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S.C. SUPREME COURT

STATE OF SOUTH CAROLINA
IN THE
SUPREME COURT

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

South Carolina Court of Appeals
2015 WL 4746971, filed 12 August 2015

Sierra Club,

Respondent,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Defendants,

Of which Chem-Nuclear Systems, LLC is the

Petitioner.

APPENDIX TO PETITION FOR WRIT OF CERTIORARI

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THE STATE OF SOUTH CAROLINA
In The Court of Appeals

Sierra Club, Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.

Appellate Case No. 2012-212791

Appeal From The Administrative Law Court
Ralph King Anderson, III, Administrative Law Judge

Opinion No. 5253
Heard February 5, 2014 – Filed July 30, 2014
Withdrawn, Substituted and Refiled August 12, 2015

AFFIRMED IN PART, REVERSED IN PART

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Mary Duncan Shahid and Stephen Peterson Groves, Sr., both of Charleston, and Sara S. Rogers, of Columbia, all of Nexsen Pruet, LLC, for Respondent Chem-Nuclear Systems; Claire Harley Prince and Jacquelyn Sue Dickman, both of Columbia, for Respondent South Carolina Department of Health & Environmental Control.

FEW, C.J.: This is an appeal from the administrative law court (ALC), which upheld the South Carolina Department of Health and Environmental Control's (DHEC) decision to renew the license under which Chem-Nuclear Systems, LLC operates a disposal facility for low-level radioactive waste. We affirm the ALC as to all issues, except four subsections of the regulation governing DHEC's issuance and renewal of such licenses. *See* 24A S.C. Code Ann. Regs. 61-63, pt. VII (1992 & Supp. 2010).

I. Procedural History

Chem-Nuclear operates a disposal facility for low-level radioactive waste in Barnwell County (the "facility") pursuant to a license DHEC first issued in 1971. Part VII of regulation 61-63—entitled "Licensing Requirements for Land Disposal of Radioactive Wastes"—establishes "specific technical requirements" and "performance objectives" "upon which [DHEC] issues licenses for the land disposal of wastes." 24A S.C. Code Ann. Regs. 61-63 § 7.1.1, 7.1.3 (1992). Before DHEC may renew Chem-Nuclear's license to operate the facility, it must determine Chem-Nuclear designed, constructed, and operates the facility in compliance with the requirements and objectives of part VII of regulation 61-63. *See generally* § 7.1.

In 2000, Chem-Nuclear submitted an application to renew its license. After holding a public hearing and accepting comments, DHEC issued a renewal license to Chem-Nuclear in 2004. DHEC's decision to renew the license was challenged on the basis that the disposal methods at the facility do not meet certain requirements and objectives of part VII of the regulation. The ALC issued an order affirming DHEC's decision to renew the license (the "2005 order"), and found Chem-Nuclear complied with subsections 7.10.1 through 7.10.4 of South Carolina Code Regulation 61-63 (1992 & Supp. 2010) and section 7.18 of South Carolina Code Regulation 61-63 (1992). However, the ALC ordered Chem-Nuclear to conduct further studies to address concerns "related to the potential for groundwater contamination on and near the [facility]." In particular, the 2005 order stated these studies must "concern[] methods to reduce contact between radioactive waste and rainfall and other water at its facility" and ordered Chem-Nuclear to submit the results of the studies to DHEC within 180 days.

This court's opinion reviewing the findings of the 2005 order is reported at 387 S.C. 424, 693 S.E.2d 13 (Ct. App. 2010) (*Chem-Nuclear I*). We affirmed the findings related to section 7.18 and subsections 7.10.1 through 7.10.4. 387 S.C. at 438, 693 S.E.2d at 20. However, we remanded the case to the ALC to apply its

factual findings from the 2005 order to determine whether Chem-Nuclear complied with the following subsections of regulation 61-63: 7.11.1 through 7.11.12 (1992 & Supp. 2010), 7.23.6 (1992), and 7.10.5 through 7.10.10 (1992 & Supp. 2010). 387 S.C. at 435, 436, 438, 693 S.E.2d at 18-19, 20.

On remand, the ALC issued an order affirming DHEC's conclusion that Chem-Nuclear complied with these subsections (the "remand order"). In this appeal, we review the findings in the remand order. After we filed our first opinion, Op. No. 5253 (S.C. Ct. App. filed July 30, 2014) (Shearouse Adv. Sh. No. 30 at 53), DHEC and Chem-Nuclear petitioned for rehearing. We granted a stay of the relief ordered in the first opinion on August 28, 2014, and we now grant both petitions for rehearing. We withdraw our original opinion and substitute this opinion.

II. Factual Findings in the 2005 Order

Following this court's instructions, the ALC considered on remand only the findings from the 2005 order. In reviewing the remand order, therefore, we likewise consider only the findings from the 2005 order. In this section of the opinion, we recite those findings relevant to our review. Unless otherwise indicated, all quotations in this section are from the 2005 order.

A. Overview of Chem-Nuclear's Disposal Practices

Chem-Nuclear disposes of waste at the facility using "enhanced shallow land burial with engineered barriers." An engineered barrier is "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives" set out in part VII of regulation 61-63. 24A S.C. Code Ann. Regs. 61-63 § 7.2.9 (Supp. 2010). The primary engineered barriers used by Chem-Nuclear are disposal trenches, disposal vaults, and enhanced caps.

Initially, waste is shipped to the facility in a disposal container. *See* 24A S.C. Code Ann. Regs. 61-63 § 3.2.30 (Supp. 2010) ("'Disposal container' means a container principally used to confine low-level radioactive waste during disposal operations at a land disposal facility . . . [and] for some shipments, the disposal container may be the transport package."). Depending on the type of waste, disposal containers are also shipped to the facility inside a container called a cask. When a shipment of waste arrives at the facility, it is directed to either the appropriate trench for disposal or the Cask Maintenance Building, where Chem-Nuclear performs quality control inspections to ensure the casks are not damaged. Following this inspection, Chem-Nuclear transports the casks to the appropriate

disposal trench where the disposal containers are loaded into reinforced concrete disposal vaults inside the trench. As disposal containers are loaded into vaults, Chem-Nuclear continues to inspect them.

Some "large components," such as steam generators and pressurizers, are considered disposal vaults themselves and can be placed directly into the trench after DHEC approves them for burial. Otherwise, all waste is contained inside a disposal container that is loaded into a vault, which is located within a trench.

Chem-Nuclear uses the term "active" to describe disposal vaults and trenches that are in the process of being filled. Thus, vaults are active until filled to capacity with disposal containers, and trenches are active until filled to capacity with vaults and large components. Once vaults and trenches become full, Chem-Nuclear refers to them as "inactive." When an individual vault becomes full, Chem-Nuclear covers the inactive vault with "general cover soils and an initial clay cap," which reduces "the infiltration of surface water into the trench." When a trench becomes full, Chem-Nuclear installs an "impermeable" multi-layer enhanced cap over the inactive trench, which consists of an initial clay cap, polyethylene and bentonite, a sand drain layer, and general soil materials.

Waste is divided into three classes—A through C—based on the concentration of "long-lived" and "shorter-lived radionuclides" in the waste. Class A is the least radioactive waste, while C is the most radioactive. *See* 24A S.C. Code Ann. Regs. 61-63 § 3.56.1.1 to .8 (Supp. 2010). Chem-Nuclear currently uses three types of disposal trenches that are designed to hold different types of waste: (1) Class A trenches, which are the largest of the three types, hold vaults containing Class A waste; (2) Class B/C trenches hold vaults containing Class B and C waste; and (3) slit trenches, which are narrow, hold irradiated hardware and large components. Chem-Nuclear uses soil to fill voids between the vaults in each type of trench, which "enhance[s] long-term stability of the entire trench system."

Each trench has a drainage system "to facilitate monitoring of water accumulation entering the trench." Chem-Nuclear also implements a "surface water management plan" to manage rainfall after it collects in trenches, which consists of pumping water into either adjacent trenches or a lined pond.

B. Tritium Contamination of Groundwater

Tritium is a radioactive isotope of hydrogen that is found in "trace amounts in groundwater throughout the world." *NRC Senior Management Review of Overall*

Regulatory Approach to Groundwater Protection (N.R.C., Rockville, M.D.), Feb. 9, 2011, at SECY-11-0019. Although tritium is naturally occurring, it is also a byproduct of the manufacture of nuclear power, and found in radioactive waste generated by nuclear power plants. *Id.*

The waste disposed of at the facility contains tritium. Rainfall "in and on the disposal trenches drives tritium into the groundwater beneath the facility." Chem-Nuclear initially discovered the presence of tritium in its disposal trenches in 1974. Chem-Nuclear determined that early disposal practices utilizing "unreliable containment and waste forms" led to this initial tritium contamination. However, these early containment methods "were acceptable at the time" under the regulations. In fact, they "were identical to practices at . . . other low-level radioactive waste disposal facilities."

Although "it is inadvisable to attempt to uncover or excavate" the old containers that caused the initial tritium release, improvements in disposal technology and changes in the operations at the facility have "enhanced site performance." In 1995, DHEC substantially revised part VII of regulation 61-63 to require engineered barriers for all waste classes disposed of at the facility. Specifically, DHEC required all waste, except large components, to be placed in vaults, and required enhanced caps to be installed on all inactive trenches. Chem-Nuclear began using vaults and enhanced caps to meet these new requirements. In addition, Chem-Nuclear began using high-integrity polyethylene disposal containers to hold certain waste forms and discontinued the disposal of unstable, liquid waste forms. All of these measures served to "reduce[] the amount of tritium migrating to groundwater."

DHEC imposes a regulatory limit on the amount of radioactive material Chem-Nuclear may release to the "general environment." *See* § 7.18. Although certain groundwater samples collected from beneath the facility show high concentrations of tritium, these samples are inappropriate for evaluating Chem-Nuclear's compliance with section 7.18. This is because DHEC regulates the release of radiation into the "general environment," § 7.18, not into the groundwater within the boundaries of the facility where there is no risk of public exposure. To determine whether Chem-Nuclear is in compliance with section 7.18, DHEC established a "compliance point"—defined as the "first point where a hypothetical member of the public might receive a dose of radiation"—at which it measures Chem-Nuclear's release of tritium into the general environment. This compliance point is located at Mary's Branch Creek, where the groundwater from beneath the facility flows into an above-ground stream. Chem-Nuclear regularly samples the

water from Mary's Branch Creek to determine whether there has been a release of tritium above the regulatory limit set by DHEC. Since 2001, tritium concentrations at the compliance point have been declining, and all measurements taken at Mary's Branch Creek have been well below the regulatory limit for exposure under section 7.18. In fact, "[t]here is no evidence of any actual release resulting in an exposure above regulatory limits to any member of the general public."

C. Actions to Prevent Tritium Exposure

Chem-Nuclear has taken steps to protect the public from exposure to radiation at the compliance point. The general public is restricted from accessing the waters of Mary's Branch Creek at the compliance point, and there are no known consumers of the water who are "located in and around the compliance point." Chem-Nuclear also erected a fence around the compliance point to prevent entry of unauthorized persons. Additionally, Chem-Nuclear has a restrictive covenant and easement on three parcels of property surrounding the compliance point. This property serves as a buffer zone by prohibiting the use of groundwater under the property, as well as surface water on the property, without written consent from DHEC. Moreover, changes in design and operations at the facility further reduce the potential for radioactive exposure to the general environment.

D. Long-Term Predictions for Compliance

As required by DHEC, Chem-Nuclear created a predictive model—the Environmental Radiological Performance Verification (ERPV)—to predict the future performance of the site for up to two thousand years. This model relies on data collected through a system of groundwater monitoring wells and thirty years of data derived from over two hundred sampling points. DHEC commissioned and funded a panel of experts—the "Blue Ribbon Panel"—to review the ERPV and determine whether Chem-Nuclear's predictions were accurate. After finding the ERPV predictions to be reliable, the Blue Ribbon Panel concluded the facility "pose[d] minimal risk to either the environment or members of the public, both today and into the long-term future." DHEC relied on the conclusions of both the ERPV and the Blue Ribbon Panel in deciding to renew the facility's license.

III. Standard of Review

In the 2005 order, the ALC conducted a de novo review of DHEC's decision to renew Chem-Nuclear's license. *See Marlboro Park Hosp. v. S.C. Dep't of Health*

& Envtl. Control, 358 S.C. 573, 579, 595 S.E.2d 851, 854 (Ct. App. 2004) (stating the ALC acts "as the fact-finder" in a contested case and "must make sufficiently detailed findings supporting the denial [or grant] of a permit application" (alteration in original) (citation omitted)). In *Chem-Nuclear I*, this court reviewed the ALC's findings and conclusions in the 2005 order to determine whether they were "[]supported by substantial evidence or controlled by some error of law." *See* 387 S.C. at 430-31, 693 S.E.2d at 16 (relying on the standard of review set forth in S.C. Code Ann. § 1-23-610(B) (Supp. 2013)). Although we affirmed the ALC's determination that Chem-Nuclear complied with all sections of regulation 61-63 addressed in the 2005 order, we remanded for the ALC to apply the factual findings from the 2005 order to other, applicable sections it did not address. 387 S.C. at 439, 693 S.E.2d at 20-21. *See* 387 S.C. at 439, 693 S.E.2d at 20 (instructing the ALC "to apply its factual findings [from the 2005 order] to these sections of regulation 61-63" on remand). In the remand order, the ALC applied the factual findings from the 2005 order to determine whether Chem-Nuclear complied with these additional sections.

In this appeal from the remand order, we must accept the factual findings in the 2005 order. We review the remand order under the standard of review set forth in subsection 1-23-610(B)(d), and may reverse only if the ALC's decision was affected by an error of law. *See* § 1-23-610(B)(d) (stating an appellate court may reverse the ALC's decision when it is affected by an error of law); *S.C. Dep't of Revenue v. Blue Moon of Newberry, Inc.*, 397 S.C. 256, 260, 725 S.E.2d 480, 483 (2012) ("The construction of a regulation is a question of law to be determined by the court. We will correct the decision of the ALC if it is affected by an error of law, and questions of law are reviewed de novo." (internal quotation marks and citations omitted)).

IV. Chem-Nuclear's Compliance with Regulation 61-63

DHEC drafted part VII of regulation 61-63 to include three general categories of regulations. *See* § 7.1.3 ("This Part establishes procedural requirements[,] . . . performance objectives[,] . . . [and] specific technical requirements for near-surface disposal of radioactive waste . . . ."). All three categories are applicable to the enhanced shallow land burial of low-level nuclear waste at the facility.[1] In this appeal, we address the ALC's determination that Chem-Nuclear complied with

[1] Subsection 7.1.3 provides that the "procedural requirements" and "performance objectives" apply "to any method of land disposal," and the "specific technical requirements" apply to "near-surface disposal of radioactive waste."

regulations in two of these categories—regulations imposing technical requirements and performance objectives. Generally, regulations containing technical requirements require Chem-Nuclear to take action to comply with the regulation, while regulations containing performance objectives require Chem-Nuclear to achieve certain results sought under the regulation. There is some overlap, however, between the action-based and result-based requirements of these two categories of regulations.

Some regulations imposing "technical requirements" require Chem-Nuclear to take a specific action to meet the requirement. For example, subsection 7.24.2 of South Carolina Code Regulation 61-63 (1992) requires that Chem-Nuclear place five meters of material above Class C waste when the disposal unit is full and made inactive. *See id.* (requiring Class C waste be disposed of "so that the top of the waste is a minimum of 5 meters below the top surface of the cover").[2] Other regulations imposing technical requirements do not list any specific action, but leave to Chem-Nuclear the choice of action to take to comply with the regulation. For example, subsection 7.11.11.7 of South Carolina Code Regulation 61-63 (Supp. 2010) requires "[t]he disposal units and the incorporated engineered barriers . . . be designed and constructed to . . . prevent[] contact between the waste and the surrounding earth."[3] Chem-Nuclear's compliance with "technical requirements" regulations may be determined only by examining the specific actions taken by Chem-Nuclear. As to subsection 7.24.2 and others, the required action is specifically listed in the regulation. As to subsection 7.11.11.7 and others, Chem-Nuclear may choose what action to take to comply with the regulation. In both instances, Chem-Nuclear must take action to meet the technical requirements of the regulation.

On the other hand, compliance with a regulation imposing "performance objectives" must be determined by examining whether Chem-Nuclear obtained the results required by the regulation. An example of such a regulation is section 7.18, which requires reasonable efforts be made to maintain radioactive releases to the general public "as low as is reasonably achievable"—a concept known by the acronym "ALARA."[4] This and other result-based "performance objective"

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[2] Chem-Nuclear's compliance with subsection 7.24.2 is not an issue in this appeal.

[3] We discuss Chem-Nuclear's compliance with subsection 7.11.11.7 in section IV.B.5 of this opinion.

[4] Regulation 61-63 defines the "ALARA" standard as:

regulations require consideration of existing environmental conditions, such as the fact that tritium levels are declining in the groundwater below the facility and in the surface water of Mary's Branch Creek.

In *Chem-Nuclear I*, we affirmed the ALC's finding that Chem-Nuclear met the performance objectives of sections 7.18 and 7.10. 387 S.C. at 438, 693 S.E.2d at 20. Section 7.18 and the subsections of 7.10 that we addressed in *Chem-Nuclear I* relate to whether Chem-Nuclear is protecting the public from radioactive releases, and generally do not impose specific requirements as to how Chem-Nuclear must accomplish any particular result.[5] In affirming Chem-Nuclear's compliance with section 7.18, we gave deference to the ALC's finding that "Chem-Nuclear . . . demonstrated adherence to ALARA . . . by taking appropriate measures to address tritium migration from the Barnwell facility and the potential for releases from other radionuclides." 387 S.C. at 429, 438, 693 S.E.2d at 15, 20. Showing similar deference, we affirmed the ALC's findings that Chem-Nuclear complied with four of the performance objectives in section 7.10. 387 S.C. at 438, 693 S.E.2d at 20.

> [M]aking every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

24A S.C. Code Ann. Regs. 61-63 § 3.2.6 (Supp. 2010).

[5] *See* § 7.10.1 ("The issuance of the license will not constitute an unreasonable risk to the health and safety of the public."); § 7.10.2 ("The applicant is qualified . . . to carry out the disposal operations . . . in a manner that protects health and minimizes danger to life or property."); § 7.10.3 ("The . . . operations . . . are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity . . . ."); § 7.10.4 ("The . . . operations . . . are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected . . . .").

We found, however, the ALC did not address the six remaining subsections of 7.10 (7.10.5 through 7.10.10). 387 S.C. at 438-39, 693 S.E.2d at 20-21. We remanded for the ALC to determine whether Chem-Nuclear complied with those subsections. *Id.*

We also required the ALC to consider on remand Chem-Nuclear's compliance with section 7.11 and subsection 7.23.6. 387 S.C. at 435-36, 693 S.E.2d at 18-19. DHEC argued that in determining whether DHEC properly renewed the license, the ALC must consider compliance with the result-based requirements "set forth in section 7.10 . . . rather than apply criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We rejected that argument, finding "the technical requirements" of "section 7.11 impose[] additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance." 387 S.C. at 435, 693 S.E.2d at 18-19. Similarly, we found "the technical requirements of [sub]section 7.23.6 . . . impose[] additional compliance requirements for Chem-Nuclear." 387 S.C. at 436, 693 S.E.2d at 19. Under our holding in *Chem-Nuclear I*, therefore, the technical requirements of subsections 7.11.11 and 7.23.6 require Chem-Nuclear to take action to design and construct the disposal site, disposal units, and engineered barriers to meet the specifications in those subsections. *See* 387 S.C. at 432, 435, 436, 693 S.E.2d at 17, 19, 20. DHEC and Chem-Nuclear may not demonstrate compliance with those subsections simply by showing Chem-Nuclear met the performance objectives of other subsections. *See id.*

With these considerations in mind, we discuss the ALC's determination that DHEC properly found Chem-Nuclear complied with the applicable subsections of regulation 61-63.

A. Section 7.10[6]

The subsections of 7.10 that we review in this appeal[7] set forth performance objectives for the issuance and renewal of Chem-Nuclear's license. The

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[6] In this section, we discuss compliance with subsections 7.10.6 and 7.10.8, and not 7.10.7, because our analysis of that subsection depends on whether Chem-Nuclear complied with the relevant subsections of 7.11.11. We later discuss subsection 7.10.7 in section IV.D. of this opinion.

[7] Chem-Nuclear's compliance with subsections 7.10.5, 7.10.9, and 7.10.10 is not an issue in this appeal.

correctness of DHEC's and the ALC's determination of compliance with subsections 7.10.6 and 7.10.8 depends, in part, on Chem-Nuclear's progress in reducing the amount of tritium released from the facility. In reviewing the ALC's findings as to these subsections, therefore, we rely upon evidence that shows its operations are "adequate to protect the public health and safety," which includes the following result-based evidence: (1) Chem-Nuclear's disposal operations currently meet the ALARA standard; (2) "improvements in waste disposal procedures" have enhanced site performance; and (3) there is a decline in the "tritium concentration at the compliance point."

1. Subsection 7.10.6

Subsection 7.10.6 provides that before DHEC may issue a license to Chem-Nuclear, it must find:

> [Chem-Nuclear]'s proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

This subsection focuses our analysis on Chem-Nuclear's efforts to protect the public, the environment, and inadvertent intruders from radioactive exposure by ensuring "long-term stability of the disposed waste and the disposal site." We begin our discussion with the definitions of the relevant terms used in subsection 7.10.6.

"Site closure" is defined as "those actions that are taken upon completion of operations that prepare the disposal site for custodial care [by the State of South Carolina] and that assure that the disposal site will remain stable and will not need ongoing active maintenance." 24A S.C. Code Ann. Regs. 61-63 § 7.2.19 (1992).

Once site closure is accomplished, the "institutional control" period begins, in which the State of South Carolina "assume[s] responsibility" for maintaining the facility, 24A S.C. Code Ann. Regs. 61-63 §§ 7.8.1, 7.15 (1992), and "control[s]

access to the disposal site." 24A S.C. Code Ann. Regs. 61-63 § 7.27.2 (1992). By regulation, the institutional control period is one hundred years. *Id.*

"Stability" is defined as "structural stability." 24A S.C. Code Ann. Regs. 61-63 § 7.2.20 (1992). According to Part III of regulation 61-63, structural stability results from: (1) "the waste form itself" being stable, or "processing the waste to stable form"; (2) converting waste containing liquid "into a form that contains as little free-standing and non-corrosive liquid as is reasonably achievable"; and (3) filling "[v]oid spaces within the waste and between the waste and its package." 24A S.C. Code Ann. Regs. 61-63 § 3.56.2.2.1 to .3 (Supp. 2010).

"Active maintenance" means "any significant activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in 7.18 and 7.19 are met." 24A S.C. Code Ann. Regs. 61-63 § 7.2.1 (1992). As we previously discussed, section 7.18 regulates the concentration of radioactive material that may be released to the general environment and the public. Section 7.19 of South Carolina Code Regulation 61-63 (1992) requires that the "[d]esign, operation, and closure of the land disposal facility . . . ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed." An "inadvertent intruder" is a "person who might occupy the disposal site after closure and engage in . . . activities . . . in which an individual might be unknowingly exposed to radiation from the waste." 24A S.C. Code Ann. Regs. 61-63 § 7.2.13 (1992).

The following findings from the 2005 order support the ALC's determination that the waste and disposal site are structurally stable:

(1) All waste is placed into reinforced concrete disposal vaults;
(2) Void space between the vaults is filled with soil, which enhances "long-term stability of the entire trench system";
(3) Enhanced caps are installed on all inactive trenches;
(4) "[T]he elimination of liquid waste forms . . . have increased site performance"; and
(5) "Improvements in waste forms . . . have succeeded in reducing the amount of tritium that is migrating to groundwater."

Additionally, the following findings support the determination that *long-term* stability of the disposed waste and disposal site will be achieved and will be

adequate to protect the general public and inadvertent intruders from radioactive exposure:

(1) Predictions of a declining trend in radioactive releases to the general environment;
(2) The Blue Ribbon Panel's conclusion that the facility "poses a minimal risk to either the environment or members of the public, both today and into the long-term future";
(3) The presence of a buffer zone, which provides "long-term protection to the public from exposure to radioactive material in the surface water at the compliance point"; and
(4) The use of concrete disposal vault lids[8] for Class C waste, which serves as an intrusion barrier for inadvertent intruders.[9]

Based on these findings, we find the ALC did not err in concluding Chem-Nuclear is in compliance with subsection 7.10.6.

2. Subsection 7.10.8

Subsection 7.10.8 requires Chem-Nuclear to provide a "proposal for institutional control" that gives "reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27." On appeal, Chem-Nuclear's compliance with this subsection is challenged on the ground that it violated subsection 7.10.6.[10] As previously discussed, subsection 7.10.6 requires the design and operations of the facility to provide "long-term stability of the

[8] We are uncertain of the nature and purpose of disposal vault lids. Neither the regulations nor the 2005 order defines "disposal vault lid," and the 2005 order references disposal lids only twice and in two limited contexts: (1) "the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault"; and (2) "[t]he disposal vault lids serve as an intrusion barrier for Class C waste."

[9] Subsection 3.56.1.2.3 requires Class C waste to be disposed of in a manner that "protect[s] against inadvertent intrusion."

[10] We previously affirmed Chem-Nuclear's compliance with subsections 7.10.3 and 7.10.4. *Chem-Nuclear I*, 387 S.C. at 438, 693 S.E.2d at 20. Chem-Nuclear's compliance with subsection 7.10.5 is not an issue on appeal.

disposed waste." When considered in the context of subsection 7.10.6, subsection 7.10.8 requires Chem-Nuclear to provide reasonable assurances the waste will be stable after the facility is closed. Based on our ruling regarding subsection 7.10.6, we find the ALC correctly determined Chem-Nuclear is in compliance with subsection 7.10.8.

B. Subsection 7.11.11

Subsection 7.11.11 provides, in relevant part,

> The disposal units and the incorporated engineered barriers shall be designed and constructed to meet the following objectives:
>
> 7.11.11.1 to minimize the migration of water onto the disposal units.
>
> 7.11.11.2 to minimize the migration of waste or waste contaminated water out of the disposal units.
>
> 7.11.11.4 temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil.
>
> 7.11.11.6 reasonable assurance that the waste will be isolated for at least the institutional control period.
>
> 7.11.11.7 prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

DHEC and Chem-Nuclear continue to assert that in reviewing the ALC's findings as to subsection 7.11.11, we may rely on result-based evidence—(1) its operations meet the ALARA standard, (2) "improvements in waste disposal procedures" have enhanced site performance, and (3) there is a decline in the "tritium concentration at the compliance point." As we previously acknowledged, evidence of improvements in disposal practices and a decline in tritium concentrations is certainly relevant to our analysis of compliance with the regulations containing

performance objectives. However, that evidence does not directly relate to, and cannot alone show compliance with, the technical requirements imposed by subsection 7.11.11. *See* 387 S.C. at 435, 693 S.E.2d at 18-19 (holding "the [specific] technical requirements" of "section 7.11 impose[] additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance"). For these subsections of the regulation, compliance may not be measured solely by results. Instead, we must consider whether Chem-Nuclear took any actions to meet the technical requirements imposed by these subsections, and if so, the sufficiency of Chem-Nuclear's actions.

1. Subsection 7.11.11.1

Subsection 7.11.11.1 requires that Chem-Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of water onto the disposal units."

The regulations define "disposal unit" to include "a vault or a trench," 24A S.C. Code Ann. Regs. 61-63 § 7.2.8 (Supp. 2010), and "engineered barrier" to include "vaults or equivalent structures," § 7.2.9. The regulations, however, do not define the phrase "migration of water." DHEC concedes the phrase encompasses not only the flow of surface water, but also rainfall. We need not rely on DHEC's concession, however, because we find the subsection clearly applies to rainfall. Thus, for DHEC to have correctly determined Chem-Nuclear complied with this subsection, DHEC must have found Chem-Nuclear took action that reduced rainfall and the flow of surface water onto the vaults and trenches. Chem-Nuclear's compliance concerning the migration of rainfall onto disposal units is particularly important, given the following findings from the 2005 order: (1) "[t]ritium is driven into the groundwater through rainfall in and on the disposal trenches," and (2) tritium concentrations in the groundwater seem to "vary[] with the amount of rainfall." Referring to these and other findings, the ALC called this "the undeniable 'rainfall problem.'"

We first examine whether the ALC correctly determined Chem-Nuclear complied with subsection 7.11.11.1 in regard to rainfall migrating onto active disposal units—vaults and trenches that are in the process of being filled. The 2005 order provides that while Chem-Nuclear is filling individual vaults with disposal containers, it employs "no cover or roof, so rain can fall directly into the vault during the loading period." The 2005 order also indicates Chem-Nuclear provides no cover for active trenches, which leaves these trenches and the vaults contained

within them exposed to rainfall until the trenches become full. Vaults contained within an active trench remain exposed to rainfall for up to two years while Chem-Nuclear fills the trench. The 2005 order further states rainfall enters vaults because they "are not sealed against water intrusion," and the "lids of the vaults are not . . . sealed to prevent water from entering" them.

DHEC interprets subsection 7.11.11.1 as requiring Chem-Nuclear to "minimize the migration of water onto the disposal units" during the period in which the trenches are active. This interpretation required DHEC to consider what action Chem-Nuclear took to reduce the amount of rain falling onto open vaults while they are being filled, and onto closed vaults in active trenches. However, neither the 2005 order, the remand order, nor any other portion of the record or the briefs contain any evidence that Chem-Nuclear has taken a single action to stop a single raindrop from falling onto active vaults or trenches.

Although the ALC determined Chem-Nuclear complied with this subsection, none of the evidence it relied upon addresses the rainfall issue. Specifically, the ALC listed the following factual findings from the 2005 order to support DHEC's determination of compliance as to active and inactive disposal units:

(1) The Class A trench has a sloped floor and a drainage system that facilitates monitoring of water that enters the trench;
(2) The Class B/C trench contains a French drain and sump system that allows monitoring of water accumulation in the trench;
(3) The slit trench has a sloped floor that is filled with "coarse drain sand" and contains "standpipes" that monitor water accumulation;
(4) Chem-Nuclear implements a surface water management plan to pump water out of trenches.

We find none of these findings support the ALC's determination that Chem-Nuclear complied with this subsection as to rain falling on disposal units—active or inactive. These findings relate to remedial measures to monitor, drain, and manage water that has already migrated onto disposal units. The plain language of this subsection, however, requires Chem-Nuclear to do more than monitor, drain, or otherwise manage water once it enters the vaults and trenches.[11] These

[11] Other subsections of regulation 61-63 deal with accumulation of water within disposal units once it migrates there. *See, e.g.*, § 7.23.6 (requiring the disposal site to be designed in a way that "minimize[s] . . . the contact of *standing water* with

measures listed by the ALC have no effect on the initial migration of rainfall and thus, do not relate to compliance with subsection 7.11.11.1. Furthermore, the record is devoid of any evidence to support the ALC's conclusion that Chem-Nuclear has done *anything* to reduce rainfall onto active disposal units. When pressed at oral argument to list what Chem-Nuclear has done to reduce rainfall onto active disposal units, neither Chem-Nuclear nor DHEC could name one action Chem-Nuclear took, except to construct berms along the edges of trenches.[12]

The ALC also listed the following two factual findings, in addition to the four discussed above, to affirm DHEC's determination of compliance with this subsection as to rainfall on inactive disposal units only:

(5) Backfilling methods that fill voids between vaults are implemented for all trenches; and
(6) Initial clay caps placed on inactive vaults and enhanced caps installed over inactive trenches minimize the infiltration of surface water into the trench.

We find neither of these findings support—and only one actually addresses—the ALC's determination that Chem-Nuclear complied with this subsection as to inactive disposal units. Regarding finding (5), "backfilling methods" involve placing soil in open spaces between the vaults, which has nothing to do with reducing the migration of water onto disposal units. Finding (6), however, is relevant to Chem-Nuclear's compliance with subsection 7.11.11.1 as to inactive disposal units. The installation of the initial clay cap on inactive vaults and the enhanced cap on inactive trenches reduces the migration of water onto these disposal units. Although these measures *reduce* the migration of water, subsection 7.11.11.1 requires Chem-Nuclear to "minimize" this occurrence. Thus, whether finding (6) supports Chem-Nuclear's compliance with this subsection requires us to consider the meaning of "minimize."

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waste during disposal, and the contact of *percolating* or *standing water* with wastes after disposal" (emphasis added)).

[12] While berms may keep surface water from migrating onto the disposal units, they do nothing to minimize direct rainfall onto active trenches and vaults. Additionally, the ALC made no findings as to whether Chem-Nuclear ever constructed a berm, or if so, whether the berms reduce the migration of surface water onto the disposal units.

Regulation 61-63 does not define minimize. Chem-Nuclear and DHEC filed a joint brief with this court in which they set forth the following definition of minimize: "to reduce to the smallest possible amount, extent, size, or degree."[13] Applying this definition to the requirements of subsection 7.11.11.1, we must consider two sub-issues in analyzing compliance: (1) whether there is evidence to support a finding that Chem-Nuclear has reduced the migration of water onto disposal units, and (2) whether the extent of this reduction is adequate to meet DHEC's definition of minimize. Thus, we cannot find the ALC correctly determined Chem-Nuclear complied with this subsection simply because Chem-Nuclear "reduced" the migration of water onto disposal units.

As to the first sub-issue, we agree with the ALC that installation of initial clay caps and enhanced caps reduce the migration of surface water and rainfall onto inactive vaults and trenches. However, the ALC did not address the second sub-issue—whether initial clay caps and enhanced caps "reduce to the smallest possible amount" the migration of water onto inactive disposal units. Both DHEC and Chem-Nuclear represented to this court in their brief that Chem-Nuclear must have taken action to "reduce [the migration of water onto inactive trenches] to the smallest possible amount." Yet, neither DHEC nor the ALC made any finding as to whether Chem-Nuclear did so. The determination of this issue is crucial to the question of whether Chem-Nuclear complied with subsection 7.11.11.1.

In considering whether Chem-Nuclear's disposal units and engineered barriers adequately reduce—"minimize"—the migration of water, we acknowledge it is the duty of DHEC, not this court, to enforce regulation 61-63. Similarly, it is the duty of Chem-Nuclear, not DHEC, to take the necessary action to comply with the

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[13] While this definition sets a strict standard for compliance, we find this is supported by the way in which this regulation, and others, are written. For example, subsection 7.23.6 requires Chem-Nuclear to "minimize to the extent practicable" the contact of water with waste at different stages of the disposal process. We interpret subsection 7.23.6 as imposing a less stringent standard for compliance than subsection 7.11.11.1 because the term "minimize" is followed by language prompting DHEC to consider the reasonableness of Chem-Nuclear's efforts to comply. The lack of similar language in subsection 7.11.11.1 suggests there is no inherent reasonableness or practicability consideration involved in analyzing Chem-Nuclear's compliance. The definition of "minimize" provided by Chem-Nuclear and DHEC accords with this interpretation. Thus, we rely on their definition of minimize—"to reduce to the smallest possible amount, extent, size, or degree"—in analyzing DHEC's and the ALC's determinations of compliance.

regulations. Nevertheless, we find support in the 2005 order that implementing "relatively simple measures" could further reduce the migration of water onto both active and inactive disposal units. These measures include "shelter[ing] the disposal trenches from rainfall" while they are being filled and "sealing and grouting the concrete disposal vaults to prevent the intrusion of water."

In 2001, DHEC directed Chem-Nuclear to consider implementing such measures. According to the 2005 order, "during the review of the re-issuance of the Chem-Nuclear license, DHEC . . . advis[ed] Chem-Nuclear to review and revise all trench construction details, plans, specifications, and procedures." "In particular, [DHEC] informed Chem-Nuclear that consideration should be given to protection of the open trenches from direct rainfall and runoff such as temporary covers." In response to this directive, Chem-Nuclear considered "several conceptual trench designs," including designs for "temporary roofs to keep water out of the trenches and vaults." Although Chem-Nuclear informed DHEC in 2001 it would take "up to two years to evaluate [these] designs," the ALC found in the 2005 order "Chem-Nuclear ha[d] not completed its evaluation and ha[d] not submitted final designs to DHEC for review and approval."

The ALC found it significant that Chem-Nuclear had not yet completed and submitted these final designs to DHEC, given the "undeniable 'rainfall problem.'" Specifically, the 2005 order stated, "Chem-Nuclear has already considered conceptual designs to keep rainfall out of the trenches, . . . [but] it failed to complete a report on its research and has not submitted such a report to DHEC, despite its request." Additionally, the ALC found further studies "were needed to evaluate the . . . feasibility of employing or implementing designs" that would: (1) "shelter disposal trenches from rainfall and prevent rainfall from entering the trenches," and (2) "provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." The order explained these additional studies were necessary because "no evidence was presented . . . that the Blue Ribbon Panel considered any of these particular issues." The ALC ordered that "Chem-Nuclear shall conduct the[se] studies . . . and submit the results to DHEC within 180 days."

These findings and directives from the 2005 order support the importance of implementing measures to address concerns related to rainfall on the disposal units. Both DHEC and the ALC ordered Chem-Nuclear to consider such measures. However, none are currently in place, a fact directly relevant to Chem-Nuclear's ability to reduce water migration onto the disposal units "to the smallest possible amount."

In conclusion, we find the record in this case conclusively demonstrates Chem-Nuclear has taken no action whatsoever to prevent even one raindrop from migrating onto one active vault or trench.[14] Additionally, while initial clay caps and enhanced caps reduce the migration of water onto inactive disposal units, there is no evidence and no finding by the ALC that DHEC has required, or that Chem-Nuclear has taken, any action that would reduce this migration to the smallest possible amount. In light of these facts, we hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.1.

2. Subsection 7.11.11.2

Subsection 7.11.11.2 requires that Chem-Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of waste or waste[-] contaminated water out of the disposal units." DHEC and Chem-Nuclear contend the same definition of minimize used in the previous section applies to the analysis of this subsection.

Based on the plain language of subsection 7.11.11.2, Chem-Nuclear must minimize the migration of two types of wastes: (1) the radioactive waste-form contained within the disposal containers, and (2) water that has been contaminated by radioactive waste. As to the first, we agree with the ALC's determination that Chem-Nuclear's disposal units and engineered barriers minimize the migration of radioactive waste-forms out of disposal units. The record establishes that Chem-Nuclear uses disposal containers and reinforced concrete vaults, which prevent the migration of these waste-forms out of disposal units. Thus, we affirm the ALC's

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[14] DHEC argues in its petition for rehearing that we "misapprehended the requirement of subsection 7.11.11.1" because "[t]he regulation does not require a design that prevents rainfall onto the disposal units." We do not believe our opinion can be fairly read to require Chem-Nuclear to prevent all rainfall onto the disposal units. Rather, the opinion is written to the requirement in subsection 7.11.11.1 that Chem-Nuclear "minimize" rainfall. *See* § 7.11.11.1 (requiring that Chem-Nuclear design and construct its disposal units and engineered barriers "to *minimize* the migration of water onto the disposal units" (emphasis added)). We chose the phrase "prevent even one raindrop from migrating onto one active vault or trench" in contemplation of the reality that to minimize rainfall onto disposal units, Chem-Nuclear must start by taking some action in an attempt to stop one drop of rain. We are struck by the lack of any evidence that Chem-Nuclear has taken any action to stop any rainfall onto the disposal units.

ruling that DHEC correctly determined Chem-Nuclear is in compliance with this subsection as to the migration of the waste itself out of the disposal units.

We next address whether Chem-Nuclear is in compliance as to the migration of waste-contaminated water out of the disposal units. According to the 2005 order, the vaults contain holes that allow water to drain from them and into the trenches. As for the trenches, they are lined with partially impermeable materials so that liquids may drain to the soil below the trench. Thus, "rainfall that accumulates in the trenches eventually percolates into the soil" and groundwater beneath the trenches. Also, the water table may rise during "wet periods," causing groundwater to "rise up into the [vaults]."

The ALC relied on its previous findings related to subsection 7.11.11.1 to hold Chem-Nuclear complied with this subsection because the methods "designed to minimize the infiltration of water into the vaults" serve to "minimize[] the migration of . . . waste-contaminated water out of them." We agree evidence of compliance with subsection 7.11.11.1 is relevant to our determination of compliance with this subsection. This is because reducing the initial migration of water onto disposal units has a reciprocal effect upon reducing the migration of waste-contaminated water out of disposal units. Therefore, our holding that Chem-Nuclear failed to comply with subsection 7.11.11.1 relates to whether it complied with subsection 7.11.11.2 as to waste-contaminated water.[15]

Relying on the two-part definition of minimize discussed in the previous section, we must first analyze whether there is evidence that Chem-Nuclear reduced the migration of waste-contaminated water out of disposal units. The ALC found Chem-Nuclear's use of disposal containers prevents waste from coming into direct contact with water that enters vaults, which reduces the potential for water to become contaminated. This, in turn, reduces the migration of waste-contaminated water out of vaults. Second, the ALC found that although the drainage holes in the vaults allow "water to rise up into the containers" and drain into the trenches below, they also allow water to drain away from the waste. This decreases the

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[15] Noncompliance with subsection 7.11.11.1 would not conclusively establish non-compliance with this subsection. Subsection 7.11.11.1 regulates the migration of "water," while subsection 7.11.11.2 regulates the migration of "waste[-] contaminated water." Thus, the fact that water migrates onto and, subsequently, out of disposal units does not itself violate this subsection. A violation occurs only when water is allowed to come in contact with waste and waste-contaminated water then migrates out of disposal units.

likelihood that water entering the vaults will become contaminated. We agree the ALC's findings support the conclusion that Chem-Nuclear has taken *some* action to reduce the migration of waste-contaminated water from the disposal units.

However, the ALC did not address the second part of the analysis—whether these measures are sufficient to meet DHEC's definition of minimize. As we previously stated regarding subsection 7.11.11.1, compliance with subsection 7.11.11.2 depends on whether there is evidence to support a finding that Chem-Nuclear's actions "reduce to the smallest amount possible" the migration of waste-contaminated water out of disposal units.

On this point, the 2005 order stated "trench water . . . becomes contaminated by the fact that there is some residual tritium on . . . vaults and waste packages that have . . . water on them as a result of rain." Based on this fact, the following findings in the 2005 order demonstrate the vaults and trenches allow water that has come into contact with residual tritium on the disposal containers to migrate out of them:

(1) The "floors of the vaults have holes to allow water to drain from the vaults";
(2) These drainage holes "can also allow water to rise up into the containers";
(3) "[N]one of the trenches . . . have an impermeable liner";
(4) "The bottoms of the trenches" are not designed to "prevent the migration of liquids out of the bottom of trenches" and, in fact, are "designed to be partially impermeable and . . . allow liquids to infiltrate the soil below the trenches"; and
(5) "Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the [facility]."

As we acknowledged above, the holes in the vaults allow water to drain away from the waste, which decreases the likelihood that water entering the vaults will become contaminated. Nevertheless, these holes permit water that has come in contact with residual tritium to drain into the trenches, which, in turn, allow the water to percolate into the soil and groundwater beneath the facility. This supports that Chem-Nuclear has not taken action to reduce to the smallest possible amount the migration of waste-contaminated water out of its vaults and trenches. Moreover, the fact that Chem-Nuclear has failed to minimize the migration of water onto vaults under subsection 7.11.11.1 weighs in favor of non-compliance with subsection 7.11.11.2.

In affirming DHEC's conclusion that Chem-Nuclear complied with this subsection, the ALC recognized that trench bottoms "are designed to be partially impermeable and allow liquids to infiltrate the soil below" them. However, the ALC noted the 2005 order contained "no finding that Chem-Nuclear's waste disposal design is faulty or fails to minimize the migration of . . . waste-contaminated water out of disposal units." We find the ALC erred in relying on the absence of such a finding in the 2005 order.

In *Chem-Nuclear I*, we held "section 7.11 imposes additional compliance requirements" not addressed by the 2005 order. 387 S.C. at 435, 693 S.E.2d at 19. We remanded for the ALC "to apply its factual findings [in the 2005 order] to the technical requirements" of section 7.11—including subsection 7.11.11.2. 387 S.C. at 435, 693 S.E.2d at 18-19. Thus, the ALC could not rely on the fact that the 2005 order did not contain the conclusion we ordered the ALC to make on remand—whether, based on the factual findings in the 2005 order, the disposal units minimized the migration of waste-contaminated water out of them. The lack of such a conclusion in the 2005 order was the very reason we remanded for the ALC to make this determination.

We also find the ALC erred in relying on evidence that "improvements in waste disposal procedures" have reduced the "tritium concentration at the compliance point." As acknowledged by the ALC in the remand order, this evidence "does not get to the heart of the technical requirements" established by the subsection. This is because subsection 7.11.11.2 imposes technical requirements, and we find the evidence does not relate to the requirement that the disposal units be designed to minimize the migration of waste-contaminated water out of them. Instead, this evidence relates to Chem-Nuclear's compliance with the result-based performance objectives contained in section 7.18—that Chem-Nuclear keep radioactive releases to the general environment "as low as is reasonably achievable." Subsection 7.11.11.2 required DHEC and the ALC to analyze the sufficiency of Chem-Nuclear's actions to comply with the plain language of this subsection. Thus, we cannot base our decision on the fact that Chem-Nuclear has reduced the overall tritium concentration at the compliance point.

We conclude the record demonstrates Chem-Nuclear has taken measures to reduce the migration of waste-contaminated water out of disposal units. However, the record does not support a finding that Chem-Nuclear complied with subsection 7.11.11.2. We base our holding on (1) Chem-Nuclear's failure to comply with subsection 7.11.11.1, and (2) there being no evidence, and no finding, that Chem-

Nuclear has taken action to "minimize"—reduce to the smallest amount possible—the migration of waste-contaminated water out of disposal units. We hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.2.

3. Subsection 7.11.11.4

Subsection 7.11.11.4 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The plain language of this subsection imposes multiple requirements on Chem-Nuclear: (1) collect and retain water that migrates onto the disposal units, (2) test this water for radioactive waste material, (3) if such waste material is discovered, engage in removal or remedial measures, and (4) accomplish this without contaminating the groundwater or surrounding soil.

The ALC relied on the following findings in the 2005 order to support its conclusion that Chem-Nuclear complied with this subsection:

(1) Chem-Nuclear implements a surface water management plan to manage precipitation that collects in trenches, which involves pumping water into adjacent trenches or a lined pond; and
(2) The trenches are designed to prevent the flow of surface water from coming into contact with waste.

We find neither finding supports—and only one addresses—the ALC's determination that DHEC correctly concluded Chem-Nuclear complied with this subsection. Finding (1)—regarding Chem-Nuclear's surface water management plan—is relevant to the first requirement of subsection 7.11.11.4, "temporary collection and retention of water." However, there is no evidence that Chem-Nuclear tests the water pumped from the trenches for radioactive waste material. The subsection requires Chem-Nuclear to do more than collect and retain the water. Finding (2)—that trenches are designed to prevent surface water from coming into contact with waste—is irrelevant to Chem-Nuclear's compliance with this subsection. It has nothing to do with collecting, testing, or removing contaminated water from the disposal units. Because the ALC cited no additional evidence of Chem-Nuclear's compliance with this subsection, we hold the ALC erred in affirming DHEC's determination that Chem-Nuclear complied with subsection 7.11.11.4.

Upon our review of the 2005 order, we find no evidence of compliance with this subsection.[16] In fact, the evidence in the record demonstrates Chem-Nuclear is not in compliance. First, the vaults and trenches are designed to allow water that enters them to drain into the soil and groundwater below. That water is not tested before it enters the ground. Second, the only other evidence relevant to this subsection is the finding in the 2005 order that states, "None of the trenches at the [facility] have . . . a leachate collection system." Leachate is defined as "any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the [radioactive] material." 10 C.F.R. § 40 app. A (2011). Although the regulation does not define "leachate collection system," in common industry usage, it is "a system or device . . . that is designed, constructed, maintained, and operated to collect and remove leachate" for proper disposal. 40 C.F.R. § 503.21(i) (2011); *see also* 40 C.F.R. § 264.301(a)(2) (2011).[17] Such a system would allow Chem-Nuclear to satisfy the four requirements of subsection 7.11.11.4—(1) collect water migrating onto the disposal units, (2) test this water, (3) remove waste-contaminated water, and (4) do this without contaminating the groundwater because the system would collect the leachate for alternate disposal. Thus, the ALC's finding regarding the non-existence of a leachate collection system undermines its conclusion that Chem-Nuclear complied with this subsection and supports our determination that the ALC erred in reaching that conclusion.

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[16] This regulation imposes requirements for the design and construction of "disposal units" and "engineered barriers." While Chem-Nuclear has monitoring wells to test the groundwater for contamination and a system to monitor water accumulation in trenches, neither of these qualifies as a disposal unit. *See* § 7.2.8 (defining "disposal unit" as "a discrete portion of the disposal site into which waste is placed for disposal"). To the extent they are considered engineered barriers—"a man-made *structure or device* that is intended to improve the land disposal facility's ability to meet the performance objectives in this part," § 7.2.9 (emphasis added)—there is no evidence these monitoring "devices" allow Chem-Nuclear to collect and test this water "without the contamination of the groundwater." § 7.11.11.4.

[17] These regulations provide the Environmental Protection Agency's definition of "leachate collection system" as stated in the regulations for "surface disposal" of "sewage sludge," 40 C.F.R. § 503.20(a) (2011), and "dispos[al] of hazardous waste in landfills," 40 C.F.R. § 264.300 (2011).

DHEC and Chem-Nuclear argue Chem-Nuclear is justified in not having a leachate collection system due to "concerns regarding the radioactive exposure to workers handling and processing the leachate." We find the argument contrary to the purpose and intent of the regulation. We fail to see how the danger of radioactive contamination to workers actually *justifies* releasing it into the groundwater without testing and remediation. Rather, it seems the danger to health and safety *requires* testing and remediation. We believe the drafters of these regulations imposed such a requirement for just that purpose. Subsection 7.11.11.4 contains no language excusing Chem-Nuclear's duty to comply with its regulatory requirements, which is especially important when the excuse for not taking a particular action is the very reason for the regulation—health and safety. Instead, the focus of compliance is on what action Chem-Nuclear did take—whether it designed and constructed its engineered barriers in a manner that allows it to collect, test, and remove contamination before it percolates into the soil and groundwater.[18]

We find no evidence to support a finding that Chem-Nuclear meets the requirements imposed by this subsection. We hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.4.

4. Subsection 7.11.11.6

Subsection 7.11.11.6 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that provides "reasonable assurance that the waste will be isolated for at least the institutional control period."

We hold the ALC did not err in affirming DHEC's determination that Chem-Nuclear's current disposal units and engineered barriers—including the disposal containers, concrete disposal vaults, disposal vault lids, disposal trenches, and

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[18] In deciding whether Chem-Nuclear's operations met the ALARA standard, the 2005 order appropriately weighed Chem-Nuclear's concerns regarding exposure to workers because an ALARA analysis involves balancing the benefit to the general public with the risk associated with worker exposure. *See* 24A S.C. Code Ann. Regs. 61-63 § 7.20 (1992) ("Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection . . . [and] governed by 7.18."). In determining compliance with the technical requirements of subsection 7.11.11.4, however, we consider the actions taken by Chem-Nuclear to comply, not the reasons why it decided not to implement a certain measure based on its own ALARA analysis.

enhanced caps on inactive trenches—comply with subsection 7.11.11.6. Waste is put into a disposal container, which is then placed into a reinforced concrete vault that is covered with an initial clay cap and buried in a disposal trench. Once the trench is full, Chem-Nuclear installs an enhanced cap over the trench. The following findings from the 2005 order demonstrate that the use of these disposal units and engineered barriers provide reasonable assurance the waste will be isolated from the general environment and inadvertent intruders "for at least the institutional control period": (1) the predictions of a "continually declining trend in radioactive releases to the general environment"; and (2) the Blue Ribbon Panel's conclusion that the facility's disposal practices "pose a minimal risk to either the environment or members of the public, both today and *in the long-term future*." (emphasis added).

5. Subsection 7.11.11.7

Subsection 7.11.11.7 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that "prevent[s] contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units." We interpret the plain language of this subsection as seeking to prevent waste, and not waste-contaminated water, from coming in contact with soil. Otherwise, the regulatory effect of subsections 7.11.11.1 and 7.11.11.2 becomes obsolete.[19] Under this interpretation, we hold the ALC did not err in affirming DHEC's determination that Chem-Nuclear complied with this subsection because the "placement of waste in a waste container and a reinforced concrete vault" prevents the waste from coming into direct contact with the soil.

C. Subsection 7.23.6

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[19] Subsections 7.11.11.1 and 7.11.11.2 explicitly regulate the migration of *water* onto disposal units and the migration of *waste* and *waste-contaminated water* out of disposal units. This distinction between "water," "waste," and "waste-contaminated water" in these subsections supports a conclusion that these regulations seek to prevent waste and waste-contaminated water from infiltrating the soil and groundwater beneath disposal units. Thus, we narrowly construe subsection 7.11.11.7 as applying to only the prevention of waste, and not waste-contaminated water, from coming in contact with the soil. To the extent the ALC relied on evidence related to subsections 7.11.11.1 and 7.11.11.2, we hold the ALC erred in that regard.

Subsection 7.23.6 requires Chem-Nuclear to design the disposal site in a way that "minimize[s] to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal."[20]

As we previously discussed, subsection 7.23.6 imposes technical requirements that require Chem-Nuclear to take action to design and construct the disposal site to meet the specifications of this subsection. Thus, DHEC and Chem-Nuclear cannot demonstrate compliance with subsection 7.23.6 simply by showing Chem-Nuclear met the performance objectives of other subsections. *Chem-Nuclear I*, 387 S.C. at 436, 693 S.E.2d at 19. Instead, we must consider whether Chem-Nuclear took any actions to meet the technical requirements of this subsection, and if so, the sufficiency of Chem-Nuclear's actions.

This subsection distinguishes between "water," "standing water," and "percolating water" and between the three different phases of operations at the facility—storage, disposal, and after disposal. This subsection requires Chem-Nuclear to implement practices that drain or remove water from active vaults and trenches, as well as minimize to the extent practicable the entry of water into inactive vaults and trenches. Although the failure to minimize the migration of water onto active vaults and trenches under subsection 7.11.11.1 contributes to the accumulation of standing water, the regulatory effect of this subsection, when narrowly construed, requires Chem-Nuclear to implement methods to minimize to the extent practicable standing water that has already migrated into the disposal units.

As to the requirement that Chem-Nuclear design the disposal site in a way that minimizes to the extent practicable the contact of water with waste *during storage*, the ALC found that "[a]ny 'storage' of waste is temporary" because "there is available disposal capacity at the [facility]." The ALC stated that when a shipment of waste is received, it is taken either to the appropriate trench for disposal or to the Cask Maintenance Building, where Chem-Nuclear inspects the casks and prepares them for off-loading. The ALC found that "[b]ased on the practice of inspecting and preparing waste for disposal within the [Cask Maintenance Building], Chem-Nuclear minimizes the contact of water with waste prior to off-loading the waste into the trench." We affirm because this evidence relied on by the ALC supports compliance with this particular requirement of subsection 7.23.6.

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[20] "Disposal site" is defined as "that portion of a land disposal facility which is used for disposal of waste" and "consists of disposal units and a buffer zone." 24A S.C. Code Ann. Regs. 61-63 § 7.2.7 (1992).

As to whether Chem-Nuclear designed the disposal site to minimize to the extent practicable the contact of standing water with waste *during disposal*, we interpret this requirement as applying to Chem-Nuclear's active vaults and trenches. We hold the ALC did not err in affirming DHEC's conclusion that Chem-Nuclear complied with this requirement of subsection 7.23.6 because the following findings from the 2005 order support this conclusion:

(1) The vaults and trenches are designed to allow water to flow out of them;
(2) Trenches are sloped and contain other design features that prevent "water from coming in contact with waste";
(3) Each trench has a drainage system that allows Chem-Nuclear to monitor any water that accumulates in the trench; and
(4) Chem-Nuclear implements a surface water management plan to manage rainwater that collects in the open trenches.

Turning to the requirement regarding minimizing to the extent practicable the contact of percolating or standing water with wastes *after disposal*, we interpret this as applying to Chem-Nuclear's inactive vaults and trenches. We hold the following findings relied on by the ALC support DHEC's determination of compliance:

(1) When vaults become full, Chem-Nuclear places an initial clay cap over inactive vaults;
(2) When trenches become full, Chem-Nuclear installs an impermeable enhanced cap on inactive trenches; and
(3) Employees fill void spaces between the vaults with backfill, which "minimizes the potential for subsidence of the enhanced caps."

Based on the above discussion, we hold the ALC did not err in finding DHEC correctly determined Chem-Nuclear is in compliance with subsection 7.23.6.

D. Subsection 7.10.7

Subsection 7.10.7 requires DHEC to find Chem-Nuclear "provides reasonable assurance that the applicable technical requirements of [part VII] will be met." The technical requirements relevant to this appeal include those set forth in subsections 7.11.11 and 7.23.6. Based on Chem-Nuclear's noncompliance with subsections 7.11.11.1, 7.11.11.2, and 7.11.11.4—particularly the absence of evidence that Chem-Nuclear took *any* action to comply with the technical

requirements of subsections 7.11.11.1 and 7.11.11.4—we do not understand how DHEC could make, nor how the ALC could affirm, a finding that Chem-Nuclear provided assurance it would meet the applicable technical requirements.

DHEC argues, however, Chem-Nuclear is in compliance with these subsections because "tritium concentrations began to decline at the compliance point" after "the incorporation of new disposal techniques." While this may have been a reasonable position for DHEC to take prior to our opinion in *Chem-Nuclear I*, the argument ignores our holding in that case—that the "specific technical requirements" of 7.11.11 cannot be met by satisfying the "performance objectives" of 7.10. As we found in *Chem-Nuclear I*, "section 7.11 imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance with section 7.11." 387 S.C. at 435, 693 S.E.2d at 19.

DHEC nevertheless continues to argue the "technical requirements are written to meet the performance objectives," and Chem-Nuclear may comply with them without taking any action—as long as it meets the performance objectives. In its petition for rehearing, DHEC states "the Court overlooks and misapprehends the crucial interplay of the performance objectives and [technical] requirements," and argues "evidence that the performance objectives have been met is appropriate to demonstrate compliance with other requirements of the regulation." We disagree with DHEC's interpretation of the regulations. The "interplay" between the performance objectives and the technical requirements of the regulations was squarely raised in *Chem-Nuclear I*. In that case, DHEC specifically "argue[d] the [court] . . . must apply the [performance objectives] criteria set forth in section 7.10 . . . rather than apply [technical requirements] criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We specifically rejected the argument and held the technical requirements of the regulation must also be met—they cannot be satisfied simply by meeting performance objectives. 387 S.C. at 435-36, 693 S.E.2d at 18-19.

There can be no doubt that the technical requirements are designed to bring about compliance with the performance criteria. As DHEC points out, "The overarching purpose of the Part VII requirements is to ensure that the performance objectives of subsection 7.18 (ALARA) through 7.21 are met." However, DHEC's argument renders the technical requirements optional, and thus essentially writes them out of the regulations. To illustrate this point, we consider how DHEC's argument would affect Chem-Nuclear's duty to comply with subsection 7.24.2. DHEC acknowledges in its petition for rehearing that subsection 7.24.2 "contain[s]

requirements for specific action[]" by Chem-Nuclear. Under the subsection, Chem-Nuclear must place five meters of material above the top of the waste after the storage unit becomes inactive. We also consider subsection 7.11.11.7, which requires Chem-Nuclear to "prevent[] . . . contact between the waste and the surrounding earth." Under DHEC's theory that it may demonstrate compliance with the technical requirements of these subsections simply by meeting the performance objectives in other subsections, Chem-Nuclear is not actually required to place five meters of fill on top of the waste, or prevent contact between the waste and the earth. Rather, DHEC's argument allows Chem-Nuclear to ignore the specific, clear, and unambiguous requirements of these subsections by demonstrating compliance with performance objectives—despite the fact that the technical requirements subsections do not provide such an exception. We fully understand the technical requirements are interconnected with the performance objectives and are designed primarily to ensure the performance objectives are achieved. We do not agree, however, that the technical requirements may be ignored as long as the performance objectives are met.

In light of our holding in *Chem-Nuclear I*, however, it is no longer reasonable for DHEC to argue Chem-Nuclear complied with subsection 7.10.7 without considering what action Chem-Nuclear took to comply with the technical requirements of 7.11.11. This is particularly true given that Chem-Nuclear failed to take *any* action to comply with the requirements of subsections 7.11.11.1 and 7.11.11.4. And yet, DHEC continues to assert Chem-Nuclear "provide[d] reasonable assurance that the applicable technical requirements of [its own regulations] will be met." Considering, for example, the technical requirement in subsection 7.11.11.1—that Chem-Nuclear "minimize the migration of [rainfall] onto the disposal units"—DHEC could not identify one action Chem-Nuclear took to meet this requirement. Nevertheless, DHEC determined Chem-Nuclear complied with subsection 7.10.7 by providing reasonable assurance that this technical requirement of 7.11.11.1 would be met.

To determine whether DHEC complied with subsection 7.10.7 in light of these facts, we consider DHEC's role in the disposal of low-level radioactive waste. In 1967, our General Assembly enacted the Atomic Energy and Radiation Control Act. *See* Act No. 223, 1967 S.C. Acts 305 (*codified at* S.C. Code Ann. §§ 13-7-10 to -100 (1977 & Supp. 2013)). Noting "that remarkable scientific developments have occurred in the field[] of atomic energy," and "plans for further developments . . . are creating broad opportunities and also responsibilities for the states," *id.* at 305, the General Assembly found "[i]t is prudent and wise that the State [give] . . . full consideration of the health and safety requirements of its people." *Id.* at 305-

06. Based on these findings, the General Assembly required DHEC to "formulate, adopt, [and] promulgate . . . regulations relating to the control of ionizing and nonionizing radiation." S.C. Code Ann. § 13-7-40(F)(3) (Supp. 2013). Pursuant to this mandate, DHEC promulgated Part VII of regulation 61-63. Under the authority of the Act, the regulations are the law of South Carolina,[21] and DHEC is required by law to enforce them. *See* S.C. Code Ann. § 13-7-40(A) (Supp. 2013) (providing DHEC "is designated as the agency of the State which is responsible for the control and regulation of radiation sources"); § 13-7-40(F)(9) (stating DHEC "shall . . . provide by regulation for the licensing . . . of radiation sources").

The United States Nuclear Regulatory Commission (NRC), through its federal enforcement policy, has emphasized the importance of regulatory enforcement when nuclear disposal facilities do not conduct their operations with "the necessary meticulous attention to detail" and in accordance with "the high standard of compliance" imposed by the applicable regulations. General Statement of Policy and Procedure for NRC Enforcement Actions, 10 C.F.R. Pt. 2, app. C (1995). Thus, while it is important for private companies such as Chem-Nuclear to comply with applicable regulations, it is equally important, if not more so, that the administrative agency mandated by law to enforce the regulations require adherence to its own standard for compliance. To allow otherwise would impede the purpose for which DHEC was created—to act in the public interest—and risk the health and safety of our citizens. *See* S.C. Code Ann. § 48-1-20 (2008) ("It is declared to be the public policy of the State to maintain reasonable standards of purity of the air and water resources of the State, consistent with the public health, safety and welfare of its citizens, . . . [and] that to secure these purposes and the enforcement of the provisions of this chapter, [DHEC] shall have authority to abate, control and prevent pollution.").

DHEC promulgated regulation 61-63 under statutory mandate for the obvious reason that nuclear waste can adversely affect the health and welfare of our citizens if not disposed of properly. In doing so, DHEC required Chem-Nuclear to comply with the "technical requirements" and "performance objectives" that DHEC chose to put in the regulations. It is important that DHEC enforce its own regulations and require Chem-Nuclear to take action to comply with the technical requirements. This importance derives not simply from the need to avoid the serious consequences of non-compliance; it is important because it is the law. We

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[21] *See S.C. Coastal Conservation League v. S.C. Dep't of Health & Envtl. Control*, 390 S.C. 418, 429, 702 S.E.2d 246, 252 (2010) (noting "a regulation has the force of law").

are concerned that DHEC did not follow the law in failing to require Chem-Nuclear to comply with all of the technical requirements of subsection 7.11.11.

We are also concerned by DHEC's decision not to amend the requirements for issuance of the license after the ALC instructed Chem-Nuclear in its 2005 order to submit a report to DHEC regarding the feasibility of covering trenches and sealing vaults. The propriety of DHEC's decision to "concur[] with the report's evaluation of the issues" is not before this court, and we do not base our holding on the merits of that decision.[22] However, the fact that DHEC did not require Chem-Nuclear to take *any* action or make *any* changes to its disposal practices casts doubt upon DHEC's decision to renew the license.

Regardless of our affirmance of Chem-Nuclear's compliance with the remaining subsections of 7.11.11, we hold the ALC erred in affirming DHEC's determination that Chem-Nuclear complied with subsection 7.10.7.

V. Remedy

As to four separate subsections of regulation 61-63, DHEC failed to enforce the law of South Carolina. As to each, the ALC erred in finding Chem-Nuclear in compliance. Under the law, Chem-Nuclear's license to operate the facility is invalid. However, the appellant informed the court at oral argument it does not seek revocation of the license; it asks simply that DHEC enforce its regulations, and that Chem-Nuclear comply. In light of this request, we decline to rule the permit is invalid. Rather, we remand to DHEC for further proceedings.

DHEC and Chem-Nuclear argue on rehearing that this court's requirement in *Chem-Nuclear I* that all remand proceedings be based only on the factual findings

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[22] A footnote in the ALC's order states Chem-Nuclear conducted these studies and DHEC "concurred with the report's evaluation of the issues." The record does not contain the results of these studies or the reasons DHEC chose not to amend the license requirements as a result of the report. The basis of DHEC's decision not to amend the license or impose additional requirements for operating the facility is not before this court. While DHEC must enforce—and Chem-Nuclear must comply with—the regulations, it is not our place to disagree with DHEC as to how it should enforce its own regulations, or mandate how Chem-Nuclear should comply with these regulations. We merely review the ALC's and DHEC's determinations of compliance without passing judgment upon the technical aspects of how this compliance is accomplished.

of the 2005 order has hampered both DHEC and Chem-Nuclear's efforts to demonstrate to this court compliance with subsections 7.11.11.1 and 7.11.11.2 and others. We understand the problem. On remand, DHEC shall consider all available information as to whether Chem-Nuclear has complied with the regulations. On appeal to the ALC, it may conduct its proceedings with no limitations from this court on the evidence it may consider.

VI. Conclusion

We affirm the ALC as to all issues presented to this court, except Chem-Nuclear's compliance with subsections 7.11.11.1, 7.11.11.2, 7.11.11.4, and 7.10.7. As to those four subsections, we hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear was in compliance.

HUFF and THOMAS, JJ., concur.

2015 WL 4746971
Only the Westlaw citation is currently available.
Court of Appeals of South Carolina.

SIERRA CLUB, Appellant,
v.
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL and Chem–Nuclear Systems, LLC, Respondents.

Appellate Case No. 2012–212791. | No. 5253. | Heard Feb. 5, 2014. | Decided July 30, 2014. | Withdrawn, Substituted and Refiled Aug. 12, 2015. | Rehearing Granted Aug. 12, 2015.

Synopsis

Background: Environmental group sought review of decision of the Department of Health and Environmental Control (DHEC), renewing license under which waste disposal facility operated to dispose of low-level radioactive waste. The Administrative Law Court (ALC), Richland County, John D. Geathers, J., affirmed. Environmental group appealed. The Court of Appeals, 387 S.C. 424, 693 S.E.2d 13, affirmed in part and remanded in part. On remand, the Administrative Law Court, Ralph King Anderson, III, J., affirmed. Environmental group appealed.

Holdings: The Court of Appeals, Few, C.J., held that:

[1] findings supported determination that facility provided long-term stability of disposed waste;

[2] evidence did not support DHEC's findings of facility's compliance with technical requirements of governing regulations; and

[3] DHEC could not rely on facility's compliance with "performance objectives" in analyzing whether facility satisfied specific technical requirements.

Affirmed in part.

West Headnotes (13)

[1] **Environmental Law**
Radioactive or nuclear waste in general

Findings supported determination of the Department of Health and Environmental Control (DHEC) that waste disposal facility provided long-term stability of disposed waste, thus supporting issuance of license permitting facility to dispose of low-level radioactive waste; all waste was placed into reinforced concrete disposal vaults, void space between vaults was filled with soil, enhanced caps were installed on all inactive trenches, elimination of liquid waste forms had increased site performance, improvements in waste forms had reduced amount of tritium migrating to groundwater, predicted radioactive releases were in decline, experts found facility to pose a "minimal risk" to environment and the public, buffer zone was present, and use of concrete disposal vault lids served as intrusion barrier for inadvertent intruders. S.C. Code of Regulations R. 7.10.6.

Cases that cite this headnote

[2] **Environmental Law**
Weight and sufficiency

Evidence of improvements in disposal practices and a decline in tritium concentrations, while relevant to demonstrate waste disposal facility's compliance with regulations containing performance objectives, could not alone show waste disposal facility's compliance with specific technical requirements of regulations governing issuance of license permitting facility to dispose of low-level radioactive waste. S.C. Code of Regulations R. 7.10.6.

Cases that cite this headnote

[3] **Environmental Law**
Radioactive or nuclear waste in general

Evidence did not support finding of the Department of Health and Environmental Control (DHEC) that waste disposal facility

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designed and constructed its disposal units and engineered barriers "to minimize the migration of water onto the disposal units," as would support DHEC's decision to renew facility's license to dispose of low-level radioactive waste; facility employed no cover or roof to prevent rain from falling directly into vaults and trenches in the process of being filled, implementation of relatively simple sheltering measures could further reduce intrusion of water, and facility had previously been ordered to consider such measures. S.C. Code of Regulations R. 7.11.11.1.

Cases that cite this headnote

[4] **Environmental Law**

Weight and sufficiency

Evidence of a reduction in the migration of water onto and out of disposal units was insufficient to establish compliance with regulation requiring waste disposal facility to "minimize" such migration of water; "minimize" required reduction to the smallest possible amount. S.C. Code of Regulations R. 7.11.11.

Cases that cite this headnote

[5] **Environmental Law**

Radioactive or nuclear waste in general

Evidence did not support finding of the Department of Health and Environmental Control (DHEC) that waste disposal facility designed and constructed its disposal units and engineered barriers "to minimize the migration of waste or waste[-]contaminated water out of the disposal units," as would support DHEC's decision to renew facility's license to dispose of low-level radioactive waste; vaults contained holes that allowed water to drain into trenches, which were lined with partially impermeable materials that allowed liquids to drain to the soil below, and facility had failed to implement relatively simple sheltering measures to minimize the migration of water onto vaults. S.C. Code of Regulations R. 7.11.11.2.

Cases that cite this headnote

[6] **Environmental Law**

Radioactive or nuclear waste in general

Regulation requiring waste disposal facility to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil" requires facility to (1) collect and retain water that migrates onto the disposal units, (2) test this water for radioactive waste material, (3) engage in removal or remedial measures if such waste material is discovered, and (4) accomplish this without contaminating the groundwater or surrounding soil. S.C. Code of Regulations R. 7.11.11.4.

Cases that cite this headnote

[7] **Environmental Law**

Radioactive or nuclear waste in general

Regulation requiring waste disposal facility to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil" was not satisfied by evidence that facility collected and retained such water, as there was no evidence that facility tested the water for radioactive waste material. S.C. Code of Regulations R. 7.11.11.4.

Cases that cite this headnote

[8] **Environmental Law**

Radioactive or nuclear waste in general

Concerns regarding radioactive exposure to workers do not excuse waste disposal facility's failure to comply with regulation requiring it to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other

remedial measures without the contamination of groundwater or the surrounding soil"; the danger of radioactive contamination to workers cannot actually justify releasing it into the groundwater without testing and remediation. S.C. Code of Regulations R. 7.11.11.4.

Cases that cite this headnote

[9] **Environmental Law**

⇦ Radioactive or nuclear waste in general

Findings supported determination of the Department of Health and Environmental Control (DHEC) that waste disposal facility designed and constructed its disposal units and engineered barriers in a way that provided "reasonable assurance that the waste will be isolated for at least the institutional control period," thus supporting issuance of license permitting facility to dispose of low-level radioactive waste; waste was put into a disposal container, which was then placed into a reinforced concrete vault covered with an initial clay cap and buried in a disposal trench, facility installed an enhanced cap over a filled trench, predicted radioactive releases were in decline, and experts found facility to pose a "minimal risk" to environment and the public over the long term. S.C. Code of Regulations R. 7.11.11.6.

Cases that cite this headnote

[10] **Environmental Law**

⇦ Radioactive or nuclear waste in general

Regulation requiring waste disposal facility to design and construct its disposal units and engineered barriers in a way that "prevent[s] contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units," seeks to prevent waste, and not waste-contaminated water, from coming in contact with soil. S.C. Code of Regulations R. 7.11.11.7.

Cases that cite this headnote

[11] **Environmental Law**

⇦ Radioactive or nuclear waste in general

Evidence supported finding of the Department of Health and Environmental Control (DHEC) that waste disposal facility designed and constructed its disposal units and engineered barriers in a way that prevented contact between the waste and the surrounding earth, as would support DHEC's decision to renew facility's license to dispose of low-level radioactive waste, where placement of waste in a waste container and a reinforced concrete vault prevented the waste from coming into direct contact with the soil. S.C. Code of Regulations R. 7.11.11.7.

Cases that cite this headnote

[12] **Environmental Law**

⇦ Radioactive or nuclear waste in general

Evidence supported finding of the Department of Health and Environmental Control (DHEC) that waste disposal facility designed disposal site in a way that "minimize[s] to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal," as would support DHEC's decision to renew facility's license to dispose of low-level radioactive waste; facility's practice of inspecting and preparing waste for disposal within cask maintenance building minimized contact of water with waste prior to off-loading the waste into trench, vaults and trenches were designed to allow water to flow out without coming in contact with waste, facility could monitor water accumulating in trench, facility placed initial clay cap over inactive vaults, impermeable enhanced cap was placed on inactive trenches, and void spaces between vaults were backfilled. S.C. Code of Regulations R. 7.23.6.

Cases that cite this headnote

[13] **Environmental Law**

⇦ Radioactive or nuclear waste in general

Department of Health and Environmental Control (DHEC) could not rely on waste disposal facility's compliance with "performance

objectives" in analyzing whether facility satisfied specific technical requirements of regulations governing issuance of license permitting facility to dispose of low-level radioactive waste. S.C. Code of Regulations R. 7.10.7, 7.11.11.

Cases that cite this headnote

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Opinion

FEW, C.J.

*1 This is an appeal from the administrative law court (ALC), which upheld the South Carolina Department of Health and Environmental Control's (DHEC) decision to renew the license under which Chem–Nuclear Systems, LLC operates a disposal facility for low-level radioactive waste. We affirm the ALC as to all issues, except four subsections of the regulation governing DHEC's issuance and renewal of such licenses. *See* 24A S.C.Code Ann. Regs. 61–63, pt. VII (1992 & Supp. 2010).

I. Procedural History

Chem–Nuclear operates a disposal facility for low-level radioactive waste in Barnwell County (the "facility") pursuant to a license DHEC first issued in 1971. Part VII of regulation 61–63—entitled "Licensing Requirements for Land Disposal of Radioactive Wastes"—establishes "specific technical requirements" and "performance objectives" "upon which [DHEC] issues licenses for the land disposal of wastes." 24A S.C.Code Ann. Regs. 61–63 § 7.1.1, 7.1.3 (1992). Before DHEC may renew Chem–Nuclear's license to operate the facility, it must determine Chem–Nuclear designed, constructed, and operates the facility in compliance with the requirements and objectives of part VII of regulation 61–63. *See generally* § 7.1.

In 2000, Chem–Nuclear submitted an application to renew its license. After holding a public hearing and accepting comments, DHEC issued a renewal license to Chem–Nuclear in 2004. DHEC's decision to renew the license was challenged on the basis that the disposal methods at the facility do not meet certain requirements and objectives of part VII of the regulation. The ALC issued an order affirming DHEC's decision to renew the license (the "2005 order"), and found Chem–Nuclear complied with subsections 7.10.1 through 7.10.4 of South Carolina Code Regulation 61–63 (1992 & Supp.2010) and section 7.18 of South Carolina Code Regulation 61–63 (1992). However, the ALC ordered Chem–Nuclear to conduct further studies to address concerns "related to the potential for groundwater contamination on and near the [facility]." In particular, the 2005 order stated these studies must "concern[ ] methods to reduce contact between radioactive waste and rainfall and other water at its facility" and ordered Chem–Nuclear to submit the results of the studies to DHEC within 180 days.

This court's opinion reviewing the findings of the 2005 order is reported at 387 S.C. 424, 693 S.E.2d 13 (Ct.App.2010) (*Chem–Nuclear I*). We affirmed the findings related to section 7.18 and subsections 7.10.1 through 7.10.4. 387 S.C. at 438, 693 S.E.2d at 20. However, we remanded the case to the ALC to apply its factual findings from the 2005 order to determine whether Chem–Nuclear complied with the following subsections of regulation 61–63: 7.11.1 through 7.11.12 (1992 & Supp.2010), 7.23.6 (1992), and 7.10.5 through 7.10.10 (1992 & Supp.2010). 387 S.C. at 435, 436, 438, 693 S.E.2d at 18–19, 20.

On remand, the ALC issued an order affirming DHEC's conclusion that Chem–Nuclear complied with these subsections (the "remand order"). In this appeal, we review the findings in the remand order. After we filed our first opinion, Op. No. 5253 (S.C. Ct. App. filed July 30, 2014) (Shearouse Adv. Sh. No. 30 at 53), DHEC and Chem–Nuclear petitioned for rehearing. We granted a stay of the relief ordered in the first opinion on August 28, 2014, and we now grant both petitions for rehearing. We withdraw our original opinion and substitute this opinion.

II. Factual Findings in the 2005 Order

*2 Following this court's instructions, the ALC considered on remand only the findings from the 2005 order. In

reviewing the remand order, therefore, we likewise consider only the findings from the 2005 order. In this section of the opinion, we recite those findings relevant to our review. Unless otherwise indicated, all quotations in this section are from the 2005 order.

A. Overview of Chem–Nuclear's Disposal Practices

Chem–Nuclear disposes of waste at the facility using "enhanced shallow land burial with engineered barriers." An engineered barrier is "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives" set out in part VII of regulation 61–63. 24A S.C.Code Ann. Regs. 61–63 § 7.2.9 (Supp.2010). The primary engineered barriers used by Chem–Nuclear are disposal trenches, disposal vaults, and enhanced caps.

Initially, waste is shipped to the facility in a disposal container. *See* 24A S.C.Code Ann. Regs. 61–63 § 3.2.30 (Supp.2010) (" 'Disposal container' means a container principally used to confine low-level radioactive waste during disposal operations at a land disposal facility ... [and] for some shipments, the disposal container may be the transport package."). Depending on the type of waste, disposal containers are also shipped to the facility inside a container called a cask. When a shipment of waste arrives at the facility, it is directed to either the appropriate trench for disposal or the Cask Maintenance Building, where Chem–Nuclear performs quality control inspections to ensure the casks are not damaged. Following this inspection, Chem–Nuclear transports the casks to the appropriate disposal trench where the disposal containers are loaded into reinforced concrete disposal vaults inside the trench. As disposal containers are loaded into vaults, Chem–Nuclear continues to inspect them.

Some "large components," such as steam generators and pressurizers, are considered disposal vaults themselves and can be placed directly into the trench after DHEC approves them for burial. Otherwise, all waste is contained inside a disposal container that is loaded into a vault, which is located within a trench.

Chem–Nuclear uses the term "active" to describe disposal vaults and trenches that are in the process of being filled. Thus, vaults are active until filled to capacity with disposal containers, and trenches are active until filled to capacity with vaults and large components. Once vaults and trenches become full, Chem–Nuclear refers to them as "inactive." When an individual vault becomes full, Chem–Nuclear covers the inactive vault with "general cover soils and an initial clay cap," which reduces "the infiltration of surface water into the trench." When a trench becomes full, Chem–Nuclear installs an "impermeable" multi-layer enhanced cap over the inactive trench, which consists of an initial clay cap, polyethylene and bentonite, a sand drain layer, and general soil materials.

*3 Waste is divided into three classes—A through C—based on the concentration of "long-lived" and "shorter-lived radionuclides" in the waste. Class A is the least radioactive waste, while C is the most radioactive. *See* 24A S.C.Code Ann. Regs. 61–63 § 3.56.1.1 to .8 (Supp.2010). Chem–Nuclear currently uses three types of disposal trenches that are designed to hold different types of waste: (1) Class A trenches, which are the largest of the three types, hold vaults containing Class A waste; (2) Class B/C trenches hold vaults containing Class B and C waste; and (3) slit trenches, which are narrow, hold irradiated hardware and large components. Chem–Nuclear uses soil to fill voids between the vaults in each type of trench, which "enhance[s] long-term stability of the entire trench system."

Each trench has a drainage system "to facilitate monitoring of water accumulation entering the trench." Chem–Nuclear also implements a "surface water management plan" to manage rainfall after it collects in trenches, which consists of pumping water into either adjacent trenches or a lined pond.

B. Tritium Contamination of Groundwater

Tritium is a radioactive isotope of hydrogen that is found in "trace amounts in groundwater throughout the world." *NRC Senior Management Review of Overall Regulatory Approach to Groundwater Protection* (N.R.C., Rockville, M.D.), Feb. 9, 2011, at SECY–11–0019. Although tritium is naturally occurring, it is also a byproduct of the manufacture of nuclear power, and found in radioactive waste generated by nuclear power plants. *Id.*

The waste disposed of at the facility contains tritium. Rainfall "in and on the disposal trenches drives tritium into the groundwater beneath the facility." Chem–Nuclear initially discovered the presence of tritium in its disposal trenches in 1974. Chem–Nuclear determined that early disposal practices utilizing "unreliable containment and waste forms" led to this initial tritium contamination. However, these early

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containment methods "were acceptable at the time" under the regulations. In fact, they "were identical to practices at ... other low-level radioactive waste disposal facilities."

Although "it is inadvisable to attempt to uncover or excavate" the old containers that caused the initial tritium release, improvements in disposal technology and changes in the operations at the facility have "enhanced site performance." In 1995, DHEC substantially revised part VII of regulation 61–63 to require engineered barriers for all waste classes disposed of at the facility. Specifically, DHEC required all waste, except large components, to be placed in vaults, and required enhanced caps to be installed on all inactive trenches. Chem–Nuclear began using vaults and enhanced caps to meet these new requirements. In addition, Chem–Nuclear began using high-integrity polyethylene disposal containers to hold certain waste forms and discontinued the disposal of unstable, liquid waste forms. All of these measures served to "reduce[ ] the amount of tritium migrating to groundwater."

*4 DHEC imposes a regulatory limit on the amount of radioactive material Chem–Nuclear may release to the "general environment." *See* § 7.18. Although certain groundwater samples collected from beneath the facility show high concentrations of tritium, these samples are inappropriate for evaluating Chem–Nuclear's compliance with section 7.18. This is because DHEC regulates the release of radiation into the "general environment," § 7.18, not into the groundwater within the boundaries of the facility where there is no risk of public exposure. To determine whether Chem–Nuclear is in compliance with section 7.18, DHEC established a "compliance point"—defined as the "first point where a hypothetical member of the public might receive a dose of radiation"—at which it measures Chem–Nuclear's release of tritium into the general environment. This compliance point is located at Mary's Branch Creek, where the groundwater from beneath the facility flows into an above-ground stream. Chem–Nuclear regularly samples the water from Mary's Branch Creek to determine whether there has been a release of tritium above the regulatory limit set by DHEC. Since 2001, tritium concentrations at the compliance point have been declining, and all measurements taken at Mary's Branch Creek have been well below the regulatory limit for exposure under section 7.18. In fact, "[t]here is no evidence of any actual release resulting in an exposure above regulatory limits to any member of the general public."

C. Actions to Prevent Tritium Exposure

Chem–Nuclear has taken steps to protect the public from exposure to radiation at the compliance point. The general public is restricted from accessing the waters of Mary's Branch Creek at the compliance point, and there are no known consumers of the water who are "located in and around the compliance point." Chem–Nuclear also erected a fence around the compliance point to prevent entry of unauthorized persons. Additionally, Chem–Nuclear has a restrictive covenant and easement on three parcels of property surrounding the compliance point. This property serves as a buffer zone by prohibiting the use of groundwater under the property, as well as surface water on the property, without written consent from DHEC. Moreover, changes in design and operations at the facility further reduce the potential for radioactive exposure to the general environment.

D. Long–Term Predictions for Compliance

As required by DHEC, Chem–Nuclear created a predictive model—the Environmental Radiological Performance Verification (ERPV)—to predict the future performance of the site for up to two thousand years. This model relies on data collected through a system of groundwater monitoring wells and thirty years of data derived from over two hundred sampling points. DHEC commissioned and funded a panel of experts—the "Blue Ribbon Panel"—to review the ERPV and determine whether Chem–Nuclear's predictions were accurate. After finding the ERPV predictions to be reliable, the Blue Ribbon Panel concluded the facility "pose[d] minimal risk to either the environment or members of the public, both today and into the long-term future." DHEC relied on the conclusions of both the ERPV and the Blue Ribbon Panel in deciding to renew the facility's license.

III. Standard of Review

*5 In the 2005 order, the ALC conducted a de novo review of DHEC's decision to renew Chem–Nuclear's license. *See Marlboro Park Hosp. v. S.C. Dep't of Health & Envtl. Control,* 358 S.C. 573, 579, 595 S.E.2d 851, 854 (Ct.App.2004) (stating the ALC acts "as the fact-finder" in a contested case and "must make sufficiently detailed findings supporting the denial [or grant] of a permit application" (alteration in original) (citation omitted)). In *Chem–Nuclear I,* this court reviewed the ALC's findings and

conclusions in the 2005 order to determine whether they were "[ ]supported by substantial evidence or controlled by some error of law." *See* 387 S.C. at 430–31, 693 S.E.2d at 16 (relying on the standard of review set forth in S.C.Code Ann. § 1–23–610(B) (Supp.2013)). Although we affirmed the ALC's determination that Chem–Nuclear complied with all sections of regulation 61–63 addressed in the 2005 order, we remanded for the ALC to apply the factual findings from the 2005 order to other, applicable sections it did not address. 387 S.C. at 439, 693 S.E.2d at 20–21. *See* 387 S.C. at 439, 693 S.E.2d at 20 (instructing the ALC "to apply its factual findings [from the 2005 order] to these sections of regulation 61–63" on remand). In the remand order, the ALC applied the factual findings from the 2005 order to determine whether Chem–Nuclear complied with these additional sections.

In this appeal from the remand order, we must accept the factual findings in the 2005 order. We review the remand order under the standard of review set forth in subsection 1–23–610(B)(d), and may reverse only if the ALC's decision was affected by an error of law. *See* § 1–23–610(B)(d) (stating an appellate court may reverse the ALC's decision when it is affected by an error of law); *S.C. Dep't of Revenue v. Blue Moon of Newberry, Inc.*, 397 S.C. 256, 260, 725 S.E.2d 480, 483 (2012) ("The construction of a regulation is a question of law to be determined by the court. We will correct the decision of the ALC if it is affected by an error of law, and questions of law are reviewed de novo." (internal quotation marks and citations omitted)).

IV. Chem–Nuclear's Compliance with Regulation 61–63

DHEC drafted part VII of regulation 61–63 to include three general categories of regulations. *See* § 7.1.3 ("This Part establishes procedural requirements[,] ... performance objectives[,] ... [and] specific technical requirements for near-surface disposal of radioactive waste...."). All three categories are applicable to the enhanced shallow land burial of low-level nuclear waste at the facility.[1] In this appeal, we address the ALC's determination that Chem–Nuclear complied with regulations in two of these categories—regulations imposing technical requirements and performance objectives. Generally, regulations containing technical requirements require Chem–Nuclear to take action to comply with the regulation, while regulations containing performance objectives require Chem–Nuclear to achieve certain results sought under the regulation. There is some overlap, however, between the action-based and result-based requirements of these two categories of regulations.

*6 Some regulations imposing "technical requirements" require Chem–Nuclear to take a specific action to meet the requirement. For example, subsection 7.24.2 of South Carolina Code Regulation 61–63 (1992) requires that Chem–Nuclear place five meters of material above Class C waste when the disposal unit is full and made inactive. *See id.* (requiring Class C waste be disposed of "so that the top of the waste is a minimum of 5 meters below the top surface of the cover").[2] Other regulations imposing technical requirements do not list any specific action, but leave to Chem–Nuclear the choice of action to take to comply with the regulation. For example, subsection 7.11.11.7 of South Carolina Code Regulation 61–63 (Supp.2010) requires "[t]he disposal units and the incorporated engineered barriers ... be designed and constructed to ... prevent[ ] contact between the waste and the surrounding earth."[3] Chem–Nuclear's compliance with "technical requirements" regulations may be determined only by examining the specific actions taken by Chem–Nuclear. As to subsection 7.24.2 and others, the required action is specifically listed in the regulation. As to subsection 7.11.11.7 and others, Chem–Nuclear may choose what action to take to comply with the regulation. In both instances, Chem–Nuclear must take action to meet the technical requirements of the regulation.

On the other hand, compliance with a regulation imposing "performance objectives" must be determined by examining whether Chem–Nuclear obtained the results required by the regulation. An example of such a regulation is section 7.18, which requires reasonable efforts be made to maintain radioactive releases to the general public "as low as is reasonably achievable"—a concept known by the acronym "ALARA."[4] This and other result-based "performance objective" regulations require consideration of existing environmental conditions, such as the fact that tritium levels are declining in the groundwater below the facility and in the surface water of Mary's Branch Creek.

In *Chem–Nuclear I,* we affirmed the ALC's finding that Chem–Nuclear met the performance objectives of sections 7.18 and 7.10. 387 S.C. at 438, 693 S.E.2d at 20. Section 7.18 and the subsections of 7.10 that we addressed in *Chem–Nuclear I* relate to whether Chem–Nuclear is protecting the public from radioactive releases, and generally do not impose specific requirements as to how Chem–Nuclear must accomplish any particular result.[5] In affirming Chem–Nuclear's compliance with section 7.18, we gave deference

to the ALC's finding that "Chem–Nuclear ... demonstrated adherence to ALARA ... by taking appropriate measures to address tritium migration from the Barnwell facility and the potential for releases from other radionuclides." 387 S.C. at 429, 438, 693 S.E.2d at 15, 20. Showing similar deference, we affirmed the ALC's findings that Chem–Nuclear complied with four of the performance objectives in section 7.10. 387 S.C. at 438, 693 S.E.2d at 20. We found, however, the ALC did not address the six remaining subsections of 7.10 (7.10.5 through 7.10.10). 387 S.C. at 438–39, 693 S.E.2d at 20–21. We remanded for the ALC to determine whether Chem–Nuclear complied with those subsections. *Id.*

*7 We also required the ALC to consider on remand Chem–Nuclear's compliance with section 7.11 and subsection 7.23.6. 387 S.C. at 435–36, 693 S.E.2d at 18–19. DHEC argued that in determining whether DHEC properly renewed the license, the ALC must consider compliance with the result-based requirements "set forth in section 7.10 ... rather than apply criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We rejected that argument, finding "the technical requirements" of "section 7.11 impose [ ] additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance." 387 S.C. at 435, 693 S.E.2d at 18–19. Similarly, we found "the technical requirements of [sub]section 7.23.6 ... impose[ ] additional compliance requirements for Chem–Nuclear." 387 S.C. at 436, 693 S.E.2d at 19. Under our holding in *Chem–Nuclear I,* therefore, the technical requirements of subsections 7.11.11 and 7.23.6 require Chem–Nuclear to take action to design and construct the disposal site, disposal units, and engineered barriers to meet the specifications in those subsections. *See* 387 S.C. at 432, 435, 436, 693 S.E.2d at 17, 19, 20. DHEC and Chem–Nuclear may not demonstrate compliance with those subsections simply by showing Chem–Nuclear met the performance objectives of other subsections. *See id.*

With these considerations in mind, we discuss the ALC's determination that DHEC properly found Chem–Nuclear complied with the applicable subsections of regulation 61–63.

A. Section 7.10 [6]

The subsections of 7.10 that we review in this appeal [7] set forth performance objectives for the issuance and renewal of Chem–Nuclear's license. The correctness of DHEC's and the ALC's determination of compliance with subsections 7.10.6 and 7.10.8 depends, in part, on Chem–Nuclear's progress in reducing the amount of tritium released from the facility. In reviewing the ALC's findings as to these subsections, therefore, we rely upon evidence that shows its operations are "adequate to protect the public health and safety," which includes the following result-based evidence: (1) Chem–Nuclear's disposal operations currently meet the ALARA standard; (2) "improvements in waste disposal procedures" have enhanced site performance; and (3) there is a decline in the "tritium concentration at the compliance point."

1. Subsection 7.10.6

[1] Subsection 7.10.6 provides that before DHEC may issue a license to Chem–Nuclear, it must find:

> [Chem–Nuclear]'s proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

*8 This subsection focuses our analysis on Chem–Nuclear's efforts to protect the public, the environment, and inadvertent intruders from radioactive exposure by ensuring "long-term stability of the disposed waste and the disposal site." We begin our discussion with the definitions of the relevant terms used in subsection 7.10.6.

"Site closure" is defined as "those actions that are taken upon completion of operations that prepare the disposal site for custodial care [by the State of South Carolina] and that assure that the disposal site will remain stable and will not need ongoing active maintenance." 24A S.C.Code Ann. Regs. 61–63 § 7.2.19 (1992).

Once site closure is accomplished, the "institutional control" period begins, in which the State of South Carolina "assume[s] responsibility" for maintaining the facility, 24A S.C.Code Ann. Regs. 61–63 §§ 7.8.1, 7.15 (1992), and "control[s] access to the disposal site." 24A S.C.Code Ann.

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Regs. 61–63 § 7.27.2 (1992). By regulation, the institutional control period is one hundred years. *Id.*

"Stability" is defined as "structural stability." 24A S.C.Code Ann. Regs. 61–63 § 7.2.20 (1992). According to Part III of regulation 61–63, structural stability results from: (1) "the waste form itself" being stable, or "processing the waste to stable form"; (2) converting waste containing liquid "into a form that contains as little free-standing and non-corrosive liquid as is reasonably achievable"; and (3) filling "[v]oid spaces within the waste and between the waste and its package." 24A S.C.Code Ann. Regs. 61–63 § 3.56.2.2.1 to .3 (Supp.2010).

"Active maintenance" means "any significant activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in 7.18 and 7.19 are met." 24A S.C.Code Ann. Regs. 61–63 § 7.2.1 (1992). As we previously discussed, section 7.18 regulates the concentration of radioactive material that may be released to the general environment and the public. Section 7.19 of South Carolina Code Regulation 61–63 (1992) requires that the "[d]esign, operation, and closure of the land disposal facility ... ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed." An "inadvertent intruder" is a "person who might occupy the disposal site after closure and engage in ... activities ... in which an individual might be unknowingly exposed to radiation from the waste." 24A S.C.Code Ann. Regs. 61–63 § 7.2.13 (1992).

The following findings from the 2005 order support the ALC's determination that the waste and disposal site are structurally stable:

(1) All waste is placed into reinforced concrete disposal vaults;

(2) Void space between the vaults is filled with soil, which enhances "longterm stability of the entire trench system";

*9 (3) Enhanced caps are installed on all inactive trenches;

(4) "[T]he elimination of liquid waste forms ... have increased site performance"; and

(5) "Improvements in waste forms ... have succeeded in reducing the amount of tritium that is migrating to groundwater."

Additionally, the following findings support the determination that *long-term* stability of the disposed waste and disposal site will be achieved and will be adequate to protect the general public and inadvertent intruders from radioactive exposure:

(1) Predictions of a declining trend in radioactive releases to the general environment;

(2) The Blue Ribbon Panel's conclusion that the facility "poses a minimal risk to either the environment or members of the public, both today and into the long-term future";

(3) The presence of a buffer zone, which provides "long-term protection to the public from exposure to radioactive material in the surface water at the compliance point"; and

(4) The use of concrete disposal vault lids[8] for Class C waste, which serves as an intrusion barrier for inadvertent intruders.[9]

Based on these findings, we find the ALC did not err in concluding Chem–Nuclear is in compliance with subsection 7.10.6.

2. Subsection 7.10.8

Subsection 7.10.8 requires Chem–Nuclear to provide a "proposal for institutional control" that gives "reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27." On appeal, Chem–Nuclear's compliance with this subsection is challenged on the ground that it violated subsection 7.10.6.[10] As previously discussed, subsection 7.10.6 requires the design and operations of the facility to provide "long-term stability of the disposed waste." When considered in the context of subsection 7.10.6, subsection 7.10.8 requires Chem–Nuclear to provide reasonable assurances the waste will be stable after the facility is closed. Based on our ruling regarding subsection 7.10.6,

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we find the ALC correctly determined Chem–Nuclear is in compliance with subsection 7.10.8.

B. Subsection 7.11.11

[2] Subsection 7.11.11 provides, in relevant part,

> The disposal units and the incorporated engineered barriers shall be designed and constructed to meet the following objectives:
>
> 7.11.11.1 to minimize the migration of water onto the disposal units.
>
> 7.11.11.2 to minimize the migration of waste or waste contaminated water out of the disposal units.
>
> 7.11.11.4 temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil.
>
> 7.11.11.6 reasonable assurance that the waste will be isolated for at least the institutional control period.
>
> 7.11.11.7 prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

***10** DHEC and Chem–Nuclear continue to assert that in reviewing the ALC's findings as to subsection 7.11.11, we may rely on result-based evidence—(1) its operations meet the ALARA standard, (2) "improvements in waste disposal procedures" have enhanced site performance, and (3) there is a decline in the "tritium concentration at the compliance point." As we previously acknowledged, evidence of improvements in disposal practices and a decline in tritium concentrations is certainly relevant to our analysis of compliance with the regulations containing performance objectives. However, that evidence does not directly relate to, and cannot alone show compliance with, the technical requirements imposed by subsection 7.11.11. *See* 387 S.C. at 435, 693 S.E.2d at 18–19 (holding "the [specific] technical requirements" of "section 7.11 impose[ ] additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance"). For these subsections of the regulation, compliance may not be measured solely by results. Instead, we must consider whether Chem–Nuclear took any actions to meet the technical requirements imposed by these subsections, and if so, the sufficiency of Chem–Nuclear's actions.

1. Subsection 7.11.11.1

[3] Subsection 7.11.11.1 requires that Chem–Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of water onto the disposal units."

The regulations define "disposal unit" to include "a vault or a trench," 24A S.C.Code Ann. Regs. 61–63 § 7.2.8 (Supp.2010), and "engineered barrier" to include "vaults or equivalent structures," § 7.2.9. The regulations, however, do not define the phrase "migration of water." DHEC concedes the phrase encompasses not only the flow of surface water, but also rainfall. We need not rely on DHEC's concession, however, because we find the subsection clearly applies to rainfall. Thus, for DHEC to have correctly determined Chem–Nuclear complied with this subsection, DHEC must have found Chem–Nuclear took action that reduced rainfall and the flow of surface water onto the vaults and trenches. Chem–Nuclear's compliance concerning the migration of rainfall onto disposal units is particularly important, given the following findings from the 2005 order: (1) "[t]ritium is driven into the groundwater through rainfall in and on the disposal trenches," and (2) tritium concentrations in the groundwater seem to "vary[ ] with the amount of rainfall." Referring to these and other findings, the ALC called this "the undeniable 'rainfall problem.' "

We first examine whether the ALC correctly determined Chem–Nuclear complied with subsection 7.11.11.1 in regard to rainfall migrating onto active disposal units—vaults and trenches that are in the process of being filled. The 2005 order provides that while Chem–Nuclear is filling individual vaults with disposal containers, it employs "no cover or roof, so rain can fall directly into the vault during the loading period." The 2005 order also indicates Chem–Nuclear provides no cover for active trenches, which leaves these trenches and the vaults contained within them exposed to rainfall until the trenches become full. Vaults contained within an active trench remain exposed to rainfall for up to two years while Chem–Nuclear fills the trench. The 2005 order further states rainfall enters vaults because they "are not sealed against water intrusion," and the "lids of the vaults are not ... sealed to prevent water from entering" them.

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*11 DHEC interprets subsection 7.11.11.1 as requiring Chem–Nuclear to "minimize the migration of water onto the disposal units" during the period in which the trenches are active. This interpretation required DHEC to consider what action Chem–Nuclear took to reduce the amount of rain falling onto open vaults while they are being filled, and onto closed vaults in active trenches. However, neither the 2005 order, the remand order, nor any other portion of the record or the briefs contain any evidence that Chem–Nuclear has taken a single action to stop a single raindrop from falling onto active vaults or trenches.

Although the ALC determined Chem–Nuclear complied with this subsection, none of the evidence it relied upon addresses the rainfall issue. Specifically, the ALC listed the following factual findings from the 2005 order to support DHEC's determination of compliance as to active and inactive disposal units:

(1) The Class A trench has a sloped floor and a drainage system that facilitates monitoring of water that enters the trench;

(2) The Class B/C trench contains a French drain and sump system that allows monitoring of water accumulation in the trench;

(3) The slit trench has a sloped floor that is filled with "coarse drain sand" and contains "standpipes" that monitor water accumulation;

(4) Chem–Nuclear implements a surface water management plan to pump water out of trenches.

We find none of these findings support the ALC's determination that Chem–Nuclear complied with this subsection as to rain falling on disposal units—active or inactive. These findings relate to remedial measures to monitor, drain, and manage water that has already migrated onto disposal units. The plain language of this subsection, however, requires Chem–Nuclear to do more than monitor, drain, or otherwise manage water once it enters the vaults and trenches. [11] These measures listed by the ALC have no effect on the initial migration of rainfall and thus, do not relate to compliance with subsection 7.11.11.1. Furthermore, the record is devoid of any evidence to support the ALC's conclusion that Chem–Nuclear has done *anything* to reduce rainfall onto active disposal units. When pressed at oral argument to list what Chem–Nuclear has done to reduce rainfall onto active disposal units, neither Chem–Nuclear nor DHEC could name one action Chem–Nuclear took, except to construct berms along the edges of trenches. [12]

The ALC also listed the following two factual findings, in addition to the four discussed above, to affirm DHEC's determination of compliance with this subsection as to rainfall on inactive disposal units only:

(5) Backfilling methods that fill voids between vaults are implemented for all trenches; and

(6) Initial clay caps placed on inactive vaults and enhanced caps installed over inactive trenches minimize the infiltration of surface water into the trench.

We find neither of these findings support—and only one actually addresses—the ALC's determination that Chem–Nuclear complied with this subsection as to inactive disposal units. Regarding finding (5), "backfilling methods" involve placing soil in open spaces between the vaults, which has nothing to do with reducing the migration of water onto disposal units. Finding (6), however, is relevant to Chem–Nuclear's compliance with subsection 7.11.11.1 as to inactive disposal units. The installation of the initial clay cap on inactive vaults and the enhanced cap on inactive trenches reduces the migration of water onto these disposal units. Although these measures *reduce* the migration of water, subsection 7.11.11.1 requires Chem–Nuclear to "minimize" this occurrence. Thus, whether finding (6) supports Chem–Nuclear's compliance with this subsection requires us to consider the meaning of "minimize."

*12 [4] Regulation 61–63 does not define minimize. Chem–Nuclear and DHEC filed a joint brief with this court in which they set forth the following definition of minimize: "to reduce to the smallest possible amount, extent, size, or degree." [13] Applying this definition to the requirements of subsection 7.11.11.1, we must consider two sub-issues in analyzing compliance: (1) whether there is evidence to support a finding that Chem–Nuclear has reduced the migration of water onto disposal units, and (2) whether the extent of this reduction is adequate to meet DHEC's definition of minimize. Thus, we cannot find the ALC correctly determined Chem–Nuclear complied with this subsection simply because Chem–Nuclear "reduced" the migration of water onto disposal units.

As to the first sub-issue, we agree with the ALC that installation of initial clay caps and enhanced caps reduce the migration of surface water and rainfall onto inactive

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vaults and trenches. However, the ALC did not address the second sub-issue—whether initial clay caps and enhanced caps "reduce to the smallest possible amount" the migration of water onto inactive disposal units. Both DHEC and Chem–Nuclear represented to this court in their brief that Chem–Nuclear must have taken action to "reduce [the migration of water onto inactive trenches] to the smallest possible amount." Yet, neither DHEC nor the ALC made any finding as to whether Chem–Nuclear did so. The determination of this issue is crucial to the question of whether Chem–Nuclear complied with subsection 7.11.11.1.

In considering whether Chem–Nuclear's disposal units and engineered barriers adequately reduce—"minimize"—the migration of water, we acknowledge it is the duty of DHEC, not this court, to enforce regulation 61–63. Similarly, it is the duty of Chem–Nuclear, not DHEC, to take the necessary action to comply with the regulations. Nevertheless, we find support in the 2005 order that implementing "relatively simple measures" could further reduce the migration of water onto both active and inactive disposal units. These measures include "shelter[ing] the disposal trenches from rainfall" while they are being filled and "sealing and grouting the concrete disposal vaults to prevent the intrusion of water."

In 2001, DHEC directed Chem–Nuclear to consider implementing such measures. According to the 2005 order, "during the review of the re-issuance of the Chem–Nuclear license, DHEC ... advis[ed] Chem–Nuclear to review and revise all trench construction details, plans, specifications, and procedures." "In particular, [DHEC] informed Chem–Nuclear that consideration should be given to protection of the open trenches from direct rainfall and runoff such as temporary covers." In response to this directive, Chem–Nuclear considered "several conceptual trench designs," including designs for "temporary roofs to keep water out of the trenches and vaults." Although Chem–Nuclear informed DHEC in 2001 it would take "up to two years to evaluate [these] designs," the ALC found in the 2005 order "Chem–Nuclear ha[d] not completed its evaluation and ha [d] not submitted final designs to DHEC for review and approval."

*13 The ALC found it significant that Chem–Nuclear had not yet completed and submitted these final designs to DHEC, given the "undeniable 'rainfall problem.' " Specifically, the 2005 order stated, "Chem–Nuclear has already considered conceptual designs to keep rainfall out of the trenches, ... [but] it failed to complete a report on its research and has not submitted such a report to DHEC, despite its request." Additionally, the ALC found further studies "were needed to evaluate the ... feasibility of employing or implementing designs" that would: (1) "shelter disposal trenches from rainfall and prevent rainfall from entering the trenches," and (2) "provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." The order explained these additional studies were necessary because "no evidence was presented ... that the Blue Ribbon Panel considered any of these particular issues." The ALC ordered that "Chem–Nuclear shall conduct the[se] studies ... and submit the results to DHEC within 180 days."

These findings and directives from the 2005 order support the importance of implementing measures to address concerns related to rainfall on the disposal units. Both DHEC and the ALC ordered Chem–Nuclear to consider such measures. However, none are currently in place, a fact directly relevant to Chem–Nuclear's ability to reduce water migration onto the disposal units "to the smallest possible amount."

In conclusion, we find the record in this case conclusively demonstrates Chem–Nuclear has taken no action whatsoever to prevent even one raindrop from migrating onto one active vault or trench. [14] Additionally, while initial clay caps and enhanced caps reduce the migration of water onto inactive disposal units, there is no evidence and no finding by the ALC that DHEC has required, or that Chem–Nuclear has taken, any action that would reduce this migration to the smallest possible amount. In light of these facts, we hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.1.

2. Subsection 7.11.11.2

[5] Subsection 7.11.11.2 requires that Chem–Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of waste or waste[-] contaminated water out of the disposal units." DHEC and Chem–Nuclear contend the same definition of minimize used in the previous section applies to the analysis of this subsection.

Based on the plain language of subsection 7.11.11.2, Chem–Nuclear must minimize the migration of two types of wastes: (1) the radioactive waste-form contained within the disposal containers, and (2) water that has been contaminated by radioactive waste. As to the first, we agree with the ALC's determination that Chem–Nuclear's disposal units and engineered barriers minimize the migration of radioactive

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waste-forms out of disposal units. The record establishes that Chem–Nuclear uses disposal containers and reinforced concrete vaults, which prevent the migration of these waste-forms out of disposal units. Thus, we affirm the ALC's ruling that DHEC correctly determined Chem–Nuclear is in compliance with this subsection as to the migration of the waste itself out of the disposal units.

*14 We next address whether Chem–Nuclear is in compliance as to the migration of waste-contaminated water out of the disposal units. According to the 2005 order, the vaults contain holes that allow water to drain from them and into the trenches. As for the trenches, they are lined with partially impermeable materials so that liquids may drain to the soil below the trench. Thus, "rainfall that accumulates in the trenches eventually percolates into the soil" and groundwater beneath the trenches. Also, the water table may rise during "wet periods," causing groundwater to "rise up into the [vaults]."

The ALC relied on its previous findings related to subsection 7.11.11.1 to hold Chem–Nuclear complied with this subsection because the methods "designed to minimize the infiltration of water into the vaults" serve to "minimize [ ] the migration of ... waste-contaminated water out of them." We agree evidence of compliance with subsection 7.11.11.1 is relevant to our determination of compliance with this subsection. This is because reducing the initial migration of water onto disposal units has a reciprocal effect upon reducing the migration of waste-contaminated water out of disposal units. Therefore, our holding that Chem–Nuclear failed to comply with subsection 7.11.11.1 relates to whether it complied with subsection 7.11.11.2 as to waste-contaminated water. [15]

Relying on the two-part definition of minimize discussed in the previous section, we must first analyze whether there is evidence that Chem–Nuclear reduced the migration of waste-contaminated water out of disposal units. The ALC found Chem–Nuclear's use of disposal containers prevents waste from coming into direct contact with water that enters vaults, which reduces the potential for water to become contaminated. This, in turn, reduces the migration of waste-contaminated water out of vaults. Second, the ALC found that although the drainage holes in the vaults allow "water to rise up into the containers" and drain into the trenches below, they also allow water to drain away from the waste. This decreases the likelihood that water entering the vaults will become contaminated. We agree the ALC's findings support the conclusion that Chem–Nuclear has taken *some* action to reduce the migration of waste-contaminated water from the disposal units.

However, the ALC did not address the second part of the analysis—whether these measures are sufficient to meet DHEC's definition of minimize. As we previously stated regarding subsection 7.11.11.1, compliance with subsection 7.11.11.2 depends on whether there is evidence to support a finding that Chem–Nuclear's actions "reduce to the smallest amount possible" the migration of waste-contaminated water out of disposal units.

On this point, the 2005 order stated "trench water ... becomes contaminated by the fact that there is some residual tritium on ... vaults and waste packages that have ... water on them as a result of rain." Based on this fact, the following findings in the 2005 order demonstrate the vaults and trenches allow water that has come into contact with residual tritium on the disposal containers to migrate out of them:

*15 (1) The "floors of the vaults have holes to allow water to drain from the vaults";

(2) These drainage holes "can also allow water to rise up into the containers";

(3) "[N]one of the trenches ... have an impermeable liner";

(4) "The bottoms of the trenches" are not designed to "prevent the migration of liquids out of the bottom of trenches" and, in fact, are "designed to be partially impermeable and ... allow liquids to infiltrate the soil below the trenches"; and

(5) "Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the [facility]."

As we acknowledged above, the holes in the vaults allow water to drain away from the waste, which decreases the likelihood that water entering the vaults will become contaminated. Nevertheless, these holes permit water that has come in contact with residual tritium to drain into the trenches, which, in turn, allow the water to percolate into the soil and groundwater beneath the facility. This supports that Chem–Nuclear has not taken action to reduce to the smallest possible amount the migration of waste-contaminated water out of its vaults and trenches. Moreover, the fact that Chem–Nuclear has failed to minimize the migration of water onto vaults under subsection 7.11.11.1 weighs in favor of non-compliance with subsection 7.11.11.2.

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In affirming DHEC's conclusion that Chem–Nuclear complied with this subsection, the ALC recognized that trench bottoms "are designed to be partially impermeable and allow liquids to infiltrate the soil below" them. However, the ALC noted the 2005 order contained "no finding that Chem–Nuclear's waste disposal design is faulty or fails to minimize the migration of ... waste-contaminated water out of disposal units." We find the ALC erred in relying on the absence of such a finding in the 2005 order.

In *Chem–Nuclear I,* we held "section 7.11 imposes additional compliance requirements" not addressed by the 2005 order. 387 S.C. at 435, 693 S.E.2d at 19. We remanded for the ALC "to apply its factual findings [in the 2005 order] to the technical requirements" of section 7.11—including subsection 7.11.11.2. 387 S.C. at 435, 693 S.E.2d at 18–19. Thus, the ALC could not rely on the fact that the 2005 order did not contain the conclusion we ordered the ALC to make on remand—whether, based on the factual findings in the 2005 order, the disposal units minimized the migration of waste-contaminated water out of them. The lack of such a conclusion in the 2005 order was the very reason we remanded for the ALC to make this determination.

We also find the ALC erred in relying on evidence that "improvements in waste disposal procedures" have reduced the "tritium concentration at the compliance point." As acknowledged by the ALC in the remand order, this evidence "does not get to the heart of the technical requirements" established by the subsection. This is because subsection 7.11.11.2 imposes technical requirements, and we find the evidence does not relate to the requirement that the disposal units be designed to minimize the migration of waste-contaminated water out of them. Instead, this evidence relates to Chem–Nuclear's compliance with the result-based performance objectives contained in section 7.18—that Chem–Nuclear keep radioactive releases to the general environment "as low as is reasonably achievable." Subsection 7.11.11.2 required DHEC and the ALC to analyze the sufficiency of Chem–Nuclear's actions to comply with the plain language of this subsection. Thus, we cannot base our decision on the fact that Chem–Nuclear has reduced the overall tritium concentration at the compliance point.

***16** We conclude the record demonstrates Chem–Nuclear has taken measures to reduce the migration of waste-contaminated water out of disposal units. However, the record does not support a finding that Chem–Nuclear complied with subsection 7.11.11.2. We base our holding on (1) Chem–Nuclear's failure to comply with subsection 7.11.11.1, and (2) there being no evidence, and no finding, that Chem–Nuclear has taken action to "minimize"—reduce to the smallest amount possible—the migration of waste-contaminated water out of disposal units. We hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.2.

3. Subsection 7.11.11.4

[6] **[7]** Subsection 7.11.11.4 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The plain language of this subsection imposes multiple requirements on Chem–Nuclear: (1) collect and retain water that migrates onto the disposal units, (2) test this water for radioactive waste material, (3) if such waste material is discovered, engage in removal or remedial measures, and (4) accomplish this without contaminating the groundwater or surrounding soil.

The ALC relied on the following findings in the 2005 order to support its conclusion that Chem–Nuclear complied with this subsection:

(1) Chem–Nuclear implements a surface water management plan to manage precipitation that collects in trenches, which involves pumping water into adjacent trenches or a lined pond; and

(2) The trenches are designed to prevent the flow of surface water from coming into contact with waste.

We find neither finding supports—and only one addresses—the ALC's determination that DHEC correctly concluded Chem–Nuclear complied with this subsection. Finding (1)—regarding Chem–Nuclear's surface water management plan—is relevant to the first requirement of subsection 7.11.11.4, "temporary collection and retention of water." However, there is no evidence that Chem–Nuclear tests the water pumped from the trenches for radioactive waste material. The subsection requires Chem–Nuclear to do more than collect and retain the water. Finding (2)—that trenches are designed to prevent surface water from coming into contact with waste—is irrelevant to Chem–Nuclear's compliance with this

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subsection. It has nothing to do with collecting, testing, or removing contaminated water from the disposal units. Because the ALC cited no additional evidence of Chem–Nuclear's compliance with this subsection, we hold the ALC erred in affirming DHEC's determination that Chem–Nuclear complied with subsection 7.11.11.4.

Upon our review of the 2005 order, we find no evidence of compliance with this subsection.[16] In fact, the evidence in the record demonstrates Chem–Nuclear is not in compliance. First, the vaults and trenches are designed to allow water that enters them to drain into the soil and groundwater below. That water is not tested before it enters the ground. Second, the only other evidence relevant to this subsection is the finding in the 2005 order that states, "None of the trenches at the [facility] have ... a leachate collection system." Leachate is defined as "any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the [radioactive] material." 10 C.F.R. § 40 app. A (2011). Although the regulation does not define "leachate collection system," in common industry usage, it is "a system or device ... that is designed, constructed, maintained, and operated to collect and remove leachate" for proper disposal. 40 C.F.R. § 503.21(i) (2011); *see also* 40 C.F.R. § 264.301(a)(2) (2011).[17] Such a system would allow Chem–Nuclear to satisfy the four requirements of subsection 7.11.11.4—(1) collect water migrating onto the disposal units, (2) test this water, (3) remove waste-contaminated water, and (4) do this without contaminating the groundwater because the system would collect the leachate for alternate disposal. Thus, the ALC's finding regarding the non-existence of a leachate collection system undermines its conclusion that Chem–Nuclear complied with this subsection and supports our determination that the ALC erred in reaching that conclusion.

*17 [8] DHEC and Chem–Nuclear argue Chem–Nuclear is justified in not having a leachate collection system due to "concerns regarding the radioactive exposure to workers handling and processing the leachate." We find the argument contrary to the purpose and intent of the regulation. We fail to see how the danger of radioactive contamination to workers actually *justifies* releasing it into the groundwater without testing and remediation. Rather, it seems the danger to health and safety *requires* testing and remediation. We believe the drafters of these regulations imposed such a requirement for just that purpose. Subsection 7.11.11.4 contains no language excusing Chem–Nuclear's duty to comply with its regulatory requirements, which is especially important when the excuse for not taking a particular action is the very reason for the regulation—health and safety. Instead, the focus of compliance is on what action Chem–Nuclear did take—whether it designed and constructed its engineered barriers in a manner that allows it to collect, test, and remove contamination before it percolates into the soil and groundwater.[18]

We find no evidence to support a finding that Chem–Nuclear meets the requirements imposed by this subsection. We hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.4.

4. Subsection 7.11.11.6

[9] Subsection 7.11.11.6 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that provides "reasonable assurance that the waste will be isolated for at least the institutional control period."

We hold the ALC did not err in affirming DHEC's determination that Chem–Nuclear's current disposal units and engineered barriers—including the disposal containers, concrete disposal vaults, disposal vault lids, disposal trenches, and enhanced caps on inactive trenches—comply with subsection 7.11.11.6. Waste is put into a disposal container, which is then placed into a reinforced concrete vault that is covered with an initial clay cap and buried in a disposal trench. Once the trench is full, Chem–Nuclear installs an enhanced cap over the trench. The following findings from the 2005 order demonstrate that the use of these disposal units and engineered barriers provide reasonable assurance the waste will be isolated from the general environment and inadvertent intruders "for at least the institutional control period": (1) the predictions of a "continually declining trend in radioactive releases to the general environment"; and (2) the Blue Ribbon Panel's conclusion that the facility's disposal practices "pose a minimal risk to either the environment or members of the public, both today and *in the long-term future.*" (emphasis added).

5. Subsection 7.11.11.7

[10] [11] Subsection 7.11.11.7 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that "prevent[s] contact between the waste and the surrounding earth, except for earthen materials

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which may be used for backfilling within the disposal units." We interpret the plain language of this subsection as seeking to prevent waste, and not waste-contaminated water, from coming in contact with soil. Otherwise, the regulatory effect of subsections 7.11.11.1 and 7.11.11.2 becomes obsolete. [19] Under this interpretation, we hold the ALC did not err in affirming DHEC's determination that Chem–Nuclear complied with this subsection because the "placement of waste in a waste container and a reinforced concrete vault" prevents the waste from coming into direct contact with the soil.

C. Subsection 7.23.6

*18 [12] Subsection 7.23.6 requires Chem–Nuclear to design the disposal site in a way that "minimize[s] to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal." [20]

As we previously discussed, subsection 7.23.6 imposes technical requirements that require Chem–Nuclear to take action to design and construct the disposal site to meet the specifications of this subsection. Thus, DHEC and Chem–Nuclear cannot demonstrate compliance with subsection 7.23.6 simply by showing Chem–Nuclear met the performance objectives of other subsections. *Chem–Nuclear I*, 387 S.C. at 436, 693 S.E.2d at 19. Instead, we must consider whether Chem–Nuclear took any actions to meet the technical requirements of this subsection, and if so, the sufficiency of Chem–Nuclear's actions.

This subsection distinguishes between "water," "standing water," and "percolating water" and between the three different phases of operations at the facility—storage, disposal, and after disposal. This subsection requires Chem–Nuclear to implement practices that drain or remove water from active vaults and trenches, as well as minimize to the extent practicable the entry of water into inactive vaults and trenches. Although the failure to minimize the migration of water onto active vaults and trenches under subsection 7.11.11.1 contributes to the accumulation of standing water, the regulatory effect of this subsection, when narrowly construed, requires Chem–Nuclear to implement methods to minimize to the extent practicable standing water that has already migrated into the disposal units.

As to the requirement that Chem–Nuclear design the disposal site in a way that minimizes to the extent practicable the contact of water with waste *during storage,* the ALC found that "[a]ny 'storage' of waste is temporary" because "there is available disposal capacity at the [facility]." The ALC stated that when a shipment of waste is received, it is taken either to the appropriate trench for disposal or to the Cask Maintenance Building, where Chem–Nuclear inspects the casks and prepares them for off-loading. The ALC found that "[b]ased on the practice of inspecting and preparing waste for disposal within the [Cask Maintenance Building], Chem–Nuclear minimizes the contact of water with waste prior to off-loading the waste into the trench." We affirm because this evidence relied on by the ALC supports compliance with this particular requirement of subsection 7.23.6.

As to whether Chem–Nuclear designed the disposal site to minimize to the extent practicable the contact of standing water with waste *during disposal,* we interpret this requirement as applying to Chem–Nuclear's active vaults and trenches. We hold the ALC did not err in affirming DHEC's conclusion that Chem–Nuclear complied with this requirement of subsection 7.23.6 because the following findings from the 2005 order support this conclusion:

*19 (1) The vaults and trenches are designed to allow water to flow out of them;

(2) Trenches are sloped and contain other design features that prevent "water from coming in contact with waste";

(3) Each trench has a drainage system that allows Chem–Nuclear to monitor any water that accumulates in the trench; and

(4) Chem–Nuclear implements a surface water management plan to manage rainwater that collects in the open trenches.

Turning to the requirement regarding minimizing to the extent practicable the contact of percolating or standing water with wastes *after disposal,* we interpret this as applying to Chem–Nuclear's inactive vaults and trenches. We hold the following findings relied on by the ALC support DHEC's determination of compliance:

(1) When vaults become full, Chem–Nuclear places an initial clay cap over inactive vaults;

(2) When trenches become full, Chem–Nuclear installs an impermeable enhanced cap on inactive trenches; and

(3) Employees fill void spaces between the vaults with backfill, which "minimizes the potential for subsidence of the enhanced caps."

Based on the above discussion, we hold the ALC did not err in finding DHEC correctly determined Chem–Nuclear is in compliance with subsection 7.23.6.

D. Subsection 7.10.7

[13] Subsection 7.10.7 requires DHEC to find Chem–Nuclear "provides reasonable assurance that the applicable technical requirements of [part VII] will be met." The technical requirements relevant to this appeal include those set forth in subsections 7.11.11 and 7.23.6. Based on Chem–Nuclear's noncompliance with subsections 7.11.11.1, 7.11.11.2, and 7.11.11.4—particularly the absence of evidence that Chem–Nuclear took *any* action to comply with the technical requirements of subsections 7.11.11.1 and 7.11.11.4—we do not understand how DHEC could make, nor how the ALC could affirm, a finding that Chem–Nuclear provided assurance it would meet the applicable technical requirements.

DHEC argues, however, Chem–Nuclear is in compliance with these subsections because "tritium concentrations began to decline at the compliance point" after "the incorporation of new disposal techniques." While this may have been a reasonable position for DHEC to take prior to our opinion in *Chem–Nuclear I,* the argument ignores our holding in that case—that the "specific technical requirements" of 7.11.11 cannot be met by satisfying the "performance objectives" of 7.10. As we found in *Chem–Nuclear I,* "section 7.11 imposes additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance with section 7.11." 387 S.C. at 435, 693 S.E.2d at 19.

DHEC nevertheless continues to argue the "technical requirements are written to meet the performance objectives," and Chem–Nuclear may comply with them without taking any action—as long as it meets the performance objectives. In its petition for rehearing, DHEC states "the Court overlooks and misapprehends the crucial interplay of the performance objectives and [technical] requirements," and argues "evidence that the performance objectives have been met is appropriate to demonstrate compliance with other requirements of the regulation." We disagree with DHEC's interpretation of the regulations. The "interplay" between the performance objectives and the technical requirements of the regulations was squarely raised in *Chem–Nuclear I.* In that case, DHEC specifically "argue[d] the [court] ... must apply the [performance objectives] criteria set forth in section 7.10 ... rather than apply [technical requirements] criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We specifically rejected the argument and held the technical requirements of the regulation must also be met —they cannot be satisfied simply by meeting performance objectives. 387 S.C. at 435–36, 693 S.E.2d at 18–19.

*20 There can be no doubt that the technical requirements are designed to bring about compliance with the performance criteria. As DHEC points out, "The overarching purpose of the Part VII requirements is to ensure that the performance objectives of subsection 7.18 (ALARA) through 7.21 are met." However, DHEC's argument renders the technical requirements optional, and thus essentially writes them out of the regulations. To illustrate this point, we consider how DHEC's argument would affect Chem–Nuclear's duty to comply with subsection 7.24.2. DHEC acknowledges in its petition for rehearing that subsection 7.24.2 "contain[s] requirements for specific action[ ]" by Chem–Nuclear. Under the subsection, Chem–Nuclear must place five meters of material above the top of the waste after the storage unit becomes inactive. We also consider subsection 7.11.11.7, which requires Chem–Nuclear to "prevent [ ] ... contact between the waste and the surrounding earth." Under DHEC's theory that it may demonstrate compliance with the technical requirements of these subsections simply by meeting the performance objectives in other subsections, Chem–Nuclear is not actually required to place five meters of fill on top of the waste, or prevent contact between the waste and the earth. Rather, DHEC's argument allows Chem–Nuclear to ignore the specific, clear, and unambiguous requirements of these subsections by demonstrating compliance with performance objectives—despite the fact that the technical requirements subsections do not provide such an exception. We fully understand the technical requirements are interconnected with the performance objectives and are designed primarily to ensure the performance objectives are achieved. We do not agree, however, that the technical requirements may be ignored as long as the performance objectives are met.

In light of our holding in *Chem–Nuclear I,* however, it is no longer reasonable for DHEC to argue Chem–Nuclear complied with subsection 7.10.7 without considering

what action Chem–Nuclear took to comply with the technical requirements of 7.11.11. This is particularly true given that Chem–Nuclear failed to take *any* action to comply with the requirements of subsections 7.11.11.1 and 7.11.11.4. And yet, DHEC continues to assert Chem–Nuclear "provide[d] reasonable assurance that the applicable technical requirements of [its own regulations] will be met." Considering, for example, the technical requirement in subsection 7.11.11.1—that Chem–Nuclear "minimize the migration of [rainfall] onto the disposal units"—DHEC could not identify one action Chem–Nuclear took to meet this requirement. Nevertheless, DHEC determined Chem–Nuclear complied with subsection 7.10.7 by providing reasonable assurance that this technical requirement of 7.11.11.1 would be met.

To determine whether DHEC complied with subsection 7.10.7 in light of these facts, we consider DHEC's role in the disposal of low-level radioactive waste. In 1967, our General Assembly enacted the Atomic Energy and Radiation Control Act. *See* Act No. 223, 1967 S.C. Acts 305 (*codified at* S.C.Code Ann. §§ 13–7–10 to –100 (1977 & Supp.2013)). Noting "that remarkable scientific developments have occurred in the field[ ] of atomic energy," and "plans for further developments ... are creating broad opportunities and also responsibilities for the states," *id.* at 305, the General Assembly found "[i]t is prudent and wise that the State [give] ... full consideration of the health and safety requirements of its people." *Id.* at 305–06. Based on these findings, the General Assembly required DHEC to "formulate, adopt, [and] promulgate ... regulations relating to the control of ionizing and nonionizing radiation." S.C.Code Ann. § 13–7–40(F)(3) (Supp.2013). Pursuant to this mandate, DHEC promulgated Part VII of regulation 61–63. Under the authority of the Act, the regulations are the law of South Carolina,[21] and DHEC is required by law to enforce them. *See* S.C.Code Ann. § 13–7–40(A) (Supp.2013) (providing DHEC "is designated as the agency of the State which is responsible for the control and regulation of radiation sources"); § 13–7–40(F)(9) (stating DHEC "shall ... provide by regulation for the licensing ... of radiation sources").

***21** The United States Nuclear Regulatory Commission (NRC), through its federal enforcement policy, has emphasized the importance of regulatory enforcement when nuclear disposal facilities do not conduct their operations with "the necessary meticulous attention to detail" and in accordance with "the high standard of compliance" imposed by the applicable regulations. General Statement of Policy and Procedure for NRC Enforcement Actions, 10 C.F.R. Pt. 2, app. C (1995). Thus, while it is important for private companies such as Chem–Nuclear to comply with applicable regulations, it is equally important, if not more so, that the administrative agency mandated by law to enforce the regulations require adherence to its own standard for compliance. To allow otherwise would impede the purpose for which DHEC was created—to act in the public interest—and risk the health and safety of our citizens. *See* S.C.Code Ann. § 48–1–20 (2008) ("It is declared to be the public policy of the State to maintain reasonable standards of purity of the air and water resources of the State, consistent with the public health, safety and welfare of its citizens, ... [and] that to secure these purposes and the enforcement of the provisions of this chapter, [DHEC] shall have authority to abate, control and prevent pollution.").

DHEC promulgated regulation 61–63 under statutory mandate for the obvious reason that nuclear waste can adversely affect the health and welfare of our citizens if not disposed of properly. In doing so, DHEC required Chem–Nuclear to comply with the "technical requirements" and "performance objectives" that DHEC chose to put in the regulations. It is important that DHEC enforce its own regulations and require Chem–Nuclear to take action to comply with the technical requirements. This importance derives not simply from the need to avoid the serious consequences of non-compliance; it is important because it is the law. We are concerned that DHEC did not follow the law in failing to require Chem–Nuclear to comply with all of the technical requirements of subsection 7.11.11.

We are also concerned by DHEC's decision not to amend the requirements for issuance of the license after the ALC instructed Chem–Nuclear in its 2005 order to submit a report to DHEC regarding the feasibility of covering trenches and sealing vaults. The propriety of DHEC's decision to "concur[ ] with the report's evaluation of the issues" is not before this court, and we do not base our holding on the merits of that decision.[22] However, the fact that DHEC did not require Chem–Nuclear to take *any* action or make *any* changes to its disposal practices casts doubt upon DHEC's decision to renew the license.

Regardless of our affirmance of Chem–Nuclear's compliance with the remaining subsections of 7.11.11, we hold the ALC erred in affirming DHEC's determination that Chem–Nuclear complied with subsection 7.10.7.

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V. Remedy

As to four separate subsections of regulation 61–63, DHEC failed to enforce the law of South Carolina. As to each, the ALC erred in finding Chem–Nuclear in compliance. Under the law, Chem–Nuclear's license to operate the facility is invalid. However, the appellant informed the court at oral argument it does not seek revocation of the license; it asks simply that DHEC enforce its regulations, and that Chem–Nuclear comply. In light of this request, we decline to rule the permit is invalid. Rather, we remand to DHEC for further proceedings.

***22** DHEC and Chem–Nuclear argue on rehearing that this court's requirement in *Chem–Nuclear I* that all remand proceedings be based only on the factual findings of the 2005 order has hampered both DHEC and Chem–Nuclear's efforts to demonstrate to this court compliance with subsections 7.11.11.1 and 7.11.11.2 and others. We understand the problem. On remand, DHEC shall consider all available information as to whether Chem–Nuclear has complied with the regulations. On appeal to the ALC, it may conduct its proceedings with no limitations from this court on the evidence it may consider.

VI. Conclusion

We affirm the ALC as to all issues presented to this court, except Chem–Nuclear's compliance with subsections 7.11.11.1, 7.11.11.2, 7.11.11.4, and 7.10.7. As to those four subsections, we hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear was in compliance.

HUFF and THOMAS, JJ., concur.

All Citations

--- S.E.2d ----, 2015 WL 4746971

Footnotes

1 Subsection 7.1.3 provides that the "procedural requirements" and "performance objectives" apply "to any method of land disposal," and the "specific technical requirements" apply to "near-surface disposal of radioactive waste."

2 Chem–Nuclear's compliance with subsection 7.24.2 is not an issue in this appeal.

3 We discuss Chem–Nuclear's compliance with subsection 7.11.11.7 in section IV.B.5 of this opinion.

4 Regulation 61–63 defines the "ALARA" standard as:

> [M]aking every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

24A S.C.Code Ann. Regs. 61–63 § 3.2.6 (Supp.2010).

5 *See* § 7.10.1 ("The issuance of the license will not constitute an unreasonable risk to the health and safety of the public."); § 7.10.2 ("The applicant is qualified ... to carry out the disposal operations ... in a manner that protects health and minimizes danger to life or property."); § 7.10.3 ("The ... operations ... are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity...."); § 7.10.4 ("The ... operations ... are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected....").

6 In this section, we discuss compliance with subsections 7.10.6 and 7.10.8, and not 7.10.7, because our analysis of that subsection depends on whether Chem–Nuclear complied with the relevant subsections of 7.11.11. We later discuss subsection 7.10.7 in section IV.D. of this opinion.

7 Chem–Nuclear's compliance with subsections 7.10.5, 7.10.9, and 7.10.10 is not an issue in this appeal.

8 We are uncertain of the nature and purpose of disposal vault lids. Neither the regulations nor the 2005 order defines "disposal vault lid," and the 2005 order references disposal lids only twice and in two limited contexts: (1) "the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault"; and (2) "[t]he disposal vault lids serve as an intrusion barrier for Class C waste."

9 Subsection 3.56.1.2.3 requires Class C waste to be disposed of in a manner that "protect[s] against inadvertent intrusion."

10 We previously affirmed Chem–Nuclear's compliance with subsections 7.10.3 and 7.10.4. *Chem–Nuclear I*, 387 S.C. at 438, 693 S.E.2d at 20. Chem–Nuclear's compliance with subsection 7.10.5 is not an issue on appeal.

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11 Other subsections of regulation 61–63 deal with accumulation of water within disposal units once it migrates there. *See, e.g.,* § 7.23.6 (requiring the disposal site to be designed in a way that "minimize[s] ... the contact of *standing water* with waste during disposal, and the contact of *percolating* or *standing water* with wastes after disposal" (emphasis added)).

12 While berms may keep surface water from migrating onto the disposal units, they do nothing to minimize direct rainfall onto active trenches and vaults. Additionally, the ALC made no findings as to whether Chem–Nuclear ever constructed a berm, or if so, whether the berms reduce the migration of surface water onto the disposal units.

13 While this definition sets a strict standard for compliance, we find this is supported by the way in which this regulation, and others, are written. For example, subsection 7.23.6 requires Chem–Nuclear to "minimize to the extent practicable" the contact of water with waste at different stages of the disposal process. We interpret subsection 7.23.6 as imposing a less stringent standard for compliance than subsection 7.11.11.1 because the term "minimize" is followed by language prompting DHEC to consider the reasonableness of Chem–Nuclear's efforts to comply. The lack of similar language in subsection 7.11.11.1 suggests there is no inherent reasonableness or practicability consideration involved in analyzing Chem–Nuclear's compliance. The definition of "minimize" provided by Chem–Nuclear and DHEC accords with this interpretation. Thus, we rely on their definition of minimize—"to reduce to the smallest possible amount, extent, size, or degree"—in analyzing DHEC's and the ALC's determinations of compliance.

14 DHEC argues in its petition for rehearing that we "misapprehended the requirement of subsection 7.11.11.1" because "[t]he regulation does not require a design that prevents rainfall onto the disposal units." We do not believe our opinion can be fairly read to require Chem–Nuclear to prevent all rainfall onto the disposal units. Rather, the opinion is written to the requirement in subsection 7.11.11.1 that Chem–Nuclear "minimize" rainfall. *See* § 7.11.11.1 (requiring that Chem–Nuclear design and construct its disposal units and engineered barriers "to *minimize* the migration of water onto the disposal units" (emphasis added)). We chose the phrase "prevent even one raindrop from migrating onto one active vault or trench" in contemplation of the reality that to minimize rainfall onto disposal units, Chem–Nuclear must start by taking some action in an attempt to stop one drop of rain. We are struck by the lack of any evidence that Chem–Nuclear has taken any action to stop any rainfall onto the disposal units.

15 Noncompliance with subsection 7.11.11.1 would not conclusively establish non-compliance with this subsection. Subsection 7.11.11.1 regulates the migration of "water," while subsection 7.11.11.2 regulates the migration of "waste[-] contaminated water." Thus, the fact that water migrates onto and, subsequently, out of disposal units does not itself violate this subsection. A violation occurs only when water is allowed to come in contact with waste and waste-contaminated water then migrates out of disposal units.

16 This regulation imposes requirements for the design and construction of "disposal units" and "engineered barriers." While Chem–Nuclear has monitoring wells to test the groundwater for contamination and a system to monitor water accumulation in trenches, neither of these qualifies as a disposal unit. *See* § 7.2.8 (defining "disposal unit" as "a discrete portion of the disposal site into which waste is placed for disposal"). To the extent they are considered engineered barriers —"a man-made *structure or device* that is intended to improve the land disposal facility's ability to meet the performance objectives in this part," § 7.2.9 (emphasis added)—there is no evidence these monitoring "devices" allow Chem–Nuclear to collect and test this water "without the contamination of the groundwater." § 7.11.11.4.

17 These regulations provide the Environmental Protection Agency's definition of "leachate collection system" as stated in the regulations for "surface disposal" of "sewage sludge," 40 C.F.R. § 503.20(a) (2011), and "dispos[al] of hazardous waste in landfills," 40 C.F.R. § 264.300 (2011).

18 In deciding whether Chem–Nuclear's operations met the ALARA standard, the 2005 order appropriately weighed Chem–Nuclear's concerns regarding exposure to workers because an ALARA analysis involves balancing the benefit to the general public with the risk associated with worker exposure. *See* 24A S.C.Code Ann. Regs. 61–63 § 7.20 (1992) ("Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection ... [and] governed by 7.18."). In determining compliance with the technical requirements of subsection 7.11.11.4, however, we consider the actions taken by Chem–Nuclear to comply, not the reasons why it decided not to implement a certain measure based on its own ALARA analysis.

19 Subsections 7.11.11.1 and 7.11.11.2 explicitly regulate the migration of *water* onto disposal units and the migration of *waste* and *waste-contaminated water* out of disposal units. This distinction between "water," "waste," and "waste-contaminated water" in these subsections supports a conclusion that these regulations seek to prevent waste and waste-contaminated water from infiltrating the soil and groundwater beneath disposal units. Thus, we narrowly construe subsection 7.11.11.7 as applying to only the prevention of waste, and not waste-contaminated water, from coming in contact with the soil. To the extent the ALC relied on evidence related to subsections 7.11.11.1 and 7.11.11.2, we hold the ALC erred in that regard.

20 "Disposal site" is defined as "that portion of a land disposal facility which is used for disposal of waste" and "consists of disposal units and a buffer zone." 24A S.C.Code Ann. Regs. 61–63 § 7.2.7 (1992).

21 *See S.C. Coastal Conservation League v. S.C. Dep't of Health & Envtl. Control,* 390 S.C. 418, 429, 702 S.E.2d 246, 252 (2010) (noting "a regulation has the force of law").

22 A footnote in the ALC's order states Chem–Nuclear conducted these studies and DHEC "concurred with the report's evaluation of the issues." The record does not contain the results of these studies or the reasons DHEC chose not to amend the license requirements as a result of the report. The basis of DHEC's decision not to amend the license or impose additional requirements for operating the facility is not before this court. While DHEC must enforce—and Chem–Nuclear must comply with—the regulations, it is not our place to disagree with DHEC as to how it should enforce its own regulations, or mandate how Chem–Nuclear should comply with these regulations. We merely review the ALC's and DHEC's determinations of compliance without passing judgment upon the technical aspects of how this compliance is accomplished.

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SC Court of Appeals

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Respondent,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Petitioners.

CHEM-NUCLEAR SYSTEMS, LLC'S REPLY TO THE SIERRA CLUB'S RETURN TO PETITIONS FOR REHEARING

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TO: THE HONORABLE JUDGES OF THE SOUTH CAROLINA COURT OF APPEALS:

COMES NOW the Petitioner, Chem-Nuclear Systems, LLC ("Chem-Nuclear"), pursuant to Rules 221 and 240 of the South Carolina Appellate Court Rules, and respectfully submits this Reply to the Return to Petitions for Rehearing submitted by the Respondent, Sierra Club.

ARGUMENT AND CITATION OF AUTHORITY

A. There Is A Significant Difference Between "Reversing A Permit" And Reversing The ALC's Decision. Sierra Club Incorrectly Asserts That *S.C. Code Ann.* § 1-23-610 Authorizes The ALC Or This Court Of Appeals To Revoke Chem-Nuclear's Operating License Without DHEC Action.

Chem-Nuclear disputes the validity of this Court's remedy based on the potential lack of procedural protections prior to revocation. Chem-Nuclear does not dispute that 1) DHEC has the authority, if warranted, to revoke the license for the Barnwell LLRW disposal facility; 2) the ALC has jurisdiction and authority to review and affirm (or reverse, modify, or remand) such revocation; and 3) this Court has the authority to affirm the Final Order and Decision of the ALC which would give effect to the revocation (or reverse, or remand). But, neither this Court nor the ALC can revoke the license *ab initio*. This Court's and the ALC's authority arise from the statutory authorizations contained in S. C. Code Ann. Sec. 1-23-600 and 1-23-610 governing administrative and judicial review of contested cases. A DHEC-initiated revocation proceeding constitutes an action that gives rise to a contested case in accordance with S. C. Code Ann. Sec. 1-23-310.

While S. C. Code Ann. Sec. 1-23-610 is authority for this Court's review and disposition of an ALC Final Order and Decision, it is not authority for *ab initio* revocation of Chem-Nuclear's license. As is demonstrated by the definition of a "contested case" in the Administrative Procedures Act, any licensing procedure, including revocation, gives rise to a contested case. S. C. Code Ann. Sec. 1-23-310 (3) and (4). The contested case presently subject to judicial review by this Court was a renewal of an existing license, not revocation of an existing license. Revocation of Chem-Nuclear's license gives rise to a new contested case. Should DHEC determine that Chem-Nuclear's license should be revoked, and if Chem-Nuclear challenged DHEC's determination using the procedures in S. C. Code Ann. Sec. 44-1-60, than the ALC's jurisdiction would be triggered to review the revocation. But this Court's remedy ignores these jurisdictional issues and administrative processes.

B. Sierra Club Misrepresents The History Of This Litigation History By Claiming Chem-Nuclear Failed To Appeal This Court of Appeals' Prior Conclusion That The Technical Requirements Under *S. C. Code Ann. Reg.* 61—63 Part VII, 7.11.11, Are In Addition To And Are Not Limited By The Performance Objectives.

In the 2010 *Chem-Nuclear I* Petition for Rehearing and Petition for Writ of Certiorari, Chem-Nuclear specifically challenged the problematic conclusion in *Chem-Nuclear I* [1] addressing the application of ALARA. Chem-Nuclear argued in

[1] This Court of Appeals stated that "we believe section 7.11 imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address whether Chem-Nuclear is in compliance with section 7.11." Chem-Nuclear I, 387 S.C. 424, 435, 693 S.E.2d 13, 19.

efforts to seek review of *Chem-Nuclear I* that "[u]nder ALARA, the Barnwell Facility must first meet the dose requirements contained in Part III of Reg. 61-63" before any additional compliance determinations are made.[2]

Chem-Nuclear is cognizant of this Court of Appeals' 2010 rejection of that argument as a ground for rehearing, but such rejection does not, as the Sierra Club asserts, constitute a complete bar to a similar subsequent challenge based on this Court' of Appeals' additional findings related to ALARA in *Chem-Nuclear II*, discussed more fully below.

C. The Sierra Club Mischaracterizes Chem-Nuclear's Arguments Regarding ALARA's Applicability When Determining Compliance with *S. C. Code Ann. Reg.* 7.11.11.

The Sierra Club asserts both Chem-Nuclear and DHEC are barred by principles of judicial finality from raising certain issues. The effect of *Chem-Nuclear I* is judicial finality as to the issues decided. "After the remittitur is sent down from an appellate court, the trial court acquires jurisdiction to enforce the judgment and take any action consistent with the appellate court ruling."[3] Matters decided by the appellate court cannot be reheard, reconsidered, or relitigated in the trial court, even under the guise of a different form.[4] The

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[2] *See* Petition for Rehearing of Respondent Chem-Nuclear Systems, LLC, p.10.

[3] Muller v. Myrtle Beach Golf & Yacht Club, 313 S.C 412, 438 S.E.2d 248 (1993); Christy v. Christy, 317 S.C. 145, 452 S.E.2d 1 (Ct.App.1994).

[4] 5 C.J.S., Appeal and Error, § 975(a) (West Group 1993).

"decision of the appellate court is final as to all questions decided [and it] is the duty of the trial court to follow the decision of the appellate court."[5]

In *Chem-Nuclear I* it appears that the following issues were finally resolved by this Court of Appeals and, therefore, not subject to later trial or appellate court challenge:

1) Chem-Nuclear's compliance with all applicable regulatory provisions except for *S. C. Code Ann. Regs.* 7.23.6, 7.11, and the sections in *S. C. Code Ann. Reg.* 7.10 which the ALC had not addressed;

2) Sierra Club's preservation of the issue of compliance under *S. C. Code Ann. Regs.* 7.11 and 7.23.6 for review;

3) This Court of Appeals' conclusion that *S. C. Code Ann. Reg.* 7.11 "impose[d] additional compliance requirements"[6] and ALARA was not sufficient to demonstrate compliance with *S. C. Code Ann. Reg.* 7.11; and

4) the conclusion that *S. C. Code Ann. Reg.* 7.23.6 imposed additional compliance requirements for Chem-Nuclear.

Contrary to the Sierra Club's "assertions", Chem-Nuclear is not attempting to challenge these matters which became final as of the 2010 remittitur to the ALC. This Court of Appeals, in *Chem-Nuclear II*, went well beyond the *Chem-Nuclear I* when determining that "minimize" meant "eliminate." Seeking to distinguish the regulatory requirement to "minimize" from the Sierra Club's claim that "no water should be allowed to enter the trenches," DHEC and Chem-Nuclear utilized a reasonable definition -- "to reduce to the smallest possible

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5 5 C.J.S., Appeal and Error, § 975(a); Ackerman v. McMillan, 324 S. C. 440, 442 477 S. E. 2d 267, 268 (1996).

6 Chem-Nuclear I, 387 S.C. 424, 435, 693 S.E.2d 13, 19.

amount, extent, size or degree."[7] This definition contemplates reduction, not total elimination. Yet this Court of Appeals determined that Chem-Nuclear was not compliant with S. C. Code Ann. Reg. 7.11 because Chem-Nuclear had failed to eliminate the presence of all rainfall into the disposal trenches. Moreover, this Court of Appeals disregarded and/or ignored the qualifier contained in the definition – "reduction to the smallest amount ***possible***."

This Court of Appeals went well beyond its findings in Chem-Nuclear I related to the standard for review of compliance with S. C. Code Ann. Reg. 7.11.11. This Court of Appeals determined that ALARA[8] was not a consideration in evaluating Chem-Nuclear's compliance with S. C. Code Ann. Reg. 7.11.11.[9] This is an expansion of this Court of Appeals' 2010 determination ALARA "would not be sufficient."[10] The term "sufficient" is defined "as much as is needed."[11] It does not mean either "irrelevant" or "inapplicable."

D. The ALC Engaged In More Than A "Result-Based" Analysis When Concluding Chem-Nuclear Had Satisfied The Requirements Of *S. C. Code Ann. Reg.* 7.11.11 And Chem-Nuclear Can Identify Measures Which Have Been Taken To Minimize Rainfall Into The Trenches.

The ALC's findings and conclusions demonstrate analysis of much more than mere site performance for determination of compliance with S. C. Code

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7 Chem-Nuclear II, 2014 WL 3734366, *11

8 This effectively means that worker exposure is not a consideration when determining what technical steps are necessary for compliance with R. 7.11.11.

9 Chem-Nuclear II, 2014 WL 3734366, *16 n.15.

10 Chem-Nuclear I, 387 S.C. 424, 435, 693 S.E.2d 13, 19.

11 American Heritage Dictionary of the English Language, p.___.

Ann. Reg. 7.11.11. The ALC analyzed, in factual detail, the disposal practices in relation to the requirement to minimize contact between water and disposal units and water and waste. The ALC's analysis related to the design and function of the trenches, vaults, and waste containers:

> The floor in that [Class A] trench is sloped at the corner locations, and a drainage system is installed to facilitate monitoring of water infiltration entering the trench. . . . . French drain and sump system on the floor of the B/C trench allows monitoring of any water that accumulates in the trench. . . . . The entire slit trench floor is filled with coarse drain sand and sloped to one end. Standpipes to monitor water accumulation are installed periodically along the length of the trench.

(R.pp. 13-14). These are just a few of the multiple factual findings that the ALC provided related to measures taken by Chem-Nuclear to satisfy the technical requirements of *S. C. Code Ann. Reg.* 7.11.11. It is inaccurate to characterize the ALC's analysis as merely "result based." Moreover, Chem-Nuclear has identified additional measures taken to achieve technical compliance with *S. C. Code Ann. Reg.* 7.11.11 since the initial hearing before the ALC in 2005 including 1) transition to the smaller trench type – the B/C trench; 2) the use of temporary covers over empty or partially filled vaults; and 3) the use of temporary covers over large components placed directly in the trench.**12**

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12 *See* Petition for Rehearing of the Petitioner Chem-Nuclear Systems, LLC, fn. 54. The petition was filed on 13 August 2014. It is true that Chem-Nuclear's counsel did not provide this information in response to this Court of Appeals' questions during oral argument due to the dilemma of offering information not contained in the appellate record. Notwithstanding, given the tenor of the Chem-Nuclear II opinion, counsel believes it important and significant for this Court of Appeals to be aware Chem-Nuclear continues to refine and improve its disposal practices and make technological improvements at the Barnwell facility.

E. **Chem-Nuclear Does Not Object To The Development Of A Compliance Plan, But Opposes This Court Of Appeals' Legal Standard Which Completely Disregards The Significance Of Evaluating Exposure To Workers Pursuant to ALARA.**

The Sierra Club apparently misunderstands Chem-Nuclear's objectives in seeking a stay. Chem-Nuclear has no objection to development of a compliance plan. In fact, Chem-Nuclear has a long practice of coordinating with DHEC on site improvements and continues to do so at present. Chem-Nuclear does, however, oppose a legal standard dictating a compliance plan which compromises worker health and safety for the sake of a minimal, if any, reduction in contaminants at the compliance point for a facility which has an excellent operations and performance record. Under the "standard" articulated by this Court of Appeals, which exceeds the *Chem-Nuclear I* directives, no consideration in developing the compliance plan is given to potential worker doses pursuant to ALARA.**13** It is, at best, premature to develop a compliance plan before the legal standard for review of such plan is finally clarified through the appellate process. The potential for unnecessary worker exposure is the driving force behind Chem-Nuclear's impetus to seek rehearing and, if necessary, certiorari review, prior to submitting or implementing a compliance plan.

S. C. Code Ann. Reg. 61-63 Part VII 7.18 provides for "Protection of the General Population from Releases of Radioactivity" and is applicable to workers during operations. *See* 7.20. These standards require that "[r]easonable effort

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13 "Matters decided by the appellate court cannot be reheard, reconsidered, or relitigated in the trial court, even under the guise of a different form." *See* 5 C.J.S., Appeal and Error, § 975(a); Ackerman v. McMillan, 324 S. C. 440, 442 477 S. E. 2d 267, 268.

should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable" and "[e]very reasonable effort should be made to maintain radiation exposures as low as is reasonably achievable." This Court identifies this as a "performance objective." And, while Chem-Nuclear is cognizant that compliance with these standards alone does not demonstrate compliance with the requirements of 7.11.11, the standards in 7.18 and 7.20 are still relevant. A reduction at the compliance point, accomplished through technical changes to operations, may not be reasonable under 7.18 and 7.20 if it results in additional exposure to workers. And, since any release is already well below the regulatory compliance limit, the beneficial effect of may be outweighed by the possibility of unjustified worker doses.

F. Chem-Nuclear Has Maintained Its Position On The Points Raised In The Petition Throughout These Protracted Proceedings Related To The Relicensing Of The Barnwell Low-Level Radioactive Waste Disposal Facility.

In 2010, this Court of Appeals determined that remand was appropriate because the ALC had failed to address compliance with *S. C. Code Ann. Regs.* 61-63 Part VII 7.11 and 7.23.6. This Court of Appeals further determined these issues had been raised by Sierra Club through general reference to *S. C. Code Ann. Reg.* 61-63 in the Sierra Club's Pre-Hearing Statement to the ALC.[14] This Court of Appeals further concluded that a reference to *S. C. Code Ann. Reg.* 61-

[14] The Sierra Club's general reference to S. C. Code Ann. Reg. 61-63 was in response to the ALC's request to provide specific statutory and regulatory grounds relevant to the proceeding before the ALC.

63 Part VII 7.11 in a post-trial proceeding sufficiently satisfied the "ruled on" test and preserve these issues for appellate review.

Chem-Nuclear agrees that parties have a duty to raise issues in a fashion which allows development of a full and fair record sufficient to support resolution of the appealed issues. Chem-Nuclear has suffered significant prejudice from Sierra Club's "identification" and "preservation" of issues after the trial record closed, as well as from Sierra Club's persistent opposition to Chem-Nuclear's efforts to supplement the appellate record with crucial information and/or documentation which would have directly addresses these issues, specifically Chem-Nuclear's compliance with the technical requirements of *S. C. Code Ann. Reg.* 61-63 Part VII 7.11.11.

Sierra Club's incorrectly contends Chem-Nuclear is making new claims and arguments in its Petition for Rehearing. On 25 March 2010, Chem-Nuclear filed its initial Petition for Rehearing in *Chem-Nuclear I*,**15** and later filed a Petition for Certiorari with the South Carolina Supreme Court.**16** Chem-Nuclear sought review based on the following allegations of error:

1) There was no regulatory requirement mandating that the engineered barriers had to prevent all migration of tritium from the disposal facility;

2) The engineered barriers cannot be evaluated separate and apart from the overall Part VII performance objectives; and

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15 Sierra Club v. S.C. Dept. of Health and Envtl. Control, 387 S.C. 424, 693 S.E.2d 13 (Ct.App. 2010) ("Chem-Nuclear I").

16 This Court of Appeals denied Chem-Nuclear's Petition for Rehearing by order dated 3 May 2010. The South Carolina Supreme Court denied the Petition for Writ of Certiorari by order dated 21 July 2011.

3) The Court of Appeals had misapprehended ALARA within the regulatory scheme of S. C. Code Ann. Reg. 61-63; and

4) S. C. Code Ann. Regs. 7.11 and 7.23.6 were not applicable to a request to renew a license.

Chem-Nuclear's Petition for Rehearing filed in this *Chem-Nuclear II*[17] case is entirely consistent with the issues Chem-Nuclear raised in 2010, seeking to challenge *Chem-Nuclear I*.[18] Even though this Court of Appeals' remittitur rendered *Chem-Nuclear I* final, as is discussed herein, such finality did not render the arguments Chem-Nuclear asserted previously as either inappropriate or inapplicable to this Court of Appeals' determinations in *Chem-Nuclear II*. This is especially true given the fact that in Chem-Nuclear II, this Court of Appeals expanded its original opinion and legal conclusions in *Chem-Nuclear I* and included new findings and conclusions in its *Chem-Nuclear II* review of the ALC's Final Order and Decision on Remand.

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17 Sierra Club v. S.C. Dept. of Health and Envtl. Control, ___ S.C. ___, ___ S.E.2d ___ (Ct.App. 2014) (2014 WL 3734366, filed 30 July 2014) ("Chem-Nuclear II").

18 *See* Petition for Rehearing of Respondent Chem-Nuclear Systems, LLC and supporting memorandum of law filed on 25 March 2010.

OGC

CONCLUSION

Based upon the foregoing arguments and citation of authority, the Respondent, Chem-Nuclear Systems, LLC, respectfully requests this Court of Appeals to grant a rehearing in this matter in order to reevaluate and review this Court of Appeals' recent decision herein.

Respectfully submitted:

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9 September 2014

NPCOL1:3971051.1-MO-(SPG) 049893-00002

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SC Court of Appeals

STATE OF SOUTH CAROLINA
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Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Of whom Chem-Nuclear Systems, LLC is the

Petitioner.

CERTIFICATE OF SERVICE OF CHEM-NUCLEAR'S REPLY TO THE SIERRA CLUB'S RETURN TO PETITION FOR REHEARING

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I, Stephen P. Groves, Esquire, hereby certify that on 9 September 2014, served one copy each of ***Chem-Nuclear's Reply to the Sierra Club's Return to Petition for Rehearing*** submitted on behalf of the Respondent, Chem-Nuclear Systems, LLC, on all counsel of record herein via United States Mail, postage pre-paid, and addressed as follows:

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STATE OF SOUTH CAROLINA
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Appeal from the Administrative Law Court
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Sierra Club,

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South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Respondent South Carolina Department of Health and Environmental Control's *Reply* to Appellant's Return to Petition for Rehearing

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The Respondent South Carolina Department of Health and Environmental Control (DHEC or the Department) hereby replies to the Return of Appellant Sierra Club to the Department's Petition for Rehearing of this Court of Appeals' July 30, 2014 decision:

Technical Requirements and Performance Objectives

Appellant misstates the Department's position with regard to the important connection between the technical requirements of subsection 7.11.11 and the performance objectives of sections 7.18 (ALARA) through 7.21. (Sierra Club Return, p.3). The Department does not argue that the technical requirements are only relevant to achieve the performance objectives or that there is no "significance or value" to the technical requirements outside of whether the

performance objectives have been met. (Sierra Club Return, p.3) Rather, it is the Department's position that the technical requirements of subsection 7.11.11. cannot be isolated from the performance objectives in sections 7.18 through 7.21. As Appellant correctly notes, the low-level radioactive disposal regulations are multi-layered, comprehensive and complex. (Sierra Club Return, p.2). This is evidenced by the interconnectivity of the technical requirements and performance objectives throughout Part VII and why the regulation must be read as a whole rather than read in its component parts in isolation. (DHEC Petition, pp. 4, 12).

Moreover, Appellant is incorrect in stating this issue not preserved for consideration by the Court of Appeals. (Sierra Club Return, p.3). The Department filed a Petition for Rehearing of the Court of Appeals' March 10, 2010 decision on March 25, 2010. In the Petition for Rehearing, the Department asked for reconsideration and modification of the Court's opinion to clarify that section 7.11 cannot be pursued in a manner that disregards or is detrimental to ALARA considerations expressed in Part VII of the regulation. Respondent Chem-Nuclear filed a Petition for Writ of Certiorari after the Petition for Rehearing was denied. In its Return to Chem-Nuclear's Petition for Certiorari, the Department joined in Chem-Nuclear's argument to the extent it supported the Department's position that the requirements of section 7.11 do impose compliance requirements that have been satisfied by Chem-Nuclear. Sierra Club opposed the Petition, in part arguing that there was not a final determination. The issue concerning the relationship between the technical requirements and performance objectives of Part VII is properly preserved for appeal here, is a proper issue for consideration after remand to the ALC, and it an appropriate ground for sustaining the decision of the ALC.

Subsection 7.11.11.2

The Department fully understood the instructions on remand to the ALC in *Chem-Nuclear I.* The Department does not contend that the ALC on remand was to make new factual findings. (Sierra Club Return, p. 10). In following the Court's instructions, the ALC applied to the fullest extent possible the 2005 factual findings and determined compliance with subsection 7.11.11.2. Yet, this Court found that the ALC erred in relying, in part, on the absence of specific negative findings to further support its determination that Chem-Nuclear had complied with this subsection. (DHEC Petition, p.7). This Court used the absence of findings in the 2005 Order to conclude that Chem-Nuclear was not in compliance with the regulation, thus shifting an impossible burden of proof to the Respondents. (*Chem-Nuclear II,* p.).

Subsection 7.11.11.4

There is one finding in the 2005 ALC Order that says, "None of the trenches at the Chem-Nuclear site have an impermeable liner or a leachate collection system." (2005 Order, Finding No.102). Subsection 7.11.11.4 contains no requirement for a leachate collection system, and nowhere in Part VII of the regulation is there a definition or reference to a leachate collection system. The Court of Appeals created a definition of a leachate collection system and applied it as the compliance standard for this subsection. As the Department noted in its Petition for Rehearing, there are numerous findings that support compliance with this subsection, and this Court erroneously created and applied a compliance standard that is not supported in the regulation. (DHEC Petition, p. 8). The Department could not have previously challenged or disputed the leachate collection system requirement because it has only now been introduced by the Court of Appeals as a compliance requirement.

The 2005 Report

The Department's issue with the 2005 report is not, as Appellant states, that this Court could not consider that some changes have been made to address concerns related to rainfall. (Sierra Club Return, p. 15). The Department's issue is that this Court improperly assumed that DHEC did not require Chem-Nuclear to take any action or make any changes to its disposal practices, and this assumption "casts doubt upon DHEC's decision to renew the license." (*Chem-Nuclear II,* p.19). The mere existence of the report, which was not part of the record on appeal and the details of which were not known to the Court, should not be used to cast doubt on the Department's decision to renew the license or as evidence that DHEC failed to enforce the law. Furthermore, because the report was not part of the record, it would not have been appropriate for the Department – even in the Petition for Rehearing – to demonstrate how a report would change this Court's result. (Sierra Club Return, p. 15).

The Remedy

In response to Appellant's arguments on the sufficiency of the remedy, the Department refers to and incorporates herein the arguments contained in the Department's Petition for Rehearing.

CONCLUSION

For the reasons stated in the Department's Petition for Rehearing, and for the reasons set forth above, the Department respectfully requests that this Court grant its Petition for Rehearing.

Respectfully Submitted,

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September____, 2014
Columbia, South Carolina

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SC Court of Appeals

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

CERTIFICATE OF SERVICE

I, Sandra R. Wessinger, Legal Assistant for the South Carolina Department of Health and Environmental Control, hereby certify that I have on this **8th day of September, 2014,** served a copy of Respondent SCDHEC's ***Reply to the Return to Petition for Rehearing*** upon all parties and counsel of record in the above-captioned case, via United States Mail, First Class, postage prepaid, addressed as follows:

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September 8, 2014
Columbia, SC

Sandra R. Wessinger
Sandra R. Wessinger

THE STATE OF SOUTH CAROLINA

In the Court of Appeals

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SC Court of Appeals

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

Case No. 04-ALJ-07-0126-CC

Sierra Club . . . . . Appellant,

vs.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, ... Respondents.

APPELLANT'S RETURN TO RESPONDENTS' PETITION FOR REHEARING

The Appellant Sierra Club hereby responds to Respondent Chem-Nuclear and Respondent DHEC's Petitions for Rehearing.

STANDARD FOR REHEARING

South Carolina Appellate Court Rule 221 allows a party to petition the court for rehearing to demonstrate points supposed to have been overlooked or misapprehended by the court. SCACR 221. "The purpose of a petition for rehearing is not to present points which lawyers for the losing parties have overlooked or misapprehended, nor is it the purpose of the petition for rehearing to have the case tried in the appellate court a second time." Arnold v. Carolina Power & Light Co., 168 S.C. 163, 167 S.E. 234 (1933); Kennedy v. S. Carolina Ret. Sys., 349 S.C. 531, 532, 564 S.E.2d 322 (2001); see also Jean H. Toal, Shahin Vafai & Robert Muckenfuss,

Appellate Practice in South Carolina 309 (1999). In order to prevail, Respondents Chem-Nuclear and DHEC cannot present new arguments, but must show how the Court overlooked the arguments made before the court.

ARGUMENT

Chem-Nuclear's Barnwell facility is one of only three radioactive nuclear waste disposal sites in the United States. Waste is not simply stored at the Barnwell facility, but is permanently "disposed" there. (Disposal is defined as "isolation of wastes from the biosphere inhabited by man and his food chains by emplacement in a land disposal facility," Subsection 7.2.6). As this Court and the parties well know, the radioactive nuclear waste disposal regulations are multi-layered, comprehensive and complex. The breadth and complexity of the regulations is not surprising given the nature of the materials that are being buried in South Carolina's soils. Chem-Nuclear's Barnwell Facility is the only site of its kind in the State, thus the regulations necessarily apply broadly and comprehensively to its disposal activities.

Yet, throughout their Petitions for Rehearing, both Chem-Nuclear and DHEC try to dissuade this Court from ensuring compliance with every single one of those regulatory requirements, effectively arguing that some portions of the regulations should trump or supercede the provisions in Subsection 7.11.11. On the whole, Chem-Nuclear and DHEC suggest that since Chem-Nuclear is in compliance with Part III and other sections of the regulations, that is enough and the license does not need to meet the specific requirements of 7.11.11. Chem-Nuclear and DHEC's arguments ask the Court to ignore the plain language of specific regulatory provisions, as well as DHEC's interpretation of the word "minimize," in favor of more loosely-defined and less restrictive provisions in other regulatory sections addressing different criteria.

Technical Requirements are Separate and Distinct Criteria from Performance Objectives

DHEC now complains that this Court overlooked the "crucial interplay" between the performance objectives and the technical requirements of Part VII.[1] (DHEC Petition, p. 1). DHEC's complaint centers around its argument that the technical requirements are only relevant to the extent that they help achieve the performance objectives. (DHEC Petition, p. 2). In other words, DHEC assigns no significance or value to the technical requirements outside of whether the performance objectives have been met. That argument must fail for two reasons. First, the Court of Appeals in 2010 concluded that the technical requirements are *in addition to, not limited by,* the performance objectives. DHEC did not seek review of that decision and thus it is not preserved for review. "A decree from which no appeal is taken becomes the law of the case in all subsequent proceedings involving the same parties and the same subject matter is the well-settled law in this state, and it is therefore unnecessary to enter upon any extended discussion of this postulate." Matheson v. McCormac, 187 S.C. 260, 196 S.E. 883, 884 (1938). See also In re Morrison, 321 S.C. 370 n. 2, 468 S.E.2d 651 n. 2 (1996) (noting that an unappealed ruling becomes the law of the case and precludes further consideration of the issue on appeal); Anonymous (M-156-90) v. State Bd. of Med. Examiners, 323 S.C. 260, 278, 473 S.E.2d 870, 879 (S.C. Ct. App. 1996) rev'd, 329 S.C. 371, 496 S.E.2d 17 (1998); State v. Sullivan, 310 S.C. 311, 426 S.E.2d 766 (1993) (to preserve an issue for appellate review, appellant must object at the first opportunity).

[1]DHEC's attempt to distinguish this Court's 2010 ruling that Section 7.11.11 imposes additional requirements beyond the performance objective from this Court's 2014 ruling that 7.11 contains technical requirements for disposal unit and engineered barrier specifications is strained. Both times this Court has heard this appeal, there has been a clear recognition that Section 7.11 required more than the performance based standards.

Second, DHEC's argument simply does not make intuitive sense. DHEC argues that "evidence that the performance objectives have been met is appropriate to demonstrate compliance with other requirements of the regulation." (DHEC Petition, p. 2). If that is the case, then there would be no need for the "other requirements," and specifically technical requirements of 7.11.11. Sierra Club agrees that the requirements of 7.11.11 are designed to meet objectives, but that does not diminish the requirements of the regulations or the clear language used: to "minimize the migration of water onto disposal units" and "minimize the migration of water out of disposal units." DHEC is correct that the provisions of 7.11.11 do not tell Chem-Nuclear precisely the specific actions that it must take to meet the requirements; rather, they allow DHEC and Chem-Nuclear some discretion in determining how minimization, detection, monitoring and remediation will be achieved. Moreover, the regulations cannot be interpreted to allow DHEC and Chem-Nuclear to actively encourage the migration of water out of disposal units.[2] If Section 7.11.11 of the regulations are to have any meaning, they must be applied as this Court did in its recent Order.

Finally, DHEC is foreclosed from arguing that the technical requirements of Sections 7.11 and 7.23.6 do not apply or are superseded by the performance objectives because this Court, in Chem-Nuclear I, rejected that argument finding that the technical requirements of Sections

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[2]It is uncontradicted that the disposal units are designed to be unsealed, ungrouted, left open while being filled with radioactive waste, with holes in the bottoms such that water is encouraged to enter into and flow out of the units. The engineered barriers are not sealed or grouted against water intrusion, thus allowing and encouraging rain to enter the vaults. There are holes in those engineered barriers to allow water that has been in contact with waste to flow out of the barriers, as well as to allow groundwater to rise up into the vaults, which has happened in the past. (R. p. 48, 2005 Order, FF# 55). The engineered barriers include partially impermeable floors to allow water that has fallen into and flowed out of vaults, coming into contact with waste, to infiltrate into the surrounding soil.

7.11 impose ***additional*** requirements beyond the performance objectives. Chem-Nuclear I, 387 S.C. at 436, 693 S.E.2d at 19. In its 2014 Order, this Court reiterated that "subsections 7.11.11 and 7.23.6 require Chem-Nuclear to take action to design and construct the disposal site, disposal units, and engineered barriers to meet the specifications in those subsections." Chem-Nuclear II, citing Chem-Nuclear I at 423, 435, 436.

Chem-Nuclear's reason for not achieving the requirements of 7.11.11 is to fall back on the performance objectives of 7.18 – the as low as reasonably achievable ("ALARA") standard. One regulation cannot be used to defeat compliance with another . . . (Chem-Nuclear Petition, p. 5 & 15-16). Essentially, where the Court has found that the ALARA standard is a lower standard than the design standards in Section 7.11.11, Chem-Nuclear asks that the ALARA standard in Part III be controlling over Part VII and utilized to negate the requirements of 7.11.11. (Chem-Nuclear Petition, p. 16). Chem-Nuclear tells this Court that compliance with one part of the regulations is proof that it has complied with another, technical, part. The Court's ruling is consistent with the regulations confirming that Part CII is "in addition to, and not separate[] from the remaining parts of 61-63." (Chem-Nuclear Petition, p. 17). If the Court had concluded otherwise, then there would be no need for Section 7.11.11 because it would serve no useful purpose. plain and ordinary meaning of the terms. New York Times Co. v. Spartanburg County School Dist. No. 7, 374 S.C. 307, 649 S.E.2d 28 (2007). "[T]he primary rule of statutory construction is that the Court must ascertain the intention of the legislature . . . [, and] [t]hus, the court will reject the agency's interpretation where it is specifically contrary to the statute or regulation." Commissioners of Public Works v. DHEC, 372 S.C. 351, 359 (Ct. App. 2007) (quotations omitted). Courts will reject statutory interpretations that lead to absurd results clearly

unintended by the legislature or that defeat the plain legislative intent. Peake v. SCDMV, 375 S.C. 589, 599, 654 S.E.2d 284, 289; Kiriakides v. United Artists Commc'ns, Inc., 312 S.C. 271, 275, 440 S.E.2d 364, 366 (1994)). Furthermore, the appellate court must presume the legislature intended to accomplish something with an enacted statute and did not intend for a section or provision to be purposeless or futile. Duvall v. S.C. Budget and Control Bd., 377 S.C. 36, 42, 659 S.E.2d 125, 128 (2008).

The Technical Requirements of 7.11.11 Require More Than a Results-Based Analysis

Importantly, even if the Court agreed with DHEC that "the results to be achieved are determinative" of whether Chem-Nuclear's license meets the requirements of Section 7.11.11, it still has a problem: Judge Geathers found that in some areas, tritium level increased between 1997 and 2001. Judge Geathers found that when tritium data is compared to rainfall data as gauged by water table levels, ***it appears that tritium concentrations have been varying with the amount of rainfall, not necessarily as a result of new storage methods***. (R. p. 46, FF # 46 (emphasis added). Thus, the "results" are not entirely favorable in a results-based analysis.

Contrary to Chem-Nuclear's arguments, this Court in 2014 did not expand the "additional compliance requirements" identified by this Court in 2010. (Chem-Nuclear Petition, p. 6). As evidenced by the opinion, this Court was fully aware of the distinction between technical requirements and performance objectives, noting that the "regulations containing technical requirements require Chem-Nuclear to take specific action to comply with the regulation, while regulations containing performance objectives require Chem-Nuclear to achieve certain results sought under the regulation." Sierra Club v. Chem-Nuclear Systems, LLC & DHEC, __S.C.__ , __S.E.2d.__ (2014 WL 3734366, filed July 30, 2014) (Chem-Nuclear II). The performance

objectives "do not impose specific requirements as to how Chem-Nuclear must accomplish any particular result," but the technical requirements do. Id. Thus, while the results being achieved at the site are relevant to whether Chem-Nuclear is meeting the performance objectives, Chem-Nuclear and DHEC cannot rest alone on "results" and must also demonstrate that the actions are being taken to meet specific requirements, for example those actions that demonstrate that migration of water onto and out of disposal units is minimized. To this day, neither Chem-Nuclear nor DHEC can identify any action being taken to minimize the migration of rainwater, as this Court clearly recognized.

The "Technical Requirement" vs. "Performance Objective" Terminology is a Distinction Without a Difference

Whether the Court referred to Section 7.11.11 as "technical requirements" or "compliance requirements" or "Conditions of Licenses" is a distinction without a difference.[3] (Chem-Nuclear Petition, p. 8-9). Similarly neither the heading of a regulation nor a permit condition are controlling in determining compliance with the regulations. (Chem-Nuclear Petition, p. 9, declaring that "7.11.11's title is clear and unambiguous").[4] What is important is the language of the regulation. Although the title and headings are part of the statute, they may not be construed

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[3]However, if it is true that the requirements of Section 7.11.11 are merely permit conditions and not stand-alone requirements for the renewal license, as argued by Chem-Nuclear, then DHEC has clearly failed to enforce those requirements. Sierra Club submits that Section 7.11.11 is a specific regulatory requirement necessary for securing a license, not just a permit condition

[4]Sierra Club would also point out that Chem-Nuclear's new argument about 7.11.11 being useful only as a permit condition and not as a separate regulatory requirement was not presented to this Court through appellate briefing and thus cannot be raised on rehearing. Arnold v. Carolina Power & Light Co., 168 S.C. 163, 167 S.E. 234 (1933).

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to limit the plain meaning of the text. Garner v. Houck, 312 S.C. 481, 486, 435 S.E.2d 847, 849 (1993) (citing Brotherhood of Railroad Trainmen v. Baltimore & O.R. Co., 331 U.S. 519, 67 S.Ct. 1387, 91 L.Ed. 1646 (1947)). For interpretative purposes, the title of a statute and heading of a section are of use only when they shed light on some ambiguous word or phrase and as tools available for resolution of doubt, but they cannot undo or limit what the text makes plain. Garner v. Houck, 312 S.C. 481, 486, 435 S.E.2d 847, 849 (1993). The title and headings of a statute may not be construed to limit the plain language of a statute, but may be used to shed light on an ambiguous word or phrase. McInnis v. McInnis, 348 S.C. 585, 592, 560 S.E.2d 632, 636 (Ct. App. 2002) (citing Garner v. Houck, 312 S.C. 481, 486, 435 S.E.2d 847, 849 (1993)).

Here, there is no doubt about what the words "minimize," "migrate," or "water" mean and those words are controlling over the headings of the regulations. This Court did not create "newly discovered" requirements, rather it applied the plain language of the text, aided by DHEC's definition of the word "minimize."

This Court's Opinion is Not Contrary to Sections 7.6 and 7.7

This Court's opinion is not contrary to Sections 7.6 and 7.7, both of which relate to the presentation of information necessary to demonstrate that other sections (the performance objectives and technical requirements) will be met. Neither section contains any standards for the manner of disposal. Section 7.6 directs the applicant to provide information to establish compliance, and specifically asks for complete "descriptions" of "design criteria" and "design features," among other things. Sierra Club submits that this section merely requires Chem-Nuclear to describe how it will design the disposal units such that they are compliant with the applicable regulatory requirements, including Subsection 7.11.11. Section 7.7 directs the

applicant to conduct analyses to establish compliance with the performance objectives. These two sections require Chem-Nuclear to produce information, but contain no technical criteria.

Section 7.11.11 is Equally Applicable to Rain as it is to Surface Water

DHEC again launches into a new argument that the "intent of subsection 7.11.11.1 is . . . that the migration of ***surface water*** onto the disposal units is minimized." (DHEC Petition, p. 5, emphasis added). DHEC's as-of-late construction of 7.11.11.1 creates a new definition of "water" as "surface water," despite its concurrence with this Court that rainwater is "water" and can "migrate" when it falls from the sky onto the vaults and trenches.[5] (DHEC Petition, p. 4). DHEC points to no legal error in the Court's conclusion that Section 7.11.11.1 requires minimization of water in the form of rain onto the vaults and trenches, it just disagrees with it.

The ALC Was Constrained by the 2005 Findings Which Are Not Under Review on Appeal

DHEC asserts that there is "substantial evidence" to support its determination that minimization of migration of water is being achieved with respect to compliance with 7.11.11.1 and 7.11.11.2. (DHEC Petition, p. 6). Contrary to DHEC's suggestion, this Court is not reviewing this appeal for "substantial evidence," nor whether the 2012 ALC Order made sufficient findings, but rather whether the ALC committed an error of law in applying the facts of the 2005 findings. (DHEC Petition, p. 6). As identified in the Order, the ALC erred in its legal conclusions as to compliance with 7.11.11.2 based on the 2005 findings that holes in the vaults

[5]Sierra Club does not dispute that some measures have been taken to reduce and minimize the contact with flowing surface water, as emphasized by Chem-Nuclear and DHEC. The site is not located in the path of an existing waterway and the trenches are sloped to divert sheet flow from rain events from the trenches so that it does not drain into the trenches. However, Chem-Nuclear's arguments fail to address the undeniable rainfall problem that was formally recognized by the ALC in 2005.

allow water to drain from and rise up into the vaults and that the trenches allow liquids to percolate into the soil. (R. p. 46, FF# 48, p. 56, FF# 103, 2005 Order).

DHEC is also wrong in its assertion that the ALC should be able "*to make additional findings* based on the existing findings." (DHEC Petition, p. 7, emphasis added). In Chem-Nuclear I, this Court *constrained* the ALC from making further findings, instead ordering the ALC on remand to apply the findings from the 2005 Order and make new conclusions of law based on the regulatory provisions not addressed in the 2005 Order. Sierra Club v. DHEC & Chem-Nuclear, 387 S.C. 424, 693 S.E.2d 13 (Ct. App. 2010).

DHEC's contention that the ALC on remand was to make new findings based on the 2005 ALC Order is contrary to this Court's 2010 Order. In its 2010 Order, this Court specifically constrained the ALC on remand to the findings of the 2005 Order. Indeed, this Court recognized in its 2014 Order that "the ALC considered on remand only the findings from the 2005 order . . . therefore, we likewise consider only the findings from the 2005 order." Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, ____S.C.____ (Ct. App. 2014) (2014 WL 3734366, filed July 30, 2014) (Chem-Nuclear II). Even Chem-Nuclear understands this Court's instructions constraining the ALC to the 2005 findings. Similarly, the ALC recognized the limitations on findings. (ALC Order, p. 2).

The ALC cannot be absolved from the obvious legal conclusion that migration of water out of disposal units is not minimized by simply proclaiming that there is "no finding" that the design "fails to minimize the migration . . . of waste-contaminated water out of disposal units." Sierra Club submits that the minimization requirement is a question of law that this Court answered based on the findings from the 2005 Order, the plain language of 7.11.11 and DHEC's

definition of "minimize."

DHEC now falls back on the "absence of specific findings" to address compliance. Sierra Club raised the issue of compliance with Regulation 7.11.11 before the ALC in 2005 by presenting evidence that Chem-Nuclear's design and disposal practices do not minimize the migration of water onto and out of the disposal units (vaults and trenches). DHEC's argument now seems to be that a lack of any evidence that Chem-Nuclear is minimizing migration of water should be read in a light favorable to the permitting agency. The absence of evidence and findings related to minimization of migration of water speak for themselves: minimization is not being achieved.

Contrary to DHEC's assertion, the Court has not created "newly conceived factors for compliance." (DHEC Petition, p. 10). Instead, the Court applied the regulatory provisions to the 2005 facts, as the ALC should have done based on the remand instructions in Chem-Nuclear I. And contrary to DHEC's assertion, the Court applied those provisions according to the "plain language" of the regulations, as well as DHEC's interpretation of "minimization." (DHEC Petition, p. 12).

The Court's Conclusions on 7.11.11 are Fully Supported by the Language Which Does Not Require Elimination, but Minimization, of Migration of Water

At base, DHEC's complaint about the compliance conclusion with Subsections 7.11.11.1 and 7.11.11.2 is that the Court applied DHEC's definition of "minimize," i.e., to "reduce to the smallest amount possible." Chem-Nuclear and DHEC exaggerate and conflate the Court's opinion to say that Chem-Nuclear must prevent any and all rainfall from entering the trenches

and "eliminate the contact of rainfall with the disposal units." (Chem-Nuclear Petition, p. 7 & 13). The Opinion is very clear that there must be an effort to "minimize" or "reduce to the smallest possible extent" the migration of rainwater onto vaults and trenches, but nowhere does the Court read the Subsection 7.11.11 as an absolute prohibition of any contact with rainwater. It is clear that Chem-Nuclear is doing nothing to reduce rainfall from entering the trenches and vaults, and DHEC is not requiring it. Instead, Chem-Nuclear and DHEC both point to measures that minimize migration of ***surface water*** onto disposal units, or measures that move water out of the trenches once it has been in contact with waste and has migrated out of the disposal vaults. This Court's proper application of the regulations to the facts requires Chem-Nuclear to take some action to reduce rainfall from entering the vaults and trenches in the first instance.

Chem-Nuclear asserts that the Court erred in concluding non-compliance with 7.11.11.1 and 7.11.11.2 because it concluded that a violation of 7.11.11.2 occurs 1) only when water comes into contact with waste and then that contaminated water migrates out of the disposal units and 2) because the holes in the vaults cause waste-contaminated water to drain into the trenches, percolating into the soil and groundwater. (Chem-Nuclear Petition, p. 19). The first "conclusion" is merely a restatement of 7.11.11.2 ("minimize migration of waste or waste-contaminated water out of the disposal units). The second "conclusion" comes directly from the findings of the 2005 Order and thus fully support the Court's conclusion on non-compliance with 7.11.11.1 and 7.11.11.2. See ALC Order, FF # 47, FF # 48, FF # 102.

This Court did not "significantly enlarge[] that original restriction placed upon the ALC" by "eliminating . . . reliance on any facts" that "demonstrate Chem-Nuclear's compliance with sections of Part VII separate from that of 7.11." (Chem-Nuclear Petition, p. 8). This Court

looked at the totality of the factual findings. Specifically, and distinct from the ALC, this Court reviewed facts related to compliance with Section 7.11.11 that were ignored or disregarded by the ALC. Those facts include: 1) DHEC's 2001 direction to Chem-Nuclear to consider temporary roofs and other conceptual trench designs to keep water out of trenches and vaults; 2) that final designs had not been submitted in 2005, despite the undeniable problem of rainfall in the vaults and trenches; 3) tritium is driven into the groundwater through rainfall in and on the disposal trenches; 4) tritium concentration varies with the amount of rainfall; 5) there is no cover or roof, so rain falls directly into the vaults during loading; 6) the vaults and trenches have no cover and are exposed to rainfall while they are active; 7) the vaults are not sealed against water intrustion. Chem-Nuclear, DHEC and the ALC would all have this Court disregard these relevant facts and place complete reliance on the fact that there are sloped trench floors, a drainage system for monitoring, backfilling of the voids between vaults, and clay caps installed *after* the trenches are filled as proof of minimizing migration of water onto the vaults and trenches. As this Court noted during oral argument and in its Opinion, those design features are relevant to detecting water once is has already migrated onto the disposal units or minimizing migration of water *after* the vaults are filled and the trenches closed and capped, but do not address rain falling onto the vaults and trenches when they are active (prior to being closed and capped).

The Court's Compliance Conclusions on Subsection 7.11.11.4 Are Supported by the 2005 Findings

This Court's conclusions regarding the lack of adequate monitoring, detection, testing and remediation measures, and specifically the lack of a "leachate collection system," derive entirely from the findings of the 2005 Order. (R. p. 56, 2005 Order, FF # 102). The findings from the

2005 Order with respect to the monitoring, detection and removal measures were never challenged or disputed by DHEC until now and thus cannot be challenged. In re Morrison, 321 S.C. 370 n. 2, 468 S.E.2d 651 n. 2 (1996) (noting that an unappealed ruling becomes the law of the case and precludes further consideration of the issue on appeal).

DHEC Not Entitled to Deference When Interpretation Contrary to Plain Language

Chem-Nuclear proposes an absolute deference to DHEC in matters related to disposal of radioactive waste because the judiciary does not have the same expertise. (Chem-Nuclear Petition, p. 23). Our courts have rejected such absolute deference to DHEC, particularly when that deference is in direct conflict with the plain language of the regulations. Engaging & Guarding Laurens Cnty.'s Env't (EAGLE) v. S. Carolina Dep't of Health & Envtl. Control, 407 S.C. 334, 755 S.E.2d 444 (2014), reh'g denied (May 7, 2014). Where an agency's interpretation of the regulation leads to a **direct conflict** with the plain language of the statutory mandate, it is an error to show the utmost deference to that interpretation by requiring a "compelling reason to differ." S.C. Coastal Conservation League v. S.C. Dep't of Health & Envtl. Control, 363 S.C. 67, 75, 610 S.E.3d 482, 486 (2005). An agency's long-standing interpretation of a statute is usually entitled to deference and should not be overruled by a reviewing court in the absence of cogent reasons, but the interpretation will not be sustained if it contradicts a statute's plain language. Etiwan Fertilizer Co., 217 S.C. 354, 359, 60 S.E.2d 682, 684 (1950). See Brown v. Bi-Lo, Inc., 354 S.C. 436, 440, 581 S.E.2d 836, 838 (2003) ("We recognize the Court generally gives deference to an administrative agency's interpretation of an applicable statute or its own regulation. Nevertheless, where, as here, the plain language of the statute is contrary to the agency's interpretation, the Court will reject the agency's interpretation." (citation omitted)).

During oral arguments DHEC admitted that rainwater is water as identified in 7.11.11. Chem-Nuclear now argues that DHEC only *applies* that regulation to "the movement of surface water." (Chem-Nuclear Petition, p. 24). Chem-Nuclear provides a strained rationale for rejecting this Court's conclusions based on 1) the misstatement that this Court required "elimination" as opposed to "minimization" and 2) its argument that 7.1.1, which provides that it is in addition to, and not a substitution for, other regulatory requirements, somehow precludes the Court's application of 7.11.11. Chem-Nuclear fails to explain exactly how this Court's interpretation of 7.11.11 is inconsistent with 7.1.1 and Sierra Club has uncovered no basis for this assertion.

The 2005 Feasibility Report

When this case was on remand to the ALC, neither DHEC nor Chem-Nuclear asked the ALC to consider the Feasibility Report, despite the topic having been specifically raised by the Administrative Law Judge on remand. Similarly, neither Chem-Nuclear nor DHEC raised the issue of this Court's denial of the motion to supplement the record with the "Feasibility Report," nor did they attempt to explain how that report could have had any impact on the issues before the Court. Even in the Petitions for Rehearing, neither Chem-Nuclear nor DHEC has made any effort to demonstrate how a report would change this Court's result.

DHEC's complaint is that because this Court could not consider the 2005 report it could not consider that some changes could have been made to address the concerns related to rainfall. (DHEC Petition, p. 5). Chem-Nuclear similarly complains that Sierra Club bears the burden of proving that neither Chem-Nuclear nor DHEC have taken any actions to address the ALC's concern, asserting that the license is "fluid" and implying that changes to address the compliance with 7.11.11 have occurred. (Chem-Nuclear Petition, p. 22). In its Motion for Imposition of

Stay, Chem-Nuclear came forth with all of the amendments that have been made to its license since 2004 and not a single one of them addresses the rainfall problems identified by the ALC in its 2005 Order.[6] (Motion for Imposition of Stay, p. 13, fn. 10). Chem-Nuclear acknowledges that shelters or covers over trenches, sealing and grouting vaults and lining trenches will achieve minimization of migration of water. (Chem-Nuclear Petition, p. 17). It does not claim that these measures would be unjustified because they would result in an unacceptable dose to employees. In fact, it has not even performed an evaluation to determine whether there would be any change in dose. (Chem-Nuclear Petition, p. 18, "Even if Chem-Nuclear performed this evaluation . . ."). If the Feasibility Report did, in fact, address the undeniable rainfall problem, the complying with this Court's remedy of developing a Compliance Plan should not be problematic for Chem-Nuclear.

Sufficiency of Remedy

Sierra Club believes that the remedy provided by this Court is fair and workable, allowing continued disposal, even though some of the technical requirements have not been met, but requiring a plan for compliance.[7] Yet DHEC argues that the remedy provided by this Court is in conflict with the basic tenets of administrative law. The argument is premised on burden-shifting and the inability of the ALC to conduct an adjudicatory review process of the compliance plan. Appellant suggests that if the Court believes there is any conflict, as an alternative either 1)

---

[6]Chem-Nuclear describes the amendments to the renewal license since 2004 in footnote 10 of its Motion and none of these amendments relate to the provisions of 7.11.11.1, 7.11.11.2, 7.11.11.4 or 7.10.7.

[7]DHEC and Chem-Nuclear had no complaints with the ALC's Order in 2005 requiring a study as a remedy.

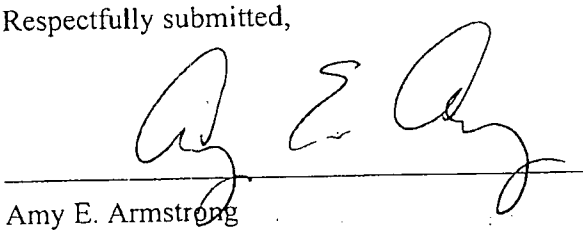
DHEC review the Plan and issue an agency decision on compliance, which could then be reviewed by the ALC, 2) remand to ALC for review of the compliance plan as part of this contested case proceeding, or 3) the license be overturned and Chem-Nuclear be ordered to discontinue accepting any waste until it has applied for and received a renewal license that meets the regulatory requirements enunciated in this Court's Opinion.

DHEC and Chem-Nuclear are wrong that this Court cannot overturn, reverse or "revoke" the permit. The Administrative Procedures Act authorizes this Court to "affirm the decision or remand the case for further proceedings; or, it may reverse or modify the decision." S.C. Code Ann. § 1-23-610.

CONCLUSION

For the reasons set forth above, the Sierra Club respectfully requests that this Court deny DHEC's Petition for Rehearing and Chem-Nuclear's Petition for Rehearing.

Respectfully submitted,



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August 29, 2014

THE STATE OF SOUTH CAROLINA

In the Court of Appeals

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

Case No. 04-ALJ-07-0126-CC

Sierra Club . . . . . Petitioner/Appellant,

vs.

South Carolina Department of Health and Environmental Control and
Chem-Nuclear Systems, ... Respondents.

CERTIFICATE OF SERVICE

I hereby certify that on this date I served the foregoing **Response to Respondent Chem-Nuclear and DHEC's Petitions for Rehearing** upon counsel for the Respondents, by placing copies of same in the United State Mail, addressed to:

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DHEC Legal Office
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Amy E. Armstrong

Georgetown, South Carolina

August 29, 2014

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SC Court of Appeals

The South Carolina Court of Appeals

Sierra Club, Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.

Appellate Case No. 2012-212791

ORDER

The Court issued its opinion in this case on July 30, 2014. DHEC and Chem-Nuclear filed petitions for rehearing, and Chem-Nuclear has requested a "Stay Pending Final Resolution of Appeals Process." We grant a temporary stay of the requirements of section V of the Court's opinion while we study the issues raised in the petitions for rehearing.

FOR THE COURT

Columbia, South Carolina

cc:
Amy Elizabeth Armstrong, Esquire
Michael Gary Corley, Esquire
Mary Duncan Shahid, Esquire
Jacquelyn Sue Dickman, Esquire
Claire Harley Prince, Esquire
Robert Guild, Esquire
Stephen Peterson Groves, Sr., Esquire

Sara S. Rogers, Esquire
The Honorable Ralph King Anderson, III

FILED
August 28, 2014

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THE STATE OF SOUTH CAROLINA

In the Court of Appeals

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SC Court of Appeals

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

73368

Case No. 04-ALJ-07-0126-CC

Sierra Club ..... Appellant,

vs.

South Carolina Department of Health and Environmental Control and
Chem-Nuclear Systems, LLC ..... Respondents.

APPELLANT'S RESPONSE TO RESPONDENT CHEM-NUCLEAR SYSTEMS, LLC'S MOTION FOR IMPOSITION OF STAY

Appellant Sierra Club submits the following response in opposition to Chem-Nuclear Systems, LLC's ("Chem-Nuclear") motion for imposition of stay (called supersedeas under SCACR Rule 241) pending final resolution of appeals process.

ARGUMENT

Standard under Rule 241

South Carolina Appellate Court Rule 241(a) sets forth the general rule that an automatic stay is in effect for the duration of the appeal, subject to the exceptions found in Rule 241(b). One of those exceptions is for appeals "from administrative tribunals as provided in S.C. Code Ann. § 1-23-380(A)(2) and § 1-23-600(G)(5)," of the Administrative Procedures Act ("APA"). SCACR

Rule 241(b)(11). This matter involves an appeal from the Administrative Law Court pursuant to the provisions of the APA, thus the automatic stay does not apply to this case. Because the automatic stay does not apply, Chem Nuclear has continued operating under the renewal license which has been the subject of this appeal for the ten (10) years that this appeal has been pending. Rule 241(c) provides that a party seeking to stay the effect of an appeal may petition the appellate court for an order of supersedeas.

In reviewing a petition for supersedeas (called a petition for imposition of a stay by Chem-Nuclear), the Court considers whether the supersedeas is necessary to preserve the jurisdiction of the appeal or to prevent a contested issue from becoming moot. SCACR Rule 241(c)(2). The general rule is that the effect of a supersedeas or stay is to suspend proceedings and preserve the status quo pending the determination of the appeal or proceeding in error. Melton v. Walker, 209 S.C. 330, 336, 40 S.E.2d 161, 164 (1946). "An order staying proceedings pending appeal to the Supreme Court . . . should be made only when it appears that the party making the application has just reason to apprehend that without a stay he would be deprived of the benefit of the favorable result of the appeal." Porter v. Lesesne, 85 S.C. 399, 67 S.E. 453 (1910). As the moving party, Chem-Nuclear bears the burden of proving stay of enforcement of the decision is warranted. Midlands Util., Inc. v. S. Carolina Dep't of Health & Envtl. Control, 287 S.C. 483, 339 S.E.2d 862 (1986).

Chem-Nuclear Fails to Provide Any Basis for Granting Supersedeas

Chem-Nuclear fails to explain how this Court or the Supreme Court's jurisdiction would not be preserved, how the case would become moot or how the status quo would be any different if it develops and implements a written compliance plan pursuant to this Court's most recent

Order. Under this Court's Order, it concluded that Chem-Nuclear's license is invalid, but did not revoke the license, rather requiring a written plan for compliance. Chem-Nuclear is authorized to continue to dispose of nuclear waste under the license, despite the Court's conclusion that "DHEC failed to enforce the law of South Carolina" by not requiring compliance with certain technical standards aimed at minimizing the migration of water onto and out of disposal units. The status quo, in the form of Chem-Nuclear continuing to dispose of waste under its license, continues under this Court's Order. Chem-Nuclear will still be operating under the license at issue, and if it were to eventually prevail in this case, it could discontinue the more protective design requirements it will have implemented under this Court's compliance plan remedy. This case will not be rendered moot by imposition of this Court's Order, nor will the jurisdiction of this Court or the Supreme Court be diminished.

Moreover, Chem-Nuclear acknowledges that the status quo has continued to change since 2005 as amendments have been made to the license. (Motion, p. 13). Given the amendments and changes to the license, it is unclear exactly what the status quo is, much less how it would be disrupted by this Court's remedy. Chem-Nuclear simply does not want to take any action to address the migration of water onto and out of disposal units or the collection, retention, testing and removal of water from disposal units.

Finally, to the extent that the development of a written compliance plan and a compliance determination by the ALC are different than the status quo, Sierra Club asserts that when a case involves "monumental hazardous conditions" related to the disposal of radioactive waste, any directive to improve those hazardous conditions should not be stayed. (2005 ALC Order, p. 13, FF # 56). The past decade's rulings indicate concern over the disposal practices at the Barnwell

facility. In 2005, the ALC recognized that the disposal practices constitute "monumental hazardous conditions," but failed to directly address the technical requirements that could reduce those hazardous conditions. (R. p. 48, FF # 56). In 2010, this Court recognized the gravity of the disposal conditions at the Barnwell facility, but without legal conclusions related to the specific technical provisions, the Court was constrained in providing a remedy. In 2012, the ALC failed to apply the relevant findings to the applicable technical provisions on remand, and finally, in 2014, this Court issued a reasoned and practical remedy. Chem-Nuclear's casual suggestion that this Court's directive for a written compliance plan may be "altogether unnecessary" is simply unfounded based on all the evidence and decisions to date.

Chem-Nuclear complains that the Court could not consider the information and documentation contained in the study it conducted pursuant to the 2005 ALC Order ("Feasibility Report"). Yet nowhere does Chem-Nuclear (or DHEC, for that matter) attempt to explain how information and documentation would change the Court's determination on non-compliance with four technical regulatory requirements. Those requirements do not involve the giving or receiving of information or documentation to DHEC, and regardless of what information and documentation Chem-Nuclear provided to DHEC, there is no question but that the license has not been amended to address the deficiencies found in both the 2005 ALC Order and this Court's 2014 Order.[1] The fact that the 2005 ALC Order did not go as far as this Court's 2014 Order to require a plan to address the deficiencies does not diminish the recognition that rainwater falls

[1]Chem-Nuclear describes the amendments to the renewal license since 2004 in footnote 10 of its Motion and none of these amendments relate to the provisions of 7.11.11.1, 7.11.11.2, 7.11.11.4 or 7.10.7.

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onto the disposal units and flows out of those disposal units by design.[2]

If the "Feasibility Report" actually addressed the deficiencies that the Sierra Club has been pointing to for nearly a decade (vault and trench designs that encourage the migration of water onto and out of those disposal units) then the matter of developing a plan in 90 days to address those deficiencies would have been unnecessary.

Chem-Nuclear continues to insist that the trend in tritium concentrations demonstrates that its disposal methods "successfully minimized the contact between waste and rain water," citing to a portion of the findings from the 2005 ALC Order (Motion, p. 8). However, Chem-Nuclear overlooks the 2005 ALC's complete findings, which indicate that in some areas, tritium levels have increased between 1997 and 2001. And when tritium data is compared to rainfall data as gauged by water table levels, it appears that tritium concentrations have been varying with the amount of rainfall, not necessarily as a result of new storage methods. (R. p. 46, FF # 46). This Court did not conclude that minimization could be "no contact whatsoever," as stated by Chem-Nuclear (Motion, p. 9), rather that it must be reduced to the smallest possible amount. Moreover, minimize cannot mean "encourage" or "promote," which is exactly the goal of the design of the vaults and trenches. Instead, as Chem-Nuclear admits, the design "allow[s] water to drain from the vaults" and "allow[s] water to migrate from the bottom of the trench." (Motion, p. 8, fn. 20).

Sierra Club does not read this Court's clear directive for the development and implementation of a plan as an "invitation" to submit a motion to stay (Motion, p. 11, fn. 30), but rather, clearly enunciating that plan development should begin immediately and is not stayed.

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[2]Contrary to Chem-Nuclear's contention, this Court did not rule that "elimination" of contact between water and waste is the standard (Motion, p. 9), but rather to "reduce to the smallest amount possible."

CONCLUSION

For the foregoing reasons, the Sierra Club respectfully requests that this Court deny Chem-Nuclear's Petition for Imposition of Stay/Supersedeas.

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August 25, 2014

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STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

73205

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

MOTION FOR IMPOSITION OF STAY PENDING FINAL RESOLUTION OF APPEALS PROCESS OF THE RESPONDENT, CHEM-NUCLEAR SYSTEMS, LLC

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Chem-Nuclear Systems, LLC

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TO: THE HONORABLE JUDGES OF THE SOUTH CAROLINA COURT OF APPEALS:

COMES NOW the Respondent, Chem-Nuclear Systems, LLC ("Chem-Nuclear"), pursuant to Rule 240(c) of the *South Carolina Appellate Court Rules*, and respectfully requests this Court of Appeals to issue an order imposing a stay upon this Court of Appeals' directive to both Chem-Nuclear and to the Respondent, South Carolina Department of Health and Environmental Control ("DHEC"), "to submit a written plan for compliance to the [South Carolina Administrative Law Court] within ninety days of [this Court of Appeals' 30 July 2014,] opinion."[1]

I. STATEMENT OF THE CASE[2]

In its Final Order and Decision issued 13 October 2005 (the "*2005 ALC Order*"), reviewed by this Court of Appeals,[3] the ALC approved renewal of Chem-Nuclear's license for operation of the low-level radioactive waste disposal facility in Barnwell, South Carolina. The ALC, however, ordered Chem-Nuclear to conduct an investigative study and submit the results to DHEC. This study included evaluation of "the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell Site that will (1) shelter the

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1 See Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, ___ S.C. ___, ___ S.E.2d ___ (Ct.App. 2014) (2014 WL 3734366, filed 30 July 2014) ("Chem-Nuclear II").

2 Chem-Nuclear previously adopted the Statement of the Case submitted by the Appellant, Sierra Club. Chem-Nuclear hereby supplements the Statement of the Case herein.

3 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 693 S.E.2d 13 (Ct.App. 2010), *rehearing denied* (3 May 2010), *certiorari denied* (21 July 2011) ("Chem-Nuclear I").

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disposal trenches from rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible."[4] Chem-Nuclear conducted the required study and forwarded the report (the "Feasibility Report")[5] to DHEC on 11 April 2006. Chem-Nuclear sought to supplement the Record on Appeal currently before this Court of Appeals with the Feasibility Report, but the Sierra Club strenuously objected to any such appellate record supplementation and this Court denied Chem-Nuclear's Motion to Supplement by Order of the Honorable Jasper Cureton, May 28, 2008.

Unfortunately, this Court of Appeals was then forced to consider this case and thereafter issue the *Chem-Nuclear I* decision without benefit of the information and documentation contained in the Feasibility Report. This Court of Appeals affirmed in part, and remanded in part the *2005 ALC Order* back to the ALC.[6] On remand this Court of Appeals "instructed the ALC to apply the factual findings from its 2005 Order in determining. . . whether Chem Nuclear [wa]s in compliance with DHEC *Regulation* 61-63, Part VII, Sections 7.10.5 through 7.10.10, 7.11, and

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4 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193 (S. C. Admin. Law. Judge.Div., filed 13 October 2005). (R.pp.36-66).

5 The report was entitled Evaluation of the Scientific and Economic Feasibility for Implementing New Designs and Operational Procedures at the Barnwell Site as Directed by the South Carolina Administrative Law Court Order Dated October 13, 2005.

6 Chem-Nuclear I, 387 S.C. 424, 693 S.E. 2d 13.

7.23.6." (R.p.2).[7] These instructions foreclosed any opportunity by Chem-Nuclear to present the Feasibility Report.

The ALC, on the remand, concluded "[the Sierra Club] must demonstrate, by a preponderance of the evidence, that renewal is not authorized based on the ALC's factual findings in the *2005 [ALC Order]* as applied to the sections of R. 61-63 discussed above." (R.p.22). The ALC concluded "[the Sierra Club] failed to carry that burden, [determining] that the factual findings in the 2005 Decision, when applied to 24A *S. C. Code Ann. Reg.* 61-63, [§§] 7.10.5-7.10.10, 7.11, and 7.23.6, demonstrate that the Barnwell Facility is compliant with these regulations and that renewal of License No. 097 was proper." (R.p.22). The ALC reached this conclusion on remand without the benefit of the study and the Report, since review was foreclosed by this Court's remand instructions.

The Sierra Club appealed and this Court of Appeals issued its decision in *Chem-Nuclear II* on 30 July 2014, affirming in part and reversing in part, the ALC's 20 July 2012, order on the initial remand. Chem-Nuclear now submits its **Motion for Imposition of Stay**, as well as its contemporaneously filed **Petition for Rehearing**.[8]

II. STATEMENT OF THE FACTS

Chem-Nuclear operates a low-level radioactive waste ("LLRW") disposal facility in Barnwell County, South Carolina (the "Barnwell Facility") on property

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7 *Chem-Nuclear I*, 387 S.C. 424, 439, 693 S.E. 2d 13, 20-21.

8 Chem-Nuclear is informed and believes that DHEC will be filing similar motions/petitions with this Court of Appeals, although separate from those filed by Chem-Nuclear.

generally contiguous to the Savannah River Site. (R.p.38, para. 1).**9** Chem-Nuclear began disposal operations at the Barnwell Facility in 1971 pursuant to License No. 097 (R.p.38, para. 1) and has been the sole operator of the Barnwell Facility since that year. (R.p.38, paras. 1, 2). DHEC has previously renewed License No. 097 seven times. (R.p.38, para. 1; R.p.42, para. 18). Including DHEC's seven renewals, License No. 097 has been amended some 57 times. (R.p.38, para. 1; R.p.42, para. 18). The most recent license renewal, constituting the then 49th amendment**10**, is the subject of the underlying contested case (R.p.42, para. 18) and the present appeal.

In 2000, almost 30 years after Chem-Nuclear commenced disposal operations at the Barnwell Facility, the South Carolina Legislature enacted the *Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act* (the "*Compact Act*")**11** which designated the Barnwell Facility as the Atlantic Compact's

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9 Beginning in the early 1950s, the Savannah River Site historically produced the basic material used in the fabrication of nuclear weapons. *See* www.srs.gov/general/about/history1.htm.

10 There have been subsequent amendments to the renewed license since DHEC's authorization of Amendment 49 on March 15, 2004. These subsequent amendments are not reflected in the Record on Appeal. Amendment 50 addresses implementation of increased controls of radioactive materials of concern. Amendment 51 imposes additional security requirements for fingerprinting and background checks of supervisors at the disposal facility. Amendment 52 relates to inventory reporting requirements for nationally tracked sealed sources. Amendments Nos. 53-55 and 57 updated the license users. Amendment No. 56 was for a training procedure change. As previously noted, there have been 57 total amendments as of the date of this motion.

11 *See* S.C. Code Ann. §§ 48-46-10, *et seq.* (Thomson Reuters West 2010). Through this legislation, South Carolina joined the Atlantic Low-Level Radioactive Waste Compact (the "Atlantic Compact") along with Connecticut and New Jersey. S.C. Code Ann. §§ 48-46-30(3) (Thomson Reuters West 2010); S.C. Code Ann. §§ 48-46-60(5)(B) (Thomson Reuters West 2010).

LLRW regional waste disposal facility.**12** The *Compact Act* established declining limits on LLRW volumes which could be disposed of at the Barnwell Facility until Fiscal Year 2008. .**13** Following expiration of the declining limits, the disposal facility could only receive waste from the three Atlantic Compact States. Consequently, since Fiscal Year 2008-2009, the Barnwell Facility has received only approximately anywhere between a high of 35,000 cubic feet per year of LLRW and a low of 8,500 cubic feet, from the member states. (R.p.38, para. 3 – R.p.39, para. 1).

Tritium,**14** a radioactive isotope of hydrogen, undisputedly moves through the groundwater at the Barnwell Facility. (R.pp.43-44, paras.24-35).**15** Since 1974, using an extensive system of groundwater monitoring wells, Chem-Nuclear and DHEC have been able to map a fairly exact tritium dispersal "plume". (R.pp.43-44, para. 29; R.p.50, para. 65). Groundwater becomes surface water in Mary's Branch Creek, beyond the boundaries of the property owned by the State of South Carolina and leased by Chem-Nuclear, but, nevertheless, within the confines of property adjoining the disposal facility and owned by Chem-Nuclear. (R.p.44, para. 32). The first point in Mary's Branch Creek where a hypothetical member of the general

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12 *See* S.C. Code Ann. §§ 48-46-40 (Thomson Reuters West 2010).

13 S.C. Code Ann. § 48-46-40(A)(6) (Thomson Reuters West 2010). Commencing in Fiscal Year 2008-2009, the Compact Act limited the Barnwell Facility to the acceptance of disposal of in-region LLRW only. S.C. Code Ann. § 48-46-40(A)(6)(a) (Thomson Reuters West 2010). This has resulted in a substantial reduction of waste volumes entering the facility.

14 Tritium has a half-life of 12.3 years and decays to approximately one-fourth of its original quantity of radiation in 24.6 years. (R.p.43, para. 27).

15 Tritium admittedly migrates with rainwater and groundwater (R.p.43, para. 24) and was first discovered in the Barnwell Facility's trenches in 1974. (R.pp.43-44, para. 29; R.p.50, para. 65).

public *might* receive a dose of radiation is the compliance point for purposes of DHEC's monitoring. (R.p.44, para. 32).**16**

The highest concentration of tritium detected in Mary's Branch Creek, from a sample taken in July 2001, resulted in a hypothetical annual dose of 5.7 *mrem*, a mere 22.8% of the allowable federal and state regulatory limits. (R.p.45, paras. 39, 41). Sampling data disclosed at the ALC's 2005 hearing provided evidence that there had been a declining trend inthe tritium concentrations at the compliance point. (R.p.45, paras. 39, 41; R.pp.47-48, para. 52).**17** Moreover, the "tritium plume" originated as a consequence of early disposal practices. (R.pp.43-44, para. 29).**18** The use of engineered barriers,**19** groundwater travel time, and decay have

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16 The compliance point approved by DHEC is an appropriate point of compliance in that it provides for measuring compliance consistent with Section 7.18 of the regulation. (R.pp.44-45, paras. 32, 37-38). The evidence demonstrated that tritium has a travel time through groundwater of 30 years between the trenches and Mary's Branch Creek. (R.p.47, para. 49). The regulatory limit for exposure to a member of the public to radioactive materials is the equivalent of an annual dose of 25 millirems ("mrem") to the whole body. (R.p.44, para. 33). *See generally* 24A S.C. Code Ann. Regs. 61-63, § 7.18 (Thomson Reuters West 2010). As noted, the exposure levels involved herein are just above one-fifth of the allowable level. Moreover, the regulatory limit dose is based on a hypothetical member of the public drinking two (2) liters of the allegedly "contaminated" water per day every day for a year.

17 Furthermore, the compliance point (*i.e.*; point of Tritium release) is located on real property controlled by Chem-Nuclear. (R.p.44, para. 32). Access to the Mary's Branch Creek at the point of release is restricted as the area is fenced and, in addition, is heavily vegetated. (R.p.44, para. 32; R.p.45, para. 42). There are no known consumers and/or users of Mary's Branch Creek in and around the compliance point. (R.pp.45-46, para. 43). The particular property, including Mary's Branch Creek, is the subject of a Restrictive Covenant prohibiting the use of the groundwater and surface water as a drinking water source. (R.p.46, para. 44). Moreover, there are no known drinking water wells down gradient of the Barnwell Facility. (R.pp.45-46, paras. 42-45).

18 A considerable amount of waste disposed during the early years of operations of the Barnwell Facility was packaged in unreliable containment and waste forms like paper or cardboard. (R.pp.43-44, para. 29).

ensured that tritium concentrations at the compliance point remain, as noted, at a level of some 22.8% or ***just over one-fifth*** of the federal and state allowable limits. (R.p.46, para. 46).

Waste is transported to the Barnwell Facility in casks, or containers, such as high-integrity polyethylene disposal containers (R.pp.56-57, para. 107) which are placed in rectangular and cylindrical reinforced concrete vaults stacked at least two high on the trench floor. (R.p.53, para. 82-84). Voids between vaults are backfilled for stability within the trench and the vaults are covered with a clay cap. (R.p.53, para. 84). Once trenches are filled they are covered with an enhanced cap consisting of clay overlain by polyethylene and bentonite materials, sand, and topsoil to allow for vegetation growth. (R.pp.53-54, para. 85).**20**

The trend in groundwater concentrations of tritium near trenches constructed with engineered barriers, attributed to better containment of waste and work controls processes, demonstrates that Chem-Nuclear has successfully minimized the contact between waste and rain water. (R.pp.56-57, para. 107). Moreover, Chem-Nuclear has implemented a surface water management plan to manage precipitation collected in the trenches. (R.pp.56-58, paras. 105-113). Water is

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19 In 1995, Part VII of Regulation 61-63 was amended to require engineered barriers for all waste disposed at the Barnwell Facility. (R.p.40, para. 9). The primary engineered barriers used at the Barnwell Facility since 1995 are concrete vaults and enhanced capping of trenches. (R.p.42, para. 20; R.p.51, para. 72). These amendments resulted in South Carolina's regulations governing LLRW becoming more stringent than the NRC's regulations.

20 The concrete vaults are not sealed against water intrusion and the vault floors contain holes to allow water to drain from the vaults. (R.p.46, para. 47; R.p.56, para. 101). The bottoms of the trenches are lined with sandy clay that is not compacted nor designed to be impermeable. (R.pp.53-56, paras. 81-103). Rather, it is designed to allow water to migrate from the bottom of the trench. (R.pp.53-56, paras. 81-103).

sampled, analyzed, and pumped, to prevent contacting vaults, into adjacent trenches or a lined pond. (R.p.58, para. 117).

The Sierra Club asserted, and this Court of Appeals essentially agreed, that the law[21] requiring Chem-Nuclear to ***minimize*** contact between the waste and rain water actually means that Chem-Nuclear must prevent ***any and all*** contact between waste and rain water (*i.e.*; there can be ***no contact*** whatsoever). Rain undisputedly enters the trenches at the Barnwell Facility which are still active and open (*i.e.*; still receiving material, in the process of being covered over, *etc.*). (R.p.47, para. 49; R.p.56, para. 101). However, through the use of engineered barriers and work control processes Chem-Nuclear has effectively eliminated all of the actual contact between the waste and rain water (R.p.58, para. 117), although contact between waste and ground water has not been completely eliminated.[22]

In concluding that the requirements of *S. C. Code Reg.* 61-63, 7.11.11, required the elimination of contact between water, disposal units, and waste, this Court of Appeals concluded that subparts 7.11.11 provided "a strict standard for compliance . . . ."[23] In so concluding, this Court of Appeals improperly trivializes the applicability of subpart 7.20 – ***Protection of Individuals During Operations***. That provision requires that "[o]perations at the land disposal facility shall be

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21 *See* 24A S.C. Code Reg. § 61-63, Part VII (Thomson Reuters West 2010).

22 Nevertheless, the lengthy groundwater travel time, the engineered barriers, and the extended decay rates of radioactive materials all operate together to ensure that any release of radioactive material would be and, indeed, is well below the applicable regulatory limits.

23 Chem-Nuclear II, ___ S.C. ___, ___, ___ S.E.2d ___, ___, fn. 11. (2014 WL 3734366, *21).

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conducted in compliance with the standards for radiation protection set out in Part III[**24**] of these regulations . . . .].**25** Most importantly, those provisions, although not considered, much less addressed, by this Court of Appeals in Chem-Nuclear II, requires that "[e]very reasonable effort should be made to maintain radiation exposures ***as low as is reasonably achievable***."**26**

III. ARGUMENT AND CITATION OF AUTHORITY

This Court Of Appeals Should Impose A Stay On All Directives In The Chem-Nuclear II Opinion Until Such Time As The Appellate Process Has Been Fully Concluded

In the *Chem-Nuclear II* decision, this Court of Appeals directed Chem-Nuclear and DHEC "to submit a written plan for [Chem-Nuclear's] compliance [with the requirements and objectives of Part VII of 24A *S.C. Code Ann. Regs.* §§ 61-63] to the ALC within [90] days of this opinion."**27** Secondarily, this Court of Appeals also directed the following to occur:

> The ALC shall promptly determine if Chem–Nuclear will come into compliance with the regulations under the plan. If the ALC determines the plan will bring Chem–Nuclear into compliance, it shall set a schedule for Chem–Nuclear to promptly implement the plan. If the ALC determines the plan will not bring Chem–Nuclear into compliance, it shall issue an order

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24 Part III of S. C. Code Reg. 61-63 addresses the Standards for Protection Against Radiation. Chem-Nuclear's position, as set forth in the contemporaneously filed Petition for Rehearing, is that it is error for this Court of Appeals to impose a strict interpretation of the requirements of 7.11.11 without necessary qualifying that interpretation on light of the important safety considerations set forth in subpart 7.20.

25 S. C. Code Ann. Reg. 61-63 Part VII 7.20

26 S. C. Code Ann. Reg. 61-63 Part VII 7.20

27 Chem-Nuclear II, ___ S.C. ___, ___, ___ S.E.2d ___, ___ (2014 WL 3734366, *21).

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> revoking Chem–Nuclear's license [to operate the Barnwell Facility].**28**

On the one hand, this Court of Appeals specifically provided that "an order of the ALC revoking Chem–Nuclear's license will be stayed while a [P]etition for [R]ehearing is pending before this [C]ourt [of Appeals], or while a [P]etition for [C]ertiorari is pending before the [S]upreme [C]ourt.**29** However, on the other hand, this Court of Appeals did not provide for a stay of (a) Chem-Nuclear's undertaking and/or production of the required written compliance plan, (b) the ALC's consideration of the required written compliance plan, or (c) the ALC's actual rendering of a written decision on whether the required written compliance plan would bring Chem-Nuclear into conformity with the applicable regulations.**30**

As this Court of Appeals is aware, Chem-Nuclear has contemporaneously filed a *Petition for Rehearing* with this Court of Appeals seeking a review of the *Chem-Nuclear II* decision. DHEC has filed a similar petition with this Court of Appeals. Even though such "petitions for rehearing" are seldom granted by the panel rendering the original decision, there is always the possibility that members of this Court of Appeals may wish to have this matter reheard. Moreover, as this Court of Appeals is aware, Chem-Nuclear's and DHEC's filing of their respective Petitions for Rehearing, is a necessary and required step for them both in the

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28 Chem-Nuclear II, ___ S.C. ___, ___, ___ S.E.2d ___, ___ (2014 WL 3734366, *21).

29 Chem-Nuclear II, ___ S.C. ___, ___, ___ S.E.2d ___, ___ (2014 WL 3734366, *21).

30 This Court of Appeals did indicate that the "requirement of a written plan will not be stayed except by order of this [C]ourt [of Appeals] or the [S]upreme [C]ourt," Chem-Nuclear II, ___ S.C. ___, ___, ___ S.E.2d ___, ___ (2014 WL 3734366, *21), thereby somewhat impliedly inviting submission of the instance motion.

process for Chem-Nuclear and DHEC to seek certiorari review of *Chem-Nuclear II* by the Supreme Court.**31**

Given the possibility of some alteration to, modification of, and/or outright reversal of the *Chem-Nuclear II* decision on (1) either the original panel's rehearing review, or (2) upon the Supreme Court's certiorari review, Chem-Nuclear believes that this Court of Appeals should impose a stay on the following activities until such time as the appellate process has been fully and finally concluded:

> (a) the directive and requirement that Chem-Nuclear undertakes to compile, assemble, and produce the required written compliance plan;
>
> (b) the directive and requirement that Chem-Nuclear and DHEC submit the required written compliance plan to the ALC within 90 days of 30 July 2014;
>
> (c) the directive and requirement that the ALC' promptly consider and make a determination whether the required written compliance plan will bring Chem-Nuclear in compliance with the relevant regulations, and
>
> (d) the implied directive and requirement that the ALC render a written decision regarding whether the required written compliance plan would bring Chem-Nuclear into conformity with the applicable regulations.

Chem-Nuclear believes that the requested stay is warranted on the grounds that the *status quo* should be maintained at present until the appellate process has been given the opportunity to run its full course since such activities

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31 *See generally* Rules 219, 221, 242, SCACR.

which Chem-Nuclear seeks to stay may ultimately be found to be either different than that ordered by this Court of Appeals or altogether unnecessary. Importantly, the status quo as relates to disposal operations has changed significantly since the appellate record was created before the ALC in 2005.**32** Furthermore, the *status quo* should be maintained at present given the fact that Chem-Nuclear, as far as the regulatory bodies are concerned, is in compliance with the applicable regulations governing its operations at the Barnwell Facility.

Alternatively, if this Court is not inclined to stay the directives set forth above, at a minimum fairness and justice would dictate a stay of the ALC's determination of Chem-Nuclear's compliance, since the standard for compliance is, or may be, or will be rendered uncertain by Chem-Nuclear's and DHEC's respective pending requests for re-hearing by this Court of Appeals and for certiorari review of *Chem-Nuclear II* by the Supreme Court.

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32 In addition to the amendments listed in footnote 10, Chem-Nuclear has developed procedures, reviewed by SCDHEC, to shelter waste from wet weather prior to disposal, to place temporary covers on large components in open trenches, and to place temporary lids on vaults that are only partially full. Chem-Nuclear has shifted to the smaller B/C trenches which reduce the potential for collection of water.

V. CONCLUSION

Based upon the foregoing arguments and citation of authority, the Respondent, Chem-Nuclear Systems, LLC, respectfully requests this Court of Appeals to impose a stay on all directives set forth in the Chem-Nuclear II decision issued on 30 July 2014, until such time as the appellate process herein has been fully and finally concluded. Alternatively, Chem-Nuclear Systems, LLC, seeks a stay on the directives to the ALC, as the standard by which the ALC would review and make determinations of the submitted plan is rendered uncertain by Chem-Nuclear Systems, LLC's intent to seek re-hearing and review.

Respectfully submitted:

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13 August 2014

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STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

RECEIVED
AUG 13 2014
SC Court of Appeals

Appellant,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Proof of Service
for the Motion for Imposition of Stay
of the Respondent, Chem-Nuclear Systems, LLC

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I, Stephen P. Groves, Esquire, hereby certify that on ___ August 2014, served one copy each of the ***Motion for Imposition of Stay*** submitted on behalf of the Respondent, Chem-Nuclear Systems, LLC, on all counsel of record herein via United States Mail, postage pre-paid, and addressed as follows:

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13 August 2014

NPCOL1:3935727.1-NT-(MSHAHID) 049893-00002

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STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

PETITION FOR REHEARING

Respondent South Carolina Department of Health and Environmental Control respectfully petitions for a rehearing on the following grounds:

I. The Opinion Overlooked and Misapprehended the Relationship between the Technical Requirements and Performance Objectives within Regulation 61-63, Part VII.

By narrowly defining and separating "action-based" technical requirements from "results-based" objectives, the Court overlooks and misapprehends the crucial interplay of the performance objectives and requirements of Part VII. The overarching purpose of the Part VII requirements is to ensure that the performance objectives of subsection 7.18 (ALARA) through 7.21 are met, and that the issuance of the license is based on a finding by the Department that it

will not constitute an unreasonable risk to the health and safety of the public.[1] The direct connection between the technical requirements and the performance objectives is evidenced throughout Part VII. Section 7.17 requires that "land disposal facilities be sited, designed, operated...so that reasonable assurance exists that exposures to individuals are within the requirements established in the performance objectives in 7.18 through 7.21." Section 7.7 requires that "specific technical information shall also include the following analyses needed to demonstrate that the performance objectives of this part will be met." Section 7.1.1 provides that the requirement for issuance of a license is based upon a finding by the Department that the issuance of the license "will not constitute an unreasonable risk to the health and safety of the public." Meeting the technical requirements of Part VII of the regulation is driven by achieving the performance objectives and ensuring no unreasonable risk to the public's health and safety.

Importantly, subsection 7.6.3 speaks directly to the connection between the technical requirements and performance objectives. Section 7.6 describes specific technical information "needed for demonstration that the performance objectives and applicable technical requirements will be met." According to subsection 7.6.3, the technical information must include "a description of the principal *design criteria* and their relationship to the performance objectives." Subsection 7.11.11.1 requires that the disposal units be *designed and constructed* to minimize migration of water onto the trenches. The requirements of the regulation cannot be divorced from the performance objectives, and evidence that the performance objectives have been met is appropriate to demonstrate compliance with other requirements of the regulation.

The technical requirements of subsection 7.11.11 are constructed to meet seven listed *objectives*. Subsections 7.11.11.1 and 2 do not contain specific actions to minimize migration of

[1] 24A S.C. Code Reg. Ann. 61-63, subsection 7.1.1, 24A S.C. Code Reg. Ann. 61-63, section 7.18. "ALARA" means "as low as reasonably achievable" for the release of radioactivity in effluents to the general environment.

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water onto the disposal units or to minimize migration of waste or waste-contaminated water out of the disposal units. Subsection 7.11.11.4 does not contain specific actions on how to meet the requirements for the temporary collection and retention of water for a time sufficient to allow for detection and removal or other remedial measures without contamination of groundwater or surrounding soil. Because specific actions are not prescribed in these subsections, it is the results to be achieved are determinative, and evidence of these results is appropriate to show compliance.

In contrast, some technical requirements in Part VII do require specific actions, for example, subsection 7.24.2 of Part VII, which requires that Class C waste be disposed "so that the top of the waste is a minimum of 5 meters below the top surface of the cover..." This requirement illustrates a specific action that must be taken for near surface disposal of Class C waste. Other technical requirements in Part VII may contain requirements for specific actions such as subsection 7.24.2 or, in the case of subsection 7.11.11, may be written as *objectives* to achieve certain results. The technical requirements are written to meet the performance objectives, and results-based evidence is appropriate to show the technical requirements have been met.[2]

The Court in the present Order imposed a new standard for technical requirements in determining that the ALC erred in finding compliance with subsections 7.11.11.1, 2, and 4. The Court's interpretation misapprehends or overlooks the holding of the Court in *Chem-Nuclear I.*[3] In *Chem-Nuclear I*, the Court found that "section 7.11 imposes additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient

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[2] See Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, ____ S.C. ____, ____ S.E.2d ____ (Ct.App. 2014) (2014 WL 3734366, *5, filed July 30, 2014) (hereinafter referred to as "*Chem-Nuclear II*).

[3] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 435, 693 S.E. 2d at 13,18 (Ct. App. 2010), *rehearing denied* (3 May 2010), *certiorari denied* (21 July 2011) (hereinafter referred to as *Chem-Nuclear I*).

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to address whether Chem–Nuclear is in compliance with section 7.11," and instructed the ALC to apply the factual findings from the 2005 Order to determine compliance.[4] The Court in *Chem-Nuclear II* restates and narrows the holding by adding that "the [specific] technical requirements" of "section 7.11" require Chem-Nuclear to "take action to design and construct the disposal units and engineered barriers to meet the specifications in those subsections."[5] The ALC on remand properly followed the instructions of the Court in *Chem-Nuclear I* to look beyond the ALARA standard. Now the Court imposes a new standard of compliance. The Court misapprehended the framework of the Part VII requirements by ignoring the interconnectivity of the technical requirements and performance objectives, and redefining the compliance standard that was not part of the instructions to the ALC on remand. This resulted in an improper conclusion by the Court that subsections 7.11.11.1, 7.11.11.2, 7.11.11.4, and subsection 7.10.7 were not met.

II. The Court misapprehended the requirement of subsection 7.11.11.1 when it found that Chem-Nuclear was not in compliance.

The Court misapprehended the requirement of subsection 7.11.11.1 when it found that "the record in this case conclusively demonstrates Chem-Nuclear has taken no action to *prevent* even one raindrop from migrating onto one active vault or trench."[6] The regulation does not require a design that prevents rainfall onto the disposal units. It requires that the disposal units and engineered barriers be designed and constructed to meet the *objective* of minimizing the migration of water onto the disposal units. Shallow land disposal by definition cannot provide absolute isolation from the elements, including rainfall.[7] Without disputing the Court's characterization that rainfall is water or that raindrops could be characterized as migrating from

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[4] *Chem-Nuclear I at 18.*
[5] *Chem-Nuclear II,* *7.
[6] *Chem-Nuclear II,* *12.
[7] Final Joint Brief of Respondents Chem-Nuclear Systems, LLC and South Carolina Department of Health and Environmental Control, R. p.17.

the sky, the regulation, taken as a whole supports the Department's interpretation of the regulation that the intent of subsection 7.11.11.1 is not to prevent rain falling directly onto a disposal unit, but rather that the migration of surface water onto the disposal units is minimized. This interpretation is reinforced by the requirements of subsection 7.6.6 which requires construction of the land disposal facility to include information on methods to control surface water and groundwater access to wastes. The conditions of Chem-Nuclear's license also confirm that subsection 7.11.11.1 addresses the migration of surface water. Condition 71.B of the license requires that the trenches be protected to prevent surface water runoff from entering active trenches.[8] License condition 73 requires Chem-Nuclear to use proper surface water management techniques to insure that surface runoff is directed away from the trenches.[9] The Court misapprehended the scope of subsection 7.11.11.1 by finding that rainfall onto the trenches is not minimized, and overlooked the fact that this subsection addresses the migration of water, not the prevention of direct rainfall.

The Court concluded that the findings and directives from the 2005 Order concerning the 2001 DHEC request to review trench construction details and the 2005 report ordered by the ALC, support the importance of implementing measures to address rainfall onto the disposal units.[10] The Court concluded that no measures are currently in place to address concerns related to rainfall on the disposal trenches. Since the 2005 report is not in the record, there is no way for the Court to know what was evaluated, and what changes were or were not made as a result. In *Chem-Nuclear I,* the Court denied Respondent Chem-Nuclear's motion to supplement the record on appeal to include the 2005 report.[11] To now use the 2005 report to negatively infer that

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[8] Chem-Nuclear License No. 097, Condition 71.B., R. p.111.
[9] Chem-Nuclear License No. 097, Condition 71.B., R. p.111.
[10] *Chem-Nuclear II,* *12.
[11] *Chem-Nuclear I,* Order on Motion to the Supplement the Record on Appeal, Court of Appeals, 27 May 2008.

neither Chem-Nuclear nor DHEC took any action in response to the report's findings, or to cast doubt on DHEC's enforcement of the requirements of subsection 7.11.11.1 improperly constrains the Department's ability to respond to the Court's statements.

III. The Court misapprehended or overlooked the requirements of subsection 7.11.11.2

Concluding that Respondent Chem-Nuclear is minimizing waste out of the disposal unit, but is not minimizing waste-contaminated water out of the disposal unit misapprehends the requirement of this subsection. The Court stated that "the fact that water migrates onto and, subsequently, out of disposal units does not itself violate this subsection. A violation occurs only when water is allowed to come into contact with waste *and* waste-contaminated water then migrates out of the disposal units."[12] (emphasis added). The Court agreed that Chem-Nuclear minimized the migration of waste out of the disposal units and had taken action to reduce the migration of waste-contaminated water out of the disposal units, but found that it did not "reduce to the smallest amount possible."[13] The ALC found, and the Court agreed, that the use of disposal containers prevents waste from coming into direct contact with water that enters vaults, which reduces of migration of waste-contaminated water out of vaults. The Court also agreed with the ALC's finding that the drainage holes in the vaults allow water to drain away from the waste and decrease the likelihood that water entering the vaults will become contaminated. The Court overlooks the sufficiency of the ALC's findings as substantial evidence that supports compliance with the objectives of subsection 7.11.11.2.

The Court found that "the ALC could not rely on the fact that the 2005 Order did not contain the conclusion we ordered the ALC to make on remand - whether, based on the factual findings in the 2005 Order, the disposal units minimized the migration of waste-contaminated

[12] *Chem-Nuclear II,* fn. 12.
[13] *Chem-Nuclear II,* *14.

water out of them."[14] Herein lies the conundrum faced by the ALC. The ALC was constrained by the Court's instructions in *Chem-Nuclear I* to make additional findings based on the existing findings in the 2005 Order. As directed on remand, the ALC used the record to the fullest extent possible to determine compliance with this subsection. and the Court acknowledged that the record supported that Chem-Nuclear had taken measures to reduce the migration of waste-contaminated water out of disposal units.

Yet the Court found that the ALC erred in relying in part on the absence of negative findings in the 2005 Order to further support its determination that Chem-Nuclear had complied. The lack of findings in the 2005 Order is not indicative of a lack of compliance with the subsection. Some of the issues remanded were not specifically addressed in the 2005 findings, but the ALC was nonetheless confined to them. Thus the Court shifts an impossible burden of proof to the Respondents.

IV. The Court misapprehended subsection 7.11.11.4 in its application of requirements for a leachate collection system.

By applying a definition of leachate and leachate collection system that is not part of the regulation, the Court misapprehends the requirements of subsection 7.11.11.4 and overlooks the findings in support of a conclusion that the requirements are being met. Even though the regulation does not require a "leachate collection system," the Court uses a definition of leachate collection system as the compliance requirement for subsection 7.11.11.4. The Court first adopts a definition of "leachate" that is taken from an appendix to a federal regulation establishing criteria for the disposition of tailing and waste from uranium mills.[15] The Court then adopts a definition of a "leachate collection system" by using definitions in the United States

[14] *Chem-Nuclear II*, *15.
[15] *Chem-Nuclear II*, *16.

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Environmental Protection Agency regulations for the management of sewage sludge units under the federal Clean Water Act and the management of hazardous waste disposal units under the federal Resource Conservation and Recovery Act.[16] The Court then applies these unrelated definitions to a leachate management system that is not part of subsection 7.11.11.4. The adoption of inapplicable requirements that do not account for the fact that the management of low-level radioactive waste is different than for the management sewage sludge, hazardous waste, and highly radioactive uranium tailings, resulted in the Court improperly redefining the requirements of subsection 7.11.11.4.

The Court overlooked the findings that show the disposal units are constructed and designed to meet the *objective* of subsection 7.11.11.4. The factual findings in the record show that in the trenches, there is a layer of sand on the sloped floor to aid in directing water to the French drains; any water entering the French drains is directed to the sumps. Standpipes have been placed in the sumps to detect water. [17] Water may be pumped into an adjacent pond, preventing infiltration into the surrounding soils. Read in conjunction with the objective of subsection 7.11.11.3 – detection of water and other liquids in the disposal units - these measures, while not defined as a leachate collection system in the regulation, serve to meet the purpose of such a system. This is further evidenced by requirements of subsection 7.6.6 requiring the description of the construction and operation of the land disposal facility to include methods to control surface water and groundwater access to the wastes.

The Court noted that "[I]n determining compliance with the technical requirements of subsection 7.11.11.4, however, we consider the actions taken by Chem-Nuclear to comply, not the reasons why it decided not to implement a certain measure based on its own ALARA

[16] Id.
[17] *2005 Order,* pp. 18-20.

analysis."[18] This statement illustrates the flaw in the Court's separation of ALARA from the technical requirements of Part VII. The Court misapprehended and overlooked the totality of the regulatory framework, and isolated individual requirements from the regulation as a whole. A determination of technical compliance requires consideration of action taken with ALARA being part of the evaluation.

Again, the absence of findings in the 2005 Order does not mean that the regulations at issue here are not being met. The Court found that the ALC erred because it cited "no additional evidence" of Chem-Nuclear's compliance with the "testing" of water pumped from the trenches under subsection 7.11.11.4. The absence of a specific finding in the 2005 Order regarding testing should not be used by this Court to assume that Chem-Nuclear is not testing. Again, the conundrum is a newly conceived issue against a record limited to the 2005 findings. The absence of a specific finding does not support a conclusion that Chem-Nuclear failed to comply with the regulation or that DHEC failed to enforce the law.

V. The Court misapprehended the regulatory framework in holding the ALC erred in affirming the Department's determination that Chem-Nuclear complied with subsection 7.10.7.

The Court misapprehended and overlooked the fact that the Department renewed Chem-Nuclear's license based upon a demonstration by Chem-Nuclear that provided reasonable assurance that the technical requirements of the part were met.[19] The Court concluded that because it found Chem-Nuclear was not in compliance with subsections 7.11.11.1, 2, and 3, DHEC "failed to enforce the law" as to these subsections. The Court found in *Chem-Nuclear I* that section 7.11 imposed additional compliance requirements, and "it is no longer reasonable for DHEC to argue Chem-Nuclear complied with subsection 7.10.7 without considering what action

[18] *Chem-Nuclear II,* fn. 15.
[19] 24A S.C. Code Ann. Regs. 61-63, subpart 7.10.7.

Chem-Nuclear took to comply with the 'specific technical requirements' of 7.11.11."[20] The Court has misapprehended the critical connection between the requirements of Part VII and the performance objectives and has created its own narrow framework that imposed "specific actions" onto the stated objectives in subsection 7.11.11. Having established a new interpretation of the requirements of subsection 7.11.11, the Court then faults the ALC and DHEC for the absence of specific findings from the 2005 Order that address the Court's newly conceived factors for compliance.

Part of the Court's concern that DHEC did not follow the law was DHEC's decision not to amend the requirements for issuance of the license after the ALC instructed Chem-Nuclear to submit a report to DHEC on the feasibility of covering trenches and sealing vaults.[21] The Court stated that while the report's evaluation was not before it, the fact that DHEC did not require Chem-Nuclear to take *any* action or make *any* changes to its disposal practices "casts doubt upon DHEC's decision to renew the license." The Court improperly based this determination in part on matters that are outside of the record. The 2005 report is not part of the record on appeal and there is no evidence in the record as to the actions DHEC did or did not require as a result of the report. The Court assumed there were no changes based on the report even though it acknowledged that it did not know the results of the studies or the reasons for the Department's concurrence. The Court used a report not in the record and the details of which were not known to it to cast doubt on the Department's decision to renew the license and to conclude that it failed to enforce the law with no recourse for the Department to defend or explain the report or its concurrence with it, or whether in fact any changes were made as a result of it.

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[20] *Chem-Nuclear II*, *19.
[21] *Chem-Nuclear II*, *20.

The use of the report as evidence of concern over the Department's decision to renew the license is illustrative of a larger problem associated with the constraints of applying findings from the 2005 Order to the current site operations in 2014. In ten years of appeals, the ALC twice affirmed the Department's decision to renew the license. This Court in *Chem-Nuclear I* affirmed the Department's license decision, but remanded certain sections of the regulation for additional findings by the ALC. The Court of Appeals' order required the ALC and the parties to apply the findings from the 2005 Order. Yet the Court casts doubt on the Department's decision to renew the license without providing the opportunity to create a complete record.

Moreover, in this case deference should be given to DHEC's interpretation of its own regulations. While the Court may correct the decision of the ALC if it is affected by an error of law and questions of law are reviewed de novo, the Court will generally give deference to an agency's interpretation of its own regulation.[22] As an "Agreement State" with the Nuclear Regulatory Commission (NRC), DHEC is required to promulgate regulations that are compatible with NRC regulation 10 C.F.R. Part 61.[23] In 1995, the Department promulgated substantial revisions to Part VII requiring engineered barriers and the use of disposal vaults for all waste classes, and codifying the requirement for enhanced caps on all disposal trenches, resulting in regulations more stringent than NRC.[24] The Department has vigorously enforced the design and construction criteria for the disposal units to meet the objectives of subsection 7.11.11. These criteria have been promulgated in regulation as license conditions and are incorporated as Condition 82 of the license. The Department's actions are wholly consistent with the requirements of subsection 7.11.11. Regulations are construed using the same canons of

[22] S. Carolina Dep't of Revenue v. Blue Moon of Newberry, Inc., 397 S.C. 256, 260-61, 725 S.E.2d 480, 483 (2012), reh'g denied (May 4, 2012), citing Brown v. Bi-Lo, Inc., 354 S.C. 436, 440, 581 S.E.2d 836, 838 (2003)
[23] *2005 Order,* p.3, para. 2; p.5, para. 6.
[24] Id., p.5, para. 5.

construction as statutes.[25] By imposing compliance standards and specific actions that do not meet the plain language of subsection 7.11.11, the Court has overlooked and misapprehended the canon of construction that the words of a regulation must be given their plain and ordinary meaning without resort to subtle or forced construction to limit or expand the regulation's operation.[26] Furthermore, by isolating the requirements of subsections 7.11.11.1, 2, and 3 from the performance objectives of sections 7.18 through 7.21, the Court overlooked or misapprehended the canon of construction that the regulation must be construed as a whole rather than read in its component parts in isolation.[27]

VI. The Court misapprehended or overlooked the legal error in the remedy ordered by the Court.

The Court misapprehended or overlooked the legal error in the remedy it ordered. The Court invalidated the license, and ordered Respondents DHEC and Chem-Nuclear to prepare and submit a plan of compliance to the ALC within 90 days of the date of the order; the ALC must then review the plan and either set a compliance schedule to implement it or determine that the plan will not bring Chem-Nuclear into compliance and revoke the license. Here, the Court has before it an appeal from the ALC which upheld DHEC's decision to renew the license. In a contested case before the ALC, the burden of proof is on the party contesting a permitting decision. See, 2005 Order, *Conclusions of Law*, paragraph 3, which specifically concludes that the burden of proof rests on the Petitioner. [28] In a contested case, the ALC has jurisdiction to make a final agency decision, based on a record made at an evidentiary hearing See, Engaging

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[25] S.C. Ambulatory Surgery Ctr. Ass'n v. S.C. Workers' Comp. Comm'n, 389 S.C.380, 389, 699 S.E. 2d 146, 151 (2010).
[26] Byerly v. Connor, 307 S.C. 441, 444, 415 S.E.2d 796, 799 (1992).
[27] Spruill v. Richland Cnty. Sch. Dist. 2, 363 S.C. 61, 64, 609 S.E.2d 524, 526 (2005).
[28] 2005 Order, p. 60.

and Guarding Laurens County's Environment (EAGLE) v. SCDHEC.[29] The authority and responsibility for making an initial decision is at the regulatory agency. This remedy is in conflict with these basic tenets of administrative law.

Throughout the Order and in the remedy at the conclusion of the Order, the Court impermissibly shifts the burden of proof to the applicant and DHEC. Where the Court finds an absence of sufficiency in the record, a negative assumption is made against the applicant and agency, which impermissibly shifts the burden of proof away from the contesting party. Here, the remedy places upon the applicant and agency the burden of providing a plan for a compliance determination to the ALC. The burden in the case is shifted to the applicant and agency.

More disconcerting is the absence of a provision for an evidentiary hearing in the process the Court orders. Here, the Court has misapprehended or overlooked the fundamental role of ALC under the Administrative Procedures Act – which is to render decisions based on an evidentiary record developed at an evidentiary hearing. In Engaging and Guarding Laurens County's Environment (EAGLE) v. SCDHEC, the Supreme Court stated that the ALC is authorized to make a final determination – after a final agency decision and subject to judicial review – as to whether an administrative agency should have granted or denied a particular permit.[30] While the ALC is not bound by the agency's factual findings or permitting decision, it is required to conduct a de novo hearing in contested cases, complete with presentation of evidence and testimony.

Indeed, the difficult status of this case is due in part to the lack of an evidentiary hearing on the issues raised in the first remand to the ALC. This Court should not negate the fundamental role of the ALC and expand its function beyond the arena of rendering decisions

[29] Engaging and Guarding Laurens County's Environment v. SCDHEC, 407 S.C. 334, 755 S.E.2d 444 (2014).
[30] Engaging and Guarding Laurens County's Environment v. SCDHEC, 407 S.C. 334, 755 S.E.2d 444 (2014).

based on an evidentiary process. It is error of law to make an administrative law judge an expert who renders a decision based on a technical review, rather than one who issues a decision after an adjudicatory process.

Moreover, the remedy misapprehends or overlooks the role of the agency in the permitting process. It is not the role of an administrative agency to provide reports to the ALC for review and for the ALC to then render permitting decisions.

The Department is the agency charged by law with the responsibility for the control of radiation sources.[31] The Department is required to establish the terms and conditions of licenses, to issue, amend, revise, or modify licenses, or to suspend or revoke licenses by reason of amendments to the Act, or by reason of rules, regulations, and orders issued by the Department.[32] At issue in this appeal is the Department's decision to *renew* Chem-Nuclear's operating license. The question before the Court is whether the Department's decision to renew the operating license was proper. If a determination was made that it was not proper, the remedy would not be revocation of the license; the license renewal would be reversed but the operating license in effect prior to the renewal would be valid. Ordering the ALC to evaluate a written plan for compliance and to revoke the license for non-compliance abrogates the statutory and regulatory responsibilities that lie squarely with the Department and sets forth a remedy that was not the issue before the Court. The remedy ordered by the Court overlooks the procedural requirements in the regulation that must be followed for license revocation by the Department.

This remedy is outside the limits adopted in the Eagle case. There, the Supreme Court **emphasized** that the ALC did not conceive a new factor or consider evidence outside the

[31] S.C. Code Ann. § 13-7-10.
[32] S.C. Code Ann. Reg. 61-63, subsection 2.19.1.

existing record. Here, the ALC is being directed to decide a new factor not previously before the agency, and without benefit of any evidence or record.

The issue before the Court on appeal is the propriety of the Department's decision to renew Chem-Nuclear's license, not whether the license should be revoked. If the Court is to pursue a new factor, the permit decision should be remanded back to the agency for review in light of the Court's ruling. Or, at a minimum, the matter should be remanded back to the ALC for a full evidentiary hearing on the issues that the Court found to be deficient, complete with the issuance of findings of fact and conclusions of law.

For these reasons the Department petitions the Court to rehear the case, to find the ALC did not err in affirming Respondent Chem-Nuclear complied with subsections 7.1.11.1, 7.11.11.2, 7.11.11.4, and 7.10.7 and the Department properly renewed the license, or in the alternative, to remand to the Department for further proceedings.

Respectfully Submitted,

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August 13, 2014
Columbia, South Carolina

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

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AUG 13 2014
SC Court of Appeals

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

CERTIFICATE OF SERVICE

I, Sandra R. Wessinger, Legal Assistant for the South Carolina Department of Health and Environmental Control, hereby certify that I have on this **13th day of August, 2014,** served a copy of Respondent SCDHEC's ***Petition for Rehearing*** upon all parties and counsel of record in the above-captioned case, via United States Mail, First Class, postage prepaid, addressed as follows:

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August 13, 2014
Columbia, SC

Sandra R. Wessinger
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STATE OF SOUTH CAROLINA
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Appeal from the Administrative Law Court
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Sierra Club,

Appellant,

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South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Of whom Chem-Nuclear Systems, LLC is the

Petitioner.

PETITION FOR REHEARING OF THE PETITIONER, CHEM-NUCLEAR SYSTEMS, LLC

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SC Court of Appeals

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TO: THE HONORABLE JUDGES OF THE SOUTH CAROLINA COURT OF APPEALS:

COMES NOW the Petitioner, Chem-Nuclear Systems, LLC ("Chem-Nuclear"), pursuant to Rules 221 and 240 of the South Carolina Appellate Court Rules, and respectfully requests this Court of Appeals to grant Chem-Nuclear a rehearing from this Court of Appeals' 30 July 2014, decision herein.[1]

ARGUMENT AND CITATION OF AUTHORITY

A. The Court of Appeals Misapprehended And/Or Overlooked Chem-Nuclear's Compliance With The ALC's Directive In The *2005 ALC Order* To Conduct Further Studies To Address Concerns Regarding Reducing Contact Between Rainfall And Waste.

The *2005 ALC Order* was a favorable outcome for Chem-Nuclear and for DHEC since the ALC concluded the Sierra Club "did not provide the [ALC] with concrete, competent evidence to demonstrate that the disposal methods permitted under License No. 097 fail to satisfy such regulatory requirements. . . ." R.pp.46-47). The ALC, however, devised a remedy to finalize the discussions between DHEC and Chem-Nuclear concerning whether there should be protection of the "open trenches from direct rainfall and runoff such as temporary covers." (R.p.47).[2] The ALC directed Chem-Nuclear to conduct a study and submit the results to DHEC. This study included evaluation of "the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell Site that will (1) shelter the disposal trenches from

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1 *See* Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, ___ S.C. ___, ___ S.E.2d ___ (Ct.App. 2014) (2014 WL 3734366, filed 30 July 2014) ("Chem-Nuclear II").

2 The ALC did not remand the matter to DHEC to require temporary or permanent covers as part of the licensing conditions. Instead, the ALC merely sought to "close the loop" on an unfinished conversation, without dictating the outcome. (R.p.66).

rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible."[3] Chem-Nuclear complied and sent the report[4] to DHEC in April 2006.[5]

DHEC advised that the Feasibility Report was under review,[6] but recommended Chem-Nuclear consider the issues identified in the *2005 ALC Order* in its planning for trench designs and operational methods. Chem-Nuclear considered the feasibility of sheltering disposal trenches, providing temporary dry storage facilities for the waste,[7] and sealing and grouting the concrete vaults.[8]

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3 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193 (S. C. Admin. Law. Judge.Div., filed 13 October 2005). (R.pp.36-66).

4 The report was entitled Evaluation of the Scientific and Economic Feasibility for implementing new Designs and Operational Procedures at the Barnwell Site as Directed by the South Carolina Administrative Law Court Order Dated October 13, 2005. (the "Feasibility Report").

5 Chem-Nuclear moved to supplement the appellate record herein with the Feasibility Report, but the Sierra Club objected and supplementation was denied. This Court of Appeals acknowledged the study and the Feasibility Report noting "[t]he record does not contain the results of these studies or the reasons DHEC chose not to amend the license requirements as a result of the [Feasibility] [R]eport." *See* Chem-Nuclear II, 2014 WL 3734366, *20 fn.19.

6 DHEC, which completed its review on 10 March 2008, concurred with the Feasibility Report's findings and conclusions.

7 Chem-Nuclear concluded temporary dry storage could be provided and had implemented policies for temporary storage of waste packages and for protection of waste packages from inclement weather. DHEC acknowledged these policies and procedures were in place.

8 Regarding sheltering of disposal trenches and sealing and grouting concrete disposal vaults, Chem-Nuclear calculated a worker dose attributable to cover operations. The proposal to grout and seal the vaults also resulted in a worker dose. The radiation dose to works to roof the trenches and seal and grout the vaults was

This analysis is entirely consistent with the concerns and issues expressed in the *2005 ALC Order*.

While this Court of Appeals acknowledged the existence of the Feasibility Report, it incorrectly concluded the Feasibility Report required Chem-Nuclear to take further affirmative action.**9** Based on the Feasibility Report, Chem-Nuclear's installation of a temporary/permanent roofing structure over open trenches and/or the grouting and sealing of the vaults would have been inconsistent with the requirements of Reg. 61-63.**10** Chem-Nuclear and DHEC correctly concluded 7.18 would require rejection of the proposals to roof the trenches and seal and grout the vaults.

Conversely, this Court of Appeals concluded that "the record in this case conclusively demonstrates Chem-Nuclear has taken no action whatsoever to prevent even one rain drop from migrating onto one active vault or trench."**11** Based on this conclusion, this Court of Appeals determined the ALC's decision

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significantly higher than any projected reduction to the hypothetical dose to the general public. For that reason, these concepts were rejected.

9 Aside from the matters noted in the 2012 ALC Order, Chem-Nuclear took no additional actions to attain compliance with 7.11.11, other than the temporary protection of waste packages during wet weather conditions.

10 As is noted in 7.1.1 "[t]he requirements of this part are in addition to, and not in substitution for, other applicable requirements of these regulations." 7.20 requires that "[o]perations at the land disposal facility shall be conducted in compliance with the standards for radiation protection set out in Part III of these regulations, except for releases of radioactivity in effluents form the land disposal facility, which shall be governed by 7.18. *Every reasonable effort should be made to maintain radiation exposures as low as is reasonably achievable*." (Emphasis added). Consequently, the question becomes whether it reasonable to significantly increase worker exposure to radiation when the potential increase in dose to the public is negligible? The simple answer is "no".

11 Chem-Nuclear II, 2014 WL 3734366, *12.

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Chem-Nuclear was compliant with 7.11.11 was legally flawed. Aside from misconstruing 7.11.11 which requires that the migration of water be minimized, and not that rainfall be absolutely prevented from entering the trench, this Court of Appeals failed to recognize that 7.11.11 neither justified nor supported any action to roof and/or cover open trenches or to seal and grout vaults, or to allow water to pond or pool with the installation of liner.

B. The Court of Appeals Misapprehended Or Overlooked The Significance Of Its *Chem-Nuclear I* Remand Instructions Which Prevented The ALC From Considering Matters Outside The Original Appellate Record Or The Studies Performed By Chem-Nuclear In Response to the *2005 ALC Order*.

This Court of Appeals, in *Chem-Nuclear I*,[12] determined remand was necessary because the ALC had failed to address all of the issues raised by the Sierra Club, including 7.11.11. This Court of Appeals instructed the ALC to apply its 2005 factual findings and rule on compliance with 7.11.11. These instructions foreclosed the ALC's consideration of the Feasibility Report. This Court of Appeals further restricted the ALC by holding 7.11 "imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address whether Chem-Nuclear is in compliance with section 7.11."[13]

The Court of Appeals' statement that "additional compliance requirements" exist has been expanded, in *Chem-Nuclear II*, to encompass only affirmative acts

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12 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 693 S.E.2d 13 (Ct.App. 2010), *rehearing denied* (3 May 2010), *certiorari denied* (21 July 2011) ("Chem-Nuclear I").

13 Chem-Nuclear I, 387 S.C. 424, 693 S.E.2d 13.

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taken by Chem-Nuclear to apparently prevent all rainfall from entering the trenches, a flawed interpretation of the requirements of 7.11.11.**14** Importantly, the ALC, in issuing the *2012 ALC Order*, complied with this Court of Appeals' directive to determine Chem-Nuclear's compliance with 7.11 without exclusive reliance on ALARA.**15** These findings are fully supported by the *2005 ALC Order* and demonstrate adherence with the requirements of 7.11.11, independent of the ALC's reliance on the evidence of decline on tritium concentrations at the compliance point and reliance on any other ALARA based standard.**16**

This Court of Appeals, in *Chem Nuclear I*, held that:

> At this point, we cannot address whether the ALC erred without giving it an opportunity to issue a specific ruling on whether Chem-Nuclear's disposal practices were in compliance with

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14 These affirmative actions are separate from Chem-Nuclear's compliance with and adherence to all other sections of 61-63 Part VII. Such an expansion would mean that this Court of Appeals, in Chem-Nuclear I, directed the parties on remand to undertake an exercise in complete futility. Chem-Nuclear doesn't believe that this Court of Appeals intended in 2010, when it issued Chem-Nuclear I, for the remand to the ALC to be futile and unproductive.

15 The ALC noted the design and function of the engineered barriers, as required by subparts 7.6.2, 7.11.9, 7.11.10, 7.21, and 7.32.5. The ALC noted the water collection system which allows for diversion of water that accumulates in the trenches. This water collection system is clearly responsive to the requirements of subpart 7.11.11. In addition, the water detection system, also noted by the ALC, is clearly responsive to the requirements of subpart 7.11.11. The ALC noted the existence of a partially impermeable clay liner in the bottom of the trenches that impedes infiltration and the drainage system installed within the trenches to move water out of the trenches. All of these measures operate to minimize the migration of water, to provide for detection and for removal.

16 Surprisingly, Chem-Nuclear II now illogically concludes the 2005 ALC Order's factual findings are inapplicable to determining Chem-Nuclear's compliance with subpart 7.11.11. Assuming that is correct, this Court of Appeals, in Chem-Nuclear I, should have remanded the matter to the ALC, with discretion for a remand to DHEC to determine compliance with subpart 7.11.11 through demonstration of Chem-Nuclear's additional measures to attain compliance, or an explanation as to why those measures were or may not be feasible.

> sections 7.11, 7.23.6 and subsections of 7.10 that the ALC did not address. On remand, we instruct the ALC that sections 7.11 and 7.23.6 impose additional compliance requirements for Chem-Nuclear and further instruct the ALC to apply its factual findings to these sections of [Reg.] 61-63.**17**

The ALC, on remand, addressed 7.11's requirements in light of the *2005 ALC Order*'s factual findings.**18** The ALC enforced this Court of Appeals' only restriction on remand and did not place exclusive reliance on site performance and/or ALARA. This Court of Appeals has now significantly enlarged that original restriction placed upon the ALC by eliminating the ALC's reliance on any facts established to demonstrate Chem-Nuclear's compliance with sections of Part VII separate from that of 7.11 and by misconstruing the requirements of 7.11.11. In so doing, this Court of Appeals has rendered the *Chem-Nuclear I* remand proceeding before the ALC in 2012, simply an exercise in complete and utter futility.

C. The Court of Appeals Misapprehended Or Overlooked The Purpose of 7.11: "Conditions Of License" In Concluding 7.11 Imposed Technical Requirements Described In 7.1.3, Rather Than "Burial Operation Conditions" As Noted On License No. 097.

This Court of Appeals concluded that 7.11 sets forth "technical requirements" which is a more limiting description of 7.11 than was provided in *Chem-Nuclear I* where 7.11 is described as "compliance requirements."**19** In

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17 Chem-Nuclear I, 387 S.C. 424, ___, 693 S.E.2d 13, ___.

18 Had those findings not been as comprehensive as they were, following a week long hearing in 2005, than the ALC may not have been able to determine compliance with subpart 7.11. Fortunately that was not the case as the evidence presented, and the ALC's findings, were comprehensive and extensive as to the design and function of the engineered barriers, the water collection and detection system, and the partially impermeable clay liner.

19 Chem-Nuclear I, 387 S.C. 424, 693 S.E.2d 13.

concluding 7.11 imposed "technical requirements" instead of just "compliance requirements," this Court of Appeals determined these "newly discovered" requirements necessitated specific action by Chem-Nuclear.**20**

Review of Part VII shows 7.11 is described as "Conditions of Licenses." Moreover, a review of License No. 097 indicates that the requirements of 7.11.11.1 through 7.11.11.4 are included verbatim as Permit Condition No. 82, under the conditions described as "Burial Operation Conditions."**21** In characterizing 7.11.11 as a license condition, DHEC has required that the licensed activity can only occur provided the enumerated permit conditions are accomplished. In the event that Chem-Nuclear does not conduct burial operations in accordance with the enumerated conditions, DHEC has grounds to proceed with enforcement.**22**

This Court of Appeals incorrectly determined 7.11.11 included "technical requirements" which necessitated specific action by Chem-Nuclear. 7.11.11 simply embodies licensing conditions. As noted, 7.11.11's title is clear and unambiguous DHEC complied with 7.11.11 by including the requirements as

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20 Chem-Nuclear I, 387 S.C. 424, 693 S.E.2d 13.

21 DHEC has authority, under the Pollution Control Act, to "[i]ssue, deny, revoke, suspend or modify permits, under such conditions as it may prescribe for the discharge of sewage, industrial waste or other waste or air contaminants ... " S. C. Code Ann. § 48-1-50(5) (Thomson Reuters West 2013) (Emphasis added). Permit conditions are, by their very nature, an important regulatory tool. "[T]he power to permit necessarily carries with it the power to place conditions on a permit." Edisto Aquaculture Corp. v. S.C. Wildlife & Marine Resources Dept., 311 S. C. 37, 40, 426 S. E. 2d 753, 755 (1993).

22 Part VII, 1.12.2 authorizes DHEC to "make findings of fact and determinations and to assess fines and civil penalties relating to violation of the provisions of the Act or any regulation, license or license condition ... ."

express "license conditions". This enables DHEC to pursue enforcement in the event Chem-Nuclear fails to implement these conditions. This Court of Appeals improperly added additional requirements not intended by 7.11.11.

D. **Even If 7.11's Requirements Are "Technical," This Court Of Appeals Misapprehended Or Overlooked The Significance Of 7.6 And 7.7 Which Dictate The Information Necessary To Demonstrate Compliance And Which Do Not Impose Any Requirement To Demonstrate Or Analyze The Efficacy Of A Roof Or Cover Over, Or A Line In, An Open Trench.**

Part VII, 7.6, entitled "Specific Technical Information," is applicable to both the performance objectives and the applicable technical requirements of Part VII.[23] The "Specific Technical Information" required to review design features does not prescribe any particular method of "cover" and certainly doesn't reference "roofs" or "temporary covers" or "leachate collection systems," as indicated in *Chem-Nuclear II*.

What is clear from 7.6 is that the same information which supports compliance with a "technical requirement" may also support compliance with a performance objective. For example, 7.6.3 requires "[a] description of the principal design criteria and their relationship to the performance objective." Additionally, 7.7., "Technical Analyses," illustrates the direct connection between

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23 "The specific technical information shall include the following information needed for demonstration that the performance objectives and the applicable technical requirements of this part will be met." 7.6, prefatory language. In fact, 7.6 does not dictate design, but requires the applicant to provide descriptions of the design features, including "those design features related to infiltration of water; integrity of covers for disposal units, design of covers for disposal units; ... contact of wastes with standing water; disposal site drainage . . . ." 7.6.2. The term "cover" as referenced in 7.6.2, is referred to in 7.2.1 as a "soil cover," or "disposal unit cover," or "intruder barrier." *See* 7.2.14. It is referenced in the plural – "integrity of covers for disposal units; structural stability of engineered barriers, backfill, wastes and covers . . . ." 7.6.2.

technical requirements and performance objectives.**24** While this Court of Appeals was quick to dismiss ALARA consideration in determining if Chem-Nuclear had complied with 7.11.11, DHEC requires Chem-Nuclear to perform that very analysis.**25**

Assuming, *arguendo*, that the compliance requirements contained in 7.11.11 are, indeed, "technical requirements", then 7.6 and 7.7 clearly provide the context as to how such "technical requirements" are reviewed and assessed for consistency with Part VII. DHEC reasonably does not dictate with precision the design features for a LLRW disposal site. Moreover, all technical analysis must be necessarily accompanied by an ALARA analysis. This Court of Appeals' conclusions in *Chem-Nuclear II* are inconsistent with and, indeed, may be contrary to the mandatory requirements of 7.6 and 7.7.

E. **The Court of Appeals Misapprehended Or Overlooked The Standard For Determining Compliance With 7.11 In *Chem-Nuclear I* And In Further Restricting This Standard By Excluding Both Other Result-Based Evidence Unrelated To ALARA And Design Features Which Did Not Eliminate Contact With Rainfall.**

In *Chem-Nuclear I*, this Court of Appeals concluded 7.11 "impose[d] additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address whether Chem-Nuclear is in

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24 "The specific technical information shall also include the following analyses needed to demonstrate that the performance objectives of this part will be met." 7.7, prefatory language.

25 Under subpart 7.7.3, Chem-Nuclear must undertake "[a]nalyses of the protection of individuals during operations [which] shall include demonstration assessments of expected exposures due to routine operations . . . The analyses shall provide reasonable assurance that exposures will be controlled to meet the requirements of Part III of these regulations."

compliance with section 7.11."[26] The *2005 ALC Order* did not specifically addressed compliance with 7.11, but concluded "Chem-Nuclear and DHEC ha[d] shown adherence to ALARA in the measures taken by Chem-Nuclear to address tritium migration from the Barnwell Facility and the potential for releases from other radionuclides that are contained in the waste buried at the Site." (R.p.48). To the extent DHEC or Chem-Nuclear attempted to support compliance with 7.11 through this conclusion of law and any associated findings of fact, that would be an insufficient evidentiary basis. Nevertheless, this Court of Appeals, in *Chem-Nuclear I*, ***did not preclude*** Chem-Nuclear, DHEC, or the ALC from using other findings related to other requirements in Part VII to support Chem-Nuclear's compliance with 7.11.[27]

This Court of Appeals, in finding the ALC had erred in concluding Chem-Nuclear complied with 7.11.11.1, 7.11.11.2, 7.11.11.3, and 7.11.11.4, imposed significant additional limitations on the evidentiary standard which it had already established in *Chem-Nuclear I*. This Court of Appeals determined "compliance may not be measured solely by results." The record shows the ALC did not measure compliance by results, but instead relied on specific physical attributes of the protection system. (R.p.12-17).[28]

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26 Chem-Nuclear I, 387 S.C. 424, 693 S.E.2d 13.

27 As is noted above, for this Court of Appeals to do so would be to render the remand, solely limited to the findings of facts in the 2005 ALC Order, a mere nullity.

28 This physical attributes included the (a) design of the trenches (including the partially impermeable sand/clay material in the bottom of the trench) (b) slope provided in the trench, (c) clay caps, (d) standpipe installed for water detection,(e) vault lids, (f) surface water management plan, (g) trench drainage system, (h) French drain

This Court of Appeals, however, deemed the ALC's findings insufficient to establish Chem-Nuclear's compliance with 7.11.11.1 through 7.11.11.4. First, this Court of Appeals concluded 7.11.11 imposed "technical requirements" and then determined the compliance measure was whether "Chem-Nuclear took any actions to meet the technical requirements imposed by these subsections."**29** This Court of Appeals rejected the ALC's referenced findings when considering compliance with 7.11.11.1 and 7.11.11.2, since those findings "have no effect on the initial migration of rainfall."**30** As relates to 7.11.11.3, this Court of Appeals determined that there was no evidence to support the assertion Chem-Nuclear minimized, by reducing to the smallest amount possible, the migration of waste-contaminated water.**31** Finally, as related to 7.11.11.4, this Court of Appeals rejected the ALC's factual findings essentially because Chem-Nuclear did not utilize a "leachate collection system."**32**

Nevertheless, when 7.11 is read in concert with 7.6 and 7.7, that demonstrates this Court of Appeals has misconstrued 7.11.11's intent and general purpose which is to ***minimize the migration of water, not to eliminate the contact of rainfall with the disposal units***.**33** Chem-Nuclear demonstrated

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and sump systems installed, and (i) pumping system to remove water from active trenches. (R.p.12-17).

29 Chem-Nuclear II, 2014 WL 3734366, *9.

30 Chem-Nuclear II, 2014 WL 3734366, *15.

31 Chem-Nuclear II, 2014 WL 3734366, **14-15.

32 Chem-Nuclear II, 2014 WL 3734366, **15-16.

33 For example, 7.6.2 addresses "standing water" and the "infiltration of water." 7.6.6 relates to "methods to control surface water." If the intent were to prevent

its surface water controls with its pump and removal system, ponding or pooling controls, with its water detection system, and the partially impermeable clay and sand that allows for infiltration. Given the clear implication that rainfall is an expected event for which corrective measures have been put in place, this Court of Appeals improperly rejected these facts as a basis for determining compliance with 7.11.11.1-7.11.11.4.**34**

Unfortunately, this Court of Appeals ignored 7.7.1 which requires technical information related to "Pathways" which include "air, soil, groundwater, surface water, plant uptake, and exhumation of burrowing animals. The analyses shall clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolation and segregating the wastes." Consistent with 7.7.1, Chem-Nuclear reasonably relied, at least in part, upon the groundwater pathway and groundwater travel time to prevent releases of radioactivity which potentially might have exceed the applicable regulatory limits.

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any rain from entering the trenches at all then 7.6, which governs the technical information required, would certainly specify methods to control rainfall. Instead, 7.6 seeks information on management measures including the prevention of ponding, surface water controls, and infiltration. All of which necessarily and reasonably presumes that rainfall has entered the trenches and requires management.

34 This Court of Appeals improperly insisted that 1) a requirement to minimize migration was tantamount to preventing rainfall from entering the trenches and, 2) infiltration was inappropriate and a leachate collection system should be installed.

F. **When 7.1.1 Specifically States "The Requirements Of This Part Are In Addition To, And Not In Substitution For, Other Applicable Requirements Of These Regulations", The Court Of Appeals Misapprehended Or Overlooked The Applicability Of The "Standards For Protection Against Radiation" (61-63 Part III) By Finding "There Is No Inherent Reasonableness Or Practicability Consideration Involved In Analyzing Chem-Nuclear's Compliance" With 7.11.**

By construing the requirement to "minimize the migration of water" to mean the elimination and prevention of rainfall from entering trenches, this Court of Appeals has strictly construed the minimization requirement. This Court of Appeals stated:

> [S]ubsection 7.23.6 requires Chem-Nuclear to 'minimize to the extent practicable' the contact of water with waste at different stages of the disposal process. We interpret subsection 7.23.6 as imposing a less stringent standard for compliance than subsection 7.11.11.1 because the term 'minimize' is followed by language prompting DHEC to consider the reasonableness of Chem-Nuclear's efforts to comply. The lack of similar language in subsection 7.11.11.1 suggests there is no inherent reasonableness or practicability consideration involved in analyzing Chem-Nuclear's compliance.**35**

In doing so, this Court of Appeals dismissed the relevancy of any ALARA analysis**36** and disregarded the effect of Reg. 61-63 Part III, 3.1,**37** which applies to Chem-Nuclear as it encompasses LLRW disposal.**38** Part VII, 7.1.1 makes

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35 Chem-Nuclear II, 2014 WL 3734366, *11 fn.11.

36 "Subsection 7.11.11.4 contains no language excusing Chem-Nuclear's duty to comply with its regulatory requirements." Chem-Nuclear II, 2014 WL 3734366, *16. "[W]e consider the actions taken by Chem-Nuclear to comply, not the reasons why it decided not to implement a certain measures based on its own ALARA analysis." Chem-Nuclear II, 2014 WL 3734366, *16 fn.15.

37 Purpose and Scope: "The regulations in this part apply to persons license by the Department to receive, possess, use, transfer, or dispose of radioactive material."

38 As a licensee, Chem-Nuclear is required to adhere to 3.4 and implement a radiation protection program "to ensure compliance with the provisions of this part."

clear that the requirements of Part VII are "in addition to, and not in substitution for, other applicable requirements of these regulations." 7.6.11 provides specific standards for the radiation safety program "to ensure compliance with the performance objective in 7.18." 7.20 mandates protection of individuals during operations. "Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection set out in Part III of these regulations, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by 7.18. Every reasonable effort should be made to maintain radiation exposures as low as is reasonably achievable."

This Court of Appeals improperly divorced 7.11.11.1 through 7.11.11.4 from Part III and from other plainly stated requirements in Part VII requiring radiation protection in all operations. These requirements cannot be separated. Like 7.23.6, the provisions in 7.11.11.1 through 7.11.11.4 are qualified by the aforementioned regulations and, consequently, this Court of Appeals' strict interpretive standard is legally flawed in several ways. Firstly, the flaw is that the determination that a "technical requirement" cannot be addressed by compliance with other regulations.**39** The next flaw was this Court of Appeals conclusion that

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Moreover, Chem-Nuclear must enforce the occupational dose limits for adults specified in 3.5. Furthermore, under 3.42, Chem-Nuclear is required to "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)."

39 Chem-Nuclear is required to incorporate engineered barriers through requirements separate from 7.11.11. The engineered barriers are, however, designed to address the requirements of 7.11.11. This Court of Appeals wrongly concluded that compliance which satisfies two different regulatory requirements is unavailing and, in turn, Chem-Nuclear must demonstrate both an affirmative and separate action to satisfy

a regulation which required "water management" had to be read to require the elimination of rainfall.**40** The final flaw was that, despite Part VII's clear introductory language confirming that the regulations were in addition to, and not separate, from the remaining parts of 61-63, this Court of Appeals concluded that 7.11.11 had to be construed separately from all other sections of Reg. 61-63.

G. **Should 7.11 Be Applied Pursuant To This Court Of Appeals' "Strict Interpretation", There Is A Risk Of Unnecessary Exposure To The Barnwell Facility's Employees As Well As, Potentially To The Barnwell Facility's LLRW Transporters.**

Chem-Nuclear understands that sheltering open disposal trenches adds another level of redundancy to prevent the migration of water on contact between water and waste, even if the shelter is only temporary.**41** Chem-Nuclear also understands sealing and grouting vaults**42** assists in the prevention of contaminated water migration. Finally, Chem-Nuclear knows management of impermeable trenches which collect rainwater helps prevent water migration. Nevertheless, in each case, Chem-Nuclear must assess whether the pursuit of one or more of those preventative measures will result in an occupational dose to its or others' employees working in or around the Barnwell Facility and whether,

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7.11.11. Furthermore, this Court of Appeals improperly determined that there are no other considerations which are relevant to possibly support a "no action" alternative.

40 The elimination of any rainfall would, of course, negate any need for water management since there would be no water to manage.

41 Such a temporary shelter might be removed when wet weather conditions are either not threatened or present, or when a trench is filled to capacity. Additionally, based upon the size of the existing trenches, any temporary shelter is likely to be very large and require multiple workers to set-up, take-down, and move to other trenches.

42 Importantly, vaults would have to be inspected to determine if they were full and ready for sealing. Sealing and grouting would likely occur in or adjacent to the disposal trenches

under the totality of the circumstances of risk to the employees, that dose is justified.

These assessments are critical to addressing the risk of occupational harm. However, this Court of Appeals' announced "legal standard" and the resulting remedy completely eliminate this important evaluation and consideration. Even if Chem-Nuclear performed this evaluation, in executing the remedy, this Court of Appeals has concluded this evaluation cannot dictate the terms of any "compliance plan" since 7.11.11 is so strictly construed.

H. **This Court Of Appeals Misapprehended Or Overlooked The Nuclear Regulatory Commission's Regulatory Requirement That The Disposal Site Be Designed To Prevent The "Ponding" Of Water In Its Consideration Of The Necessity For A Leachate Collection System.**

As noted in the *2005 ALC Order*:

> South Carolina's regulatory authority over radioactive waste is derived from a formal agreement with the United States Atomic Energy Commission ... States that entered into such agreements are referred to as Agreement States. An Agreement State may promulgate regulations more stringent than federal regulations, but it must, as a minimum, have regulations that are compatible with federal regulations.

The Nuclear Regulatory Commission's regulations prescribes the site suitability requirements for land disposal.**43** The requirements in Reg. 61-63 are presently consistent with the NRC requirements in that both sets of regulation

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43 *See generally* 10 CFR Part 61.50. For example, Part 61.50(5) provides that "[t]he disposal site must be generally well drained and free of areas of flooding or frequent ponding." Moreover, Part 61.51(5) provides that "[s]urface features must direct surface water drainage away from disposal units." Finally, Part 61-51(6) provides that "[t]he disposal site must be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal."

envision ***water management*** and not the prevention of rainfall from entering the trenches.**44**

I. **The Court of Appeals Misapprehended Or Overlooked The Barnwell Facility's Natural Attributes Analyzed Under 7.7, Which Includes Extensive Groundwater Pathways And Travel Time Allowing For Significant Reduction In Tritium Radiation Content Prior To Release.**

The "Technical Analyses" contained in 7.7 includes an analysis of "[p]athways" to demonstrate "protection of the general population from releases of radioactivity." "The analyses shall clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes." This Court of Appeals overlooked the significance of this technical information when it concluded that "[a] violation occurs only when water is allowed to come in contact with waste and waste-contaminated water then migrates out of the disposal units."**45** And, when addressing the holes in the floors of the vaults, this Court of Appeals overlooked the natural physical attributes of the Barnwell Facility site when concluding that "these holes permit water that has come in contact with residual tritium to drain into the trenches which, in turn, allow the water to percolate into the soil and groundwater beneath the facility"**46** Based on this the Court concluded, in error, that Chem-Nuclear is not in compliance with 7.11.11.1 and 7.11.11.2.**47**

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44 Importantly, if Reg. 61-63 Part VII were amended to require a leachate collection system, or if this Court of Appeals interpreted 7.11.11 as requiring a leachate collection system, the addition of such a requirement would render South Carolina' regulations inconsistent with the NRC's regulations.

45 Chem-Nuclear II, 2014 WL 3734366, *11 fn.12.

46 Chem-Nuclear II, 2014 WL 3734366, *14.

47 Chem-Nuclear II, 2014 WL 3734366, **13-15.

This Court of Appeals has misapprehended the requirements of Reg. 61-63 Part VII which are intended to provide for the ***dispersal and management of surface water*** rather than the collection and retention of volumes of water with tritium contamination. Furthermore, the natural physical attributes of the Barnwell Facility site – groundwater pathways and travel time – clearly contribute positively to a reduction in the radiation and ensure site performance and compliance.

J. The Court of Appeals Misapprehended Or Overlooked The ALC's Contested Case Jurisdiction By Directing The ALC To Review Chem-Nuclear's "Compliance Plan"[48]

This Court of Appeals' remedy is legally flawed. First, this Court of Appeals has overlooked the nature of the ALC's jurisdiction over contested cases. Second, this Court of Appeals has overlooked DHEC's statutory authorization to enforce and, where indicated, revoke permits. Third, this Court of Appeals has overlooked DHEC's enforcement and revocation procedures which provides Chem-Nuclear the procedural protections to which it is entitled.

This Court of Appeals directed the ALC to review Chem-Nuclear's "Compliance Plan", determine compliance, and revoke License No. 097 if the Compliance Plan was not compliant. This "direction" is patently inconsistent with judicial recognition of the ALC's jurisdiction:

> Our state's constitution provides that '[n]o person shall be finally bound by a judicial or quasi-judicial decision of an administrative agency affecting private rights except on due notice and an opportunity to be heard . . . and he shall have in all such instances the right to judicial review.' To that end,

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48 This Argument encompasses the issues identified on pages iii - iv herein as "J,""K," and "L."

> the ALC conducts a *de novo* hearing in contested cases, complete with the presentation of evidence and testimony. In contested permitting cases, the ALC presides as the fact-finder. According to the APA, an ALC's "final decision *shall include* findings of fact and conclusions of law, separately stated." Consequently, **the ALC is authorized to make a final determination—after a final agency decision** and subject to judicial review - as to whether an administrative agency should have granted or denied a particular permit. As to factual issues, judicial review of administrative agency orders is limited to a determination whether the order is supported by substantial evidence.**49**

The ALC has contested case jurisdiction.**50** A contested case arises after a final agency decision. DHEC reviews the plans and procedures submitted by Chem-Nuclear, and then takes whatever licensing action may be necessary. The ALC can review challenges to DHEC's action as a contested case.**51** DHEC has the authority to revoke the permit,**52** not the ALC. The ALC, however, has the authority to hear a challenge to revocation and review DHEC's actions as a contested case.

This Court of Appeals has determined the need for a "compliance plan", based upon the absence of any evidence showing either Chem-Nuclear or DHEC

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49 Engaging and Guarding Laurens County's Environment v. SCDHEC and MRR Highway 92, LLC, Defendants, 407 S. C. 334, 344, 755 S. E. 2d 444, 449 (2014) (First emphasis in original, second emphasis added and internal citations omitted).

50 S.C. Code Ann. § 1-23-600 (Thomson Reuters West 2012).

51 A "contested case" is a "proceeding including. . . licensing . . in which the legal rights, duties or privileges of a party are required by law to be determined by an agency after an opportunity for a hearing." S.C. Code Ann. § 1-23-310(3) (Thomson Reuters West 2013) (Emphasis added).

52 DHEC is authorized to "[i]ssue, deny, revoke, suspend[,] or modify permits . . .provided however, that no permits shall be revoked without first providing an opportunity for a hearing." S.C. Code Ann. § 48-1-50(5) (Thomson Reuters West 2012).

took affirmative and/or specific actions to address the concerns raised in the *2005 ALC Order*. The Sierra Club, however, had the burden of demonstrating that no actions have been taken.

In sharp contrast to the Sierra Club's and this Court of Appeals' "conclusion" that neither Chem-Nuclear or DHEC had taken any actions to address the ALC's concerns, this Court of Appeals ignored the fact that License No. 097 is a fluid license, as demonstrated by the number of amendments made to License No, 097 since the 2005 proceeding. Moreover, the ***excluded*** Feasibility Report**53** clearly shows Chem-Nuclear revised its procedures to provide temporary dry storage of waste during wet weather conditions. Chem-Nuclear has taken additional measures, reviewed by DHEC, through revisions to or development of other procedures to address the issues of concern identified in the *2005 ALC Order*.**54** This is, of course, in addition to the analysis provided in the Feasibility Report.

This Court of Appeals' conclusion that the lack of evidence of action was equivalent to evidence of no action was inaccurate. Instead, the lack of evidence of action stems from this Court of Appeals' refusal to consider the Feasibility Report, as well as, the significant restrictions placed on the *Chem-Nuclear I*

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53 The Sierra Club took full advantage of both (a) this Court of Appeals' refusal to consider and/or supplement the appellate record with the Feasibility Report as evidence that neither Chem-Nuclear nor DHEC had taken any action, as well as, this Court of Appeals' Chem-Nuclear I remand instructions which foreclosed the ALC's consideration of the Feasibility Report or any other evidentiary matters arising since 2005.

54 These include (a) transition to the smaller trench type - the B/C trench; (b) the use of temporary covers over empty or partially filled vaults; and (c) the use of temporary covers over large components placed directly in the trench.

remand proceeding. Had the Court of Appeals reviewed the Feasibility Report and/or allowed the ALC to re-open the *Chem-Nuclear I* remanded contested case record, then this Court of Appeals would have had before it a record of the fairly continuous exchanges between DHEC and Chem-Nuclear regarding the concerns identified in the 2005 ALC Order together with the actions taken by DHEC and Chem-Nuclear to address those concerns.

K. Public Policy And Applicable Law Mandates Deference To DHEC In Interpreting The Requirements Of 7.11, Since DHEC Has The Technical Expertise And Experience To Balance The Numerous And Potentially Competing Considerations In Reg. 61-63 Which The Judiciary May Lack.[55]

This Court of Appeals, in reaching its conclusions and crafting its remedy, did not afford any deference to DHEC's interpretation and/or application of DHEC's own regulations. In matters as complex as the disposal of LLRW, it seems reasonable for the judiciary to defer to the experts in radiological health when interpreting and applying the multiple, intertwined regulations contained in Reg. 61-63. Regarding evidentiary matters in contested cases, the law provides that "notice may be taken of generally recognized technical or scientific facts with the agency's specialized knowledge. . . . The agency's experience, technical competence and specialized knowledge may be utilized in the evaluation of the evidence."[56] And, in matters of regulatory interpretation "as a general rule, agencies charged with enforcing statutes . . receive deference from the courts as

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55 This argument encompasses the issues identified on page iv as "M."

56 S.C. Code Ann. § 1-23-330(4) (Thomson Reuters West 2013).

to their interpretation of those laws."**57** "The interpretation of a statue is a question of law."**58** Further, "[t]he construction of a statute by the agency charged with its administration will be accorded the most respectful consideration and will not be overruled absent compelling reasons."**59**

Here this Court of Appeals determined that language related to "minimiz[ing] the migration of water" and "waste contaminated water" encompasses rainfall.**60** DHEC, however, applies the applicable regulation to the movement of surface water, created as rainwater hits the surface of the earth. This is consistent with Part VII and the numerous references therein to ***surface water management***. Furthermore, this Court of Appeals "strictly construed" the "requirement to minimize" contained in 7.11.11, without qualification. DHEC, however, applies 7.11.11 as directed in 7.1.1.**61** This Court of Appeals' strict interpretation would requires Chem-Nuclear and DHEC to adopt and/or implement measures to ***eliminate*** rainfall into the trenches without any consideration of and/or regard for the worker dose resulting from these measures. DHEC's interpretation, however, accounts for and considers worker

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57 State v. Sweat, 379 S. C. 367, 385, 665 S. E. 2d 645, 655 (Ct.App. 2008).

58 CFRE, LLC v. Greenville County Assessor, 395 S. C. 67, 74, 716 S. E. 2d 877, 881 (2001).

59 CFRE, LLC v. Greenville County Assessor, 395 S. C. 67, 77, 716 S. E. 2d 877, 882. Conversely, albeit understandably, when and if an agency's interpretation conflicts with the statute's plain language, such an interpretation must be rejected. Sparks v. Palmetto Hardwood, Inc., 406 S. C. 124, 128, 750 S. E. 2d 61, 53 (2013).

60 Chem-Nuclear II, 2014 WL 3734366.

61 Subpart 7.1.1 provides that the "requirements of this part are in addition to, and not in substitution for, other applicable requirements of these regulations." (Emphasis added).

dose. Based on the directions provide in 7.1.1, DHEC's interpretation is not in conflict with the plain language of the regulation. Unfortunately, this Court of Appeals' new interpretation is in conflict. DHEC's interpretation of 7.11.11 is entitled to respectful consideration which this Court of Appeals did not provide in *Chem-Nuclear II*.

CONCLUSION

Based upon the foregoing arguments and citation of authority, the Respondent, Chem-Nuclear Systems, LLC, respectfully requests this Court of Appeals to grant a rehearing in this matter in order to reevaluate and review this Court of Appeals' recent decision herein.

Respectfully submitted:

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13 August 2014

NPCOL1:3940102.1-MO-(SPG) 049893-00002

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Of whom Chem-Nuclear Systems, LLC is the

Petitioner.

PETITION FOR REHEARING OF THE PETITIONER, CHEM-NUCLEAR SYSTEMS, LLC

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I, Stephen P. Groves, Esquire, hereby certify that on 13 August 2014, served one copy each of the ***Petition for Rehearing*** submitted on behalf of the Respondent, Chem-Nuclear Systems, LLC, on all counsel of record herein via United States Mail, postage pre-paid, and addressed as follows:

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NPCOL1:3940102.1-MO-(SPG) 049893-00002

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AUG 13 2014
SC Court of Appeals

--- S.E.2d ----, 2014 WL 3734366 (S.C.App.)
(Cite as: 2014 WL 3734366 (S.C.App.))

Only the Westlaw citation is currently available.

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Court of Appeals of South Carolina.
SIERRA CLUB, Appellant,
v.
SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL and **Chem**–Nuclear Systems, LLC, Respondents.
Appellate Case No.2012–212791.

No. 5253.
Heard Feb. 5, 2014.
Decided July 30, 2014.

Appeal from the Administrative Law Court; Ralph King Anderson, III, Administrative Law Judge.
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Mary Duncan Shahid and Stephen Peterson Groves, Sr., both of Charleston, and Sara S. Rogers, of Columbia, all of Nexsen Pruet, LLC, for Respondent Chem–Nuclear Systems; Claire Harley Prince and Jacquelyn Sue Dickman, both of Columbia, for Respondent South Carolina Department of Health & Environmental Control.

FEW, C.J.

***1** This is an appeal from the administrative law court (ALC), which upheld the South Carolina Department of Health and Environmental Control's (DHEC) decision to renew the license under which Chem–Nuclear Systems, LLC operates a disposal facility for low-level radioactive waste. We affirm the ALC as to all issues, except four subsections of the regulation governing DHEC's issuance and renewal of such licenses. *See* 24A S.C.Code Ann. Regs. 61–63, pt. VII (1992 & Supp.2010).

I. Procedural History

Chem–Nuclear operates a disposal facility for low-level radioactive waste in Barnwell County (the "facility") pursuant to a license DHEC first issued in 1971. Part VII of regulation 61–63—entitled "Licensing Requirements for Land Disposal of Radioactive Wastes"—establishes "specific technical requirements" and "performance objectives" "upon which [DHEC] issues licenses for the land disposal of wastes." 24A S.C.Code Ann. Regs. 61–63 § 7.1.1, 7.1.3 (1992). Before DHEC may renew Chem–Nuclear's license to operate the facility, it must determine Chem–Nuclear designed, constructed, and operates the facility in compliance with the requirements and objectives of part VII of regulation 61–63. *See generally* § 7.1.

In 2000, Chem–Nuclear submitted an application to renew its license. After holding a public hearing and accepting comments, DHEC issued a renewal license to Chem–Nuclear in 2004. DHEC's decision to renew the license was challenged on the basis that the disposal methods at the facility do not meet certain requirements and objectives of part VII of the regulation. The ALC issued an order affirming DHEC's decision to renew the license (the "2005 order"), and found Chem–Nuclear complied with subsections 7. 10.1 through 7.10.4 of South Carolina Code Regulation 61–63 (1992 & Supp.2010) and section 7.18 of South Carolina Code Regulation 61–63 (1992). However, the ALC ordered Chem–Nuclear to conduct further studies to address concerns "related to the potential for groundwater contamination on and near the [facility]." In particular, the 2005 order stated

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these studies must "concern[ ] methods to reduce contact between radioactive waste and rainfall and other water at its facility" and ordered Chem–Nuclear to submit the results of the studies to DHEC within 180 days.

This court's opinion reviewing the findings of the 2005 order is reported at 387 S.C. 424, 693 S.E.2d 13 (Ct.App.2010) (*Chem–Nuclear I*). We affirmed the findings related to section 7.18 and subsections 7.10.1 through 7.10.4. 387 S.C. at 438, 693 S.E.2d at 20. However, we remanded the case to the ALC to apply its factual findings from the 2005 order to determine whether Chem–Nuclear complied with the following subsections of regulation 61–63: 7.11.1 through 7.11.12 (1992 & Supp.2010), 7.23.6 (1992), and 7.10.5 through 7.10.10 (1992 & Supp.2010). 387 S.C. at 435, 436, 438, 693 S.E.2d at 18–19, 20.

On remand, the ALC issued an order affirming DHEC's conclusion that Chem–Nuclear complied with these subsections (the "remand order"). In this appeal, we review the findings in the remand order.

II. Factual Findings in the 2005 Order

*2 Following this court's instructions, the ALC considered on remand only the findings from the 2005 order. In reviewing the remand order, therefore, we likewise consider only the findings from the 2005 order. In this section of the opinion, we recite those findings relevant to our review. Unless otherwise indicated, all quotations in this section are from the 2005 order.

A. Overview of Chem–Nuclear's Disposal Practices

Chem–Nuclear disposes of waste at the facility using "enhanced shallow land burial with engineered barriers." An engineered barrier is "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives" set out in part VII of regulation 61–63. 24A S.C.Code Ann. Regs. 61–63 § 7.2.9 (Supp.2010). The primary engineered barriers used by Chem–Nuclear are disposal trenches, disposal vaults, and enhanced caps.

Initially, waste is shipped to the facility in a disposal container. *See* 24A S.C.Code Regs. 61–63 § 3.2.30 (Supp.2010) (" 'Disposal container' means a container principally used to confine low-level radioactive waste during disposal operations at a land disposal facility ... [and] for some shipments, the disposal container may be the transport package."). Depending on the type of waste, disposal containers are also shipped to the facility inside a container called a cask. When a shipment of waste arrives at the facility, it is directed to either the appropriate trench for disposal or the Cask Maintenance Building, where Chem–Nuclear performs quality control inspections to ensure the casks are not damaged. Following this inspection, Chem–Nuclear transports the casks to the appropriate disposal trench where the disposal containers are loaded into reinforced concrete disposal vaults inside the trench. As disposal containers are loaded into vaults, Chem–Nuclear continues to inspect them.

Some "large components," such as steam generators and pressurizers, are considered disposal vaults themselves and can be placed directly into the trench after DHEC approves them for burial. Otherwise, all waste is contained inside a disposal container that is loaded into a vault, which is located within a trench.

Chem–Nuclear uses the term "active" to describe disposal vaults and trenches that are in the process of being filled. Thus, vaults are active until filled to capacity with disposal containers, and trenches are active until filled to capacity with vaults and large components. Once vaults and trenches become full, Chem–Nuclear refers to them as "inactive." When an individual vault becomes full, Chem–Nuclear covers the inactive vault with "general cover soils and an initial clay cap," which reduces "the infiltration of surface water into the trench." When a trench becomes

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full, Chem–Nuclear installs an "impermeable" multi-layer enhanced cap over the inactive trench, which consists of an initial clay cap, polyethylene and bentonite, a sand drain layer, and general soil materials.

*3 Waste is divided into three classes—A through C—based on the concentration of "long-lived" and "shorter-lived radionuclides" in the waste. Class A is the least radioactive waste, while C is the most radioactive. *See* 24A S.C.Code Ann. Regs. 61–63 § 3.56 .1.1 to .8 (Supp.2010). Chem–Nuclear currently uses three types of disposal trenches that are designed to hold different types of waste: (1) Class A trenches, which are the largest of the three types, hold vaults containing Class A waste; (2) Class B/C trenches hold vaults containing Class B and C waste; and (3) slit trenches, which are narrow, hold irradiated hardware and large components. Chem–Nuclear uses soil to fill voids between the vaults in each type of trench, which "enhance[s] long-term stability of the entire trench system."

Each trench has a drainage system "to facilitate monitoring of water accumulation entering the trench." Chem–Nuclear also implements a "surface water management plan" to manage rainfall after it collects in trenches, which consists of pumping water into either adjacent trenches or a lined pond.

B. Tritium Contamination of Groundwater

Tritium is a radioactive isotope of hydrogen that is found in "trace amounts in groundwater throughout the world." *NRC Senior Management Review of Overall Regulatory Approach to Groundwater Protection* (N.R.C., Rockville, M.D.), Feb. 9, 2011, at SECY–11–0019. Although tritium is naturally occurring, it is also a byproduct of the manufacture of nuclear power, and found in radioactive waste generated by nuclear power plants. *Id.*

The waste disposed of at the facility contains tritium. Rainfall "in and on the disposal trenches drives tritium into the groundwater beneath the facility." Chem–Nuclear initially discovered the presence of tritium in its disposal trenches in 1974. Chem–Nuclear determined that early disposal practices utilizing "unreliable containment and waste forms" led to this initial tritium contamination. However, these early containment methods "were acceptable at the time" under the regulations. In fact, they "were identical to practices at ... other low-level radioactive waste disposal facilities."

Although "it is inadvisable to attempt to uncover or excavate" the old containers that caused the initial tritium release, improvements in disposal technology and changes in the operations at the facility have "enhanced site performance." In 1995, DHEC substantially revised part VII of regulation 61–63 to require engineered barriers for all waste classes disposed of at the facility. Specifically, DHEC required all waste, except large components, to be placed in vaults, and required enhanced caps to be installed on all inactive trenches. Chem–Nuclear began using vaults and enhanced caps to meet these new requirements. In addition, Chem–Nuclear began using high-integrity polyethylene disposal containers to hold certain waste forms and discontinued the disposal of unstable, liquid waste forms. All of these measures served to "reduce[ ] the amount of tritium migrating to groundwater."

*4 DHEC imposes a regulatory limit on the amount of radioactive material Chem–Nuclear may release to the "general environment." *See* § 7.18. Although certain groundwater samples collected from beneath the facility show high concentrations of tritium, these samples are inappropriate for evaluating Chem–Nuclear's compliance with section 7.18. This is because DHEC regulates the release of radiation into the "general environment," § 7.18, not into the groundwater within the boundaries of the facility where there is no risk of public exposure. To determine whether Chem–Nuclear is in compliance with section 7.18, DHEC established a "compliance

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point"—defined as the "first point where a hypothetical member of the public might receive a dose of radiation"—at which it measures Chem–Nuclear's release of tritium into the general environment. This compliance point is located at Mary's Branch Creek, where the groundwater from beneath the facility flows into an above-ground stream. Chem–Nuclear regularly samples the water from Mary's Branch Creek to determine whether there has been a release of tritium above the regulatory limit set by DHEC. Since 2001, tritium concentrations at the compliance point have been declining, and all measurements taken at Mary's Branch Creek have been well below the regulatory limit for exposure under section 7.18. In fact, "[t]here is no evidence of any actual release resulting in an exposure above regulatory limits to any member of the general public."

C. Actions to Prevent Tritium Exposure

Chem–Nuclear has taken steps to protect the public from exposure to radiation at the compliance point. The general public is restricted from accessing the waters of Mary's Branch Creek at the compliance point, and there are no known consumers of the water who are "located in and around the compliance point." Chem–Nuclear also erected a fence around the compliance point to prevent entry of unauthorized persons. Additionally, Chem–Nuclear has a restrictive covenant and easement on three parcels of property surrounding the compliance point. This property serves as a buffer zone by prohibiting the use of groundwater under the property, as well as surface water on the property, without written consent from DHEC. Moreover, changes in design and operations at the facility further reduce the potential for radioactive exposure to the general environment.

D. Long–Term Predictions for Compliance

As required by DHEC, Chem–Nuclear created a predictive model—the Environmental Radiological Performance Verification (ERPV)—to predict the future performance of the site for up to two thousand years. This model relies on data collected through a system of groundwater monitoring wells and thirty years of data derived from over two hundred sampling points. DHEC commissioned and funded a panel of experts—the "Blue Ribbon Panel"—to review the ERPV and determine whether Chem–Nuclear's predictions were accurate. After finding the ERPV predictions to be reliable, the Blue Ribbon Panel concluded the facility "pose[d] minimal risk to either the environment or members of the public, both today and into the long-term future." DHEC relied on the conclusions of both the ERPV and the Blue Ribbon Panel in deciding to renew the facility's license.

III. Standard of Review

*5 In the 2005 order, the ALC conducted a de novo review of DHEC's decision to renew Chem–Nuclear's license. *See Marlboro Park Hosp. v. S.C. Dep't of Health & Envtl. Control,* 358 S.C. 573, 579, 595 S .E.2d 851, 854 (Ct.App.2004) (stating the ALC acts "as the fact-finder" in a contested case and "must make sufficiently detailed findings supporting the denial [or grant] of a permit application" (alteration in original) (citation omitted)). In *Chem–Nuclear I,* this court reviewed the ALC's findings and conclusions in the 2005 order to determine whether they were "[ ]supported by substantial evidence or controlled by some error of law." *See* 387 S.C. at 430–31, 693 S.E.2d at 16 (relying on the standard of review set forth in S.C.Code Ann. § 1–23–610(B) (Supp.2013)). Although we affirmed the ALC's determination that Chem–Nuclear complied with all sections of regulation 61–63 addressed in the 2005 order, we remanded for the ALC to apply the factual findings from the 2005 order to other, applicable sections it did not address. 387 S.C. at 439, 693 S.E.2d at 20–21. *See* 387 S.C. at 439, 693 S.E.2d at 20 (instructing the ALC "to apply its factual findings [from the 2005 order] to these sections of regulation 61–63" on remand). In the remand order, the ALC applied the factual findings from the 2005 order to determine whether Chem–Nuclear complied with these additional sections.

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In this appeal from the remand order, we must accept the factual findings in the 2005 order. We review the remand order under the standard of review set forth in subsection 1–23–610(B)(d), and may reverse only if the ALC's decision was affected by an error of law. *See* § 1–23–610(B)(d) (stating an appellate court may reverse the ALC's decision when it is affected by an error of law); *S. C. Dep't of Revenue v. Blue Moon of Newberry, Inc.*, 397 S.C. 256, 260, 725 S.E.2d 480, 483 (2012) ("The construction of a regulation is a question of law to be determined by the court. We will correct the decision of the ALC if it is affected by an error of law, and questions of law are reviewed de novo." (internal quotation marks and citations omitted)).

IV. Chem–Nuclear's Compliance with Regulation 61–63

DHEC drafted part VII of regulation 61–63 to include three general categories of regulations. *See* § 7.1.3 ("This Part establishes procedural requirements[,] ... performance objectives[,] ... [and] specific technical requirements for near-surface disposal of radioactive waste...."). All three categories are applicable to the enhanced shallow land burial of low-level nuclear waste at the facility.[FN1] In this appeal, we address the ALC's determination that Chem–Nuclear complied with regulations in two of these categories—regulations imposing technical requirements and performance objectives. Generally, regulations containing technical requirements require Chem–Nuclear to take specific action to comply with the regulation, while regulations containing performance objectives require Chem–Nuclear to achieve certain results sought under the regulation. There is some overlap, however, between the action-based and result-based requirements of these two categories of regulations.

FN1. Subsection 7.1.3 provides that the "procedural requirements" and "performance objectives" apply "to any method of land disposal," and the "specific technical requirements" apply to "near-surface disposal of radioactive waste."

*6 As an example of a regulation imposing "technical requirements," subsection 7.11.11.7 of South Carolina Code Regulation 61–63 (Supp.2010) requires "[t]he disposal units and the incorporated engineered barriers ... be designed and constructed to ... prevent[ ] contact between the waste and the surrounding earth." Chem–Nuclear's compliance with this subsection, which we discuss in section IV.B.5 of this opinion, may be determined only by examining specific actions taken by Chem–Nuclear to prevent contact between waste and the "surrounding earth." On the other hand, compliance with a regulation imposing "performance objectives" must be determined by examining whether Chem–Nuclear obtained the results required by the regulation. An example of such a regulation is section 7.18, which requires reasonable efforts be made to maintain radioactive releases to the general public "as low as is reasonably achievable"—a concept known by the acronym "ALARA." [FN2] This and other result-based "performance objective" regulations require consideration of existing environmental conditions, such as the fact that tritium levels are declining in the groundwater below the facility and in the surface water of Mary's Branch Creek.

FN2. Regulation 61–63 defines the "ALARA" standard as:

> [M]aking every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in

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> relation to utilization of nuclear energy and licensed materials in the public interest.
>
> 24A S.C.Code Ann. Regs. 61–63 § 3.2.6 (Supp.2010).

In *Chem–Nuclear I,* we affirmed the ALC's finding that Chem–Nuclear met the performance objectives of sections 7.18 and 7.10. 387 S.C. at 438, 693 S.E.2d at 20. Section 7.18 and the subsections of 7.10 that we addressed in *Chem–Nuclear I* relate to whether Chem–Nuclear is protecting the public from radioactive releases, and generally do not impose specific requirements as to how Chem–Nuclear must accomplish any particular result.[FN3] In affirming Chem–Nuclear's compliance with section 7.18, we gave deference to the ALC's finding that "Chem–Nuclear ... demonstrated adherence to ALARA ... by taking appropriate measures to address tritium migration from the Barnwell facility and the potential for releases from other radionuclides." 387 S.C. at 429, 438, 693 S.E.2d at 15, 20. Showing similar deference, we affirmed the ALC's findings that Chem–Nuclear complied with four of the performance objectives in section 7.10. 387 S.C. at 438, 693 S.E.2d at 20. We found, however, the ALC did not address the six remaining subsections of 7.10 (7.10.5 through 7.10.10). 387 S.C. at 438–39, 693 S.E.2d at 20–21. We remanded for the ALC to determine whether Chem–Nuclear complied with those subsections. *Id.*

> FN3. *See* § 7. 10.1 ("The issuance of the license will not constitute an unreasonable risk to the health and safety of the public."); § 7.10.2 ("The applicant is qualified ... to carry out the disposal operations ... in a manner that protects health and minimizes danger to life or property."); § 7.10.3 ("The ... operations ... are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity ...."); § 7.10.4 ("The ... operations ... are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected....").

We also required the ALC to consider on remand Chem–Nuclear's compliance with section 7.11 and subsection 7.23.6. 387 S.C. at 435–36, 693 S.E.2d at 18–19. DHEC argued that in determining whether DHEC properly renewed the license, the ALC must consider compliance with the result-based requirements "set forth in section 7.10 ... rather than apply criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We rejected that argument, finding "the [specific] technical requirements" of "section 7.11 impose [ ] additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance." 387 S.C. at 435, 693 S.E.2d at 18–19. Similarly, we found "the technical requirements of [sub]section 7.23.6 ... impose[ ] additional compliance requirements for Chem–Nuclear." 387 S.C. at 436, 693 S.E.2d at 19. Under our holding in *Chem–Nuclear I,* therefore, the technical requirements of subsections 7.11.11 and 7.23.6 require Chem–Nuclear to take action to design and construct the disposal site, disposal units, and engineered barriers to meet the specifications in those subsections. *See* 387 S.C. at 432, 435, 436, 693 S.E.2d at 17, 19, 20. DHEC and Chem–Nuclear may not demonstrate compliance with those subsections simply by showing Chem–Nuclear met the performance objectives of other subsections. *See id.*

*7 With these considerations in mind, we discuss the ALC's determination that DHEC properly found Chem–Nuclear complied with the applicable subsections of regulation 61–63.

A. Section 7.10[FN4]

> FN4. In this section, we discuss compliance

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with subsections 7.10.6 and 7.10.8, and not 7.10.7, because our analysis of that subsection depends on whether Chem–Nuclear complied with the relevant subsections of 7.11.11. We later discuss subsection 7.10.7 in section IV.D. of this opinion.

The subsections of 7.10 that we review in this appeal [FN5] set forth performance objectives for the issuance and renewal of Chem–Nuclear's license. The correctness of DHEC's and the ALC's determination of compliance with subsections 7.10.6 and 7.10.8 depends, in part, on Chem–Nuclear's progress in reducing the amount of tritium released from the facility. In reviewing the ALC's findings as to these subsections, therefore, we rely upon evidence that shows its operations are "adequate to protect the public health and safety," which includes the following result-based evidence: (1) Chem–Nuclear's disposal operations currently meet the ALARA standard; (2) "improvements in waste disposal procedures" have enhanced site performance; and (3) there is a decline in the "tritium concentration at the compliance point."

FN5. Chem–Nuclear's compliance with subsections 7.10.5, 7.10.9, and 7.10.10 is not an issue in this appeal.

1. Subsection 7.10.6

Subsection 7.10.6 provides that before DHEC may issue a license to Chem–Nuclear, it must find:

> [Chem–Nuclear]'s proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

This subsection focuses our analysis on Chem–Nuclear's efforts to protect the public, the environment, and inadvertent intruders from radioactive exposure by ensuring "long-term stability of the disposed waste and the disposal site." We begin our discussion with the definitions of the relevant terms used in subsection 7.10.6.

"Site closure" is defined as "those actions that are taken upon completion of operations that prepare the disposal site for custodial care [by the State of South Carolina] and that assure that the disposal site will remain stable and will not need ongoing active maintenance." 24A S.C.Code Ann. Regs. 61–63 § 7.2.19 (1992).

Once site closure is accomplished, the "institutional control" period begins, in which the State of South Carolina "assume[s] responsibility" for maintaining the facility, 24A S.C.Code Ann. Regs. 61–63 §§ 7.8.1, 7.15 (1992), and "control[s] access to the disposal site." 24A S.C.Code Ann. Regs. 61–63 § 7.27.2 (1992). By regulation, the institutional control period is one hundred years. *Id.*

"Stability" is defined as "structural stability." 24A S.C.Code Ann. Regs. 61–63, § 7.2.20 (1992). According to Part III of regulation 61–63, structural stability results from: (1) "the waste form itself" being stable, or "processing the waste to stable form"; (2) converting waste containing liquid "into a form that contains as little free-standing and non-corrosive liquid as is reasonably achievable"; and (3) filling "[v]oid spaces within the waste and between the waste and its package." 24A S.C.Code Ann. Regs. 61–63 § 3.56.2.2.1 to .3 (Supp.2010).

*8 "Active maintenance" means "any significant activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in 7.18 and 7.19 are met." 24A S.C.Code Ann. Regs. 61–63 § 7.2.1 (1992). As we

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previously discussed, section 7.18 regulates the concentration of radioactive material that may be released to the general environment and the public. Section 7.19 of South Carolina Code Regulation 61–63 (1992) requires that the "[d]esign, operation, and closure of the land disposal facility ... ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed." An "inadvertent intruder" is a "person who might occupy the disposal site after closure and engage in ... activities ... in which an individual might be unknowingly exposed to radiation from the waste." 24A S.C.Code Ann. Regs. 61–63 § 7.2.13 (1992).

The following findings from the 2005 order support the ALC's determination that the waste and disposal site are structurally stable:

(1) All waste is placed into reinforced concrete disposal vaults;

(2) Void space between the vaults is filled with soil, which enhances "long-term stability of the entire trench system";

(3) Enhanced caps are installed on all inactive trenches;

(4) "[T]he elimination of liquid waste forms ... have increased site performance"; and

(5) "Improvements in waste forms ... have succeeded in reducing the amount of tritium that is migrating to groundwater."

Additionally, the following findings support the determination that *long-term* stability of the disposed waste and disposal site will be achieved and will be adequate to protect the general public and inadvertent intruders from radioactive exposure:

(1) Predictions of a declining trend in radioactive releases to the general environment;

(2) The Blue Ribbon Panel's conclusion that the facility "poses a minimal risk to either the environment or members of the public, both today and into the long-term future";

(3) The presence of a buffer zone, which provides "long-term protection to the public from exposure to radioactive material in the surface water at the compliance point"; and

(4) The use of concrete disposal vault lids [FN6] for Class C waste, which serves as an intrusion barrier for inadvertent intruders.[FN7]

FN6. We are uncertain of the nature and purpose of disposal vault lids. Neither the regulations nor the 2005 order defines "disposal vault lid," and the 2005 order references disposal lids only twice and in two limited contexts: (1) "the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault"; and (2) "[t]he disposal vaults lids serve as an intrusion barrier for Class C waste."

FN7. Subsection 3.56.1.2.3 requires Class C waste to be disposed of in a manner that "protect[s] against inadvertent intrusion."

Based on these findings, we find the ALC did not err in concluding Chem–Nuclear is in compliance with subsection 7.10.6.

2. Subsection 7.10.8

Subsection 7.10.8 requires Chem–Nuclear to provide a "proposal for institutional control" that gives "reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that

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the institutional control meets the requirements of 7.27." On appeal, Chem–Nuclear's compliance with this subsection is challenged on the ground that it violated subsection 7.10.6.[FN8] As previously discussed, subsection 7.10.6 requires the design and operations of the facility to provide "long-term stability of the disposed waste." When considered in the context of subsection 7.10.6, subsection 7.10.8 requires Chem–Nuclear to provide reasonable assurances the waste will be stable after the facility is closed. Based on our ruling regarding subsection 7.10.6, we find the ALC correctly determined Chem–Nuclear is in compliance with subsection 7 .10.8.

> FN8. We previously affirmed Chem–Nuclear's compliance with subsections 7.10.3 and 7.10.4. *Chem–Nuclear I,* 387 S.C. at 438, 693 S.E.2d at 20. Chem–Nuclear's compliance with subsection 7.10.5 is not an issue on appeal.

B. Subsection 7.11.11

*9 Subsection 7.11.11 provides, in relevant part,

> The disposal units and the incorporated engineered barriers shall be designed and constructed to meet the following objectives:
>
> 7.11.11.1 to minimize the migration of water onto the disposal units.
>
> 7.11.11.2 to minimize the migration of waste or waste contaminated water out of the disposal units.
>
> 7.11.11.4 temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil.
>
> 7.11.11.6 reasonable assurance that the waste will be isolated for at least the institutional control period.
>
> 7.11.11.7 prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

DHEC and Chem–Nuclear continue to assert that in reviewing the ALC's findings as to subsection 7.11.11, we may rely on result-based evidence—(1) its operations meet the ALARA standard, (2) "improvements in waste disposal procedures" have enhanced site performance, and (3) there is a decline in the "tritium concentration at the compliance point." As we previously acknowledged, evidence of improvements in disposal practices and a decline in tritium concentrations is certainly relevant to our analysis of compliance with the regulations containing performance objectives. However, that evidence does not directly relate to, and cannot alone show compliance with, the technical requirements imposed by subsection 7.11.11. *See* 387 S.C. at 435, 693 S.E.2d at 18–19 (holding "the [specific] technical requirements" of "section 7.11 impose[ ] additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance"). For these subsections of the regulation, compliance may not be measured solely by results. Instead, we must consider whether Chem–Nuclear took any actions to meet the technical requirements imposed by these subsections, and if so, the sufficiency of Chem–Nuclear's actions.

1. Subsection 7.11.11.1

Subsection 7.11.11.1 requires that Chem–Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of water onto the disposal units."

The regulations define "disposal unit" to include

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"a vault or a trench," 24A S.C.Code Ann. Regs. 61–63 § 7.2.8 (Supp.2010), and "engineered barrier" to include "vaults or equivalent structures," § 7.2.9. The regulations, however, do not define the phrase "migration of water." DHEC concedes the phrase encompasses not only the flow of surface water, but also rainfall. Thus, for DHEC to have correctly determined Chem–Nuclear complied with this subsection, DHEC must have found Chem–Nuclear took action that reduced rainfall and the flow of surface water onto the vaults and trenches. Chem–Nuclear's compliance concerning the migration of rainfall onto disposal units is particularly important, given the followings findings from the 2005 order: (1) "[t]ritium is driven into the groundwater through rainfall in and on the disposal trenches," and (2) tritium concentrations in the groundwater seem to "vary[ ] with the amount of rainfall." Referring to these and other findings, the ALC called this "the undeniable 'rainfall problem.' "

***10** We first examine whether the ALC correctly determined Chem–Nuclear complied with subsection 7.11.11.1 in regard to rainfall migrating onto active disposal units—vaults and trenches that are in the process of being filled. The 2005 order provides that while Chem–Nuclear is filling individual vaults with disposal containers, it employs "no cover or roof, so rain can fall directly into the vault during the loading period." The 2005 order also indicates Chem–Nuclear provides no cover for active trenches, which leaves these trenches and the vaults contained within them exposed to rainfall until the trenches become full. Vaults contained within an active trench remain exposed to rainfall for up to two years while Chem–Nuclear fills the trench. The 2005 order further states rainfall enters vaults because they "are not sealed against water intrusion," and the "lids of the vaults are not ... sealed to prevent water from entering" them.

DHEC interprets subsection 7.11.11.1 as requiring Chem–Nuclear to "minimize the migration of water onto the disposal units" during the period in which the trenches are active. This interpretation required DHEC to consider what action Chem–Nuclear took to reduce the amount of rain falling onto open vaults while they are being filled, and onto closed vaults in active trenches. However, neither the 2005 order, the remand order, nor any other portion of the record or the briefs contain any evidence that Chem–Nuclear has taken a single action to prevent a single raindrop from falling onto active vaults or trenches.

Although the ALC determined Chem–Nuclear complied with this subsection, none of the evidence it relied upon addresses the rainfall issue. Specifically, the ALC listed the following factual findings from the 2005 order to support DHEC's determination of compliance as to active and inactive disposal units:

(1) The Class A trench has a sloped floor and a drainage system that facilitates monitoring of water that enters the trench;

(2) The Class B/C trench contains a French drain and sump system that allows monitoring of water accumulation in the trench;

(3) The slit trench has a sloped floor that is filled with "coarse drain sand" and contains "standpipes" that monitor water accumulation;

(4) Chem–Nuclear implements a surface water management plan to pump water out of trenches;

We find none of these findings support the ALC's determination that Chem–Nuclear complied with this subsection as to rain falling on disposal units-active or inactive. These findings relate to remedial measures to monitor, drain, and manage water that has already migrated onto disposal units. The plain language of this subsection, however, requires Chem–Nuclear to do more than monitor, drain, or otherwise manage water once it enters the vaults and trenches.[FN9] These

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measures listed by the ALC have no effect on the initial migration of rainfall and thus, do not relate to compliance with subsection 7.11.11.1. Furthermore, the record is devoid of any evidence to support the ALC's conclusion that Chem–Nuclear has done *anything* to reduce rainfall onto active disposal units. When pressed at oral argument to list what Chem–Nuclear has done to reduce rainfall onto active disposal units, neither Chem–Nuclear nor DHEC could name one action Chem–Nuclear took, except to construct berms along the edges of trenches.[FN10]

FN9. Other subsections of regulation 61–63 deal with accumulation of water within disposal units once it migrates there. *See, e.g.,* § 7.23.6 (requiring the disposal site to be designed in a way that "minimize[s] ... the contact of *standing water* with waste during disposal, and the contact of *percolating* or *standing water* with wastes after disposal" (emphasis added)).

FN10. While berms may keep surface water from migrating onto the disposal units, they do nothing to minimize direct rainfall onto active trenches and vaults. Additionally, the ALC made no findings as to whether Chem–Nuclear ever constructed a berm, or if so, whether the berms reduce the migration of surface water onto the disposal units.

***11** The ALC also listed the following two factual findings, in addition to the four discussed above, to affirm DHEC's determination of compliance with this subsection as to rainfall on inactive disposal units only:

(5) Backfilling methods that fill voids between vaults are implemented for all trenches; and

(6) Initial clay caps placed on inactive vaults and enhanced caps installed over inactive trenches minimize the infiltration of surface water into the trench.

We find neither of these findings support—and only one actually addresses—the ALC's determination that Chem–Nuclear complied with this subsection as to inactive disposal units. Regarding finding (5), "backfilling methods" involve placing soil in open spaces between the vaults, which has nothing to do with reducing the migration of water onto disposal units. Finding (6), however, is relevant to Chem–Nuclear's compliance with subsection 7.11.11.1 as to inactive disposal units. The installation of the initial clay cap on inactive vaults and the enhanced cap on inactive trenches reduces the migration of water onto these disposal units. Although these measures *reduce* the migration of water, subsection 7.11.11 .1 requires Chem–Nuclear to "minimize" this occurrence. Thus, whether finding (6) supports Chem–Nuclear's compliance with this subsection requires us to consider the meaning of "minimize."

Regulation 61–63 does not define minimize. Chem–Nuclear and DHEC filed a joint brief with this court in which they set forth the following definition of minimize: "to reduce to the smallest possible amount, extent, size, or degree." [FN11] Applying this definition to the requirements of subsection 7.11.11.1, we must consider two sub-issues in analyzing compliance: (1) whether there is evidence to support a finding that Chem–Nuclear has reduced the migration of water onto disposal units, and (2) whether the extent of this reduction is adequate to meet DHEC's definition of minimize. Thus, we cannot find the ALC correctly determined Chem–Nuclear complied with this subsection simply because Chem–Nuclear "reduced" the migration of water onto disposal units.

FN11. While this definition sets a strict standard for compliance, we find this is supported by the way in which this regulation, and others, are written. For example, subsection 7.23.6 requires Chem–Nuclear to

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> "minimize to the extent practicable" the contact of water with waste at different stages of the disposal process. We interpret subsection 7.23.6 as imposing a less stringent standard for compliance than subsection 7.11.11.1 because the term "minimize" is followed by language prompting DHEC to consider the reasonableness of Chem–Nuclear's efforts to comply. The lack of similar language in subsection 7.11.11.1 suggests there is no inherent reasonableness or practicability consideration involved in analyzing Chem–Nuclear's compliance. The definition of "minimize" provided by Chem–Nuclear and DHEC accords with this interpretation. Thus, we rely on their definition of minimize—"to reduce to the smallest possible amount, extent, size, or degree"—in analyzing DHEC's and the ALC's determinations of compliance.

As to the first sub-issue, we agree with the ALC that installation of initial clay caps and enhanced caps reduce the migration of surface water and rainfall onto inactive vaults and trenches. However, the ALC did not address the second sub-issue—whether initial clay caps and enhanced caps "reduce to the smallest possible amount" the migration of water onto inactive disposal units. Both DHEC and Chem–Nuclear represented to this court in their brief that Chem–Nuclear must have taken action to "reduce [the migration of water onto inactive trenches] to the smallest possible amount." Yet, neither DHEC nor the ALC made any finding as to whether Chem–Nuclear did so. The determination of this issue is crucial to the question of whether Chem–Nuclear complied with subsection 7.11.11.1.

In considering whether Chem–Nuclear's disposal units and engineered barriers adequately reduce—"minimize"—the migration of water, we acknowledge it is the duty of DHEC, not this court, to enforce regulation 61–63. Similarly, it is the duty of Chem–Nuclear, not DHEC, to take the necessary action to comply with the regulations. Nevertheless, we find support in the 2005 order that implementing "relatively simple measures" could further reduce the migration of water onto both active and inactive disposal units. These measures include "shelter[ing] the disposal trenches from rainfall" while they are being filled and "sealing and grouting the concrete disposal vaults to prevent the intrusion of water."

***12** In 2001, DHEC directed Chem–Nuclear to consider implementing such measures. According to the 2005 order, "during the review of the re-issuance of the Chem–Nuclear license, DHEC ... advis[ed] Chem–Nuclear to review and revise all trench construction details, plans, specifications, and procedures." "In particular, [DHEC] informed Chem–Nuclear that consideration should be given to protection of the open trenches from direct rainfall and runoff such as temporary covers." In response to this directive, Chem–Nuclear considered "several conceptual trench designs," including designs for "temporary roofs to keep water out of the trenches and vaults." Although Chem–Nuclear informed DHEC in 2001 it would take "up to two years to evaluate [these] designs," the ALC found in the 2005 order "Chem–Nuclear ha[d] not completed its evaluation and ha [d] not submitted final designs to DHEC for review and approval."

The ALC found it significant that Chem–Nuclear had not yet completed and submitted these final designs to DHEC; given the "undeniable 'rainfall problem.' " Specifically, the 2005 order stated, "Chem–Nuclear has already considered conceptual designs to keep rainfall out of the trenches, ... [but] it failed to complete a report on its research and has not submitted such a report to DHEC, despite its request." (internal citations omitted). Additionally, the ALC found further studies "were needed to evaluate the ... feasibility of employing or implementing designs" that would: (1) "shelter disposal trenches from rainfall and prevent rainfall from entering the trenches," and

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(2) "provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." The order explained these additional studies were necessary because "no evidence was presented ... that the Blue Ribbon Panel considered any of these particular issues." The ALC ordered that "Chem–Nuclear shall conduct the[se] studies ... and submit the results to DHEC within 180 days."

These findings and directives from the 2005 order support the importance of implementing measures to address concerns related to rainfall on the disposal units. Both DHEC and the ALC ordered Chem–Nuclear to consider such measures. However, none are currently in place, a fact directly relevant to Chem–Nuclear's ability to reduce water migration onto the disposal units "to the smallest possible amount."

In conclusion, we find the record in this case conclusively demonstrates Chem–Nuclear has taken no action whatsoever to prevent even one rain drop from migrating onto one active vault or trench. Additionally, while initial clay caps and enhanced caps reduce the migration of water onto inactive disposal units, there is no evidence and no finding by the ALC that DHEC has required, or that Chem–Nuclear has taken, any action that would reduce this migration to the smallest possible amount. In light of these facts, we hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.1.

2. Subsection 7.11.11.2

***13** Subsection 7.11.11.2 requires that Chem–Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of waste or waste[-]contaminated water out of the disposal units." DHEC and Chem–Nuclear contend the same definition of minimize used in the previous section applies to the analysis of this subsection.

Based on the plain language of subsection 7.11.11.2, Chem–Nuclear must minimize the migration of two types of wastes: (1) the radioactive waste-form contained within the disposal containers, and (2) water that has been contaminated by radioactive waste. As to the first, we agree with the ALC's determination that Chem–Nuclear's disposal units and engineered barriers minimize the migration of radioactive waste-forms out of disposal units. The record establishes that Chem–Nuclear uses disposal containers and reinforced concrete vaults, which prevent the migration of these waste-forms out of disposal units. Thus, we affirm the ALC's ruling that DHEC correctly determined Chem–Nuclear is in compliance with this subsection as to the migration of the waste itself out of the disposal units.

We next address whether Chem–Nuclear is in compliance as to the migration of waste-contaminated water out of the disposal units. According to the 2005 order, the vaults contain holes that allow water to drain from them and into the trenches. As for the trenches, they are lined with partially impermeable materials so that liquids may drain to the soil below the trench. Thus, "rainfall that accumulates in the trenches eventually percolates into the soil" and groundwater beneath the trenches. Also, the water table may rise during "wet periods," causing groundwater to "rise up into the [vaults]."

The ALC relied on its previous findings related to subsection 7.11.11.1 to hold Chem–Nuclear complied with this subsection because the methods "designed to minimize the infiltration of water into the vaults" serve to "minimize [ ] the migration of ... waste-contaminated water out of them." We agree evidence of compliance with subsection 7.11.11.1 is relevant to our determination of compliance with this subsection. This is because reducing the initial migration of water onto disposal units has a reciprocal effect upon reducing the migration of waste-contaminated water out of disposal units.

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Therefore, our holding that Chem–Nuclear failed to comply with subsection 7.11.11.1 relates to whether it complied with subsection 7.11.11.2 as to waste-contaminated water.[FN12]

> FN12. Noncompliance with subsection 7.11.11.1 would not conclusively establish noncompliance with this subsection. Subsection 7.11.11.1 regulates the migration of "water," while subsection 7.11.11.2 regulates the migration of "waste[-]contaminated water." Thus, the fact that water migrates onto and, subsequently, out of disposal units does not itself violate this subsection. A violation occurs only when water is allowed to come in contact with waste and waste-contaminated water then migrates out of disposal units.

Relying on the two-part definition of minimize discussed in the previous section, we must first analyze whether there is evidence that Chem–Nuclear reduced the migration of waste-contaminated water out of disposal units. The ALC found Chem–Nuclear's use of disposal containers prevents waste from coming into direct contact with water that enters vaults, which reduces the potential for water to become contaminated. This, in turn, reduces the migration of waste-contaminated water out of vaults. Second, the ALC found that although the drainage holes in the vaults allow "water to rise up into the containers" and drain into the trenches below, they also allow water to drain away from the waste. This decreases the likelihood that water entering the vaults will become contaminated. We agree the ALC's findings support the conclusion that Chem–Nuclear has taken *some* action to reduce the migration of waste-contaminated water from the disposal units.

***14** However, the ALC did not address the second part of the analysis—whether these measures are sufficient to meet DHEC's definition of minimize. As we previously stated regarding subsection 7.11.11.1, compliance with subsection 7.11.11.2 depends on whether there is evidence to support a finding that Chem–Nuclear's actions "reduce to the smallest amount possible" the migration of waste-contaminated water out of disposal units.

On this point, the 2005 order stated "trench water ... becomes contaminated by the fact that there is some residual tritium on ... vaults and waste packages that have ... water on them as a result of rain." Based on this fact, the following findings in the 2005 order demonstrate the vaults and trenches allow water that has come into contact with residual tritium on the disposal containers to migrate out of them:

(1) The "floors of the vaults have holes to allow water to drain from the vaults";

(2) These drainage holes "can also allow water to rise up into the containers";

(3) "[N]one of the trenches ... have an impermeable liner";

(4) "The bottoms of the trenches" are not designed to "prevent the migration of liquids out of the bottom of trenches" and, in fact, are "designed to be partially impermeable and ... allow liquids to infiltrate the soil below the trenches"; and

(5) "Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the [facility]."

As we acknowledged above, the holes in the vaults allow water to drain away from the waste, which decreases the likelihood that water entering the vaults will become contaminated. Nevertheless, these holes permit water that has come in contact with residual tritium to drain into the trenches, which, in turn, allow the water to percolate into the soil and groundwater beneath the facility. This supports that Chem–Nuclear has not taken action to reduce to the

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smallest possible amount the migration of waste-contaminated water out of its vaults and trenches. Moreover, the fact that Chem–Nuclear has failed to minimize the migration of water onto vaults under subsection 7.11.11.1 weighs in favor of non-compliance with subsection 7.11.11.2.

In affirming DHEC's conclusion that Chem–Nuclear complied with this subsection, the ALC recognized that trench bottoms "are designed to be partially impermeable and allow liquids to infiltrate the soil below" them. However, the ALC noted the 2005 order contained "no finding that Chem–Nuclear's waste disposal design is faulty or fails to minimize the migration of ... waste-contaminated water out of disposal units." We find the ALC erred in relying on the absence of such a finding in the 2005 order.

In *Chem–Nuclear I,* we held "section 7.11 imposes additional compliance requirements" not addressed by the 2005 order. 387 S.C. at 435, 693 S.E.2d at 19. We remanded for the ALC "to apply its factual findings [in the 2005 order] to the technical requirements" of section 7.11—including subsection 7.11.11.2. 387 S.C. at 435, 693 S.E.2d at 18–19. Thus, the ALC could not rely on the fact that the 2005 order did not contain the conclusion we ordered the ALC to make on remand—whether, based on the factual findings in the 2005 order, the disposal units minimized the migration of waste-contaminated water out of them. The lack of such a conclusion in the 2005 order was the very reason we remanded for the ALC to make this determination.

***15** We also find the ALC erred in relying on evidence that "improvements in waste disposal procedures" have reduced the "tritium concentration at the compliance point." As acknowledged by the ALC in the remand order, this evidence "does not get to the heart of the technical requirements" established by the subsection. This is because subsection 7.11.11.2 imposes specific technical requirements, and we find the evidence does not relate to the requirement that the disposal units be designed to minimize the migration of waste-contaminated water out of them. Instead, this evidence relates to Chem–Nuclear's compliance with the result-based performance objectives contained in section 7.18—that Chem–Nuclear keep radioactive releases to the general environment "as low as is reasonably achievable." Subsection 7.11.11.2 required DHEC and the ALC to analyze the sufficiency of Chem–Nuclear's actions to comply with the plain language of this subsection. Thus, we cannot base our decision on the fact that Chem–Nuclear has reduced the overall tritium concentration at the compliance point.

We conclude the record demonstrates Chem–Nuclear has taken measures to reduce the migration of waste-contaminated water out of disposal units. However, the record does not support a finding that Chem–Nuclear complied with subsection 7.11.11.2. We base our holding on (1) Chem–Nuclear's failure to comply with subsection 7.11.11.1, and (2) there being no evidence, and no finding, that Chem–Nuclear has taken action to "minimize"—reduce to the smallest amount possible—the migration of waste-contaminated water out of disposal units. We hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.2.

3. Subsection 7.11.11.4

Subsection 7.11.11.4 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The plain language of this subsection imposes multiple requirements on Chem–Nuclear: (1) collect and retain water that migrates onto the disposal units, (2) test this water for radioactive waste material, (3) if such waste material is discovered, engage in removal or remedial

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measures, and (4) accomplish this without contaminating the groundwater or surrounding soil.

The ALC relied on the following findings in the 2005 order to support its conclusion that Chem–Nuclear complied with this subsection:

> (1) Chem–Nuclear implements a surface water management plan to manage precipitation that collects in trenches, which involves pumping water into adjacent trenches or a lined pond; and
>
> (2) The trenches are designed to prevent the flow of surface water from coming into contact with waste.

We find neither finding supports—and only one addresses—the ALC's determination that DHEC correctly concluded Chem–Nuclear complied with this subsection. Finding (1)—regarding Chem–Nuclear's surface water management plan—is relevant to the first requirement of subsection 7.11.11.4, "temporary collection and retention of water." However, there is no evidence that Chem–Nuclear tests the water pumped from the trenches for radioactive waste material. The subsection requires Chem–Nuclear to do more than collect and retain the water. Finding (2)—that trenches are designed to prevent surface water from coming into contact with waste—is irrelevant to Chem–Nuclear's compliance with this subsection. It has nothing to do with collecting, testing, or removing contaminated water from the disposal units. Because the ALC cited no additional evidence of Chem–Nuclear's compliance with this subsection, we hold the ALC erred in affirming DHEC's determination that Chem–Nuclear complied with subsection 7.11.11.4.

***16** Upon our review of the 2005 order, we find no evidence of compliance with this subsection.[FN13] In fact, the evidence in the record demonstrates Chem–Nuclear is not in compliance. First, the vaults and trenches are designed to allow water that enters them to drain into the soil and groundwater below. That water is not tested before it enters the ground. Second, the only other evidence relevant to this subsection is the finding in the 2005 order that states, "None of the trenches at the [facility] have ... a leachate collection system." Leachate is defined as "any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the [radioactive] material." 10 C.F.R. § 40 app. A (2011). Although the regulation does not define "leachate collection system," in common industry usage, it is "a system or device ... that is designed, constructed, maintained, and operated to collect and remove leachate" for proper disposal. 40 C.F.R. § 503.21(i) (2011); *see also* 40 C.F.R. § 264.301(a)(2) (2011). [FN14] Such a system would allow Chem–Nuclear to satisfy the four requirements of subsection 7.11.11.4—(1) collect water migrating onto the disposal units, (2) test this water, (3) remove waste-contaminated water, and (4) do this without contaminating the groundwater because the system would collect the leachate for alternate disposal. Thus, the ALC's finding regarding the non-existence of a leachate collection system undermines its conclusion that Chem–Nuclear complied with this subsection and supports our determination that the ALC erred in reaching that conclusion.

> FN13. This regulation imposes requirements for the design and construction of "disposal units" and "engineered barriers." While Chem–Nuclear has monitoring wells to test the groundwater for contamination and a system to monitor water accumulation in trenches, neither of these qualifies as a disposal unit. *See* § 7.2.8 (defining "disposal unit" as "a discrete portion of the disposal site into which waste is placed for disposal"). To the extent they are considered engineered barriers—"a man-made *structure or device* that is intended to improve the land disposal facility's ability to meet the performance objectives in this part," § 7.2.9 (emphasis

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added)—there is no evidence these monitoring "devices" allow Chem–Nuclear to collect and test this water "without the contamination of the groundwater." § 7.11.11.4.

FN14. These regulations provide the Environmental Protection Agency's definition of "leachate collection system" as stated in the regulations for "surface disposal" of "sewage sludge," 40 C.F.R. § 503.20(a) (2011), and "dispos[al] of hazardous waste in landfills," 40 C.F.R. § 264.300 (2011).

DHEC and Chem–Nuclear argue Chem–Nuclear is justified in not having a leachate collection system due to "concerns regarding the radioactive exposure to workers handling and processing the leachate ." We find the argument contrary to the purpose and intent of the regulation. We fail to see how the danger of radioactive contamination to workers actually *justifies* releasing it into the groundwater without testing and remediation. Rather, it seems the danger to health and safety *requires* testing and remediation. We believe the drafters of these regulations imposed such a requirement for just that purpose. Subsection 7.11.11.4 contains no language excusing Chem–Nuclear's duty to comply with its regulatory requirements, which is especially important when the excuse for not taking a particular action is the very reason for the regulation—health and safety. Instead, the focus of compliance is on what action Chem–Nuclear did take—whether it designed and constructed its engineered barriers in a manner that allows it to collect, test, and remove contamination before it percolates into the soil and groundwater.[FN15]

FN15. In deciding whether Chem–Nuclear's operations met the ALARA standard, the 2005 order appropriately weighed Chem–Nuclear's concerns regarding exposure to workers because an ALARA analysis involves balancing the benefit to the general public with the risk associated with worker exposure. *See* 24A S.C.Code Ann. Regs. 61–63 § 7.20 (1992) ("Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection ... [and] governed by 7.18."). In determining compliance with the technical requirements of subsection 7.11.11.4, however, we consider the actions taken by Chem–Nuclear to comply, not the reasons why it decided not to implement a certain measure based on its own ALARA analysis.

We find no evidence to support a finding that Chem–Nuclear meets the requirements imposed by this subsection. We hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear complied with subsection 7.11.11.4.

4. Subsection 7.11.11.6

*17 Subsection 7.11.11.6 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that provides "reasonable assurance that the waste will be isolated for at least the institutional control period."

We hold the ALC did not err in affirming DHEC's determination that Chem–Nuclear's current disposal units and engineered barriers—including the disposal containers, concrete disposal vaults, disposal vault lids, disposal trenches, and enhanced caps on inactive trenches—comply with subsection 7.11.11.6. Waste is put into a disposal container, which is then placed into a reinforced concrete vault that is covered with an initial clay cap and buried in a disposal trench. Once the trench is full, Chem–Nuclear installs an enhanced cap over the trench. The following findings from the 2005 order demonstrate that the use of these disposal units and engineered barriers provide reasonable assurance the waste will be isolated from the general environment and inadvertent intruders "for at least the institutional control period": (1) the predictions of a "continually declining trend in radioactive releases to the general environment"; and (2) the Blue Ribbon

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(Cite as: 2014 WL 3734366 (S.C.App.))

Panel's conclusion that the facility's disposal practices "pose a minimal risk to either the environment or members of the public, both today and *in the long-term future.*" (emphasis added).

5. Subsection 7.11.11.7

Subsection 7.11.11.7 requires Chem–Nuclear to design and construct its disposal units and engineered barriers in a way that "prevent[s] contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units." We interpret the plain language of this subsection as seeking to prevent waste, and not waste-contaminated water, from coming in contact with soil. Otherwise, the regulatory effect of subsections 7.11.11.1 and 7.11.11.2 become obsolete.[FN16] Under this interpretation, we hold the ALC did not err in affirming DHEC's determination that Chem–Nuclear complied with this subsection because the "placement of waste in a waste container and a reinforced concrete vault" prevents the waste from coming into direct contact with the soil.

> FN16. Subsections 7.11.11.1 and 7.11.11.2 explicitly regulate the migration of *water* onto disposal units and the migration of *waste* and *waste-contaminated water* out of disposal units. This distinction between "water," "waste," and "waste-contaminated water" in these subsections support a conclusion that these regulations seek to prevent waste and waste-contaminated water from infiltrating the soil and groundwater beneath disposal units. Thus, we narrowly construe subsection 7.11.11.7 as applying to only the prevention of waste, and not waste-contaminated water, from coming in contact with the soil. To the extent the ALC relied on evidence related to subsections 7.11.11 .1 and 7.11.11.2, we hold the ALC erred in that regard.

C. Subsection 7.23.6

Subsection 7.23.6 requires Chem–Nuclear to design the disposal site in a way that "minimize[s] to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal." [FN17]

> FN17. "Disposal site" is defined as "that portion of a land disposal facility which is used for disposal of waste" and "consists of disposal units and a buffer zone." 24A S.C.Code Ann. Regs. 61–63 § 7.2.7 (1992).

As we previously discussed, subsection 7.23.6 imposes technical requirements that require Chem–Nuclear to take action to design and construct the disposal site to meet the specifications of this subsection. Thus, DHEC and Chem–Nuclear cannot demonstrate compliance with subsection 7.23.6 simply by showing Chem–Nuclear met the performance objectives of other subsections. *Chem–Nuclear I,* 387 S.C. at 436, 693 S.E.2d at 19. Instead, we must consider whether Chem–Nuclear took any actions to meet the technical requirements of this subsection, and if so, the sufficiency of Chem–Nuclear's actions.

***18** This subsection distinguishes between "water," "standing water," and "percolating water" and between the three different phases of operations at the facility—storage, disposal, and after disposal. This subsection requires Chem–Nuclear to implement practices that drain or remove water from active vaults and trenches, as well as minimize to the extent practicable the entry of water into inactive vaults and trenches. Although the failure to minimize the migration of water onto active vaults and trenches under subsection 7.11.11.1 contributes to the accumulation of standing water, the regulatory effect of this subsection, when narrowly construed, requires Chem–Nuclear to implement methods to minimize to the extent practicable standing water that has already migrated into the disposal units.

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As to the requirement that Chem–Nuclear design the disposal site in a way that minimizes to the extent practicable the contact of water with waste *during storage,* the ALC found that "[a]ny 'storage' of waste is temporary" because "there is available disposal capacity at the [facility]." The ALC stated that when a shipment of waste is received, it is taken either to the appropriate trench for disposal or to the Cask Maintenance Building, where Chem–Nuclear inspects the casks and prepares them for off-loading. The ALC found that "[b]ased on the practice of inspecting and preparing waste for disposal within the [Cask Maintenance Building], Chem–Nuclear minimizes the contact of water with waste prior to off-loading the waste into the trench." We affirm because this evidence relied on by the ALC supports compliance with this particular requirement of subsection 7.23.6.

As to whether Chem–Nuclear designed the disposal site to minimize to the extent practicable the contact of standing water with waste *during disposal,* we interpret this requirement as applying to Chem–Nuclear's active vaults and trenches. We hold the ALC did not err in affirming DHEC's conclusion that Chem–Nuclear complied with this requirement of subsection 7.23.6 because the following findings from the 2005 order support this conclusion:

(1) The vaults and trenches are designed to allow water to flow out of them;

(2) Trenches are sloped and contain other design features that prevent "water from coming in contact with waste";

(3) Each trench has a drainage system that allows Chem–Nuclear to monitor any water that accumulates in the trench; and

(4) Chem–Nuclear implements a surface water management plan to manage rainwater that collects in the open trenches.

Turning to the requirement regarding minimizing to the extent practicable the contact of percolating or standing water with wastes *after disposal,* we interpret this as applying to Chem–Nuclear's inactive vaults and trenches. We hold the following findings relied on by the ALC support DHEC's determination of compliance:

(1) When vaults become full, Chem–Nuclear places an initial clay cap over inactive vaults;

***19** (2) When trenches become full, Chem–Nuclear installs an impermeable enhanced cap on inactive trenches; and

(3) Employees fill void spaces between the vaults with backfill, which "minimizes the potential for subsidence of the enhanced caps."

Based on the above discussion, we hold the ALC did not err in finding DHEC correctly determined Chem–Nuclear is in compliance with subsection 7.23.6.

D. Subsection 7.10.7

Subsection 7.10.7 requires DHEC to find Chem–Nuclear "provides reasonable assurance that the applicable technical requirements of [part VII] will be met." The technical requirements relevant to this appeal include those set forth in subsections 7.11.11 and 7.23.6. Based on Chem–Nuclear's noncompliance with subsections 7.11 .11.1, 7.11.11.2, and 7.11.11.4—particularly the absence of evidence that Chem–Nuclear took *any* action to comply with the technical requirements of subsections 7.11.11.1 and 7.11.11.4—we do not understand how DHEC could make, nor how the ALC could affirm, a finding that Chem–Nuclear provided assurance it would meet the applicable technical requirements.

DHEC argues, however, Chem–Nuclear is in

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compliance with these subsections because "tritium concentrations began to decline at the compliance point" after "the incorporation of new disposal techniques." While this may have been a reasonable position for DHEC to take prior to our opinion in *Chem–Nuclear I,* the argument ignores our holding in that case—that the "specific technical requirements" of 7.11.11 cannot be met by satisfying the "performance objectives" of 7.10. As we found in *Chem–Nuclear I,* "section 7.11 imposes additional compliance requirements for Chem–Nuclear such that the balancing test of ALARA would not be sufficient to address[ ] whether Chem–Nuclear is in compliance with section 7.11." 387 S.C. at 435, 693 S.E.2d at 19. In light of our holding in that case, however, it is no longer reasonable for DHEC to argue Chem–Nuclear complied with subsection 7.10.7 without considering what action Chem–Nuclear took to comply with the "specific technical requirements" of 7.11.11. This is particularly true given that Chem–Nuclear failed to take *any* action to comply with the requirements of subsections 7.11.11.1 and 7.11.11.4. And yet, DHEC continues to assert Chem–Nuclear "provide[d] reasonable assurance that the applicable technical requirements of [its own regulations] will be met." Considering, for example, the technical requirement in subsection 7.11.11.1—that Chem–Nuclear "minimize the migration of [rainfall] onto the disposal units"—DHEC could not identify one action Chem–Nuclear took to meet this requirement. Nevertheless, DHEC determined Chem–Nuclear complied with subsection 7.10.7 by providing reasonable assurance that this technical requirement of 7.11.11.1 would be met.

To determine whether DHEC complied with subsection 7.10.7 in light of these facts, we consider DHEC's role in the disposal of low-level radioactive waste. In 1967, our General Assembly enacted the Atomic Energy and Radiation Control Act. *See* Act No. 223, 1967 S.C. Acts 305 (*codified at* S.C.Code Ann. §§ 13–7–10 to –100 (1977 & Supp.2013)). Noting "that remarkable scientific developments have occurred in the field[ ] of atomic energy," and "plans for further developments ... are creating broad opportunities and also responsibilities for the states," *id.* at 305, the General Assembly found "[i]t is prudent and wise that the State [give] ... full consideration of the health and safety requirements of its people." *Id.* at 305–06. Based on these findings, the General Assembly required DHEC to "formulate, adopt, [and] promulgate ... regulations relating to the control of ionizing and nonionizing radiation." S.C.Code Ann. § 13–7–40(F)(3) (Supp.2013). Pursuant to this mandate, DHEC promulgated Part VII of regulation 61–63. Under the authority of the Act, the regulations are the law of South Carolina,[FN18] and DHEC is required by law to enforce them. *See* S.C.Code Ann. § 13–7–40(A) (Supp.2013) (providing DHEC "is designated as the agency of the State which is responsible for the control and regulation of radiation sources"); § 13–7–40(F)(9) (stating DHEC "shall ... provide by regulation for the licensing ... of radiation sources").

FN18. *See S.C. Coastal Conservation League v. S.C. Dep't of Health & Envtl. Control,* 390 S.C. 418, 429, 702 S.E.2d 246, 252 (2010) (noting "a regulation has the force of law").

***20** The United States Nuclear Regulatory Commission (NRC), through its federal enforcement policy, has emphasized the importance of regulatory enforcement when nuclear disposal facilities do not conduct their operations with "the necessary meticulous attention to detail" and in accordance with "the high standard of compliance" imposed by the applicable regulations. General Statement of Policy and Procedure for NRC Enforcement Actions, 10 C.F.R. Pt. 2, app. C (1995). Thus, while it is important for private companies such as Chem–Nuclear to comply with applicable regulations, it is equally important, if not more so, that the administrative agency mandated by law to enforce the regulations require adherence to its own standard for compliance. To allow otherwise would impede the purpose for which DHEC was cre-

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ated—to act in the public interest—and risk the health and safety of our citizens. *See* S.C.Code Ann. § 48–1–20 (2008) ("It is declared to be the public policy of the State to maintain reasonable standards of purity of the air and water resources of the State, consistent with the public health, safety and welfare of its citizens, ... [and] that to secure these purposes and the enforcement of the provisions of this chapter, [DHEC] shall have authority to abate, control and prevent pollution.").

DHEC promulgated regulation 61–63 under statutory mandate for the obvious reason that nuclear waste can adversely affect the health and welfare of our citizens if not disposed of properly. In doing so, DHEC required Chem–Nuclear to comply with the "specific technical requirements" and "performance objectives" that DHEC chose to put in the regulations. It is important that DHEC enforce its own regulations and require Chem–Nuclear to take action to comply with the specific technical requirements. This importance derives not simply from the need to avoid the serious consequences of non-compliance; it is important because it is the law. We are concerned that DHEC did not follow the law in failing to require Chem–Nuclear to comply with all of the technical requirements of subsection 7.11.11.

We are also concerned by DHEC's decision not to amend the requirements for issuance of the license after the ALC instructed Chem–Nuclear in its 2005 order to submit a report to DHEC regarding the feasibility of covering trenches and sealing vaults. The propriety of DHEC's decision to "concur[.] with the report's evaluation of the issues" is not before this court, and we do not base our holding on the merits of that decision.[FN19] However, the fact that DHEC did not require Chem–Nuclear to take *any* action or make *any* changes to its disposal practices casts doubt upon DHEC's decision to renew the license.

FN19. A footnote in the ALC's order states Chem–Nuclear conducted these studies and DHEC "concurred with the report's evaluation of the issues." The record does not contain the results of these studies or the reasons DHEC chose not to amend the license requirements as a result of the report. The basis of DHEC's decision not to amend the license or impose additional requirements for operating the facility is not before this court. While DHEC must enforce—and Chem–Nuclear must comply with—the regulations, it is not our place to disagree with DHEC as to how it should enforce its own regulations, or mandate how Chem–Nuclear should comply with these regulations. We merely review the ALC's and DHEC's determinations of compliance without passing judgment upon the technical aspects of how this compliance is accomplished.

Regardless of our affirmance of Chem–Nuclear's compliance with the remaining subsections of 7.11.11, we hold the ALC erred in affirming DHEC's determination that Chem–Nuclear complied with subsection 7.10.7.

V. Remedy

***21** As to four separate subsections of regulation 61–63, DHEC failed to enforce the law of South Carolina. As to each, the ALC erred in finding Chem–Nuclear in compliance. Under the law, Chem–Nuclear's license to operate the facility is invalid. However, the appellant informed the court at oral argument it does not seek revocation of the license; it asks simply that DHEC enforce its regulations, and that Chem–Nuclear comply. In light of this request, we order DHEC and Chem–Nuclear to submit a written plan for compliance to the ALC within ninety days of this opinion. The ALC shall promptly determine if Chem–Nuclear will come into compliance with the regulations under the plan. If the ALC determines the plan will bring Chem–Nuclear into compliance, it shall set a schedule for Chem–Nuclear to promptly implement the plan. If the ALC deter-

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mines the plan will not bring Chem–Nuclear into compliance, it shall issue an order revoking Chem–Nuclear's license.

The requirement of a written plan will not be stayed except by order of this court or the supreme court. However, an order of the ALC revoking Chem–Nuclear's license will be stayed while a petition for rehearing is pending before this court, or while a petition for certiorari is pending before the supreme court.

VI. Conclusion

We affirm the ALC as to all issues presented to this court, except Chem–Nuclear's compliance with subsections 7.11.11.1, 7.11.11 .2, 7.11.11.4, and 7.10.7. As to those four subsections, we hold the ALC erred in affirming DHEC's conclusion that Chem–Nuclear was in compliance.

HUFF and THOMAS, JJ., concur.

S.C.App.,2014.
Sierra Club v. South Carolina Dept. of Health and Environmental Control
--- S.E.2d ----, 2014 WL 3734366 (S.C.App.)

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THE STATE OF SOUTH CAROLINA
In The Court of Appeals

Sierra Club, Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.

Appellate Case No. 2012-212791

Appeal From The Administrative Law Court
Ralph King Anderson, III, Administrative Law Judge

Opinion No. 5253
Heard February 5, 2014 – Filed July 30, 2014

AFFFIRMED IN PART, REVERSED IN PART

Amy Elizabeth Armstrong and Michael Gary Corley, S.C. Environmental Law Project, both of Pawleys Island, and Robert Guild, of Columbia, for Appellant.

Mary Duncan Shahid and Stephen Peterson Groves, Sr., both of Charleston, and Sara S. Rogers, of Columbia, all of Nexsen Pruet, LLC, for Respondent Chem-Nuclear Systems; Claire Harley Prince and Jacquelyn Sue Dickman, both of Columbia, for Respondent South Carolina Department of Health & Environmental Control.

FEW, C.J.: This is an appeal from the administrative law court (ALC), which upheld the South Carolina Department of Health and Environmental Control's (DHEC) decision to renew the license under which Chem-Nuclear Systems, LLC operates a disposal facility for low-level radioactive waste. We affirm the ALC as to all issues, except four subsections of the regulation governing DHEC's issuance and renewal of such licenses. *See* 24A S.C. Code Ann. Regs. 61-63, pt. VII (1992 & Supp. 2010).

I. Procedural History

Chem-Nuclear operates a disposal facility for low-level radioactive waste in Barnwell County (the "facility") pursuant to a license DHEC first issued in 1971. Part VII of regulation 61-63—entitled "Licensing Requirements for Land Disposal of Radioactive Wastes"—establishes "specific technical requirements" and "performance objectives" "upon which [DHEC] issues licenses for the land disposal of wastes." 24A S.C. Code Ann. Regs. 61-63 § 7.1.1, 7.1.3 (1992). Before DHEC may renew Chem-Nuclear's license to operate the facility, it must determine Chem-Nuclear designed, constructed, and operates the facility in compliance with the requirements and objectives of part VII of regulation 61-63. *See generally* § 7.1.

In 2000, Chem-Nuclear submitted an application to renew its license. After holding a public hearing and accepting comments, DHEC issued a renewal license to Chem-Nuclear in 2004. DHEC's decision to renew the license was challenged on the basis that the disposal methods at the facility do not meet certain requirements and objectives of part VII of the regulation. The ALC issued an order affirming DHEC's decision to renew the license (the "2005 order"), and found Chem-Nuclear complied with subsections 7.10.1 through 7.10.4 of South Carolina Code Regulation 61-63 (1992 & Supp. 2010) and section 7.18 of South Carolina Code Regulation 61-63 (1992). However, the ALC ordered Chem-Nuclear to conduct further studies to address concerns "related to the potential for groundwater contamination on and near the [facility]." In particular, the 2005 order stated these studies must "concern[] methods to reduce contact between radioactive waste and rainfall and other water at its facility" and ordered Chem-Nuclear to submit the results of the studies to DHEC within 180 days.

This court's opinion reviewing the findings of the 2005 order is reported at 387 S.C. 424, 693 S.E.2d 13 (Ct. App. 2010) (*Chem-Nuclear I*). We affirmed the findings related to section 7.18 and subsections 7.10.1 through 7.10.4. 387 S.C. at 438, 693 S.E.2d at 20. However, we remanded the case to the ALC to apply its

factual findings from the 2005 order to determine whether Chem-Nuclear complied with the following subsections of regulation 61-63: 7.11.1 through 7.11.12 (1992 & Supp. 2010), 7.23.6 (1992), and 7.10.5 through 7.10.10 (1992 & Supp. 2010). 387 S.C. at 435, 436, 438, 693 S.E.2d at 18-19, 20.

On remand, the ALC issued an order affirming DHEC's conclusion that Chem-Nuclear complied with these subsections (the "remand order"). In this appeal, we review the findings in the remand order.

II. Factual Findings in the 2005 Order

Following this court's instructions, the ALC considered on remand only the findings from the 2005 order. In reviewing the remand order, therefore, we likewise consider only the findings from the 2005 order. In this section of the opinion, we recite those findings relevant to our review. Unless otherwise indicated, all quotations in this section are from the 2005 order.

A. Overview of Chem-Nuclear's Disposal Practices

Chem-Nuclear disposes of waste at the facility using "enhanced shallow land burial with engineered barriers." An engineered barrier is "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives" set out in part VII of regulation 61-63. 24A S.C. Code Ann. Regs. 61-63 § 7.2.9 (Supp. 2010). The primary engineered barriers used by Chem-Nuclear are disposal trenches, disposal vaults, and enhanced caps.

Initially, waste is shipped to the facility in a disposal container. *See* 24A S.C. Code Regs. 61-63 § 3.2.30 (Supp. 2010) ("'Disposal container' means a container principally used to confine low-level radioactive waste during disposal operations at a land disposal facility . . . [and] for some shipments, the disposal container may be the transport package."). Depending on the type of waste, disposal containers are also shipped to the facility inside a container called a cask. When a shipment of waste arrives at the facility, it is directed to either the appropriate trench for disposal or the Cask Maintenance Building, where Chem-Nuclear performs quality control inspections to ensure the casks are not damaged. Following this inspection, Chem-Nuclear transports the casks to the appropriate disposal trench where the disposal containers are loaded into reinforced concrete disposal vaults inside the trench. As disposal containers are loaded into vaults, Chem-Nuclear continues to inspect them.

Some "large components," such as steam generators and pressurizers, are considered disposal vaults themselves and can be placed directly into the trench after DHEC approves them for burial. Otherwise, all waste is contained inside a disposal container that is loaded into a vault, which is located within a trench.

Chem-Nuclear uses the term "active" to describe disposal vaults and trenches that are in the process of being filled. Thus, vaults are active until filled to capacity with disposal containers, and trenches are active until filled to capacity with vaults and large components. Once vaults and trenches become full, Chem-Nuclear refers to them as "inactive." When an individual vault becomes full, Chem-Nuclear covers the inactive vault with "general cover soils and an initial clay cap," which reduces "the infiltration of surface water into the trench." When a trench becomes full, Chem-Nuclear installs an "impermeable" multi-layer enhanced cap over the inactive trench, which consists of an initial clay cap, polyethylene and bentonite, a sand drain layer, and general soil materials.

Waste is divided into three classes—A through C—based on the concentration of "long-lived" and "shorter-lived radionuclides" in the waste. Class A is the least radioactive waste, while C is the most radioactive. *See* 24A S.C. Code Ann. Regs. 61-63 § 3.56.1.1 to .8 (Supp. 2010). Chem-Nuclear currently uses three types of disposal trenches that are designed to hold different types of waste: (1) Class A trenches, which are the largest of the three types, hold vaults containing Class A waste; (2) Class B/C trenches hold vaults containing Class B and C waste; and (3) slit trenches, which are narrow, hold irradiated hardware and large components. Chem-Nuclear uses soil to fill voids between the vaults in each type of trench, which "enhance[s] long-term stability of the entire trench system."

Each trench has a drainage system "to facilitate monitoring of water accumulation entering the trench." Chem-Nuclear also implements a "surface water management plan" to manage rainfall after it collects in trenches, which consists of pumping water into either adjacent trenches or a lined pond.

B. Tritium Contamination of Groundwater

Tritium is a radioactive isotope of hydrogen that is found in "trace amounts in groundwater throughout the world." *NRC Senior Management Review of Overall Regulatory Approach to Groundwater Protection* (N.R.C., Rockville, M.D.), Feb. 9, 2011, at SECY-11-0019. Although tritium is naturally occurring, it is also a byproduct of the manufacture of nuclear power, and found in radioactive waste generated by nuclear power plants. *Id.*

The waste disposed of at the facility contains tritium. Rainfall "in and on the disposal trenches drives tritium into the groundwater beneath the facility." Chem-Nuclear initially discovered the presence of tritium in its disposal trenches in 1974. Chem-Nuclear determined that early disposal practices utilizing "unreliable containment and waste forms" led to this initial tritium contamination. However, these early containment methods "were acceptable at the time" under the regulations. In fact, they "were identical to practices at . . . other low-level radioactive waste disposal facilities."

Although "it is inadvisable to attempt to uncover or excavate" the old containers that caused the initial tritium release, improvements in disposal technology and changes in the operations at the facility have "enhanced site performance." In 1995, DHEC substantially revised part VII of regulation 61-63 to require engineered barriers for all waste classes disposed of at the facility. Specifically, DHEC required all waste, except large components, to be placed in vaults, and required enhanced caps to be installed on all inactive trenches. Chem-Nuclear began using vaults and enhanced caps to meet these new requirements. In addition, Chem-Nuclear began using high-integrity polyethylene disposal containers to hold certain waste forms and discontinued the disposal of unstable, liquid waste forms. All of these measures served to "reduce[] the amount of tritium migrating to groundwater."

DHEC imposes a regulatory limit on the amount of radioactive material Chem-Nuclear may release to the "general environment." *See* § 7.18. Although certain groundwater samples collected from beneath the facility show high concentrations of tritium, these samples are inappropriate for evaluating Chem-Nuclear's compliance with section 7.18. This is because DHEC regulates the release of radiation into the "general environment," § 7.18, not into the groundwater within the boundaries of the facility where there is no risk of public exposure. To determine whether Chem-Nuclear is in compliance with section 7.18, DHEC established a "compliance point"—defined as the "first point where a hypothetical member of the public might receive a dose of radiation"—at which it measures Chem-Nuclear's release of tritium into the general environment. This compliance point is located at Mary's Branch Creek, where the groundwater from beneath the facility flows into an above-ground stream. Chem-Nuclear regularly samples the water from Mary's Branch Creek to determine whether there has been a release of tritium above the regulatory limit set by DHEC. Since 2001, tritium concentrations at the compliance point have been declining, and all measurements taken at Mary's Branch Creek have been well below the regulatory limit for

exposure under section 7.18. In fact, "[t]here is no evidence of any actual release resulting in an exposure above regulatory limits to any member of the general public."

C. Actions to Prevent Tritium Exposure

Chem-Nuclear has taken steps to protect the public from exposure to radiation at the compliance point. The general public is restricted from accessing the waters of Mary's Branch Creek at the compliance point, and there are no known consumers of the water who are "located in and around the compliance point." Chem-Nuclear also erected a fence around the compliance point to prevent entry of unauthorized persons. Additionally, Chem-Nuclear has a restrictive covenant and easement on three parcels of property surrounding the compliance point. This property serves as a buffer zone by prohibiting the use of groundwater under the property, as well as surface water on the property, without written consent from DHEC. Moreover, changes in design and operations at the facility further reduce the potential for radioactive exposure to the general environment.

D. Long-Term Predictions for Compliance

As required by DHEC, Chem-Nuclear created a predictive model—the Environmental Radiological Performance Verification (ERPV)—to predict the future performance of the site for up to two thousand years. This model relies on data collected through a system of groundwater monitoring wells and thirty years of data derived from over two hundred sampling points. DHEC commissioned and funded a panel of experts—the "Blue Ribbon Panel"—to review the ERPV and determine whether Chem-Nuclear's predictions were accurate. After finding the ERPV predictions to be reliable, the Blue Ribbon Panel concluded the facility "pose[d] minimal risk to either the environment or members of the public, both today and into the long-term future." DHEC relied on the conclusions of both the ERPV and the Blue Ribbon Panel in deciding to renew the facility's license.

III. Standard of Review

In the 2005 order, the ALC conducted a de novo review of DHEC's decision to renew Chem-Nuclear's license. *See Marlboro Park Hosp. v. S.C. Dep't of Health & Envtl. Control*, 358 S.C. 573, 579, 595 S.E.2d 851, 854 (Ct. App. 2004) (stating the ALC acts "as the fact-finder" in a contested case and "must make sufficiently detailed findings supporting the denial [or grant] of a permit application" (alteration in original) (citation omitted)). In *Chem-Nuclear I*, this court reviewed

the ALC's findings and conclusions in the 2005 order to determine whether they were "[]supported by substantial evidence or controlled by some error of law." *See* 387 S.C. at 430-31, 693 S.E.2d at 16 (relying on the standard of review set forth in S.C. Code Ann. § 1-23-610(B) (Supp. 2013)). Although we affirmed the ALC's determination that Chem-Nuclear complied with all sections of regulation 61-63 addressed in the 2005 order, we remanded for the ALC to apply the factual findings from the 2005 order to other, applicable sections it did not address. 387 S.C. at 439, 693 S.E.2d at 20-21. *See* 387 S.C. at 439, 693 S.E.2d at 20 (instructing the ALC "to apply its factual findings [from the 2005 order] to these sections of regulation 61-63" on remand). In the remand order, the ALC applied the factual findings from the 2005 order to determine whether Chem-Nuclear complied with these additional sections.

In this appeal from the remand order, we must accept the factual findings in the 2005 order. We review the remand order under the standard of review set forth in subsection 1-23-610(B)(d), and may reverse only if the ALC's decision was affected by an error of law. *See* § 1-23-610(B)(d) (stating an appellate court may reverse the ALC's decision when it is affected by an error of law); *S.C. Dep't of Revenue v. Blue Moon of Newberry, Inc.*, 397 S.C. 256, 260, 725 S.E.2d 480, 483 (2012) ("The construction of a regulation is a question of law to be determined by the court. We will correct the decision of the ALC if it is affected by an error of law, and questions of law are reviewed de novo." (internal quotation marks and citations omitted)).

IV. Chem-Nuclear's Compliance with Regulation 61-63

DHEC drafted part VII of regulation 61-63 to include three general categories of regulations. *See* § 7.1.3 ("This Part establishes procedural requirements[,] . . . performance objectives[,] . . . [and] specific technical requirements for near-surface disposal of radioactive waste . . . ."). All three categories are applicable to the enhanced shallow land burial of low-level nuclear waste at the facility.[1] In this appeal, we address the ALC's determination that Chem-Nuclear complied with regulations in two of these categories—regulations imposing technical requirements and performance objectives. Generally, regulations containing technical requirements require Chem-Nuclear to take specific action to comply with the regulation, while regulations containing performance objectives require

[1] Subsection 7.1.3 provides that the "procedural requirements" and "performance objectives" apply "to any method of land disposal," and the "specific technical requirements" apply to "near-surface disposal of radioactive waste."

Chem-Nuclear to achieve certain results sought under the regulation. There is some overlap, however, between the action-based and result-based requirements of these two categories of regulations.

As an example of a regulation imposing "technical requirements," subsection 7.11.11.7 of South Carolina Code Regulation 61-63 (Supp. 2010) requires "[t]he disposal units and the incorporated engineered barriers . . . be designed and constructed to . . . prevent[] contact between the waste and the surrounding earth." Chem-Nuclear's compliance with this subsection, which we discuss in section IV.B.5 of this opinion, may be determined only by examining specific actions taken by Chem-Nuclear to prevent contact between waste and the "surrounding earth." On the other hand, compliance with a regulation imposing "performance objectives" must be determined by examining whether Chem-Nuclear obtained the results required by the regulation. An example of such a regulation is section 7.18, which requires reasonable efforts be made to maintain radioactive releases to the general public "as low as is reasonably achievable"—a concept known by the acronym "ALARA."[2] This and other result-based "performance objective" regulations require consideration of existing environmental conditions, such as the fact that tritium levels are declining in the groundwater below the facility and in the surface water of Mary's Branch Creek.

In *Chem-Nuclear I*, we affirmed the ALC's finding that Chem-Nuclear met the performance objectives of sections 7.18 and 7.10. 387 S.C. at 438, 693 S.E.2d at 20. Section 7.18 and the subsections of 7.10 that we addressed in *Chem-Nuclear I* relate to whether Chem-Nuclear is protecting the public from radioactive releases,

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[2] Regulation 61-63 defines the "ALARA" standard as:

> [M]aking every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

24A S.C. Code Ann. Regs. 61-63 § 3.2.6 (Supp. 2010).

and generally do not impose specific requirements as to how Chem-Nuclear must accomplish any particular result.[3] In affirming Chem-Nuclear's compliance with section 7.18, we gave deference to the ALC's finding that "Chem-Nuclear . . . demonstrated adherence to ALARA . . . by taking appropriate measures to address tritium migration from the Barnwell facility and the potential for releases from other radionuclides." 387 S.C. at 429, 438, 693 S.E.2d at 15, 20. Showing similar deference, we affirmed the ALC's findings that Chem-Nuclear complied with four of the performance objectives in section 7.10. 387 S.C. at 438, 693 S.E.2d at 20. We found, however, the ALC did not address the six remaining subsections of 7.10 (7.10.5 through 7.10.10). 387 S.C. at 438-39, 693 S.E.2d at 20-21. We remanded for the ALC to determine whether Chem-Nuclear complied with those subsections. *Id.*

We also required the ALC to consider on remand Chem-Nuclear's compliance with section 7.11 and subsection 7.23.6. 387 S.C. at 435-36, 693 S.E.2d at 18-19. DHEC argued that in determining whether DHEC properly renewed the license, the ALC must consider compliance with the result-based requirements "set forth in section 7.10 . . . rather than apply criteria set forth in sections 7.11 and 7.23.6." 387 S.C. at 431, 693 S.E.2d at 16. We rejected that argument, finding "the [specific] technical requirements" of "section 7.11 impose[] additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance." 387 S.C. at 435, 693 S.E.2d at 18-19. Similarly, we found "the technical requirements of [sub]section 7.23.6 . . . impose[] additional compliance requirements for Chem-Nuclear." 387 S.C. at 436, 693 S.E.2d at 19. Under our holding in *Chem-Nuclear I*, therefore, the technical requirements of subsections 7.11.11 and 7.23.6 require Chem-Nuclear to take action to design and construct the disposal site, disposal units, and engineered barriers to meet the specifications in those subsections. *See* 387 S.C. at 432, 435, 436, 693 S.E.2d at 17, 19, 20. DHEC and Chem-Nuclear

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[3] *See* § 7.10.1 ("The issuance of the license will not constitute an unreasonable risk to the health and safety of the public."); § 7.10.2 ("The applicant is qualified . . . to carry out the disposal operations . . . in a manner that protects health and minimizes danger to life or property."); § 7.10.3 ("The . . . operations . . . are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity . . . ."); § 7.10.4 ("The . . . operations . . . are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected . . . .").

may not demonstrate compliance with those subsections simply by showing Chem-Nuclear met the performance objectives of other subsections. *See id.*

With these considerations in mind, we discuss the ALC's determination that DHEC properly found Chem-Nuclear complied with the applicable subsections of regulation 61-63.

A. Section 7.10[4]

The subsections of 7.10 that we review in this appeal[5] set forth performance objectives for the issuance and renewal of Chem-Nuclear's license. The correctness of DHEC's and the ALC's determination of compliance with subsections 7.10.6 and 7.10.8 depends, in part, on Chem-Nuclear's progress in reducing the amount of tritium released from the facility. In reviewing the ALC's findings as to these subsections, therefore, we rely upon evidence that shows its operations are "adequate to protect the public health and safety," which includes the following result-based evidence: (1) Chem-Nuclear's disposal operations currently meet the ALARA standard; (2) "improvements in waste disposal procedures" have enhanced site performance; and (3) there is a decline in the "tritium concentration at the compliance point."

1. Subsection 7.10.6

Subsection 7.10.6 provides that before DHEC may issue a license to Chem-Nuclear, it must find:

> [Chem-Nuclear]'s proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved

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[4] In this section, we discuss compliance with subsections 7.10.6 and 7.10.8, and not 7.10.7, because our analysis of that subsection depends on whether Chem-Nuclear complied with the relevant subsections of 7.11.11. We later discuss subsection 7.10.7 in section IV.D. of this opinion.

[5] Chem-Nuclear's compliance with subsections 7.10.5, 7.10.9, and 7.10.10 is not an issue in this appeal.

and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

This subsection focuses our analysis on Chem-Nuclear's efforts to protect the public, the environment, and inadvertent intruders from radioactive exposure by ensuring "long-term stability of the disposed waste and the disposal site." We begin our discussion with the definitions of the relevant terms used in subsection 7.10.6.

"Site closure" is defined as "those actions that are taken upon completion of operations that prepare the disposal site for custodial care [by the State of South Carolina] and that assure that the disposal site will remain stable and will not need ongoing active maintenance." 24A S.C. Code Ann. Regs. 61-63 § 7.2.19 (1992).

Once site closure is accomplished, the "institutional control" period begins, in which the State of South Carolina "assume[s] responsibility" for maintaining the facility, 24A S.C. Code Ann. Regs. 61-63 §§ 7.8.1, 7.15 (1992), and "control[s] access to the disposal site." 24A S.C. Code Ann. Regs. 61-63 § 7.27.2 (1992). By regulation, the institutional control period is one hundred years. *Id.*

"Stability" is defined as "structural stability." 24A S.C. Code Ann. Regs. 61-63, § 7.2.20 (1992). According to Part III of regulation 61-63, structural stability results from: (1) "the waste form itself" being stable, or "processing the waste to stable form"; (2) converting waste containing liquid "into a form that contains as little free-standing and non-corrosive liquid as is reasonably achievable"; and (3) filling "[v]oid spaces within the waste and between the waste and its package." 24A S.C. Code Ann. Regs. 61-63 § 3.56.2.2.1 to .3 (Supp. 2010).

"Active maintenance" means "any significant activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in 7.18 and 7.19 are met." 24A S.C. Code Ann. Regs. 61-63 § 7.2.1 (1992). As we previously discussed, section 7.18 regulates the concentration of radioactive material that may be released to the general environment and the public. Section 7.19 of South Carolina Code Regulation 61-63 (1992) requires that the "[d]esign, operation, and closure of the land disposal facility . . . ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed." An "inadvertent intruder" is a "person who might occupy the disposal site after closure and engage in . . . activities . . . in

which an individual might be unknowingly exposed to radiation from the waste." 24A S.C. Code Ann. Regs. 61-63 § 7.2.13 (1992).

The following findings from the 2005 order support the ALC's determination that the waste and disposal site are structurally stable:

(1) All waste is placed into reinforced concrete disposal vaults;
(2) Void space between the vaults is filled with soil, which enhances "long-term stability of the entire trench system";
(3) Enhanced caps are installed on all inactive trenches;
(4) "[T]he elimination of liquid waste forms . . . have increased site performance"; and
(5) "Improvements in waste forms . . . have succeeded in reducing the amount of tritium that is migrating to groundwater."

Additionally, the following findings support the determination that *long-term* stability of the disposed waste and disposal site will be achieved and will be adequate to protect the general public and inadvertent intruders from radioactive exposure:

(1) Predictions of a declining trend in radioactive releases to the general environment;
(2) The Blue Ribbon Panel's conclusion that the facility "poses a minimal risk to either the environment or members of the public, both today and into the long-term future";
(3) The presence of a buffer zone, which provides "long-term protection to the public from exposure to radioactive material in the surface water at the compliance point"; and
(4) The use of concrete disposal vault lids[6] for Class C waste, which serves as an intrusion barrier for inadvertent intruders.[7]

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[6] We are uncertain of the nature and purpose of disposal vault lids. Neither the regulations nor the 2005 order defines "disposal vault lid," and the 2005 order references disposal lids only twice and in two limited contexts: (1) "the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault"; and (2) "[t]he disposal vaults lids serve as an intrusion barrier for Class C waste."

[7] Subsection 3.56.1.2.3 requires Class C waste to be disposed of in a manner that "protect[s] against inadvertent intrusion."

Based on these findings, we find the ALC did not err in concluding Chem-Nuclear is in compliance with subsection 7.10.6.

2. Subsection 7.10.8

Subsection 7.10.8 requires Chem-Nuclear to provide a "proposal for institutional control" that gives "reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27." On appeal, Chem-Nuclear's compliance with this subsection is challenged on the ground that it violated subsection 7.10.6.[8] As previously discussed, subsection 7.10.6 requires the design and operations of the facility to provide "long-term stability of the disposed waste." When considered in the context of subsection 7.10.6, subsection 7.10.8 requires Chem-Nuclear to provide reasonable assurances the waste will be stable after the facility is closed. Based on our ruling regarding subsection 7.10.6, we find the ALC correctly determined Chem-Nuclear is in compliance with subsection 7.10.8.

B. Subsection 7.11.11

Subsection 7.11.11 provides, in relevant part,

> The disposal units and the incorporated engineered barriers shall be designed and constructed to meet the following objectives:
>
> 7.11.11.1 to minimize the migration of water onto the disposal units.
>
> 7.11.11.2 to minimize the migration of waste or waste contaminated water out of the disposal units.
>
> 7.11.11.4 temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures

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[8] We previously affirmed Chem-Nuclear's compliance with subsections 7.10.3 and 7.10.4. *Chem-Nuclear I*, 387 S.C. at 438, 693 S.E.2d at 20. Chem-Nuclear's compliance with subsection 7.10.5 is not an issue on appeal.

without the contamination of groundwater or the surrounding soil.

7.11.11.6 reasonable assurance that the waste will be isolated for at least the institutional control period.

7.11.11.7 prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

DHEC and Chem-Nuclear continue to assert that in reviewing the ALC's findings as to subsection 7.11.11, we may rely on result-based evidence—(1) its operations meet the ALARA standard, (2) "improvements in waste disposal procedures" have enhanced site performance, and (3) there is a decline in the "tritium concentration at the compliance point." As we previously acknowledged, evidence of improvements in disposal practices and a decline in tritium concentrations is certainly relevant to our analysis of compliance with the regulations containing performance objectives. However, that evidence does not directly relate to, and cannot alone show compliance with, the technical requirements imposed by subsection 7.11.11. *See* 387 S.C. at 435, 693 S.E.2d at 18-19 (holding "the [specific] technical requirements" of "section 7.11 impose[] additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance"). For these subsections of the regulation, compliance may not be measured solely by results. Instead, we must consider whether Chem-Nuclear took any actions to meet the technical requirements imposed by these subsections, and if so, the sufficiency of Chem-Nuclear's actions.

1. Subsection 7.11.11.1

Subsection 7.11.11.1 requires that Chem-Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of water onto the disposal units."

The regulations define "disposal unit" to include "a vault or a trench," 24A S.C. Code Ann. Regs. 61-63 § 7.2.8 (Supp. 2010), and "engineered barrier" to include "vaults or equivalent structures," § 7.2.9. The regulations, however, do not define the phrase "migration of water." DHEC concedes the phrase encompasses not only the flow of surface water, but also rainfall. Thus, for DHEC to have correctly determined Chem-Nuclear complied with this subsection, DHEC must have found

Chem-Nuclear took action that reduced rainfall and the flow of surface water onto the vaults and trenches. Chem-Nuclear's compliance concerning the migration of rainfall onto disposal units is particularly important, given the followings findings from the 2005 order: (1) "[t]ritium is driven into the groundwater through rainfall in and on the disposal trenches," and (2) tritium concentrations in the groundwater seem to "vary[] with the amount of rainfall." Referring to these and other findings, the ALC called this "the undeniable 'rainfall problem.'"

We first examine whether the ALC correctly determined Chem-Nuclear complied with subsection 7.11.11.1 in regard to rainfall migrating onto active disposal units—vaults and trenches that are in the process of being filled. The 2005 order provides that while Chem-Nuclear is filling individual vaults with disposal containers, it employs "no cover or roof, so rain can fall directly into the vault during the loading period." The 2005 order also indicates Chem-Nuclear provides no cover for active trenches, which leaves these trenches and the vaults contained within them exposed to rainfall until the trenches become full. Vaults contained within an active trench remain exposed to rainfall for up to two years while Chem-Nuclear fills the trench. The 2005 order further states rainfall enters vaults because they "are not sealed against water intrusion," and the "lids of the vaults are not . . . sealed to prevent water from entering" them.

DHEC interprets subsection 7.11.11.1 as requiring Chem-Nuclear to "minimize the migration of water onto the disposal units" during the period in which the trenches are active. This interpretation required DHEC to consider what action Chem-Nuclear took to reduce the amount of rain falling onto open vaults while they are being filled, and onto closed vaults in active trenches. However, neither the 2005 order, the remand order, nor any other portion of the record or the briefs contain any evidence that Chem-Nuclear has taken a single action to prevent a single raindrop from falling onto active vaults or trenches.

Although the ALC determined Chem-Nuclear complied with this subsection, none of the evidence it relied upon addresses the rainfall issue. Specifically, the ALC listed the following factual findings from the 2005 order to support DHEC's determination of compliance as to active and inactive disposal units:

(1) The Class A trench has a sloped floor and a drainage system that facilitates monitoring of water that enters the trench;
(2) The Class B/C trench contains a French drain and sump system that allows monitoring of water accumulation in the trench;

(3) The slit trench has a sloped floor that is filled with "coarse drain sand" and contains "standpipes" that monitor water accumulation;
(4) Chem-Nuclear implements a surface water management plan to pump water out of trenches;

We find none of these findings support the ALC's determination that Chem-Nuclear complied with this subsection as to rain falling on disposal units—active or inactive. These findings relate to remedial measures to monitor, drain, and manage water that has already migrated onto disposal units. The plain language of this subsection, however, requires Chem-Nuclear to do more than monitor, drain, or otherwise manage water once it enters the vaults and trenches.[9] These measures listed by the ALC have no effect on the initial migration of rainfall and thus, do not relate to compliance with subsection 7.11.11.1. Furthermore, the record is devoid of any evidence to support the ALC's conclusion that Chem-Nuclear has done *anything* to reduce rainfall onto active disposal units. When pressed at oral argument to list what Chem-Nuclear has done to reduce rainfall onto active disposal units, neither Chem-Nuclear nor DHEC could name one action Chem-Nuclear took, except to construct berms along the edges of trenches.[10]

The ALC also listed the following two factual findings, in addition to the four discussed above, to affirm DHEC's determination of compliance with this subsection as to rainfall on inactive disposal units only:

(5) Backfilling methods that fill voids between vaults are implemented for all trenches; and
(6) Initial clay caps placed on inactive vaults and enhanced caps installed over inactive trenches minimize the infiltration of surface water into the trench.

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[9] Other subsections of regulation 61-63 deal with accumulation of water within disposal units once it migrates there. *See, e.g.*, § 7.23.6 (requiring the disposal site to be designed in a way that "minimize[s] . . . the contact of *standing water* with waste during disposal, and the contact of *percolating* or *standing water* with wastes after disposal" (emphasis added)).

[10] While berms may keep surface water from migrating onto the disposal units, they do nothing to minimize direct rainfall onto active trenches and vaults. Additionally, the ALC made no findings as to whether Chem-Nuclear ever constructed a berm, or if so, whether the berms reduce the migration of surface water onto the disposal units.

We find neither of these findings support—and only one actually addresses—the ALC's determination that Chem-Nuclear complied with this subsection as to inactive disposal units. Regarding finding (5), "backfilling methods" involve placing soil in open spaces between the vaults, which has nothing to do with reducing the migration of water onto disposal units. Finding (6), however, is relevant to Chem-Nuclear's compliance with subsection 7.11.11.1 as to inactive disposal units. The installation of the initial clay cap on inactive vaults and the enhanced cap on inactive trenches reduces the migration of water onto these disposal units. Although these measures *reduce* the migration of water, subsection 7.11.11.1 requires Chem-Nuclear to "minimize" this occurrence. Thus, whether finding (6) supports Chem-Nuclear's compliance with this subsection requires us to consider the meaning of "minimize."

Regulation 61-63 does not define minimize. Chem-Nuclear and DHEC filed a joint brief with this court in which they set forth the following definition of minimize: "to reduce to the smallest possible amount, extent, size, or degree."[11] Applying this definition to the requirements of subsection 7.11.11.1, we must consider two sub-issues in analyzing compliance: (1) whether there is evidence to support a finding that Chem-Nuclear has reduced the migration of water onto disposal units, and (2) whether the extent of this reduction is adequate to meet DHEC's definition of minimize. Thus, we cannot find the ALC correctly determined Chem-Nuclear complied with this subsection simply because Chem-Nuclear "reduced" the migration of water onto disposal units.

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[11] While this definition sets a strict standard for compliance, we find this is supported by the way in which this regulation, and others, are written. For example, subsection 7.23.6 requires Chem-Nuclear to "minimize to the extent practicable" the contact of water with waste at different stages of the disposal process. We interpret subsection 7.23.6 as imposing a less stringent standard for compliance than subsection 7.11.11.1 because the term "minimize" is followed by language prompting DHEC to consider the reasonableness of Chem-Nuclear's efforts to comply. The lack of similar language in subsection 7.11.11.1 suggests there is no inherent reasonableness or practicability consideration involved in analyzing Chem-Nuclear's compliance. The definition of "minimize" provided by Chem-Nuclear and DHEC accords with this interpretation. Thus, we rely on their definition of minimize—"to reduce to the smallest possible amount, extent, size, or degree"—in analyzing DHEC's and the ALC's determinations of compliance.

As to the first sub-issue, we agree with the ALC that installation of initial clay caps and enhanced caps reduce the migration of surface water and rainfall onto inactive vaults and trenches. However, the ALC did not address the second sub-issue—whether initial clay caps and enhanced caps "reduce to the smallest possible amount" the migration of water onto inactive disposal units. Both DHEC and Chem-Nuclear represented to this court in their brief that Chem-Nuclear must have taken action to "reduce [the migration of water onto inactive trenches] to the smallest possible amount." Yet, neither DHEC nor the ALC made any finding as to whether Chem-Nuclear did so. The determination of this issue is crucial to the question of whether Chem-Nuclear complied with subsection 7.11.11.1.

In considering whether Chem-Nuclear's disposal units and engineered barriers adequately reduce—"minimize"—the migration of water, we acknowledge it is the duty of DHEC, not this court, to enforce regulation 61-63. Similarly, it is the duty of Chem-Nuclear, not DHEC, to take the necessary action to comply with the regulations. Nevertheless, we find support in the 2005 order that implementing "relatively simple measures" could further reduce the migration of water onto both active and inactive disposal units. These measures include "shelter[ing] the disposal trenches from rainfall" while they are being filled and "sealing and grouting the concrete disposal vaults to prevent the intrusion of water."

In 2001, DHEC directed Chem-Nuclear to consider implementing such measures. According to the 2005 order, "during the review of the re-issuance of the Chem-Nuclear license, DHEC . . . advis[ed] Chem-Nuclear to review and revise all trench construction details, plans, specifications, and procedures." "In particular, [DHEC] informed Chem-Nuclear that consideration should be given to protection of the open trenches from direct rainfall and runoff such as temporary covers." In response to this directive, Chem-Nuclear considered "several conceptual trench designs," including designs for "temporary roofs to keep water out of the trenches and vaults." Although Chem-Nuclear informed DHEC in 2001 it would take "up to two years to evaluate [these] designs," the ALC found in the 2005 order "Chem-Nuclear ha[d] not completed its evaluation and ha[d] not submitted final designs to DHEC for review and approval."

The ALC found it significant that Chem-Nuclear had not yet completed and submitted these final designs to DHEC, given the "undeniable 'rainfall problem.'" Specifically, the 2005 order stated, "Chem-Nuclear has already considered conceptual designs to keep rainfall out of the trenches, . . . [but] it failed to complete a report on its research and has not submitted such a report to DHEC, despite its request." (internal citations omitted). Additionally, the ALC found

further studies "were needed to evaluate the . . . feasibility of employing or implementing designs" that would: (1) "shelter disposal trenches from rainfall and prevent rainfall from entering the trenches," and (2) "provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." The order explained these additional studies were necessary because "no evidence was presented . . . that the Blue Ribbon Panel considered any of these particular issues." The ALC ordered that "Chem-Nuclear shall conduct the[se] studies . . . and submit the results to DHEC within 180 days."

These findings and directives from the 2005 order support the importance of implementing measures to address concerns related to rainfall on the disposal units. Both DHEC and the ALC ordered Chem-Nuclear to consider such measures. However, none are currently in place, a fact directly relevant to Chem-Nuclear's ability to reduce water migration onto the disposal units "to the smallest possible amount."

In conclusion, we find the record in this case conclusively demonstrates Chem-Nuclear has taken no action whatsoever to prevent even one rain drop from migrating onto one active vault or trench. Additionally, while initial clay caps and enhanced caps reduce the migration of water onto inactive disposal units, there is no evidence and no finding by the ALC that DHEC has required, or that Chem-Nuclear has taken, any action that would reduce this migration to the smallest possible amount. In light of these facts, we hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.1.

2. Subsection 7.11.11.2

Subsection 7.11.11.2 requires that Chem-Nuclear design and construct its disposal units and engineered barriers "to minimize the migration of waste or waste[-] contaminated water out of the disposal units." DHEC and Chem-Nuclear contend the same definition of minimize used in the previous section applies to the analysis of this subsection.

Based on the plain language of subsection 7.11.11.2, Chem-Nuclear must minimize the migration of two types of wastes: (1) the radioactive waste-form contained within the disposal containers, and (2) water that has been contaminated by radioactive waste. As to the first, we agree with the ALC's determination that Chem-Nuclear's disposal units and engineered barriers minimize the migration of radioactive waste-forms out of disposal units. The record establishes that Chem-Nuclear uses disposal containers and reinforced concrete vaults, which prevent the

migration of these waste-forms out of disposal units. Thus, we affirm the ALC's ruling that DHEC correctly determined Chem-Nuclear is in compliance with this subsection as to the migration of the waste itself out of the disposal units.

We next address whether Chem-Nuclear is in compliance as to the migration of waste-contaminated water out of the disposal units. According to the 2005 order, the vaults contain holes that allow water to drain from them and into the trenches. As for the trenches, they are lined with partially impermeable materials so that liquids may drain to the soil below the trench. Thus, "rainfall that accumulates in the trenches eventually percolates into the soil" and groundwater beneath the trenches. Also, the water table may rise during "wet periods," causing groundwater to "rise up into the [vaults]."

The ALC relied on its previous findings related to subsection 7.11.11.1 to hold Chem-Nuclear complied with this subsection because the methods "designed to minimize the infiltration of water into the vaults" serve to "minimize[] the migration of . . . waste-contaminated water out of them." We agree evidence of compliance with subsection 7.11.11.1 is relevant to our determination of compliance with this subsection. This is because reducing the initial migration of water onto disposal units has a reciprocal effect upon reducing the migration of waste-contaminated water out of disposal units. Therefore, our holding that Chem-Nuclear failed to comply with subsection 7.11.11.1 relates to whether it complied with subsection 7.11.11.2 as to waste-contaminated water.[12]

Relying on the two-part definition of minimize discussed in the previous section, we must first analyze whether there is evidence that Chem-Nuclear reduced the migration of waste-contaminated water out of disposal units. The ALC found Chem-Nuclear's use of disposal containers prevents waste from coming into direct contact with water that enters vaults, which reduces the potential for water to become contaminated. This, in turn, reduces the migration of waste-contaminated water out of vaults. Second, the ALC found that although the drainage holes in the vaults allow "water to rise up into the containers" and drain into the trenches

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[12] Noncompliance with subsection 7.11.11.1 would not conclusively establish non-compliance with this subsection. Subsection 7.11.11.1 regulates the migration of "water," while subsection 7.11.11.2 regulates the migration of "waste[-] contaminated water." Thus, the fact that water migrates onto and, subsequently, out of disposal units does not itself violate this subsection. A violation occurs only when water is allowed to come in contact with waste and waste-contaminated water then migrates out of disposal units.

below, they also allow water to drain away from the waste. This decreases the likelihood that water entering the vaults will become contaminated. We agree the ALC's findings support the conclusion that Chem-Nuclear has taken *some* action to reduce the migration of waste-contaminated water from the disposal units.

However, the ALC did not address the second part of the analysis—whether these measures are sufficient to meet DHEC's definition of minimize. As we previously stated regarding subsection 7.11.11.1, compliance with subsection 7.11.11.2 depends on whether there is evidence to support a finding that Chem-Nuclear's actions "reduce to the smallest amount possible" the migration of waste-contaminated water out of disposal units.

On this point, the 2005 order stated "trench water . . . becomes contaminated by the fact that there is some residual tritium on . . . vaults and waste packages that have . . . water on them as a result of rain." Based on this fact, the following findings in the 2005 order demonstrate the vaults and trenches allow water that has come into contact with residual tritium on the disposal containers to migrate out of them:

(1) The "floors of the vaults have holes to allow water to drain from the vaults";
(2) These drainage holes "can also allow water to rise up into the containers";
(3) "[N]one of the trenches . . . have an impermeable liner";
(4) "The bottoms of the trenches" are not designed to "prevent the migration of liquids out of the bottom of trenches" and, in fact, are "designed to be partially impermeable and . . . allow liquids to infiltrate the soil below the trenches"; and
(5) "Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the [facility]."

As we acknowledged above, the holes in the vaults allow water to drain away from the waste, which decreases the likelihood that water entering the vaults will become contaminated. Nevertheless, these holes permit water that has come in contact with residual tritium to drain into the trenches, which, in turn, allow the water to percolate into the soil and groundwater beneath the facility. This supports that Chem-Nuclear has not taken action to reduce to the smallest possible amount the migration of waste-contaminated water out of its vaults and trenches. Moreover, the fact that Chem-Nuclear has failed to minimize the migration of

water onto vaults under subsection 7.11.11.1 weighs in favor of non-compliance with subsection 7.11.11.2.

In affirming DHEC's conclusion that Chem-Nuclear complied with this subsection, the ALC recognized that trench bottoms "are designed to be partially impermeable and allow liquids to infiltrate the soil below" them. However, the ALC noted the 2005 order contained "no finding that Chem-Nuclear's waste disposal design is faulty or fails to minimize the migration of . . . waste-contaminated water out of disposal units." We find the ALC erred in relying on the absence of such a finding in the 2005 order.

In *Chem-Nuclear I*, we held "section 7.11 imposes additional compliance requirements" not addressed by the 2005 order. 387 S.C. at 435, 693 S.E.2d at 19. We remanded for the ALC "to apply its factual findings [in the 2005 order] to the technical requirements" of section 7.11—including subsection 7.11.11.2. 387 S.C. at 435, 693 S.E.2d at 18-19. Thus, the ALC could not rely on the fact that the 2005 order did not contain the conclusion we ordered the ALC to make on remand—whether, based on the factual findings in the 2005 order, the disposal units minimized the migration of waste-contaminated water out of them. The lack of such a conclusion in the 2005 order was the very reason we remanded for the ALC to make this determination.

We also find the ALC erred in relying on evidence that "improvements in waste disposal procedures" have reduced the "tritium concentration at the compliance point." As acknowledged by the ALC in the remand order, this evidence "does not get to the heart of the technical requirements" established by the subsection. This is because subsection 7.11.11.2 imposes specific technical requirements, and we find the evidence does not relate to the requirement that the disposal units be designed to minimize the migration of waste-contaminated water out of them. Instead, this evidence relates to Chem-Nuclear's compliance with the result-based performance objectives contained in section 7.18—that Chem-Nuclear keep radioactive releases to the general environment "as low as is reasonably achievable." Subsection 7.11.11.2 required DHEC and the ALC to analyze the sufficiency of Chem-Nuclear's actions to comply with the plain language of this subsection. Thus, we cannot base our decision on the fact that Chem-Nuclear has reduced the overall tritium concentration at the compliance point.

We conclude the record demonstrates Chem-Nuclear has taken measures to reduce the migration of waste-contaminated water out of disposal units. However, the record does not support a finding that Chem-Nuclear complied with subsection

7.11.11.2. We base our holding on (1) Chem-Nuclear's failure to comply with subsection 7.11.11.1, and (2) there being no evidence, and no finding, that Chem-Nuclear has taken action to "minimize"—reduce to the smallest amount possible—the migration of waste-contaminated water out of disposal units. We hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.2.

3. Subsection 7.11.11.4

Subsection 7.11.11.4 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that allows for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The plain language of this subsection imposes multiple requirements on Chem-Nuclear: (1) collect and retain water that migrates onto the disposal units, (2) test this water for radioactive waste material, (3) if such waste material is discovered, engage in removal or remedial measures, and (4) accomplish this without contaminating the groundwater or surrounding soil.

The ALC relied on the following findings in the 2005 order to support its conclusion that Chem-Nuclear complied with this subsection:

(1) Chem-Nuclear implements a surface water management plan to manage precipitation that collects in trenches, which involves pumping water into adjacent trenches or a lined pond; and
(2) The trenches are designed to prevent the flow of surface water from coming into contact with waste.

We find neither finding supports—and only one addresses—the ALC's determination that DHEC correctly concluded Chem-Nuclear complied with this subsection. Finding (1)—regarding Chem-Nuclear's surface water management plan—is relevant to the first requirement of subsection 7.11.11.4, "temporary collection and retention of water." However, there is no evidence that Chem-Nuclear tests the water pumped from the trenches for radioactive waste material. The subsection requires Chem-Nuclear to do more than collect and retain the water. Finding (2)—that trenches are designed to prevent surface water from coming into contact with waste—is irrelevant to Chem-Nuclear's compliance with this subsection. It has nothing to do with collecting, testing, or removing contaminated water from the disposal units. Because the ALC cited no additional evidence of Chem-Nuclear's compliance with this subsection, we hold the ALC

erred in affirming DHEC's determination that Chem-Nuclear complied with subsection 7.11.11.4.

Upon our review of the 2005 order, we find no evidence of compliance with this subsection.[13] In fact, the evidence in the record demonstrates Chem-Nuclear is not in compliance. First, the vaults and trenches are designed to allow water that enters them to drain into the soil and groundwater below. That water is not tested before it enters the ground. Second, the only other evidence relevant to this subsection is the finding in the 2005 order that states, "None of the trenches at the [facility] have . . . a leachate collection system." Leachate is defined as "any liquid, including any suspended or dissolved components in the liquid, that has percolated through or drained from the [radioactive] material." 10 C.F.R. § 40 app. A (2011). Although the regulation does not define "leachate collection system," in common industry usage, it is "a system or device . . . that is designed, constructed, maintained, and operated to collect and remove leachate" for proper disposal. 40 C.F.R. § 503.21(i) (2011); *see also* 40 C.F.R. § 264.301(a)(2) (2011).[14] Such a system would allow Chem-Nuclear to satisfy the four requirements of subsection 7.11.11.4—(1) collect water migrating onto the disposal units, (2) test this water, (3) remove waste-contaminated water, and (4) do this without contaminating the groundwater because the system would collect the leachate for alternate disposal. Thus, the ALC's finding regarding the non-existence of a leachate collection system undermines its conclusion that Chem-Nuclear complied with this

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[13] This regulation imposes requirements for the design and construction of "disposal units" and "engineered barriers." While Chem-Nuclear has monitoring wells to test the groundwater for contamination and a system to monitor water accumulation in trenches, neither of these qualifies as a disposal unit. *See* § 7.2.8 (defining "disposal unit" as "a discrete portion of the disposal site into which waste is placed for disposal"). To the extent they are considered engineered barriers—"a man-made *structure or device* that is intended to improve the land disposal facility's ability to meet the performance objectives in this part," § 7.2.9 (emphasis added)—there is no evidence these monitoring "devices" allow Chem-Nuclear to collect and test this water "without the contamination of the groundwater." § 7.11.11.4.

[14] These regulations provide the Environmental Protection Agency's definition of "leachate collection system" as stated in the regulations for "surface disposal" of "sewage sludge," 40 C.F.R. § 503.20(a) (2011), and "dispos[al] of hazardous waste in landfills," 40 C.F.R. § 264.300 (2011).

subsection and supports our determination that the ALC erred in reaching that conclusion.

DHEC and Chem-Nuclear argue Chem-Nuclear is justified in not having a leachate collection system due to "concerns regarding the radioactive exposure to workers handling and processing the leachate." We find the argument contrary to the purpose and intent of the regulation. We fail to see how the danger of radioactive contamination to workers actually *justifies* releasing it into the groundwater without testing and remediation. Rather, it seems the danger to health and safety *requires* testing and remediation. We believe the drafters of these regulations imposed such a requirement for just that purpose. Subsection 7.11.11.4 contains no language excusing Chem-Nuclear's duty to comply with its regulatory requirements, which is especially important when the excuse for not taking a particular action is the very reason for the regulation—health and safety. Instead, the focus of compliance is on what action Chem-Nuclear did take—whether it designed and constructed its engineered barriers in a manner that allows it to collect, test, and remove contamination before it percolates into the soil and groundwater.[15]

We find no evidence to support a finding that Chem-Nuclear meets the requirements imposed by this subsection. We hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear complied with subsection 7.11.11.4.

4. Subsection 7.11.11.6

Subsection 7.11.11.6 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that provides "reasonable assurance that the waste will be isolated for at least the institutional control period."

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[15] In deciding whether Chem-Nuclear's operations met the ALARA standard, the 2005 order appropriately weighed Chem-Nuclear's concerns regarding exposure to workers because an ALARA analysis involves balancing the benefit to the general public with the risk associated with worker exposure. *See* 24A S.C. Code Ann. Regs. 61-63 § 7.20 (1992) ("Operations at the land disposal facility shall be conducted in compliance with the standards for radiation protection . . . [and] governed by 7.18."). In determining compliance with the technical requirements of subsection 7.11.11.4, however, we consider the actions taken by Chem-Nuclear to comply, not the reasons why it decided not to implement a certain measure based on its own ALARA analysis.

We hold the ALC did not err in affirming DHEC's determination that Chem-Nuclear's current disposal units and engineered barriers—including the disposal containers, concrete disposal vaults, disposal vault lids, disposal trenches, and enhanced caps on inactive trenches—comply with subsection 7.11.11.6. Waste is put into a disposal container, which is then placed into a reinforced concrete vault that is covered with an initial clay cap and buried in a disposal trench. Once the trench is full, Chem-Nuclear installs an enhanced cap over the trench. The following findings from the 2005 order demonstrate that the use of these disposal units and engineered barriers provide reasonable assurance the waste will be isolated from the general environment and inadvertent intruders "for at least the institutional control period": (1) the predictions of a "continually declining trend in radioactive releases to the general environment"; and (2) the Blue Ribbon Panel's conclusion that the facility's disposal practices "pose a minimal risk to either the environment or members of the public, both today and *in the long-term future*." (emphasis added).

5. Subsection 7.11.11.7

Subsection 7.11.11.7 requires Chem-Nuclear to design and construct its disposal units and engineered barriers in a way that "prevent[s] contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units." We interpret the plain language of this subsection as seeking to prevent waste, and not waste-contaminated water, from coming in contact with soil. Otherwise, the regulatory effect of subsections 7.11.11.1 and 7.11.11.2 become obsolete.[16] Under this interpretation, we hold the ALC did not err in affirming DHEC's determination that Chem-Nuclear complied with this subsection because the "placement of waste in a waste container and a reinforced concrete vault" prevents the waste from coming into direct contact with the soil.

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[16] Subsections 7.11.11.1 and 7.11.11.2 explicitly regulate the migration of *water* onto disposal units and the migration of *waste* and *waste-contaminated water* out of disposal units. This distinction between "water," "waste," and "waste-contaminated water" in these subsections support a conclusion that these regulations seek to prevent waste and waste-contaminated water from infiltrating the soil and groundwater beneath disposal units. Thus, we narrowly construe subsection 7.11.11.7 as applying to only the prevention of waste, and not waste-contaminated water, from coming in contact with the soil. To the extent the ALC relied on evidence related to subsections 7.11.11.1 and 7.11.11.2, we hold the ALC erred in that regard.

C. Subsection 7.23.6

Subsection 7.23.6 requires Chem-Nuclear to design the disposal site in a way that "minimize[s] to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal."[17]

As we previously discussed, subsection 7.23.6 imposes technical requirements that require Chem-Nuclear to take action to design and construct the disposal site to meet the specifications of this subsection. Thus, DHEC and Chem-Nuclear cannot demonstrate compliance with subsection 7.23.6 simply by showing Chem-Nuclear met the performance objectives of other subsections. *Chem-Nuclear I*, 387 S.C. at 436, 693 S.E.2d at 19. Instead, we must consider whether Chem-Nuclear took any actions to meet the technical requirements of this subsection, and if so, the sufficiency of Chem-Nuclear's actions.

This subsection distinguishes between "water," "standing water," and "percolating water" and between the three different phases of operations at the facility—storage, disposal, and after disposal. This subsection requires Chem-Nuclear to implement practices that drain or remove water from active vaults and trenches, as well as minimize to the extent practicable the entry of water into inactive vaults and trenches. Although the failure to minimize the migration of water onto active vaults and trenches under subsection 7.11.11.1 contributes to the accumulation of standing water, the regulatory effect of this subsection, when narrowly construed, requires Chem-Nuclear to implement methods to minimize to the extent practicable standing water that has already migrated into the disposal units.

As to the requirement that Chem-Nuclear design the disposal site in a way that minimizes to the extent practicable the contact of water with waste *during storage*, the ALC found that "[a]ny 'storage' of waste is temporary" because "there is available disposal capacity at the [facility]." The ALC stated that when a shipment of waste is received, it is taken either to the appropriate trench for disposal or to the Cask Maintenance Building, where Chem-Nuclear inspects the casks and prepares them for off-loading. The ALC found that "[b]ased on the practice of inspecting and preparing waste for disposal within the [Cask Maintenance Building], Chem-

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[17] "Disposal site" is defined as "that portion of a land disposal facility which is used for disposal of waste" and "consists of disposal units and a buffer zone." 24A S.C. Code Ann. Regs. 61-63 § 7.2.7 (1992).

Nuclear minimizes the contact of water with waste prior to off-loading the waste into the trench." We affirm because this evidence relied on by the ALC supports compliance with this particular requirement of subsection 7.23.6.

As to whether Chem-Nuclear designed the disposal site to minimize to the extent practicable the contact of standing water with waste *during disposal*, we interpret this requirement as applying to Chem-Nuclear's active vaults and trenches. We hold the ALC did not err in affirming DHEC's conclusion that Chem-Nuclear complied with this requirement of subsection 7.23.6 because the following findings from the 2005 order support this conclusion:

(1) The vaults and trenches are designed to allow water to flow out of them;
(2) Trenches are sloped and contain other design features that prevent "water from coming in contact with waste";
(3) Each trench has a drainage system that allows Chem-Nuclear to monitor any water that accumulates in the trench; and
(4) Chem-Nuclear implements a surface water management plan to manage rainwater that collects in the open trenches.

Turning to the requirement regarding minimizing to the extent practicable the contact of percolating or standing water with wastes *after disposal*, we interpret this as applying to Chem-Nuclear's inactive vaults and trenches. We hold the following findings relied on by the ALC support DHEC's determination of compliance:

(1) When vaults become full, Chem-Nuclear places an initial clay cap over inactive vaults;
(2) When trenches become full, Chem-Nuclear installs an impermeable enhanced cap on inactive trenches; and
(3) Employees fill void spaces between the vaults with backfill, which "minimizes the potential for subsidence of the enhanced caps."

Based on the above discussion, we hold the ALC did not err in finding DHEC correctly determined Chem-Nuclear is in compliance with subsection 7.23.6.

D. Subsection 7.10.7

Subsection 7.10.7 requires DHEC to find Chem-Nuclear "provides reasonable assurance that the applicable technical requirements of [part VII] will be met." The technical requirements relevant to this appeal include those set forth in

subsections 7.11.11 and 7.23.6. Based on Chem-Nuclear's noncompliance with subsections 7.11.11.1, 7.11.11.2, and 7.11.11.4—particularly the absence of evidence that Chem-Nuclear took *any* action to comply with the technical requirements of subsections 7.11.11.1 and 7.11.11.4—we do not understand how DHEC could make, nor how the ALC could affirm, a finding that Chem-Nuclear provided assurance it would meet the applicable technical requirements.

DHEC argues, however, Chem-Nuclear is in compliance with these subsections because "tritium concentrations began to decline at the compliance point" after "the incorporation of new disposal techniques." While this may have been a reasonable position for DHEC to take prior to our opinion in *Chem-Nuclear I*, the argument ignores our holding in that case—that the "specific technical requirements" of 7.11.11 cannot be met by satisfying the "performance objectives" of 7.10. As we found in *Chem-Nuclear I*, "section 7.11 imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address[] whether Chem-Nuclear is in compliance with section 7.11." 387 S.C. at 435, 693 S.E.2d at 19. In light of our holding in that case, however, it is no longer reasonable for DHEC to argue Chem-Nuclear complied with subsection 7.10.7 without considering what action Chem-Nuclear took to comply with the "specific technical requirements" of 7.11.11. This is particularly true given that Chem-Nuclear failed to take *any* action to comply with the requirements of subsections 7.11.11.1 and 7.11.11.4. And yet, DHEC continues to assert Chem-Nuclear "provide[d] reasonable assurance that the applicable technical requirements of [its own regulations] will be met." Considering, for example, the technical requirement in subsection 7.11.11.1—that Chem-Nuclear "minimize the migration of [rainfall] onto the disposal units"—DHEC could not identify one action Chem-Nuclear took to meet this requirement. Nevertheless, DHEC determined Chem-Nuclear complied with subsection 7.10.7 by providing reasonable assurance that this technical requirement of 7.11.11.1 would be met.

To determine whether DHEC complied with subsection 7.10.7 in light of these facts, we consider DHEC's role in the disposal of low-level radioactive waste. In 1967, our General Assembly enacted the Atomic Energy and Radiation Control Act. *See* Act No. 223, 1967 S.C. Acts 305 (*codified at* S.C. Code Ann. §§ 13-7-10 to -100 (1977 & Supp. 2013)). Noting "that remarkable scientific developments have occurred in the field[] of atomic energy," and "plans for further developments . . . are creating broad opportunities and also responsibilities for the states," *id.* at 305, the General Assembly found "[i]t is prudent and wise that the State [give] . . . full consideration of the health and safety requirements of its people." *Id.* at 305-06. Based on these findings, the General Assembly required DHEC to "formulate,

adopt, [and] promulgate . . . regulations relating to the control of ionizing and nonionizing radiation." S.C. Code Ann. § 13-7-40(F)(3) (Supp. 2013). Pursuant to this mandate, DHEC promulgated Part VII of regulation 61-63. Under the authority of the Act, the regulations are the law of South Carolina,[18] and DHEC is required by law to enforce them. *See* S.C. Code Ann. § 13-7-40(A) (Supp. 2013) (providing DHEC "is designated as the agency of the State which is responsible for the control and regulation of radiation sources"); § 13-7-40(F)(9) (stating DHEC "shall . . . provide by regulation for the licensing . . . of radiation sources").

The United States Nuclear Regulatory Commission (NRC), through its federal enforcement policy, has emphasized the importance of regulatory enforcement when nuclear disposal facilities do not conduct their operations with "the necessary meticulous attention to detail" and in accordance with "the high standard of compliance" imposed by the applicable regulations. General Statement of Policy and Procedure for NRC Enforcement Actions, 10 C.F.R. Pt. 2, app. C (1995). Thus, while it is important for private companies such as Chem-Nuclear to comply with applicable regulations, it is equally important, if not more so, that the administrative agency mandated by law to enforce the regulations require adherence to its own standard for compliance. To allow otherwise would impede the purpose for which DHEC was created—to act in the public interest—and risk the health and safety of our citizens. *See* S.C. Code Ann. § 48-1-20 (2008) ("It is declared to be the public policy of the State to maintain reasonable standards of purity of the air and water resources of the State, consistent with the public health, safety and welfare of its citizens, . . . [and] that to secure these purposes and the enforcement of the provisions of this chapter, [DHEC] shall have authority to abate, control and prevent pollution.").

DHEC promulgated regulation 61-63 under statutory mandate for the obvious reason that nuclear waste can adversely affect the health and welfare of our citizens if not disposed of properly. In doing so, DHEC required Chem-Nuclear to comply with the "specific technical requirements" and "performance objectives" that DHEC chose to put in the regulations. It is important that DHEC enforce its own regulations and require Chem-Nuclear to take action to comply with the specific technical requirements. This importance derives not simply from the need to avoid the serious consequences of non-compliance; it is important because it is the law.

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[18] *See S.C. Coastal Conservation League v. S.C. Dep't of Health & Envtl. Control*, 390 S.C. 418, 429, 702 S.E.2d 246, 252 (2010) (noting "a regulation has the force of law").

We are concerned that DHEC did not follow the law in failing to require Chem-Nuclear to comply with all of the technical requirements of subsection 7.11.11.

We are also concerned by DHEC's decision not to amend the requirements for issuance of the license after the ALC instructed Chem-Nuclear in its 2005 order to submit a report to DHEC regarding the feasibility of covering trenches and sealing vaults. The propriety of DHEC's decision to "concur[] with the report's evaluation of the issues" is not before this court, and we do not base our holding on the merits of that decision.[19] However, the fact that DHEC did not require Chem-Nuclear to take *any* action or make *any* changes to its disposal practices casts doubt upon DHEC's decision to renew the license.

Regardless of our affirmance of Chem-Nuclear's compliance with the remaining subsections of 7.11.11, we hold the ALC erred in affirming DHEC's determination that Chem-Nuclear complied with subsection 7.10.7.

V. Remedy

As to four separate subsections of regulation 61-63, DHEC failed to enforce the law of South Carolina. As to each, the ALC erred in finding Chem-Nuclear in compliance. Under the law, Chem-Nuclear's license to operate the facility is invalid. However, the appellant informed the court at oral argument it does not seek revocation of the license; it asks simply that DHEC enforce its regulations, and that Chem-Nuclear comply. In light of this request, we order DHEC and Chem-Nuclear to submit a written plan for compliance to the ALC within ninety days of this opinion. The ALC shall promptly determine if Chem-Nuclear will come into compliance with the regulations under the plan. If the ALC determines the plan will bring Chem-Nuclear into compliance, it shall set a schedule for

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[19] A footnote in the ALC's order states Chem-Nuclear conducted these studies and DHEC "concurred with the report's evaluation of the issues." The record does not contain the results of these studies or the reasons DHEC chose not to amend the license requirements as a result of the report. The basis of DHEC's decision not to amend the license or impose additional requirements for operating the facility is not before this court. While DHEC must enforce—and Chem-Nuclear must comply with—the regulations, it is not our place to disagree with DHEC as to how it should enforce its own regulations, or mandate how Chem-Nuclear should comply with these regulations. We merely review the ALC's and DHEC's determinations of compliance without passing judgment upon the technical aspects of how this compliance is accomplished.

Chem-Nuclear to promptly implement the plan. If the ALC determines the plan will not bring Chem-Nuclear into compliance, it shall issue an order revoking Chem-Nuclear's license.

The requirement of a written plan will not be stayed except by order of this court or the supreme court. However, an order of the ALC revoking Chem-Nuclear's license will be stayed while a petition for rehearing is pending before this court, or while a petition for certiorari is pending before the supreme court.

VI. Conclusion

We affirm the ALC as to all issues presented to this court, except Chem-Nuclear's compliance with subsections 7.11.11.1, 7.11.11.2, 7.11.11.4, and 7.10.7. As to those four subsections, we hold the ALC erred in affirming DHEC's conclusion that Chem-Nuclear was in compliance.

HUFF and THOMAS, JJ., concur.

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

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SC Court of Appeals

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

Sierra Club,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

FINAL JOINT BRIEF OF THE RESPONDENTS, CHEM-NUCLEAR SYSTEMS, LLC AND SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

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A. Whether The ALJ Correctly Applied The Relevant Findings Of Fact From The *2005 ALC Order* In Concluding Chem-Nuclear Had Complied With The Remanded Portions Of The Regulation And SCDHEC's Decision To Renew The Operations License Was Proper?

B. Whether The Disposal Technology Utilized At The Barnwell Facility Meets The Regulatory Definition Of "Disposal" By Ensuring The Isolation Of Wastes In Compliance With The Regulatory Requirements?

C. Whether The ALJ Misconstrued The Regulatory Requirements In Concluding The Factual Findings From The *2005 ALC Order* Support Affirmance Of The Renewal Of Operations License 097?

II. STATEMENT OF THE CASE

The Respondents, Chem-Nuclear Systems, LLC ("Chem-Nuclear") and South Carolina Department of Health and Environmental Control ("SCDHEC" or "the Department"), jointly adopt the *Statement of the Case* submitted by the Appellant, Sierra Club, and, in addition, supplements the *Statement of the Case* as follows:

In its Final Order and Decision issued 13 October 2005 (the "*2005 ALC Order*"), reviewed by this Court of Appeals,[1] Administrative Law Judge John D. Geathers approved renewal of Chem-Nuclear's license for operation of the low-level radioactive waste disposal facility in Barnwell, South Carolina. Judge Geathers, however, ordered Chem-Nuclear to conduct a study and submit the results to SCDHEC. This study included evaluation of "the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell Site that will (1) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible."[2] Chem-Nuclear followed Judge Geathers' directive and sent the report[3] to SCDHEC on 11 April 2006.

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1 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 693 S.E.2d 13 (Ct.App. 2010), *rehearing denied* (3 May 2010), *certiorari denied* (21 July 2011).

2 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193 (S. C. Admin. Law. Judge.Div., filed 13 October 2005). (R.pp.36-66).

3 The report was entitled Evaluation of the Scientific and Economic Feasibility for implementing new Designs and Operational Procedures at the Barnwell

This Court of Appeals affirmed in part, and remanded in part the *2005 ALC Order* back to the ALC.[4] On remand this Court of Appeals "instructed the ALC to apply the factual findings from its 2005 Order in determining . . whether Chem Nuclear is in compliance with DHEC *Regulation* 61-63, Part VII, Sections 7.10.5 through 7.10.10, 7.11, and 7.23.6." (R.p.2).[5]

The ALC, the Honorable Ralph King Anderson, III, concluded "[the Sierra Club] must demonstrate, by a preponderance of the evidence, that renewal is not authorized based on the ALC's factual findings in the 2005 Decision as applied to the sections of R. 61-63 discussed above." (R.p.22). The ALC concluded "[the Sierra Club] failed to carry that burden, [determining] that the factual findings in the 2005 Decision, when applied to 24A *S. C. Code Ann. Reg.* 61-63, [§§] 7.10.5-7.10.10, 7.11, and 7.23.6, demonstrate that the Barnwell Facility is compliant with these regulations and that renewal of License No. 097 was proper." (R.p.22).

III. STATEMENT OF THE FACTS

Chem-Nuclear operates a low-level radioactive waste ("LLRW") disposal facility in Barnwell County, South Carolina (the "Barnwell Facility") on property generally contiguous to the Savannah River Site. (R.p.38, para. 1).[6] Chem-

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Site as Directed by the South Carolina Administrative Law Court Order Dated October 13, 2005.

[4] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 693 S.E. 2d 13.

[5] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 439, 693 S.E. 2d 13, 20-21.

[6] Beginning in the early 1950s, the Savannah River Site historically produced the basic material used in the fabrication of nuclear weapons. *See* www.srs.gov/general/about/history1.htm.

Nuclear began disposal operations at the Barnwell Facility in 1971 pursuant to License No. 097. (R.p.38, para. 1). Chem-Nuclear has been the only operator of the Barnwell Facility since 1971. (R.p.38, paras. 1, 2). SCDHEC has renewed License No. 097 seven times. (R.p.38, para. 1; R.p.42, para. 18). Including SCDHEC's seven renewals, License No. 097 has been amended 48 times. (R.p.38, para. 1; R.p.42, para. 18). The most recent license renewal, constituting the 49th amendment, is the subject of the underlying contested case (R.p.42, para. 18) and this appeal..

In 2000, almost 30 years after Chem-Nuclear commenced disposal operations at the Barnwell Facility, the South Carolina Legislature enacted the *Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act* (the "*Compact Act*").[7] Through this legislation, the South Carolina joined the Atlantic Low-Level Radioactive Waste Compact (the "Atlantic Compact") along with the States of Connecticut and New Jersey.[8] In turn, the Barnwell Facility became the designated regional waste disposal facility of LLRW for the Atlantic Compact.[9] The *Compact Act* established declining limits on LLRW volumes which can be disposed of at the Barnwell Facility by the compact members.[10] Consequently, commencing in Fiscal Year 2008-2009, the *Compact Act* limited the Barnwell Facility to acceptance of disposal of in-region LLRW only, which resulted in a substantial

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7 *See* S.C. Code Ann. §§ 48-46-10, *et seq.* (Thomson Reuters West 2010).

8 *See* S.C. Code Ann. §§ 48-46-30(3) (Thomson Reuters West 2010); S.C. Code Ann. §§ 48-46-60(5)(B) (Thomson Reuters West 2010).

9 *See* S.C. Code Ann. §§ 48-46-40 (Thomson Reuters West 2010).

10 S.C. Code Ann. § 48-46-40(A)(6) (Thomson Reuters West 2010).

reduction of waste volumes entering the facility.[11] Consequently, the Barnwell Facility has received only approximately 8000 cubic feet per year of LLRW, or less, from the three Atlantic Compact states since Fiscal Year 2008-2009 as compared to previous rates as high as 1.2 million cubic feet per year. (R.p.38, para. 3 – R.p.39, para. 1).

It is undisputed that tritium,[12] a radioactive isotope of hydrogen, moves through groundwater at the Barnwell Facility. (R.pp.43-44, paras.24-35). Tritium admittedly migrates with rainwater and groundwater. (R.p.43, para. 24). Tritium was initially discovered in the trenches at the Barnwell Facility in 1974. (R.pp.43-44, para. 29; R.p.50, para. 65). Thereafter, through the benefit of an extensive system of groundwater monitoring wells, Chem-Nuclear and SCDHEC have been able to map a fairly exact tritium dispersal "plume". (R.pp.43-44, para. 29; R.p.50, para. 65).

Groundwater becomes surface water in Mary's Branch Creek, beyond the boundaries of the property owned by the State of South Carolina and leased by Chem-Nuclear, but, nevertheless, within the confines of property adjoining the disposal facility and owned by Chem-Nuclear. (R.p.44, para. 32). The first point in Mary's Branch Creek where a hypothetical member of the general public *might* receive a dose of radiation is the compliance point for purposes of SCDHEC's monitoring. (R.p.44, para. 32). The compliance point approved by SCDHEC is an appropriate point of compliance in that it provides for measuring compliance

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11 S.C. Code Ann. § 48-46-40(A)(6)(a) (Thomson Reuters West 2010).

12 Tritium has a half-life of 12.3 years and decays to approximately one-fourth of its original quantity of radiation in 24.6 years. (R.p.43, para. 27).

consistent with Section 7.18 of the regulation. (R.pp.44-45, paras. 32, 37-38). The evidence demonstrated that tritium has a travel time through groundwater of 20 years between the trenches and Mary's Branch Creek. (R.p.47, para. 49).

The regulatory limit for exposure to radioactive materials is the equivalent of an annual dose of 25 millirems ("*mrem*") to the whole body. (R.p.44, para. 33).**13** The highest concentration of tritium detected in Mary's Branch Creek, from a sample taken in July 2001, resulted in a hypothetical annual dose of 5.7 *mrem*, well below the applicable regulatory limit. (R.p.45, paras. 39, 41). Sampling data disclosed at the 2005 ALC hearing provided evidence that since July, 2001, there had been a ***declining*** trend in tritium concentration at the compliance point. (R.p.45, paras. 39, 41; R.pp.47-48, para. 52).

The "tritium plume" originated as a consequence of early disposal practices. (R.pp.43-44, para. 29). A considerable amount of waste disposed during the early years of operations of the Barnwell Facility was packaged in unreliable containment and waste forms like paper or cardboard. (R.pp.43-44, para. 29). The use of engineered barriers, groundwater travel time, and decay have ensured that tritium concentrations at the compliance point remain well below regulatory limits. (R.p.46, para. 46). In 1995, *Part VII* of *R. 61-63* was amended to require engineered barriers for all waste disposed at the Barnwell Facility. (R.p.40, para. 9). The primary engineered barriers used at the Barnwell Facility since 1995 are concrete vaults and enhanced capping of trenches. (R.p.42, para. 20; R.p.51, para. 72).

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13 *See generally* 24A S.C. Code Ann. Regs. 61-63, § 7.18 (Thomson Reuters West 2010).

Waste is transported to the Barnwell Facility in casks, or containers, such as high-integrity polyethylene disposal containers (R.pp.56-57, para. 107) which are placed in rectangular and cylindrical reinforced concrete vaults stacked up to three high on the trench floor. (R.p.53, para. 82-84). Voids between vaults are backfilled for stability within the trench and the vaults are covered with a clay cap. (R.p.53, para. 84). Once trenches are filled they are covered with an enhanced cap consisting of clay overlain by polyethylene and bentonite materials, sand, and topsoil to allow for vegetation growth. (R.pp.53-54, para. 85).

The concrete vaults are not sealed against water intrusion and the vault floors contain holes to allow water to drain from the vaults. (R.p.46, para. 47; R.p.56, para. 101). The bottoms of the trenches are lined with sandy clay that is not compacted nor designed to be impermeable. (R.pp.53-56, paras. 81-103). Rather, it is designed to allow water to migrate from the bottom of the trench. (R.pp.53-56, paras. 81-103).

The declining trend in groundwater concentrations of tritium near trenches constructed with engineered barriers, attributed to better containment of waste, demonstrates that Chem-Nuclear has successfully minimized contact between waste and rain water. (R.pp.56-57, para. 107). Moreover, Chem-Nuclear has implemented a surface water management plan to manage precipitation collected in the trenches. (R.pp.56-58, paras. 105-113). Water is pumped, when necessary, into adjacent trenches or a lined pond. (R.p.58, para. 117).

The Sierra Club has appealed on the basis that the law[14] requiring Chem-Nuclear to ***minimize*** contact between the waste and rain water actually means that Chem-Nuclear must prevent ***any and all*** contact between waste and rain water (*i.e.*; there can be ***no contact*** whatsoever). Rain undisputedly enters the trenches at the Barnwell Facility which are still active and open (*i.e.*; still receiving material, in the process of being covered over, *etc.*). (R.p.47, para. 49; R.p.56, para. 101). However, through the use of engineered barriers Chem-Nuclear has significantly minimized the actual contact between the waste and rain water (R.p.58, para. 117), although admittedly it hasn't been completely eliminated. The lengthy groundwater travel time, the engineered barriers, and the extended decay rates of radioactive materials all operate together to insure that any release of radioactive material would be and, indeed, is well below the applicable regulatory limits.

Importantly, the compliance point, or point of release, is located on real property controlled by Chem-Nuclear. (R.p.44, para. 32). Access to the Mary's Branch Creek at the point of release is restricted as the area is fenced and, in addition, is heavily vegetated. (R.p.44, para. 32; R.p.45, para. 42). There are no known consumers and/or users of Mary's Branch Creek in and around the compliance point. (R.pp.45-46, para. 43). The particular property, including Mary's Branch Creek, is the subject of a Restrictive Covenant prohibiting the use of the groundwater and surface water as a drinking water source. (R.p.46, para. 44). Moreover, there are no known drinking water wells down gradient of the Barnwell Facility. (R.pp.45-46, paras. 42-45).

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[14] *See* 24A S.C. Code Reg. § 61-63, Part VII (Thomson Reuters West 2010).

IV. ARGUMENT AND CITATION OF AUTHORITY

Standard of Review

The Sierra Club asserts S. C. Code Ann. § 1-23-380 establishes this Court of Appeals' standard of review. On the contrary, the review standard specifically applicable to an ALC's final order and/or decision is set forth in S. C. Code Ann. § 1-23-610. That statute specifically provides:

> **(B)** The review of the administrative law judge's order must be confined to the record. The court may not substitute its judgment for the judgment of the administrative law judge as to the weight of the evidence on questions of fact. The court of appeals may affirm the decision or remand the case for further proceedings; or, it may reverse or modify the decision if the substantive rights of the petitioner have been prejudiced because the finding, conclusion, or decision is:
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> **(a)** in violation of constitutional or statutory provisions;
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> **(b)** in excess of the statutory authority of the agency;
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> **(c)** made upon unlawful procedure;
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> **(d)** affected by other error of law;
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> **(e)** clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or
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> **(f)** arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion.**15**

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15 *See* S. C. Code Ann. § 1-23-610(B) (Thomson Reuters West 2010). *See also generally* Centex Intern., Inc. v. S. C. Dep't of Revenue, ___ S.C. ___, ___, ___ S.E.2d ___, ___ (2013) (2013 WL 3816542, *3, filed 24 July 2013) (*citing* Original Blue Ribbon Taxi Corp. v. S.C. Dep't of Motor Vehicles, 380 S.C. 600, 604, 670 S.E.2d 674, 676 (Ct.App.2008); Media Gen. Commc'ns, Inc. v. S.C. Dep't of Revenue, 388 S.C. 138, 144, 694 S.E.2d 525, 528 (2010)).

Here, the Sierra Club claims that the ALJ committed legal error on remand when he concluded that Chem-Nuclear's disposal practices complied with the law.**16** Sierra Club alleges legal error because undisputedly rainwater may come into contact with waste and then infiltrate the groundwater. Sierra Club claims that proper construction of these regulatory requirements would lead to a conclusion that they are violated upon a demonstration of water coming into contact with waste. It is the Sierra Club's analysis which is legally flawed, not that of the ALJ, as will be discussed herein.

A. ***The ALJ Correctly Applied The Relevant Findings Of Fact From The 2005 ALC Order To Conclude That Chem-Nuclear Complied With The Remanded Portions Of The Regulation And SCDHEC's Decision To Renew The Operating License Was Proper.***

The Sierra Club contends that the ALJ "discarded" findings from the *2005 ALC Order* that are material to compliance with specific regulations, "re-weighed" the evidence, and "ignored" some facts in favor of others. (*Appellant's Brief*, p.33). Specifically, Sierra Club highlights certain findings that it believes should have been relevant to the ALJ's conclusions on remand. (*Appellant's Brief*, pp.11-14). These findings concern the so-called "North Carolina" model, the tritium contamination in Mary's Branch Creek, the design of the waste containment vault, and the study required by the *2005 ALC Order*. (*Appellant's Brief*, pp.11-14).

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16 *See* 24A S.C. Code Ann. Reg. §§ 61-63 Part VII - 7.10.6, 7.10.8, 7.11.11, and 7.23.6 (Thomson Reuters West 2010).

Regarding the "North Carolina" model which the Sierra Club has steadfastly argued *should* be the standard for compliance, the ALJ correctly noted that there is no information upon which to evaluate the "North Carolina" design since the facility was (a) never constructed, (b) a license was never issued, (c) no facility exists which uses the "North Carolina" design, and (d) the "North Carolina" design feature of "assured isolation" exists only in theory. (R.p.15, para. 2; R.p.52, paras. 73-74, 76). Rather than focus on the non-existent "North Carolina" model, the ALJ examined current disposal practices and technologies to determine if they complied with the requirements for license renewal, including extensive application of the factual findings to the objectives of minimizing contact between waste and water in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11 and minimizing to the extent practicable the contact of water with waste during storage, disposal and after disposal pursuant to Section 7.23.6. (R.pp.9-22).

Second, the ALJ not only did not ignore, but acknowledged the fact that earlier disposal practices at the Barnwell Facility resulted in tritium contamination in the groundwater leading to Mary's Branch Creek. The ALJ stated that "[i]In the early years at the Barnwell [F]acility, the acceptable waste disposal practices for low-level radioactive facilities resulted in tritium releases into the trenches. These early disposal practices included unreliable containment and waste forms, including packaging in paper and cardboard containers." (R.p.18; R.pp.43-44, para. 29). The ALJ applied the findings from the *2005 ALC Order* that reflect that:

> The changes in design and operations at the Barnwell facility . . the use of vaults to stabilize the trenches, the use of high-integrity polyethylene disposal containers to contain waste forms, the elimination of liquid waste, and the installation of impermeable caps on inactive trenches – have enhanced site performance so as to support Chem-Nuclear's predictions of a declining trend in radioactive releases to the general environment.

(R.p.18; R.pp.56-57, para. 107).

Acknowledging that past disposal practices, even though in compliance with the regulation at that time, contributed to the releases of tritium to groundwater does not negate the findings that show disposal practices and technology have changed and improved significantly since then. (R.p.18; R.pp.56-57, para. 107).

Third, the Sierra Club asserts the ALJ ignored relevant findings concerning the containment vault design and the contact of waste with water, specifically focusing on the fact the vaults were not grouted and sealed against water intrusion and contained holes in the vault bottom. (*Appellant's Brief*, p.14). In fact, the ALJ reviewed relevant findings concerning the vaults and the trench system, and applied these findings to the license requirements in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 that provide for "minimizing to the extent practicable" the contact of water with waste in the design and construction of the disposal units (vaults) and engineered barriers. (R.p.20).

The ALJ also applied the findings concerning the vaults and the engineered barriers to the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11 and the seven objectives for the engineered barriers. These objectives

contain qualitative standards for minimizing contact of water with waste and, in turn, the ALJ rightly concluded Chem-Nuclear and the operating license complied with these objectives. (R.pp.13-19).

Finally, the Sierra Club continues to cite the study required by the *2005 ALC Order* concerning methods to reduce contact between waste and rainfall and other water at the facility.**17** The decision of the ALC in 2005 sustaining SCDHEC's decision to renew Chem-Nuclear's operating license was not conditioned upon the study or its results. Rather than focusing on the study, Judge Anderson correctly applied the factual findings concerning the Blue Ribbon panel of experts' review of the Environmental Radiological Performance Verification ("ERPV") which concluded that "the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and in the long-term future." Notably, the Appellant did not refute the findings and conclusions of either the ERPV or the Blue Ribbon Panel. (R.pp.4, 6; R.p.50, para. 66).

This Court of Appeals instructed the ALJ to "rul[e] on whether Chem-Nuclear's ***current*** waste disposal practices are in compliance with *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11, 7.23.6, and 7.10.5-7.10.10 by applying the factual findings from the *2005 ALC Order*. (R.p.2) (Emphasis added).**18** In reaching its

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17 Chem-Nuclear submitted a proposed outline in response to the 2005 ALC Order; SCDHEC concurred with the outline in December 2005; the study was submitted to SCDHEC in April 2006, and SCDHEC acknowledged receipt in September 2006; SCDHEC's response to the report was issued in April 2008.

18 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 439, 693 S.E. 2d 13, 20-21.

conclusions, the ALJ did not discard findings from the *2005 ALC Order*, re-weigh the evidence, or ignore some facts in favor of others. Rather, the ALJ applied the factual findings to the technical requirements of the remanded sections of the regulation, and appropriately concluded that the Barnwell facility license is compliant with the regulations, and the license renewal is proper. That the ALJ did not cite every factual finding in the *2005 ALC Order* or employ all of the findings relied upon by Appellant does not mean that the ALJ committed errors of law. It simply means that the factual findings, in total and in context, support the conclusions reached by the ALJ.

B. *The Disposal Technology Utilized At The Barnwell Facility Meets The Regulatory Definition Of "Disposal" By Ensuring The Isolation Of Wastes In Compliance With The Regulatory Requirements.*

The Sierra Club's pervading argument against the operating license renewal for the Barnwell facility is that the disposal[19] technology does not isolate waste from the environment. The Sierra Club appends a dictionary definition of "isolation" to waste disposal, asserting that "this license approval must be viewed in the context of disposal that will ensure that wastes are isolated, separated and quarantined from man's biosphere and food chain." (*Appellant's Brief*, pp.9, 23). This narrow rendition of disposal and waste isolation is inaccurate, contradicts the plain language of the regulation, and misses the contextual connections between the regulatory definitions and the licensing requirements of *S.C. Code Ann. Reg.* § 61-63.

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19 S.C. Code Ann. Reg. § 61-63, Sec. 7.2.6 (Thomson Reuters West 2010) provides that "Disposal" means "the isolation of wastes from the biosphere inhabited by man and his food chain by emplacement in a land disposal facility."

S.C. Code Ann. Reg. § 61-63 does not contain a definition of "isolation" or "waste isolation," however, in the context of the regulation and in particular the sections on remand, isolation of wastes in a land disposal facility means the disposal of waste in a manner that is expected to provide adequate protection of human health and the environment. That is why S.C. Code Ann. Reg. § 61-63, Sec. 7.10.6 requires SCDHEC issue the operating license upon a finding that the Barnwell Facility's disposal site design, operations, closure, and post-closure institutional control "are adequate to protect the public health and safety..." (R.p.4). The ALJ noted that this section is a qualitative standard designed to ensure that the public's health and safety are protected through the long-term stability of the disposed waste and disposal site. (R.p.4). In finding Chem-Nuclear had complied with this statutory section, the ALJ correctly focused on (1) the findings regarding the use of engineered barriers and (2) the mechanisms that afford a buffer against the risk of exposure to the general public. (R.pp.4, 5).

The use of engineered barriers for the underground burial of wastes serves to isolate waste from man's biosphere as contemplated in the disposal definition. (R.pp.53-56, paras. 81-103). As the ALJ correctly noted, the current disposal technology at the Barnwell Facility is most accurately described as enhanced shallow land burial with engineered barriers: the primary engineered barriers being disposal trenches; disposal vaults; and enhanced caps. (R.p.10; R.53, para. 81).

The Barnwell Facility is a "near-surface disposal facility" which means a "land disposal facility in which waste is disposed of within approximately the upper 30 meters of the earth's surface." (R.p.53, para. 81).**20** Engineered barriers are defined as man-made structures or devices intended to improve the land disposal facility's ability to meet the performance objectives in Part VII of the applicable regulation, and include above or below grade vaults or equivalent structures.**21**

The engineered barriers used to isolate waste must be designed and constructed to ***complement and improve*** the ability of the disposal facility to meet the performance objectives.**22** As the ALJ discussed in his review of S.C. Code Ann. Reg. § 61-63, Sec. 7.11.9, these objectives include:

a. S.C. Code Ann. Reg. § 61-63, Sec. 7.18, which specifically provides that concentrations of radioactive material may be released to the general environment so long as it does not exceed the dose rate and reasonable efforts are made to maintain releases of radioactively in effluents to the general environment "as low as is reasonably achievable";

b. S.C. Code Ann. Reg. § 61-63, Sec. 7.19, protection from inadvertent intruders;

c. S.C. Code Ann. Reg. § 61-63, Sec. 7.20, protection of individuals during operations to maintain radiation exposures "as low as is reasonably achievable"; and

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20 *See* S.C. Code Ann. Reg. § 61-63, Sec. 7.2.17 (Thomson Reuters West 2010).

21 *See* S.C. Code Ann. Reg. § 61-63, Sec. 7.2.9 (Thomson Reuters West 2010) (Emphasis added).

22 *See* S.C. Code Ann. Reg. § 61-63, Sec. 7.11.9 (Thomson Reuters West 2010).

d. S.C. Code Ann. Reg. § 61-63, Sec. 7.21, disposal site stability at closure to eliminate, "to the extent practicable" the need for ongoing maintenance after closure.

(R.pp.10-11). If disposal means that there can be absolutely no contact between waste and water, then S.C. Code Ann. Reg. § 61-63, Sec. 7.18 would not allow for a dose rate below which concentrations of radioactive material released to the general environment (including, air, groundwater, surface water, soil) is allowable, and S.C. Code Ann. Reg. § 61-63, Sec. 7.20 would not provide that radiation exposure to workers during site operations should be "as low as reasonably achievable." Waste isolation, in the context of the plain language of the regulatory provisions does not contemplate preventing or quarantining all waste from contact with water.

S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11 is a key provision that clearly shows that the objectives for the engineered barriers to accomplish waste isolation are not absolute. The objectives in this section place the concept of waste isolation into a context that acknowledges that shallow land disposal by definition cannot provide absolute isolation from the elements, including rainfall. S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.1, for example, provides that engineered barriers should be designed and constructed to *minimize* the migration of water onto disposal units, and S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.2, provides that they should *minimize* the migration of waste or waste contaminated water out of disposal units.

These statutory objectives do not absolutely prohibit contact by the waste with water; rather, they recognize and moreover, acknowledge, that the goal of the disposal units and engineered barriers is that they be designed and constructed to *minimize* waste to water contact. The ALJ's *2012 Final Order* discusses in detail the factual findings that indicate compliance with these objectives. (R.pp.12-20).

While buried waste is isolated through the use of engineered barriers, releases of radioactive material (*e.g.*; tritium) to the general environment are also isolated through mechanisms that protect the public and the environment. (R.pp.56-58, paras. 105-113). In addition to controlling the disposal site under it operating license, Chem-Nuclear also owns three parcels of property around the site, including the property at the regulatory compliance point at Mary's Branch Creek. (R.p.7; R.p.44, para. 32). There are restrictive covenants and easements on the three parcels of property to protect the compliance point from access by the general public. (R.p.46, para. 44). There is a fence and heavy vegetation at the entry point to prevent the general public from accessing Mary's Branch Creek at the compliance point, and there are no consumers of water from the Creek. (R.p.7; R.p.45, para. 42). All of these mechanisms further ensure waste isolation within the regulatory requirements.

The Sierra Club correctly notes the words of a regulation must be given their plain and ordinary meaning. (*Appellant's Brief*, p.33). That is why it is difficult to understand the Sierra Club's attempt to impose an inaccurate interpretation of disposal and waste isolation onto and as a substitute for the

plain language of the regulatory provisions reviewed on remand. By cloaking its fundamental argument in a definition of disposal that is not supported by the language contained in the regulation is to misapprehend the meaning of the regulation and to misconstrue the regulatory requirements that are, in fact, supported by the factual findings from the *2005 ALC Order*. (R.pp.36-66).

In the following sections, each of the remanded provisions will be discussed in more detail to demonstrate that the ALJ did not commit errors of law in applying the factual findings, and in concluding that Chem-Nuclear is in compliance with the regulations, and SCDHEC's operating license renewal was proper.

C. *The ALJ Did Not Misconstrue The Regulatory Requirements In Concluding That The Factual Findings Form The 2005 ALC Order Support Affirmance Of The Renewal of Operating License 097.*

1. Remanded Sections: Sections 7.10.5 Through 7.10.10.

The ALJ's final order in this matter addresses *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10,6, 7.10.7, 7.10.8, and 7.10.10. The Sierra Club only contests the ALC's conclusions regarding *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10.6, 7.10.7, and 7.10.8. (*Appellant's Brief*, pp.27-28).

(a) 24A *S.C. Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.10.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.10.6 sets forth the following requirements:

> The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and post closure institutional control are adequate to protect the public health and safety in

> that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.**23**

The ALJ found that the disposal practices assured the stability of the waste. (R.p.7). In addition, the review by the Blue Ribbon panel confirmed Chem-Nuclear's predictions of declining concentrations of tritium flowing into Mary's Branch Creek. (R.p.50, para. 65). Further, the property restrictions placed on the property surrounding the compliance point protected the public's health and safety. (R.p.46, para. 44).

The Sierra Club challenges the ALJ's conclusion regarding the stability of the waste (*Appellant's Brief*, pp.28-30) arguing that the waste isn't stable because "waste leave[s] the disposal vaults and the trenches and migrate[s]into the groundwater." (*Appellant's Brief*, p.30) "Stability" is defined in S.C. Code Ann. Reg. § 61-63, Sec. 7.2.20 as "structural stability" and the ALJ correctly focused on the backfilling between vaults and the caps both of which are used, with the vaults, to provide long-term structural stability for the waste. (R.p.7).

There is no finding in the *2005 ALC Order* (R.pp.36-66) upon which anyone could reasonably conclude that waste, as defined in S.C. Code Ann. Reg. § 61-63, Sec. 7.2.22, is not stable and becomes displaced at the Barnwell Facility. There is no finding in the *2005 ALC Order* (R.pp.36-66) upon which anyone could reasonably conclude that waste, as defined in S.C. Code Ann. Reg. § 61-63, Sec. 7.2.22 is unearthed after burial and that the public is subject

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23 S.C. Code Ann. Reg. § 61-63, Sec. 7.10.6 (Thomson Reuters West 2010).

to exposure from the unearthed waste. There is reference in the Findings of Fact contained in the *2005 ALC Order* that, with regard to earlier unreliable containment, "[i]t is undisputed that it is inadvisable to attempt to uncover or excavate these containers and waste in order to provide better containment." (R.p.44, para. 30).

Tritium, driven by rainwater percolating to ground water, may migrate from the disposal site but, in that process, there is no disturbance of waste or waste forms. And, the incorporation of engineered barriers into the Barnwell Facility, coupled with groundwater travel time and decay rates, results in a release of radioactive material into the environment well below the applicable regulatory limit. The stability or instability of the waste forms has nothing to do with the migration of rain-driven tritium through groundwater.

(b) 24A *S.C. Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.10.7

S.C. Code Ann. Reg. § 61-63, *Sec.* Sec. 7.10.7 requires that Chem-Nuclear provide "reasonable assurance that the applicable technical requirements of this part will be met." The Sierra Club concludes that Chem-Nuclear has failed to demonstrate reasonable assurances based on the "extensive findings that the vaults are unsealed and ungrouted allowing water to fall into the vaults; the vaults have holes in the bottom to allow water to migrate out of the vaults; the trenches are designed to allow water to percolate into the groundwater." (*Appellant's Brief*, p.32).

"Engineered barriers" are defined in S.C. Code Ann. Reg. § 61-63, Sec. 7.2.9 as "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives in this part. This shall include above or below grade vaults or equivalent structures." S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11 identifies the "technical requirements" as contemplated in S.C. Code Ann. Reg. § 61-63, Sec. 7.10.7, for engineered barriers with the overriding requirement relative to this appeal set forth in S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.2 "to minimize migration of waste or waste contaminated water out of the disposal unit." With the incorporation of new disposal techniques and the use of engineered barriers, beginning in 1995, tritium concentrations began to decline at the compliance point. (R.pp.56-57, para. 107).

Consequently, Chem-Nuclear has not only provided assurances, but has demonstrated that the engineered barriers satisfy the performance objectives of S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11 and the technical requirements of S.C. Code Ann. Reg. § 61-63, Part VII are met.

(c) 24A S.C. Code Ann. Reg. 61-63 Part VII, Sec. 7.10.8

S.C. Code Ann. Reg. § 61-63, Sec. 7.10.8 refers to the applicant's proposed institutional controls and the requirement that the applicant provide reasonable assurance the controls are provided for the length of time necessary to protect public health and safety through post-closure. The Sierra Club argues that there were "multiple releases from the site over its history" from which the ALJ should have concluded that the waste was not stable and that exposure of

the public was likely. (*Appellant's Brief*, pp.30-32). The Sierra Club further claims that it was irrelevant that a release was below regulatory limits. (*Appellant's Brief*, p.31).

The Sierra Club's claim is a misapprehension of the requirements of S.C. Code Ann. Reg. § 61-63, Part VII. The statutory scheme anticipates that a release may occur and addresses that possibility be establishing specific release limits. In fact, S.C. Code Ann. Reg. § 61-63, Sec. 7.18 specifically provides that:

> Concentrations of radioactive material which ***may*** be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 mrems to the whole body, 75 mrems to the thyroid, and 25 mrems to any other organ of any member of the public. Reasonable efforts should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.[24]

The data collected by Chem-Nuclear demonstrates that the groundwater migrating off the disposal site and into Mary's Branch Creek does not exceed the regulatory limits and, therefore, is allowable under S.C. Code Ann. Reg. § 61-63, Sec. 7.18 as a concentration that may be released into the environment. Moreover, Chem-Nuclear strives to reduce any release as low as is reasonably achievable ("ALARA"). (R.pp.56-58, para. 104-113). Chem-Nuclear has incorporated disposal practices to ensure that any releases are well below allowable limits.

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[24] S.C. Code Ann. Reg. § 61-63, Sec. 7.18 (Thomson Reuters West 2010) (Emphasis added).

The Sierra Club is inaccurate in stating that the ALJ concluded in the *2005 ALC Order* that there have been "multiple releases from the site over its history." (*Appellant's Brief*, p.31). The only evidence of any releases from the site is the concentration measured at the compliance point, which under *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.18, is authorized, and the release which occurred in 1998-1999 when water pumped from Trench 86 percolated into the groundwater which flowed under a neighboring property occupied by St. Paul Church and contaminated the groundwater. (R.pp.48-49, para. 56). It is not reasonably disputed that Chem-Nuclear detected and confirmed the release and conducted remediation activities. (R.pp.48-49, para. 56).

The ALJ, in the *2012 Final Order*, relied on the data collected at the compliance point, and the trend of decreasing concentrations of tritium in the groundwater flowing into the Mary's Branch Creek, to conclude that the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.10.8 have been satisfied. (R.pp.6-8). The Sierra Club relies on the same data, or evidence of a release to surface water, to argue that Chem-Nuclear has failed to provide the necessary assurances. The Sierra Club, however, ignores that the concentration measured at the compliance point, where groundwater flowing under the Barnwell Facility migrates to surface water off-site, is an allowable release under *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.18.

2. Remanded Sections: *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.

The *2012 Final Order* includes findings and conclusions addressing *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11.9, 7.11.10, and 7.11.11.1-7. (R.pp.10-19). While the Sierra Club explains that it is addressing *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11.9, 7.11.10 and 7.11.11, the Sierra Club's brief actually includes only a discussion of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11. (*Appellant's Brief*, p.16, footnote no. 3). In particular, the Sierra Club addresses *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11.11.1, 7.11.11.2, 7.11.11.4, 7.11.11.6, and 7.11.11.7.

(a) 24A S.C. *Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.11.11.1

In accordance with *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.1, the disposal units and engineered barriers shall be designed and constructed "to minimize the migration of water onto the disposal units." The Sierra Club argues that the engineered barriers "do not prevent water from entering the disposal units." (*Appellant's Brief*, p.17). There is, however, a difference in meaning between "minimize" and "prevent." The term "minimize" is defined as "to reduce to the smallest possible amount, extent, size, or degree."**25** The term "prevent" is defined as "to keep from happening."**26** The regulation imposes a requirement to simply ***minimize*** the migration of water into the vault or trench.**27**

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25 American Heritage Dictionary of the English Language (online edition) (found at http://www.ahdictionary.com/word/search.html?q=minimize).

26 American Heritage Dictionary of the English Language, (online edition) (found at http://www.ahdictionary.com/word/search.html?q=prevent).

27 24A S.C. Code Ann. Reg. 61-63, Sec. 7.2.8 (Thomson Reuters West 2010) states that "[d]isposal unit' means a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal, the unit is usually a vault or trench."

The ALJ noted the following to support compliance with *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.1:

1) the trench facilitates drainage of water, not the collection of water;

2) water accumulation is monitored;

3) Chem-Nuclear implements a surface water management plan to manage precipitation in the trenches;

4) vaults are capped; and

5) trenches are capped.

(R.pp.17-20). The Sierra Club relies in its arguments challenging the findings and conclusions of the ALC on the undisputed fact that that the vaults are potentially exposed to rain fall during loading and unloading and the lids are not grouted or sealed. (*Appellant's Brief*, pp.17-19).

It is clear from the ALC factual findings recited in the *2012 Final Order* that Chem-Nuclear has minimized the migration of water into the vault or trench, by facilitating drainage, managing any accumulated standing water, capping the vault, and capping the trench. (R.pp.10-22). These facts clearly provide evidentiary support for minimization. The Sierra Club's insistence on sealing or grouting the lids on the vaults supports the Sierra Club's position that the regulation requires elimination of water into the vault or trench, but sealing or grouting is not necessary to accomplish minimization. The design of the vault allows for drainage of water out of the vault and away from the waste.

(b) 24A *S.C. Code Ann. Reg.* §61-63 Part VII, *Sec.* 7.11.11.2

The disposal units (vaults and trenches) must also be designed and constructed to "minimize the migration of waste or waste contaminated water out of the disposal units." The Sierra Club claims Chem-Nuclear's disposal practices fail to minimize the migration of waste or waste contaminated water out of the disposal units since the units allow for drainage. (*Appellant's Brief*, pp.19-21). Moreover, the Sierra Club claims the ALJ ignored the implication of the finding in the *2005 ALC Order* that some monitoring wells showed increases in tritium concentrations between 1997-2001, and that tritium levels varied with rainfall data. (*Appellant's Brief*, p.20). That finding, however, did not relate to data collected at the compliance point. Instead it related to the extensive groundwater data collected by Chem-Nuclear – 30 years of data for more than 200 sampling points.

Clearly Chem-Nuclear has minimized the migration of waste or waste contaminated water out of disposal units since incorporating engineered barriers in its disposal practices. Evidence in 2005 indicating a decline in tritium concentrations at the compliance point since 2001 and a resulting reduction of radioactive material in groundwater support a finding of minimization.

Importantly, *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.2 distinguishes between "waste" and "waste contaminated water." This distinction is relevant since Appellant makes no distinction between the waste placed within the container and the vault, and the waste contaminated water resulting from rainwater coming in contact with waste. Under the regulatory regime applicable

to land disposal of radioactive waste, waste contaminated water is distinct from waste. This distinction is important in evaluating Appellant's claims that "waste" isn't properly isolated as required by S.C. Code Ann. Reg. § 61-63, Secs. 7.11.11.6 and 7.11.11.7, discussed below. (*Appellant's Brief*, pp.23-26). The waste forms are isolated, as is demonstrated below. Groundwater migrates under the Barnwell Facility, not the waste forms.

(c) 24A *S.C. Code Ann. Reg.* § 61-63 Part VII, Sec. 7.11.11.4

S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.4 requires that the engineered barriers be designed to allow for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The Sierra Club claims that the contamination of groundwater which migrated to the adjacent property is a demonstration that Chem-Nuclear has failed to meet this objective. (*Appellant's Brief*, pp.22-23). In fact, the incident described in the *2005 ALC Order* (R.pp.48-49, para. 56) is demonstrative that Chem-Nuclear has implemented a system of surface water management to prevent the accumulation of water in the trenches. The fact that the "pumped water ponded on the Chem-Nuclear property and then percolated through the soil and into the groundwater" is not indicative of a lack of a surface water management system. It may be indicative of a mechanical or other failure that has since been addressed, but it is clear that a temporary collection system exists. The factual findings in the *2005 ALC Order*, that Chem-Nuclear implements a surface water management plan to manage precipitation, which

includes pumping into adjacent trenches or a lined pond (R.p.58, para. 117), supports the conclusions in the *2012 Final Order* that Chem-Nuclear has satisfied the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.4.

(d) 24A *S.C. Code Ann. Reg.* § 61-63 Part VII, *Sec.* 7.11.11.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.11.11.6 requires assurances that "the waste will be isolated for at least the institutional control period." The Sierra Club claims the waste isn't isolated "because it is entering the soils and groundwater as a direct result of Chem-Nuclear's disposal practices." (*Appellant's Brief*, pp.23-24). Restrictions on waste forms and characteristics that have been imposed over the past 20 years (including the use of high integrity containers to contain waste forms and the elimination of liquid waste) have increased the reliability and waste isolation capabilities at the facility. (R.pp.52-53, para. 79; R.pp.56-57, para. 107). The current waste forms are isolated in disposal containers, including high integrity polyethelene containers, and encapsulated in capped vaults. (R.p.18; R.p.55, paras. 94-95, 98; R.pp.56-57, para. 107). Upon closure of the Barnwell Facility all trenches are capped with a vegetated land cover. (R.p.56, para. 100). Tritium migrates through the groundwater, released from the trenches, and is released into Mary's Branch Creek but the concentration released is authorized, or permitted, under the applicable regulatory standard.

(e) 24A *S.C. Code Reg.* § 61-63 Part VII, *Sec.* 7.11.11.7

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.11.11.7 requires prevention of contact between waste and the surrounding earth. Appellant argues that the infiltration of water into the soil and groundwater beneath the trenches is evidence of failure of Chem-Nuclear to adhere to this design objective. (*Appellant's Brief*, pp.25-26). The ALJ properly concluded that the waste was the item or items placed in the container and stored in a reinforced concrete block. (R.pp.18-19). The ALJ concluded that the use of the engineered barriers as described in the findings contained in the 2005 Order, prevented contact between the waste and the surrounding earth. (R.pp.18-19). The ALJ also appropriately noted the findings regarding the composition of the trench bottoms, and the design features that move water out of the trenches as further evidence of preventing contact between waste and the surrounding earth. (R.p.19).

3. Remanded Section: 24A *S.C. Code Ann. Reg.* § 61-63 Part VII, *Sec.* 7.23.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.23.6 is the provision that requires the Barnwell site be designed to minimize to the extent practicable the contact of water with waste during storage, disposal, and after disposal. To meet this requirement, waste forms are placed in disposal containers such as high-integrity polyethylene disposal containers, for shipment to the Barnwell facility except for large components which may be placed directly into the trench. (R.p.46, para. 44; R.p.55, paras. 94-95; R.pp.56-57, para. 107). The shipping casks holding the disposal containers are off-loaded from the transport vehicles, and may be

temporarily stored under cover or taken directly to the disposal unit. (R.p.54, para. 88; R.p.55, paras. 93-95). The disposal unit is a thick concrete vault placed in the trench. (R.p.55, para. 98). A minimum of five-foot separation between the trench and the high water table is required. (R.p.51, para. 69). The bottom of the trench is lined with partially impermeable clay/sand or sandy clay. (R.p.56, para. 103). The disposal container holding the waste is taken out of the cask and placed into the vault. (R.p.5, para. 95). Once the vault is filled and closed with a vault lid that serves as an intrusion barrier, backfill material is used to fill the void spaces between the vaults. (R.pp.55-56, para. 99). Impermeable caps are constructed over inactive trenches. (R.p.56, para. 100). Together, these techniques provide a multi-phased system for waste isolation.

The plain language of S.C. Code Ann. Reg. § 61-63, Sec. 7.23.6 recognizes the qualitative nature of the requirements for the disposal techniques utilized to accomplish waste isolation. The ALJ carefully noted the three phases of operation at the site – temporary storage, disposal, and after disposal – in concluding that Chem-Nuclear has minimized the possibility of contact with water in each of these phases. (R.p.21).

The Sierra Club claims that Chem-Nuclear failed to demonstrate compliance with S.C. Code Ann. Reg. § 61-63, Sec. 7.23.6 because:

> the . . . .disposal practices at the Barnwell Facility fail . . . to prevent contact of waste and water. . . . The trenches are open and uncovered until they are filled with vaults, and only then are they covered with dirt. The design allows rainfall that accumulates in the trenches to percolate into the soil, and drive the groundwater movement that is carrying tritium and other radioactive materials into Mary's Branch Creek.

(*Appellant's Brief*, pp.26-27). Notably, S.C. Code Ann. Reg. § 61-63, Sec. 7.23.6 does not require "prevention." Moreover, the standard in S.C. Code Ann. Reg. § 61-63, Sec. 7.23.6 is *minimization* "to the maximum extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal," ***not the standard*** applied by the Sierra Club in its arguments on appeal.

The multi-phased system described herein – the use of disposal containers, concrete vaults, and capping – result in minimization of the contact of water with waste during storage, disposal, and after disposal. The disposal practices are designed to prevent the accumulation of water in the trenches – and the resulting exposure between containers, waste forms, and standing water – by insuring that drainage from the vaults and trenches is facilitated.

V. CONCLUSION

In applying S.C. Code Ann. § 1-23-610(B) this Court of Appeals has held that "[a]s to factual issues, judicial review of administrative agency orders is limited to a determination of whether the order is supported by substantial evidence."**28** Moreover, "[s]ubstantial evidence sufficient to support a finding of the ALC is evidence which, considering the record as a whole, would allow reasonable minds to reach the conclusion that the administrative agency

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28 Murphy v. S. C. Dep't of Health and Envt'l Control, 396 S. C. 633, 723 S. E. 2d 191 (2012).

reached."[29] Additionally, in reviewing the application of a statute or regulation, appellate courts apply the "plain meaning rule." "Under the plain meaning rule, it is not the court's place to change the meaning of a clear and unambiguous statute."[30]

There is no issue as to whether the factual findings of the ALC, in 2005, were supported by substantial evidence. This Court of Appeals did not remand the case to the ALC for the taking of additional evidence. Rather, the remand was for the purpose of applying "its factual findings to the technical requirements of" *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10.5-7.10.10, 7.11.11, and 7.23.6. The Sierra Club has conceded that there was substantial evidence to support the factual findings in the *2005 ALC Order*. The Sierra Club argues, in this appeal, that the factual findings from the *2005 ALC Order* including findings that rain water is allowed to percolate into groundwater from the bottom of the trenches, and findings that the tritium plume at the facility is attributable to that migration, dictate a conclusion that Chem-Nuclear has not complied with regulatory requirements. But, in order to adopt the Sierra Club's position, this Court of Appeals must substitute the term "prevent" for the term "minimize." The applicable rule of statutory construction articulated above belies the Sierra Club's argument.

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29 Greeneagle, Inc., v. S. C. Dep't of Health and Envt'l Control, 730 S. C. 2d 869, 871 (Ct.App. 2012).

30 Hampton Friends of the Arts v. S. C. Dep't of Revenue, 401 S.C. 372, 737 S.E.2d 628 (2013).

Based on the factual findings of the *2005 ALC Order*, as relied on and cited in the *2012 Final Order*, Chem-Nuclear has satisfied the challenged requirements. Minimization is clearly demonstrated by current disposal practices as well as by compliance with the regulatory standard for allowable exposures to radiation and by the site performance which demonstrates that tritium concentrations at the compliance point are well below regulatory limits.

Based upon the foregoing arguments and citation of authority, the Respondents, Chem-Nuclear Systems, LLC, and the South Carolina Department of Health and Environmental Control, respectfully request this Court of Appeals to affirm the decision of the Administrative Law Court in all respects.

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11 September 2013

NPCOL1:3521212.1-BR-(SPG) 049893-00002

STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

Appeal from the Administrative Law Court
Honorable Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

RECEIVED
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SC Court of Appeals

Appellant,

Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC,

Respondents.

Proof of Service
for the Final Brief of the Respondents,
Chem-Nuclear Systems, LLC and the South Carolina Department of Health and Environmental Control

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NPCOL1:3521212.1-BR-(SPG) 049893-00002

STATE OF SOUTH CAROLINA

IN THE COURT OF APPEALS

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

Case No. 04-ALC-07-0126-CC

Sierra Club ..... Appellant,

vs.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC ..... Respondents.

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SUMMARY OF ARGUMENT

The Brief of Respondents contains numerous misstatements and mischaracterizations of the Appellant's arguments, in addition to its misapplication of the applicable regulations. The crux of Respondents' argument is that because release of radioactive waste below a set concentration limit is "allowed," and that concentration limit has not yet been exceeded, Chem-Nuclear should not be required to improve its design. (Resp. Brief p. 24-25). The reality is that neither Chem-Nuclear nor DHEC have any control over the concentration of the releases, which the 2005 ALC Order found to be "varying with the amount of rainfall, not necessarily as a result of new storage methods." (R. p. 46, 2005 Order, FF # 46).

A fundamental inconsistency with Respondents' arguments, and the ALJ's 2012 Opinion, is that the disposal units cannot be designed to minimize migration of water into or out of vaults, while at the same time be designed to allow and encourage water to enter and leave the vaults. It is uncontradicted that the disposal units are designed to be unsealed, ungrouted, left open while being filled with radioactive waste, with holes in the bottoms such that water is encouraged to enter into and flow out of the units. Similarly inconsistent, the disposal units and engineered barriers cannot be designed to prevent contact between waste and the surrounding earth while at the same time be "designed to allow liquids to infiltrate the soil beneath the trenches." (R. p. 56 2005 Order, FF # 103). The Respondents, and the ALC, ignore the fact that water is the vector, that it comes into contact with waste by falling into or rising into the vaults, and that once in contact with waste it carries that waste into the surrounding soil. The migration of waste into the

surrounding soil and then into the groundwater is the reason a tritium plume has formed beneath the site. (R. pp. 43-44, 2005 Order, FF# 29 & 35).

In sum, the Respondents' Brief has the same flaws at the ALC's 2012 Opinion: both suffer from broad, conclusory statements about compliance without ever actually addressing head on the Appellant's well-supported position that migration of water onto and out of the disposal units is not minimized and contact between waste and the surrounding earth is not prevented. S.C. Code Ann. Reg. 61-63, Section 7.11.11.2, 3 & 7.

I. The Permit Fails to Meet the Requirements of Section 7.11.11, Which Require Minimization and Prevention of Contact with Waste

Section 7.11.11 speaks directly to design standards for disposal units and engineered barriers by requiring Chem-Nuclear to: 1) "minimize the migration of water onto the disposal units;" 2) "minimize the migration of waste or waste contaminated water out of the disposal units;" and 3) prevent "contact between the waste and the surrounding earth." S.C. Code Ann. Regs. § 61-63, Sections 7.11.11.1, 7.11.11.2 & 7.11.11.7.

A. A Design that Encourages and Promotes Contact Between Waste and Water Cannot at the Same Time Minimize Contact Between Waste and Water

Minimize cannot mean "encourage" or "promote," yet encouraging and promoting contact with water is the purposes of the vaults and trenches as designed. Respondents' brief overlooks the obvious consequence of the fact that: 1) the vaults contain the waste; 2) the design "allows for drainage of water out of the vault;" 3) the water is allowed to

contact the waste through rain and groundwater; and 4) the semipermeable trench allows waste-contaminated water to migrate into the groundwater. (Resp. Brief p. 9 & 27).

Respondents' arguments related to the engineered barriers simply fail to dig into the natural, unavoidable consequences of what is going on here. The engineered barriers are not sealed or grouted against water intrusion, thus allowing and encouraging rain to enter the vaults. There are holes in those engineered barriers to allow water that has been in contact with waste to flow out of the barriers, as well as to allow groundwater to rise up into the vaults, which has happened in the past. (R. p. 48, 2005 Order, FF# 55). The engineered barriers include partially impermeable floors to allow water that has fallen into and flowed out of vaults, coming into contact with waste, to infiltrate into the surrounding soil. The Respondents do not dispute any of these facts, nor would they have grounds to do so. The engineered barriers provide structural stability, as pointed out by the Respondents, but entirely fail to ***minimize*** contact between waste and rainwater or waste and groundwater.

Respondents frame Appellant's argument to say that the requirement for minimizing contact with water is automatically violated simply upon demonstration that waste is, in fact, coming into contact with water. (Resp. Brief, p. 11). That is a gross misstatement of Appellant's argument. Appellant's instead argue the fact that the engineered barriers – vaults and trenches – are designed to ***allow and encourage*** water to migrate into and out of those barriers (Resp. Brief, p. 9), and that such contact does occur, demonstrating that the requirement of minimization of contact has not been met. The engineered barriers cannot be designed to explicitly allow and encourage water contact

with waste while at the same time be designed to minimize such contact. Indeed, the regulations require that those barriers be designed to act as true barriers such that water is neither allowed nor encouraged to come into contact with waste and, in turn, waste to come into contact with the surrounding soil. The fact that the design specifically ***allows, encourages and promotes*** contact between waste and water is in direct conflict with the requirements to minimize migration of water onto disposal units, to minimize migration of waste or waste-contaminated water out of disposal units, and to prevent contact between waste and the surrounding earth, and standing alone is enough to necessitate reversal of the ALC's Order. S.C. Code Ann. Reg. 61-63, Section 7.11.11.(1), (2) & (7).

B. A Design that Encourages Water in Trenches to Infiltrate Into the Soils Cannot Also Prevent Contact Between Waste and the Surrounding Earth

On the issue of whether the permit "prevents the contact between waste and the surrounding earth," Section 7.11.11.7, Respondents utterly fail to address this important requirement,[1] essentially reiterating the ALC's 2012 conclusory statement that the engineered barriers do prevent contact. (Resp. Brief p. 31). The Respondents' and ALC's interpretation of this regulation as requiring only that nuclear waste not be placed directly on bare ground is illogical and makes a mockery of the regulations aimed at protecting the health and safety of residents of this state. If water can come into contact with waste

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[1] The Respondents' provide a half-hearted attempt at refutation, which is to interpret this section in a manner that means actual waste cannot be placed directly on the soil or trench bottom. Such a narrow reading ignores the fact that if water comes into contact with waste, that water will carry waste into the sandy clay/clay sand trench bottom, which is necessarily allowing waste to come into contact with the surrounding earth.

in vaults through the unsealed lids and then leave through the unsealed bottoms, and the trenches are lined with partially permeable clay sand or sandy clay, it is impossible for waste not to come into contact with surrounding earth unless no rainwater or groundwater ever reaches the vault – a scenario that contradicts all evidence in the record.

Respondents frame Petitioners' argument as though the permit "must prevent any and all contact" between waste, water and the surrounding earth. While Petitioner certainly asserts that prevention of contact is the goal of Section 7.11.11.7, ***at a minimum Chem-Nuclear should be required to take active efforts to avoid contact rather than active efforts to encourage contact.*** The permit fails in this fundamental respect by allowing and encouraging water to flow onto the vaults, flow out of the vaults, and flow into the surrounding soil after having come into contact with waste. Respondents admit the design encourages waste-contaminated water to seep into the earth below the trenches – a far cry from "minimizing" or "preventing" contact, both of which are standards enunciated in Section 7.11.11.

The ALJ erroneously concluded that unsealed vaults with holes, placed in uncovered trenches with semipermeable floors, represent a design of minimizing contact between waste and water and preventing contact between waste and the surrounding earth. This error is reversible.

II. Respondents Perpetuate the ALC's Failure to Apply the 2005 Findings to the Applicable Regulations and Fail to Address the Legal Questions Raised

Respondents' misstatements and misrepresentations indicate at best a lack of understanding Appellant's arguments, and at worst an attempt to confuse the real

questions of law identified in Appellant's brief. One of these misrepresentations is that Sierra Club asserts that "Chem-Nuclear must prevent ***any and all*** contact between waste and rain water (*i.e.*; there can be ***no contact*** whatsoever). (Resp. Brief p. 8). Sierra Club's brief clearly identifies the applicable standards, which require ***minimization* of contact between waste and water** and ***prevention of* contact between waste and the surrounding earth**. See S.C. Code Ann. Reg. 61-63, Section 7.11.11.2, 3 & 7; App. Brief pp. 13-14. Another glaring misrepresentation is Respondents' statement that Sierra Club has "steadfastly argued for the North Carolina design." (Resp. Brief p. 11). Rather, what Sierra Club has asserted is that the North Carolina design is evidence that waste can clearly be kept from coming into contact with water by design – indeed a design developed by Chem-Nuclear.

Later Chem-Nuclear points to "evidence in 2005 indicating a decline in tritium concentrations" in support of its assertions that it "has minimized the migration of waste or waste contaminated water out of disposal units since incorporating engineered barriers in its disposal practices." (Resp. Brief p. 28). This statement not only overlooks the 2005 finding that tritium concentrations are correlated with rainfall, but ignores the plain fact that the engineered barriers are **designed to promote and encourage water to enter into and out of the vaults and, in turn, migrate into the permeable trench floors**.

In addition, while Chem Nuclear faults the Appellant for pointing to evidence of past releases as irrelevant to the question of minimization, it then asks the Court to consider evidence of a decrease of releases to support its theory that contact between waste and water is minimized. The test for regulatory compliance is not whether

groundwater travel time or decay rates have led to releases below the regulatory limits; whether access to Mary's Branch at the point of release is restricted; whether there are consumers or users of Mary's Branch at the compliance point; whether there is a restrictive covenant prohibiting use of groundwater and surface water for drinking; or whether there are known drinking wells downgradient. (Resp. Brief p. 9). None of these factual assertions put forward by the Respondents address the key questions of whether the disposal units and engineered barriers are designed to minimize contact between waste and water and are designed to prevent contact between waste and the surrounding earth. The Respondents' apparent belief that it should receive credit for some of these factual assertions shows a startling disregard for the fact that Chem-Nuclear is responsible for nuclear waste that has escaped into the surrounding property and waters. The ALJ's failure to apply the 2005 findings to these legal standards is reversible error of law.

III. The Goal of Isolation of Waste from Man's Biosphere and Food Chains is Not Being Attained

The concept of "isolation" of waste is implicated because the definition "disposal" is "the isolation of wastes from the biosphere inhabited by man and his food chains by emplacement in a land disposal facility." S.C. Code Ann. Regs. § 61-63, Section 7.2.6. While disposal is defined in the regulations, isolation is not defined.

When the words of a statute are not defined, the Court should look to the plain and ordinary meaning of that word. New York Times Co. v. Spartanburg County School Dist. No. 7, 374 S.C. 307, 649 S.E.2d 28 (2007). If the General Assembly declines to

define a term within the statute, the Court should construe the word in accordance with its usual and customary meaning. Adoptive Parents v. Biological Parents, 315 S.C. 535, 543, 446 S.E.2d 404, 409 (1994). Rather than look to the plain and ordinary meaning of the word isolation, the Respondents create their own definition of isolation as "disposal of waste in a manner than is expected to provide **adequate protection** of human health and the environment." (Resp. Brief p. 16 (emphasis added)). This definition of "isolation" effectively writes out any requirement to keep waste "set apart or cut off" from the biosphere inhabited by man and his food chains. The Respondents are effectively telling this Court that the word "isolation" should be replaced with the words "adequate protection." The regulations do not sanction such a cavalier attitude toward harmful radioactive nuclear waste.

The Respondents' statement that "buried waste is isolated through the use of engineered barriers" is simply indefensible - it is an oversimplification of the engineered barriers and ignores Respondents' own statements regarding the intent of the design of the vaults and trenches. (Resp. Brief p. 19). Those statements are that the holes allow waste-contaminated water to leave the vaults and that the sandy clay trench bottoms allow waste- contaminate water to infiltrate into the soil. (R. pp. 46, 56, 2005 Order, FF# 47, 48, 101 & 103). If waste was truly isolated, it would not be getting into the groundwater and would not be detected throughout the site in extremely high concentrations. (R. p. 48, 2005 Order, FF # 53). The fact that the tritium plume and other wastes have not been detected above allowable limits *yet* is of no moment. Respondents' statement that waste is "isolated" simply because the toxic releases are on its property ignores the obvious fact

that water flows and moves below the earth's surface and that the water knows no property boundaries.

IV. Waste is Not Stabilized

The Respondents seem to acknowledge that stability is related to whether waste will be "disturbed." (Resp. Brief p. 22). But the only disturbance Respondents (or the 2012 ALC Opinion) are able to contemplate is disturbance by an "inadvertent intruder." Again, this interpretation trivializes regulations relating to disposal of some of the most potentially hazardous material in this state. Appellant asserts that waste can also be disturbed by the fact that it comes into contact with water and is carried with this water out of its container and into the surrounding earth. Under either scenario, waste or the disposal units are being moved from the location they were placed in at the time of disposal. In other words, the disturbance could be from man or from natural forces, like rain, water infiltration and groundwater movement.

Moreover, the focus here is whether the waste contained in the disposal units is stabilized, not just whether the units themselves are stabilized. If the units are structurally stable, but the waste is not structurally stable and it is escaping those units, being carried by rainwater and groundwater into the surrounding earth, then that waste cannot logically be considered "stable" in its location. One would hope that a nuclear disposal company would not need the government to tell it to use disposal containers that are structurally sound. But this is the exact interpretation argued for the Respondents.

V. The Respondents' Reliance on ALARA is Misplaced

The Respondents repeatedly point out that the Court found that the permit meets

the "As Low As Reasonably Achievable" (ALARA) standard, thus waste must be "isolated." (Resp. Brief p. 17). Yet, this Court in its 2010 Opinion explicitly recognized that the Regulations require more than just compliance with ALARA. Indeed, this Court remanded the case specifically for legal conclusions on standards other than ALARA. The Petitioner is at a loss to understand Respondents' focus on ALARA, unless it is purely a distraction from the more stringent standards found in 7.11.11 and 7.23.6.

CONCLUSION

For the foregoing errors of law, as well as those identified in the Appellant's opening brief, the Final Order and Decision on Remand of the Administrative Law Judge should be reversed.

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STATE OF SOUTH CAROLINA

IN THE COURT OF APPEALS

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

Case No. 04-ALC-07-0126-CC

Sierra Club ..... Appellant,

vs.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC ..... Respondents.

FINAL BRIEF OF APPELLANT

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STATEMENT OF THE ISSUES

I. Whether the Administrative Law Judge Erred in Concluding that the Permit Issued by DHEC to Chem Nuclear Complies With the Applicable Regulations, Which Require Radioactive Waste to be "Isolated from Man's Environment," Despite Findings that the Design and Practices Allow Waste-Contaminated Water to Migrate Through the Bottom of the Trench Floor and Into the Groundwater?

II. Whether the Administrative Law Judge Erred in Concluding that the Radioactive Waste is Being Disposed of in a Stable Manner as Required by Subsection 7.10, Despite Findings that the Design Allows Water to Enter Into and Drain From Disposal Vaults and Allows Water Contaminated with Waste to Leach from the Trenches Into the Groundwater?

III. Whether the ALJ Erred in Concluding that the Renewal License Complies with Sections 7.11.11 and 7.23.6, Which Require Minimization of Contact Between Waste and Water, Minimization of Migration of Water Onto and Out of Disposal Units and the Prevention of Contact Between the Waste and Surrounding Earth, Despite Findings that the Unsealed and Ungrouted Vaults Allow Water to Enter the Vaults; the Vaults Have Holes in the Bottom to Allow Waste-Contaminated Water to Flow Out of the Vaults; and the Trenches are Designed to Allow Waste-Contaminated Water to Drain into the Groundwater?

STATEMENT OF THE CASE

This matter arises on remand from a contested case hearing challenging the South Carolina Department of Health and Environmental Control's issuance of a renewal license to Chem Nuclear Systems, LLC, authorizing the operation of the Low Level Radioactive Waste Disposal Facility in Barnwell County.

Sierra Club filed its request for contested case hearing on March 30, 2004, pursuant to S.C. Code Ann. § 1-23-600(A) and S.C. Code Ann. § 44-1-60 before the Administrative Law Court. The Honorable John D. Geathers (at that time an Administrative Law Judge) conducted a hearing on February 16, 17, 18 and 22, 2005. On October 13, 2005, Judge Geathers issued his final order affirming the renewal license, but directing Chem-Nuclear to conduct studies concerning methods to reduce the contact between radioactive waste and rainfall and other water and the surrounding earth, and submit those studies to DHEC. Sierra Club filed a motion for reconsideration on October 24, 2005. The motion was denied on November 1, 2005.

On November 30, 2005, Sierra Club petitioned the DHEC Board for review of the decision of the ALC. The matter was expected to be heard by the DHEC Board at its July, 2006 meeting. On July 1, 2006, Act 387 of 2006 became effective, thereby amending the appeals procedures for permits and licenses issued by DHEC. The effect of the Act on this appeal was in dispute, prompting Chem-Nuclear to file a petition in the original jurisdiction of the Supreme Court. On July 23, 2007, the Supreme Court issued its opinion concluding that the DHEC Board no longer had jurisdiction to hear Sierra Club's appeal, and directing that DHEC transfer the appeal to the Court of Appeals.

The case was briefed and argued before the Court of Appeals. On March 10, 2010, the Court of Appeals issued an opinion, affirming in part and remanding in part the ALC's Final Order and Decision. Sierra Club v. DHEC & Chem-Nuclear, 387 S.C. 424, 693 S.E.2d 13 (Ct. App. 2010; cert. denied July 21, 2011). In particular, the Court of Appeals affirmed the ALC's factual findings, but remanded the case to the ALC with instructions to apply its factual findings to the technical requirements of Sections 7.10.5-7.10.10, 7.11 and 7.23.6 of S.C. Code of Regulations 61-63. Chem-Nuclear filed a petition for certiorari, which was denied by order of the Supreme Court on July 21, 2011. The case was thereafter remitted to the ALC in accordance with the Court of Appeals' Order.

On remand the case was assigned to the Honorable Ralph King Anderson, III. The issues before the ALC were whether, under the factual findings made by Judge Geathers in 2005, the permit complied with Sections 7.11 and 7.23.6 of Regulations 61-63. The parties submitted proposed orders on May 11, 2012. On July 20, 2012, Judge Anderson issued a Final Order and Decision on Remand concluding that the renewal permit met the technical requirements of Regulation 61-63 and affirmed issuance of the permit. On August 20, 2012, Sierra Club filed its second Notice of Appeal with this Court.

Factual Background[1]

Chem-Nuclear began operating a low-level radioactive nuclear waste disposal

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[1] The parties agree that the Court of Appeal's 2010 Order required the ALC to base its legal conclusions solely on the findings contained in the 2005 Order. Therefore, the background facts are based on the undisputed findings in the ALC's 2005 Order.

facility located approximately five miles west of the City of Barnwell, at what is called the Barnwell Facility, in 1971. It has operated continuously under License No. 097, which has been amended forty-eight times, including seven renewals. The Barnwell Facility is located on 235 acres owned by the State of South Carolina and leased to Chem-Nuclear.

The State of South Carolina and the Nuclear Regulatory Commission ("NRC") have a formal agreement whereby the State has regulatory authority over radioactive materials in quantities not sufficient to form a critical mass. The NRC promulgated 10 C.F.R. Part 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," and South Carolina was required to adopt compatible regulations, which it did by amending Regulation 61-63.

In designing, building, and operating the Barnwell Facility, Chem-Nuclear is required to adhere to Regulation 61-63, and Part VII in particular. Thus, the renewal application had to meet these regulatory requirements.

In 2001, during review of the renewal application, DHEC advised Chem-Nuclear to "review and revise all trench construction details, plans, specifications, and procedures and revise to account for the decline in waste receipts." (R. p. 47, ALC Order of October 13, 2005, FF # 50, citing Tr. Vol. III, p. 50). DHEC specifically asked Chem-Nuclear to consider placing temporary covers over trenches, which are typically kept open for active receipt of waste, in order to protect the trenches and waste contained therein from direct rainfall. (R. p. 47 FF # 50). Chem-Nuclear provided some conceptual designs, but never completed evaluation of the designs and never submitted any final designs to DHEC for

approval. (R. p. 47 FF # 50).

The disposal technology used at the Barnwell Facility is described as "enhanced shallow land burial with engineered barriers." The waste is brought to the facility and placed in concrete vaults, which are then placed in one of three below-grade trench designs. The purpose of the three trench designs is to segregate waste by dose rates. (R. p. 53 FF # 82). In some instances, large components are qualified as "disposal vaults," and thus they are placed directly in the trench. (R. p. 55, FF # 98).

The primary "engineered barriers" used by Chem-Nuclear are disposal trenches, disposal vaults, and enhanced caps. (R. p. 53, FF # 81). The disposal vaults provide only for structural stability to prevent subsistence. (R. p. 51, FF # 70). The vaults are not sealed against water intrusion and have holes in the bottom to allow water to leave the vaults. (R. p.46, FF # 47). None of the trenches at the Chem-Nuclear site have an impermeable liner or a leachate collection system, and are in fact designed to allow water to flow into the ground beneath the trenches. (R. p. 56, FF # 102). And the enhanced caps reduce, but do not eliminate, water intrusion into the trenches. (R. p. 51, FF # 70). Not until a trench is completely filled with vaults containing waste will the enhanced cap be installed. (R. p. 56, FF # 100). It takes years before a trench is filled and a cap is installed. (R. p. 47, FF # 51).

Heavy rainfall in Barnwell County is not uncommon, and highlights the potential for ground and surface water contamination caused by the collection of rainwater in the open disposal trenches and on the radioactive waste waiting to be buried at the site. (R. p. 58, FF # 115). Photographs taken during DHEC inspections revealed rainwater collecting

in open trenches. (R. p. 58, FF # 116).

Chem-Nuclear implemented a surface water management plan whereby it pumps rainwater collecting in its trenches into adjacent trenches or a lined pond. (R. p. 58, FF # 117). But this system has caused tritium to migrate and cause contamination off-site in the past. In 1998 or early 1999, Chem-Nuclear pumped water from one of its trenches resulting in contamination of a neighboring property occupied by St. Paul Church. (R. p. 48, FF # 56). Tritium contamination was discovered on the church property around March 1999. (R. p. 48, FF # 56). The contamination resulted from the pumping of water from Chem-Nuclear's trench 86. The pumped water ponded on the Chem-Nuclear property and then percolated through the soil and into the groundwater. (Id.). The contaminated groundwater migrated to the church property and contaminated the groundwater there. (Id.). Chem-Nuclear remediated the contamination by excavating 13,000 cubic yards of soil from the church property. (Id.).

The DHEC permit authorizes Chem-Nuclear to continue disposing of waste by placing it in concrete vaults, which are then placed in dug disposal trenches. The renewal license issued by DHEC included a few substantive changes: 1) an amendment to the waste volumes allowed into the facility; 2) an update to the list of authorized Facility users; 3) a requirement for sampling water that may be collected from waste disposal containers during inspection of the containers to verify that what is on the manifest matches what is detected in the water; 4) a requirement for an annual review of the decommissioning and long-term care funds; and 5) a requirement that Chem-Nuclear place special conditions on waste acceptance criteria, including a certification statement

from a responsible individual at the company or nuclear power plant generating the waste. (R. p. 43, FF # 23). The renewal license does not change the disposal units or practices.

STANDARD OF REVIEW

The court may reverse or modify the decision if substantial rights of the appellant have been prejudiced because the administrative findings, inferences, conclusions, or decisions are:

(a) in violation of constitutional or statutory provisions;

(b) in excess of the statutory authority of the agency;

(c) made upon unlawful procedure;

(d) affected by other error of law;

(e) clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or

(f) arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion.

S.C. Code Ann. § 1-23-380.

The appellate court "will correct the decision of the ALC if it is affected by an error of law, S.C. Code Ann. § 1–23–380(5)(d) (Supp. 2010), and questions of law are reviewed de novo." S.C. Dept. of Revenue v. Blue Moon of Newberry, Inc., 397 S.C. 256, 260, 725 S.E.2d 480, 483 (2012), reh'g denied (May 4, 2012) (citing Town of Summerville v. City of N. Charleston, 378 S.C. 107, 110, 662 S.E.2d 40, 41 (2008)). When the evidence gives rise to but one reasonable inference the question becomes one of law for the courts to decide. Kinsey v. Champion Am. Service Center, 268 S.C. 177,

181, 232 S.E.2d 720, 722 (1977); Sharpe v. Case Produce Co., 329 S.C. 534, 545, 495 S.E.2d 790, 795 (Ct. App.1997) (rev'd on other grounds). Under this standard, a reviewing court may reverse or modify an agency decision based on errors of law. Turner v. S. Carolina Dept. of Health & Envtl. Control, 377 S.C. 540, 544, 661 S.E.2d 118, 120 (Ct. App. 2008).

In the instant case, there is no dispute over the evidence or the findings made by the ALC in its 2005 Order. Thus, the substantial evidence standard has no applicability, and this Court exercises de novo review to determine whether the ALC's Order is affected by an error of law.

ARGUMENT

Overview of Regulatory Program for Radioactive Waste

The South Carolina Atomic Energy and Radiation Act, S.C. Code Ann. § 13-7-10, *et seq.*, and the South Carolina Radioactive Waste Transportation and Disposal Act, S.C. Code Ann. § 13-7-110, *et seq.* govern Chem-Nuclear's permit, as well as Regulation 61-63, which was promulgated thereunder. Regulation 61-63 provides the standards for permitting and operation of the Chem-Nuclear Facility, and Part VII specifically sets forth the standards and requirements for this land disposal facility. It bears noting that the Chem-Nuclear facility is the **only** radioactive waste disposal facility in South Carolina. As noted by the Court of Appeals in its 2010 Order, the regulations thus apply broadly and exclusively to the Chem-Nuclear renewal license. (R. p. 26).

Regulation 61-63, Part 7.2.6 defines "disposal" as "the isolation of wastes from the biosphere inhabited by man and his food chains by emplacement in a land disposal

facility." S.C. Code Ann. Regs. § 61-63, 7.2.6. The term "isolation" means "the act of isolating" or "the quality or condition of being isolated." The American Heritage Dictionary of the English Language, Houghton Mifflin Co., 2000, p. 928. To "isolate" means to "set apart or cut off from others," "to place in quarantine." Id. Thus, this license approval must be viewed in the context of disposal that will ensure that wastes are isolated, separated and quarantined from man's biosphere and food chains.

I. Implications of the 2005 ALC Order and the 2010 Court of Appeals Order

The ALC Order of October 13, 2005

Judge Geathers issued a Final Order and Decision upholding DHEC's issuance of renewal license No. 97. The Order concluded that Sierra Club failed to present sufficient evidence to warrant revocation of Chem-Nuclear's renewal license. Specifically, the ALC found that Sierra Club did not establish that Chem-Nuclear was not in compliance with sections 7.10.1, 7.10.2, 7.10.3 and 7.10.4. Section 7.10.3 requires a reasonable effort to maintain releases to the environment "as low as reasonably achievable," known as the "ALARA" standard. The ALC found that Sierra Club did not establish violation of the ALARA standard. The Order nevertheless recognized that the **"monumental hazardous conditions that can result from tritium and other radioactive materials leaching into the soils, and, in turn, into the groundwater cannot be ignored**." (R. p. 48, FF # 56) (emphasis added).

The Order concludes that Sierra Club did "raise legitimate issues and presented evidence suggesting that further studies are needed to evaluate the scientific and economic feasibility of employing or implementing designs and operational procedures at

the Barnwell site that will (1) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches; (2) provide temporary dry storage facilities for the storage of waste received during wet conditions; and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." (R. pp. 64-65, Conclusion of Law #16).

The 2010 Court of Appeals Opinion

The Court of Appeals issued its opinion on March 10, 2010, reviewing the 2005 ALC Order. The Court first noted that the ALC found, as DHEC and Chem-Nuclear argued, that only section 7.10, entitled "Requirements for Issuance of a License," applies in this contested case. 378 S.C. at 431. The Court of Appeals rejected this narrow reading of the regulations and ruled that Chem-Nuclear must be in compliance Regulation 61-63 as a whole, not just Sections 7.10.1-7.10.4 and 7.18. The ALC thus failed to address compliance with Parts 7.10.5-7.10.10, 7.11 and 7.23.6. This failure is significant, as the Court of Appeals further found that section 7.11 "imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address whether Chem-Nuclear is in compliance with section 7.11." 387 S.C. at 435.

The Court of Appeals notes that the "Sierra Club contends the ALC's factual findings establish that Chem-Nuclear's landfill fails to comply with section seven . . . because the landfill design fails to achieve the 'isolation of wastes from the biosphere inhabited by man and his food chains' and fails to meet the technical requirements of section 7.10 and 7.11." 387 S.C. at 435. The Court also recognized that Section 7.23.6

requires that the "disposal site shall be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal." Id. at 436. Finally, the Court of Appeals recognized that the ALC noted the rainfall problem and stated: "The problems caused by rainfall are compounded . . . and [r]ainfall that accumulates in the trenches eventually percolates into the soil, and drives the groundwater movement that is carrying tritium and other radioactive materials into Mary's Branch Creek." Id.

The Court of Appeals could not address compliance with the legal requirements found in Sections 7.10.5-7.10.10, 7.11 and 7.23.6 because the 2005 ALC Opinion did not address those regulatory requirements. The Court of Appeals thus remanded this case back to the ALC to apply the factual findings of the 2005 ALC Final Order & Decision to these specific regulations.

The 2005 ALC Findings of Fact Directly Relevant on Remand

The October 13, 2005 Final Order and Decision of Judge Geathers made numerous findings of fact that should have been relevant to the ALJ's conclusions on remand:

Revisions to Part VII of Regulation 61-63 were enacted to require the use of engineered barriers for all waste classes disposed of at the Barnwell Facility. (R. p. 40, FF #9). These revisions were prompted by the DHEC Board learning of the application made by Chem-Nuclear to construct a low-level radioactive waste disposal facility in North Carolina and of the design that Chem-Nuclear incorporated into that application.

(R. p. 40, FF #10). That design included above-grade bunker disposal and infiltration collection and detection systems in the floor. (R. p. 50, FF # 67). Incoming waste containers would be loaded and grouted in uniform concrete waste packages. (R. p. 50, FF # 67). A monitoring gallery for inspection was provided. The engineered earthen cover included a synthetic liner and a drainage layer as a secondary monitoring system. (R. p. 50, FF # 67).

There are a variety of low level radioactive wastes disposed of at the Barnwell facility, including tritium. Tritium is a radioactive isotope that is contained in and comes from waste disposed of at the Barnwell Facility ("the Site"). (R. p. 43, FF # 24 & 25). Tritium was initially discovered in trenches at the Barnwell Site in 1974. Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the Site. (R. p. 43, FF # 26). It will take 120 years for the tritium on the Site to decay to a negligible level. (R. p. 43, FF # 28).

Tritium that has migrated from the trenches is referred to as the "tritium plume." (R. pp. 43-44, FF # 29). Thus far, tritium is the most significant source of radioactive material from the Site in the groundwater. (R. p. 44, FF # 35).

The groundwater on the Site encounters the surface waters and forms a stream know as Mary's Branch Creek. Mary's Branch is fed by springs containing groundwater migrating from the Barnwell site. (R. p. 45, FF # 40). The stream is outside the Site boundaries and has been approved by DHEC as Chem-Nuclear's "compliance point." (R. p. 44, FF # 32). This approval is based on the recognition that this is the first point where a hypothetical member of the public might receive a dose of radiation. (R. p. 44, FF # 32).

Levels of tritium at the compliance point at Mary's Branch Creek have been as high as 1.1 x 10^5 picoCuries per liter (pCi/L). (R. p. 45, FF # 39). High concentrations of tritium in the groundwater have been detected nearest the disposal trenches. (R. p. 48, FF #53). Groundwater travel time from beneath the disposal trenches into Mary's Branch is approximately twenty years. (R. p. 48, FF # 53).

The license issued to Chem-Nuclear requires it to maintain a separation of at least five feet between the bottom of the trenches and the highest groundwater level. (R. p. 48, FF # 55). But there have been at least two instances when the groundwater rose up into the trenches. (R. p. 48, FF # 55).

Improvements in waste forms and containers, the use of vaults, and enhanced capping appear to have succeeded in reducing the amount of tritium that is migrating to groundwater. (R. p. 46, FF # 46). But in some areas, tritium levels have increased between 1997 and 2001. And when tritium data is compared to rainfall data as gauged by water table levels, it appears that tritium concentrations have been varying with the amount of rainfall, not necessarily as a result of new storage methods. (R. p. 46, FF # 46).

Importantly, the concrete vaults holding the radioactive waste are not sealed against water intrusion. (R. p. 46, FF # 47). The floors of the vaults have holes to allow water to drain from the vaults, and the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault. (R. p. 46, FF # 47). The Barnwell site receives an average of 47 inches of rain annually, and the water table rises during wet periods. (R. p. 46, FF # 47). When waste is buried underground, a particularly rainy

period will moisten the soil around the buried waste, even with enhanced capping. (R. p. 46, FF # 47).

The problems caused by rainfall are compounded because when Chem-Nuclear is filling a vault, the vault has no cover or roof, allowing rain to fall directly into the vault during the loading period. (R. p. 46, FF # 48). Similarly, the trenches have no cover or roof. Rainfall that accumulates in the trenches eventually percolates into the soil and drives the groundwater movement that is carrying tritum and other radioactive materials into Mary's Branch Creek. (R. p. 46, FF # 48).

Elevated tritium levels were first detected in monitoring wells at the Site between 1978 and 1982. In 1980, Chem-Nuclear predicted that if any radio nuclides leaked from the landfill cells, it would take more than 424 years for those radio nuclides to reach Mary's Branch Creek. (R. p. 47, FF # 49). The actual travel time ended up being about 20 years. (R. p. 47, FF # 49).

In recognition of water entering the vaults and then leaving the vaults and trenches carrying radioactive materials into the groundwater and ultimately to surface waters of Mary's Branch Creek, the Administrative Law Judge directed Chem-Nuclear to evaluate the use of designs and procedures that "will (1) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible." (R. pp. 64-65).

II. The License Fails to Comply with Subsection 7.11.11 and 7.23.6 in that it does not minimize the migration of water onto and out of disposal units, does not minimize the contact of water with waste during and after disposal, and does not prevent contact between waste and the surrounding earth and does not isolate waste

Section 7.11.11. requires that Chem-Nuclear's disposal units and the incorporated engineered barriers[2] shall be designed and constructed to meet the following objectives:

(1.) to minimize the migration of water onto the disposal units.

(2.) to minimize the migration of waste or waste contaminated water out of the disposal units.

(3.) detection of water and other liquids in the disposal units.

(4.) temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil.

(5.) facilitation of remedial methods without disturbing other disposal units.

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Section 7.11.9 requires Chem-Nuclear to "incorporate engineered barriers for all waste classifications. The engineered barriers shall be designed and constructed to complement and improve the ability of the disposal facility to meet the performance objectives in this part."
Engineered barriers as defined as "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives of this part." S.C. Code Ann. Reg. 61-63, Section 7.2.9. Section 7.11.10 states that: "The engineered barriers shall be designed and constructed of materials having physical and chemical properties so as to provide reasonable assurance that the barriers will maintain their functional integrity under all foreseeable conditions for at least the institutional control period." S.C. Code Ann. Regs. § 61-63, 7.11.10. In this case, the engineered barriers are the "disposal trenches, disposal vaults, and enhanced caps." (R. p. 53, 2005 Order, FF # 81).

(6.) reasonable assurance that the waste will be isolated for at least the institutional control period.

(7.) prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

S.C. Code Ann. Regs. § 61-63, 7.11.11.1 - 7.11.11.7.[3]

Virtually all of the objectives in Section 7.11.11 promote the goal of keeping water away from waste. Similarly, Section 7.23.6 promotes the goal of preventing the contact between water and waste by requiring the disposal site design to "minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with waste after disposal." S.C. Code Ann. Reg. 61-63, Section 7.23.6.

Because compliance with these objectives was not addressed in the 2005 Order, the ALJ was required to make conclusions of law based on the findings of the 2005 Order. The ALJ made errors of law in concluding that the renewal license complies with the requirements that migration of water onto and out of the disposal units has been minimized, that waste has been isolated, and that contact between waste and the surrounding earth has been prevented, as those conclusions are unsupported by, and

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The Court of Appeals Opinion directed the Administrative Law Court to make legal conclusions related to Section 7.11. It is clear that some subsections of 7.11 are not applicable to this licensing decision in that they address transfer, assignment, revision and termination of the license, record-keeping, closure of the facility, and inspection of the facility. Indeed, the Court of Appeals' Opinion goes on to specifically identify and list sections 7.11.9, 7.11.10 and 7.11.11 in its discussion of the merits, but this brief will only address the ALJ's erroneous conclusions on compliance with Sections 7.11.9, 7.11.10 and 7.11.11.

directly contradict the 2005 factual findings.[4]

A. Chem-Nuclear's Disposal Units Do Not Minimize the Migration of Water Onto Vaults and Trenches, as required by Subsection 7.11.11.1

Judge Anderson correctly noted that 7.11.11.1 requires the disposal units to be designed to minimize the migration of water onto the disposal units, and that the disposal units are "usually a vault or trench." (R. p.13, Order, p. 13). From there the ALJ goes astray. The ALJ focused almost exclusively on points irrelevant to the question of whether the disposal units – the vaults and the trenches – minimize migration of water onto the units. The ALJ first gave an iteration of the three types of trenches, mentioned the monitoring systems for the trenches, and then discussed the "enhanced cap" that is placed over the trench after it has been completely filled with vaults.[5] (R. p. 13, Order, p. 13). The ALJ glossed over what occurs when the trenches are being filled with the vaults

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The ALJ relies heavily on the results of the Environmental Radiological Performance Verification (ERPV) model, and the Blue Ribbon Panel that reviewed the model, for its conclusion that "the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and into the long-term future." (R. p. 4, Order on Remand, p. 4). In so doing, the ALJ gave misplaced reliance on a model, rather than applying the clear and plain language of Regulations 61-61, Sections 7.11 and 7.23. Nothing in the ERPV supports a conclusion that the Chem-Nuclear's disposal practices and designs are designed to minimize the contact between waste, water and the surrounding earth; that they are designed to "isolate" waste from man's biosphere; or that the waste is "stabilized." As discussed throughout this brief, the design does just the opposite.

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While Appellant recognizes that some measures have been taken to minimize migration of water ***after*** the trenches are completely filled with concrete vaults (a process which can take over two years, FF # 51) with the construction of the "enhanced cap" over the trench, the ALJ completely ignores the 2005 findings discussing water intrusion while vaults are being filled and the trenches are being filled.

and completely ignored critical findings from the 2005 Order related to the design of the vaults and trenches, which are the "disposal units" referenced in Subsection 7.11.11.1.

First, according to the findings of the ALC Order of October 13, 2005, the incorporated "engineered barriers" used by Chem-Nuclear do not prevent water from entering the disposal units. Just the opposite. With respect to the vaults, the 2005 Order finds that the "concrete vaults are not sealed against water intrusion" and the "lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault." (R. p. 46, 56, 2005 Order, FF # 47 & 101). The "vaults have no cover or roof, so rain can fall directly into the vault during the loading period." (R. p. 46, 2005 Order, FF #48). The ALJ points to lids on the disposal units as evidence of minimizing the migration of water into the vaults, claiming that the lids serve as "intrusion barriers." (R. p. 14, 2012 Order, p. 14). The ALJ misses the mark. The "intrusion barrier" function which the lids serve is for inadvertent intruders that may enter onto the property, not as a barrier to rain or other water.[6] (R. p. 54, 2005 Order, FF #90).

With respect to the trenches, the 2005 Order found that the "bottoms of the trenches . . . are lined with clay sand or sandy clay that is neither compacted nor designed to be impermeable. In fact, the liner sand . . . is designed to allow liquids to infiltrate the soil beneath the trenches." (R. p. 56, 2005 Order, FF # 103). Nonetheless, the ALJ's 2012 Order states that "the trenches are designed and constructed to prevent the flow of surface water from coming in contact with waste, and the findings related to disposal

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6 The requirement for inadvertent intrusion barriers is a requirement of another part of the regulations not at issue in this appeal. *See* S.C. Code Ann. Reg. 61-63, section 7.10.4.

practices . . . demonstrate that the objective of minimizing the migration of water onto the disposal units was established." (R. pp. 13-14, Order, pp. 13-14). This conclusion is entirely inconsistent with the 2005 Order and overlooks all of the findings related to the vault and trench design indicating that the design allows water to migrate into and out of the vaults and trenches and into the groundwater.

The ALJ's conclusion that "there are no findings that Chem-Nuclear has failed to minimize [water] intrusion" (R. p. 13, Order, p. 13) overlooks and is inconsistent with these 2005 findings which demonstrate a failure to minimize the migration of water onto the disposal units, as required by Section 7.11.11.1, and is reversible error of law.

B. Chem-Nuclear's Disposal Units Do Not Minimize the Migration of Water Out of Vaults and Trenches, as required by Subsection 7.11.11.2

The ALJ again noted the proper standard for Subsection 7.11.11.2, which requires engineered barriers to be designed and constructed "to minimize the migration of waste contaminated water out of the disposal units," but then relied on his previous conclusion that because Chem-Nuclear has minimized the migration of water into the vaults, Chem-Nuclear has necessarily minimized migration of water or waste-contaminated water out of the vaults. (R. p. 14). The ALJ gives passing reference to the vault design consisting of "**drainage holes in the floors of the vaults [to] allow water to drain out of the vault**," but he brushes that finding aside by stating that there is a "trench drainage system" installed to monitor water in the trench.[7] (R. p. 14, emphasis added).

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[7] Appellant submits that a monitoring system tells you when water has entered the trench,

The ALJ's perplexing conclusion is that:

> Furthermore, though the finding[s] clearly reflect that clay-sand trench bottoms are not designed to prevent the migration of liquids out of the bottom of trenches, but rather, are **designed to** be partially impermeable and **allow liquids to infiltrate the soil below the trenches**, there is no finding that Chem-Nuclear's waste disposal design is faulty or fails to minimize the migration of waste or waste contaminated water out of the disposal units.

(R. p. 15, 2012 Order, p. 15, emphasis added). The ALJ's conclusion is confounding in its recitation of, but utter failure to apply, the 2005 findings that the vaults were intentionally designed to ***allow*** water to migrate out of those units, and that the trenches were intentionally designed to ***allow*** water to infiltrate into the soil and groundwater beneath the trenches. (R. 46, FF# 47). The ALJ's conclusion on compliance with Subsection 7.11.11.2 is clearly erroneous and demands reversal.[8]

Chem-Nuclear's disposal practices and designs simply fail to minimize migration of waste or waste contamination water out of the vaults. Indeed the evidence shows that the disposal design and practices have the opposite result, actually encouraging water movement in and out of the vaults and into the soil beneath the trenches. Some relatively simple measures are available to reduce water infiltration. As evidenced by Judge

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but in and of itself does nothing to minimize or prevent contact of water and waste.

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The ALJ dismisses the Appellant's assertions that there are obvious ways to minimize migration into and out of the vaults, such as sealing and grouting the vaults and eliminating the hole in the bottom of the vaults and covering the trenches while they are being filled, but rejects them by claiming that they were "dismissed by the findings." (R. p. 15, 2012 Order, p. 15). However, the 2005 findings in fact support some of these assertions. Indeed, the Appellant's suggestion of covering the trenches while they were being filled came directly from DHEC evidence that it had asked Chem-Nuclear to do so, even though Chem-Nuclear never implemented that recommendation. (R. p. 47, 2005 Order, FF # 50).

Geathers' findings, the North Carolina design, which was also created by Chem-Nuclear, demonstrates that sealing the vaults to prevent contact between the waste and water would be one step towards minimizing this water migration and groundwater contamination. (R. p. 36). In addition, the design of the proposed North Carolina facility was to have incoming waste containers loaded and grouted in uniform concrete waste packages. Covering the trenches while they are being filled with the vaults would also help prevent contact between the waste and the water. The 2005 Order, and Chem-Nuclear's response to DHEC's Interrogatories, indicate that a cover over the trenches to prevent rainfall from coming into contact with the waste-filled vaults would also help achieve compliance with Section 7.11.11. None of these relatively simply design features or disposal practices were required under the license, although the 2005 Order gives a nod to the use of these practices. (R. pp. 64-65, 2005 Order, CL#16).

The ALJ goes one step further to conclude that Chem-Nuclear's practices have reduced the migration of tritium and therefore Chem-Nuclear's "effort to minimize migration of waste or waste contaminated water out of the disposal units is successful." R. p. 15-16, 2012 Order, p. 15-16). The ALJ places great weight on an incomplete portion of a finding suggesting that practices may have led to a decrease in tritium releases, but ignores the remainder of Finding #46 that tritium levels have "**increased** between 1997 and 2001," and "when tritium data is compared to rainfall data as gauged by water table levels, **it appears that tritium concentrations have been varying with the amount of rainfall, not necessarily varying as a result of new storage methods.**" (R. p. 46, 2005 Order, FF # 46, emphasis added).

C. The license fails to prevent contamination of groundwater or surrounding soil, as required by Subsection 7.11.11.4

Subsection 7.11.11.4 requires "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The disposal units and their "engineered barriers" fail to provide for temporary collection and retention of water and other liquids for a time sufficient to allow for their detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil, and fail to prevent contact between the waste and the surrounding earth. Appellant submits that the best evidence on compliance with this provision are the findings that Chem-Nuclear's monitoring, collection, retention and remedial measures have already resulted in the contamination of the adjacent church property. (R. pp. 48-49, 2005 Order, FF # 56). Chem-Nuclear's practice under the license is to pump contaminated water from the trenches into ponds or other sites on its property. That practice is exactly what Chem-Nuclear did when waste water contaminated the church property in 1999. The contaminated water "ponded on the Chem Nuclear property and then percolated into the soil and into the groundwater," ultimately contaminating the groundwater at the church and requiring excavation of soil. (R. pp. 48-49, 2005 Order, FF # 56). If it happened once utilizing these practices, it can happen again and Chem-Nuclear does not have a collection and retention system sufficient to allow for detection or removal or other remedial measures to prevent the contamination of groundwater and the surrounding soil, as required by Subsection 7.11.11.4.

The ALJ appears to place complete reliance on the monitoring and detection

system utilized by Chem Nuclear. The system is designed to pump water out of the trenches. However, the ALJ ignores two important facts. First, none of the trenches at the Chem-Nuclear site have a leachate collection system. (R. p. 56, 2005 Order, FF # 102). Second, this system has resulted in contamination of an adjacent church when contaminated water was pumped out of a trench. (R. p. 48-49, 2005 Order, FF # 56). The ALJ's reliance on the monitoring and detection system for a conclusion that the license allows for detection and removal of waste without resulting in contamination is clearly erroneous in light of the 2005 findings that despite that system, waste had left the Chem Nuclear property and contaminated groundwater and soil at the church property, and that there is no leachate collection system.

D. The License Does Not Require Waste to be Isolated and is thus in violation of Subsections 7.11.11.6 and 7.2.6

The ALJ's conclusion that Chem-Nuclear has provided "reasonable assurance that the waste will be isolated for at least the institutional control period," as required by Subsection 7.11.11.6, overlooks the purpose of the regulatory program.

As discussed above, the ordinary meaning of "isolate" means to "set apart or cut off from others," "to place in quarantine." The American Heritage Dictionary of the English Language, Houghton Mifflin Co., 2000, p. 928. Instead of applying the ordinary meaning of the regulations, the ALJ asserts that isolation means "isolation from inadvertent intruders, and this is accomplished through the use of engineered barriers" because the lids on the vaults are "designed to protect against an inadvertent intrusion for at least 500 years." (R. p. 18, 2012 Order). The ALJ goes astray in focusing on inadvertent intruders, while failing to acknowledge that the waste is not "set apart or cut

off from others" nor is it "quarantined," because it is entering the soils and groundwater as a direct result of Chem-Nuclear's disposal practices. These specific findings from the 2005 Order establish that waste is not isolated:

1. the vault design allows water to enter into and drain from the vaults (R. pp. 46, FF # 47 & 56. FF # 101);
2. the trenches are lined with clay sand or sandy clay and are designed to allow liquids to infiltrate the soil below the trenches (R. p. 56, FF # 103);
3. rainfall accumulates in the trenches and percolates into the soil, driving the groundwater movement that is carrying tritium and other radioactive materials (R. p. 46, FF # 48);

- the contaminated groundwater from beneath the site is intercepted by surface waters of Mary's Branch Creek (R. p. 44, FF # 32);
- tritium has been detected in Mary's Branch Creek (R. p. 45, FF # 39);
- radioactive materials have contaminated an adjacent church site (R. p. 48-49, FF # 56).

The ALJ seems to recognize that waste is not isolated in that it escapes the trenches and reaches the groundwater, but claims unconditionally that there is a "continually declining trend in radioactive releases" as a result of Chem-Nuclear's disposal practices to justify his conclusion. (R. p. 11). That conclusion is based on a selective reading, which is contradictory to the 2005 findings related to the nature and extent of tritium releases. (R. pp. 43-49).

E. The disposal units and engineered barriers do not prevent contact between waste and the surrounding earth and thus violate Subsection 7.11.11.7

The ALJ's conclusion on compliance with Subsection 7.11.11.7 is confusing, at best. Subsection 7.11.11.7 requires the disposal units and the incorporated engineered barriers to be designed and constructed for "prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units." S.C. Code Ann. Reg. § 61-63, 7.11.11.7. The ALJ first restates a separate, and previously discussed, requirement to minimize migration of waste out of disposal units. The ALJ then fails to point to any findings from the 2005 Order establishing that the disposal units are designed to "prevent" contact between waste and the surrounding earth and ignores all of the previously discussed findings, particularly those related to the trench design and allowing water to infiltrate into the soil and groundwater beneath the trenches.

It is true that the list of findings on page 20 of the 2012 Order mention some things that Chem-Nuclear is doing, but merely taking some steps in the right direction and away from disposal of waste in cardboard boxes does not mean that all of the regulatory requirements have been fulfilled. The findings that directly contradict the ALJ's conclusion that the disposal units and engineered barriers prevent the contact between waste and the surrounding earth, together with findings related to vault design, are: 1) the trenches are lined with clay sand or sandy clay and are not designed to be impermeable, but are designed to allow liquids to infiltrate the soil below the trenches (R. p. 56, FF # 103) and 2) rainfall accumulates in the trenches and percolates into the soil, driving the

groundwater movement that is carrying tritium and other radioactive materials (R. p. 46, FF # 48).

F. The disposal site is not designed to minimize the contact of water with waste during storage, disposal or after disposal, as required by Section 7.23.6

Section 7.23.6 requires Chem-Nuclear to design the disposal site to "minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with waste after disposal." S.C. Code Ann. Reg. 61-63, Section 7.23.6. Again, the ALJ cites, but immediately discredits, the 2005 findings that the vaults are not covered while they are being filled and are designed to allow water to flow into and drain from them. Then he cites, and dismisses, the finding that post-disposal, the holes in the bottoms of the vaults allow water to rise up into the vaults during heavy rains. The ALJ's recitation of the pertinent findings followed by a swift dismissal of those findings is particularly troublesome given the major risks to public health implicated by the license at issue. Instead, the ALJ claims that contact between water and waste is not prohibited (R. p. 20) and concludes that Chem-Nuclear is doing enough to "minimize" said contact. As described thoroughly throughout this brief, there is no question (at least based on the 2005 Order) that water is coming into contact with waste, and given the design of the disposal units and "engineered barriers," waste will continue to come into contact with water unless rain never again falls in Barnwell County.

In sum, the license renewal at issues fails to comply with Regulation 61-63, Section 7.11.11 and 7.23.6, in that the disposal units and disposal practices at the

Barnwell Facility fail to minimize the migration of waste or waste contaminated water out of the disposal units and fail to prevent contact of waste and water. Judge Geathers found that the vaults "are not sealed against water intrusion." (R. p. 56, FF # 101). The vaults have holes in the bottoms, are not grouted and sealed at the top, have no cover or roof, and thus allow rain to fall directly into the vault during the loading period. The base of the trenches are sand and are designed specifically "to allow liquids to infiltrate the soil below the trenches." (R. p. 56, FF # 103). The trenches are open and uncovered until they are filled with vaults, and only then are they covered with dirt. The design allows rainfall that accumulates in the trenches to percolate into the soil, and drive the groundwater movement that is carrying tritum and other radioactive materials into Mary's Branch Creek.

III. The Radioactive Waste is Not Stabilized and There is No Assurance that it Will be Stabilized for the Institutional Control Period as Required by Section 7.10

Section 7.10 of the Regulations sets forth requirements for the issuance of a waste disposal permit. The 2005 Order previously addressed subsections 7.10.1, 7.10.2, 7.10.3 and 7.10.4 of these requirements, which the Court of Appeals affirmed, and are not at issue in this appeal.

On remand, the ALJ addressed the remaining subsections of 7.10 that were not addressed by the 2005 Order, but erred in applying those remaining subsections. The remaining subsections at issue are:

> 7.10.6 The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in

that they will provide reasonable assurance that **long-term stability of the disposed waste and the disposal site will be achieved** and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure;

7.10.7 The applicant's demonstration provides reasonable assurance that the applicable technical requirements of this part will be met;

7.10.8 The applicant's proposal for institutional control provides reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27; . . .

S.C. Code Ann. Reg. 61-63, Section 7.10 (emphasis added).

The Appellant contests the ALJ's conclusions on 7.10.6, 7.10.7 and 7.10.8.

A. The Waste is not Stabilized as Required by Subsection 7.10.6

Chem-Nuclear is required to "provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved." S.C. Code Ann. § 61-63, subsection 7.10.6. The ALJ erred in concluding that the disposal practices and designs are consistent with Section 7.10.6 and that the "waste is stabilized." (R. p. 5, 2012 Order). In concluding that the waste is stabilized, the ALJ selectively chose certain limited findings, but excluded consideration of numerous other findings from the 2005 Order directly bearing on the question of stability of the waste. Stabilize is defined as "to make stable or steadfast; to become stable, steadfast or fixed." Stable is defined as "resistant to change of position or condition; not easily moved or disturbed; enduring or permanent." The American Heritage Dictionary of the English Language, Houghton Mifflin Co., 2000, p. 1687.

The ALJ points to the structural nature of the concrete vaults, along with "backfilling methods," as providing "stability" to "minimize subsistence." (R. p. 39).

Indeed, the 2005 Order notes that the purpose of the concrete vaults is to provide "structural stability" to stabilize the trenches for the enhanced caps, so that the caps would not sink, but not to keep the waste in a stable position. (R. pp. 51, 56-57, 2005 Order, FF # 70 & 107). The ALJ's finding of stability is based entirely on the sturdiness of the vaults in maintaining structural integrity. When dealing with nuclear waste, one would hope that no credit would be given to the fact that the nuclear storage vaults will not collapse upon themselves, but instead look to whether the waste contained within those vaults is "fixed" and "permanent" in its location. The ALJ erroneously equated structural stability of the trenches with stability of the disposed waste itself, which is the purpose of Section 7.10.6.

The ALJ failed to apply the findings of the 2005 Order that indicate that while the vaults are structurally stable, the waste is not stabilized within the vaults nor within the trenches nor within the site. For instance, the 2005 Order makes the following findings related to stability of waste:

- the vaults are not sealed to prevent water intrusion and are designed with holes in the bottom (R. p. 46, FF # 47 & p. 56, FF # 101);
- the vault design allows water to enter into and drain from the vaults (R. pp. 46, FF # 47 & p. 56, FF # 101);
- rain falls directly into the vaults when the trenches are being loaded because there is no cover (R. p. 46, FF # 48)[9];

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9 During the license renewal process DHEC asked Chem-Nuclear to consider giving protection to the open trenches from direct rainfall, such as temporary covers. (R. p. 47, 2005 Order, FF# 50). To date nothing has come of this request.

- some trenches take over two years to fill (R. p. 47, FF # 51);
- the trenches are lined with clay sand or sandy clay and are designed to allow liquids to infiltrate the soil below the trenches (R. p. 56, FF#103);
- rainfall accumulates in the trenches and percolates into the soil, driving the groundwater movement that is carrying tritium and other radioactive materials (R. p.46, FF # 48);
- the contaminated groundwater from beneath the site is intercepted by surface waters of Mary's Branch Creek (R. p.44, FF # 32);
- tritium has been detected in Mary's Branch Creek (R. p. 45, FF # 39);
- radioactive materials have contaminated an adjacent church site (R. p. 48-49 FF # 56).

Applying all of these findings collectively, it is apparent that the current design allows waste to leave the disposal vaults and the trenches and migrate into the groundwater, and does not keep it stable in one location. Based on these findings it is evident that Chem Nuclear's design and operations are not currently providing stability of waste and are certainly not providing any assurance of long-term stability, as required by Subsection 7.10.6. S.C. Code Ann. Regs. 61-63, §7.10.6. The ALJ's conclusion to the contrary is reversible error of law.

B. The License Fails to Meet the Requirements of 7.10.8 for Institutional Control for Stability of Waste Given that the Waste is Presently Not Stabilized

Because the license fails to comply with section 7.10.6, it also fails to comply with section 7.10.8, which requires institutional controls to ensure that section 7.10.6,

among other standards, is met. Section 7.10.8 requires that the "applicant's proposal for institutional control provides reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27." In Judge Anderson's words, "the applicant is required to demonstrate that the waste and disposal site are stable after the facility is closed." (R. p. 7, 2012 Order, p. 7). The ALJ concluded that the renewal license complied with Section 7.10.8 in part because "there is no evidence of any actual release resulting in exposure above the regulatory limits to any member of the general public and there are no known incidents of such releases since the inception of the facility." (R. p. 6, 2012 Order, p. 6). While this statement is technically accurate, the 2005 Order finds that there have been multiple releases from the site over its history, including releases into Mary's Branch Creek and the adjacent church property.

The flaw in the 2005 Order, which is compounded in the 2012 Order, is the erroneous conclusion that simply because a release is below the regulatory limits the waste is stabilized and is sufficiently "isolated," as required by S.C. Code Ann. Regs. § 61-63, 7.2.6. This statement also fails to establish that waste will be "stable" after the facility is closed. The ALJ's conclusion that the waste is stabilized is based on a partial application of selectively chosen facts, rather than the entirety of the relevant findings from the 2005 Order. Instead the ALJ ignores all of the other facts directly bearing on the question of "stability" of waste, which establish that the waste is not "fixed" or "steadfast," but can and has migrated from the disposal vaults, trenches and the site itself.

The ALJ also bases his conclusion of compliance with Section 7.10.8 on the statement that "the data demonstrates a trend of decreasing concentrations in Mary's Branch Creek and in groundwater." (R. p. 6, 2012 Order). However, the ALJ summarizes a finding of the 2005 Order out of context and without looking at the entire finding, which states that "decreasing tritium concentrations have been varying with the amount of rainfall, and not necessarily as a result of new storage practices" and that at some monitoring stations tritium has increased. (R. p. 46, 2005 Order, FF # 46).

C. The License Fails to Meet Technical Design Requirements of 7.10.7

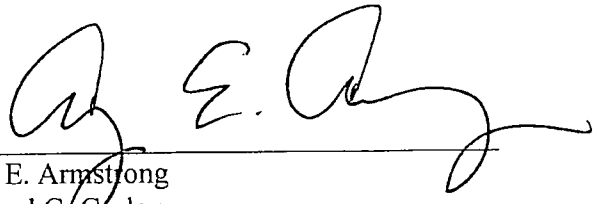
Section 7.10.7 requires that the applicant "provide reasonable assurance that the applicable technical requirements of this part will be met." Section 7.11 sets forth the applicable standards and technical requirements for the design standards for disposal units and the engineered barriers to be utilized in disposal units. As discussed thoroughly above in Section II, the disposal units – vaults and trenches – and their engineered barriers fall short of meeting those requirements. The disposal units and engineered barriers do not minimize contact between water and waste; do not minimize migration of water into and out of disposal units; do not prevent contact between the waste and surrounding soil; and do not isolate waste, as evidenced by the extensive findings that the vaults are unsealed, ungrouted and allow water to fall into the vaults; the vaults have holes in the bottom to allow water to migrated out of the vaults; and the trenches are designed to allow water to percolate into the groundwater. The ALJ's conclusions to the contrary defy the logical application of these findings and is reversible error of law.

CONCLUSION

The words of a regulation must be given their plain and ordinary meaning without resort to subtle or forced construction to limit or expand the regulation's operation. S.C. Dept. of Revenue v. Blue Moon of Newberry, Inc., 397 S.C. 256, 261, 725 S.E.2d 480, 483 (2012), reh'g denied (May 4, 2012) (citing Byerly v. Connor, 307 S.C. 441, 444, 415 S.E.2d 796, 799 (1992)). Yet rather than apply the plain and ordinary meaning of the regulations to the relevant findings of the 2005 Order, the Administrative Law Judge failed to incorporate the findings that due to Chem-Nuclear's current disposal practices and designs 1) water enters the disposal units and 2) that water carries radioactive waste into the surrounding soil and then into the groundwater forming a tritium plume that ultimately leaves the site. By discarding findings from the 2005 Order that are material to compliance with the specific provisions of Regulation 61-63, the ALJ re-weighed the evidence, ignoring some facts in favor of others, and issued an opinion that is fundamentally inconsistent both internally and with the 2005 Order.

For the foregoing errors of law, the Final Order and Decision on Remand of the Administrative Law Judge should be reversed.

Respectfully submitted,



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THE STATE OF SOUTH CAROLINA

In the Court of Appeals

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

Case No. 04-ALJ-07-0126-CC

Sierra Club . . . . . Petitioner/Appellant,

vs.

South Carolina Department of Health and Environmental Control and
Chem-Nuclear Systems, ... Respondents.

CERTIFICATE OF SERVICE

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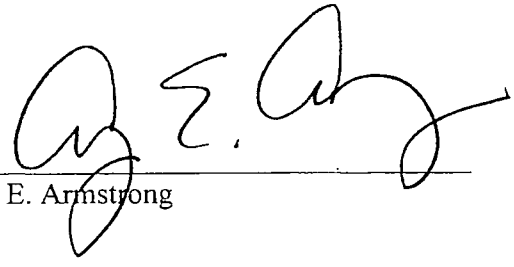

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STATE OF SOUTH CAROLINA

IN THE COURT OF APPEALS

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge
Case No. 04-ALC-07-0126-CC

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Sierra Club ..... Appellant,

vs.

South Carolina Department of Health and Environmental Control
and Chem-Nuclear Systems, LLC ..... Respondents.

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July 20, 2012
SC ADMIN. LAW COURT

STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAW COURT

Sierra Club, Petitioner, vs. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	Docket No. 04-ALJ-07-0126-CC **FINAL ORDER AND DECISION ON REMAND**

This matter comes before the Administrative Law Court (Court or ALC) on remand from the South Carolina Court of Appeals which affirmed in part and remanded in part the Final Order and Decision of this Court dated October 13, 2005 (2005 Order). The 2005 Order affirmed the decision of Respondent South Carolina Department of Health and Environmental Control (DHEC or Department) to renew the license of Respondent Chem-Nuclear Systems, LLC (Chem-Nuclear) to operate the low-level radioactive waste disposal facility located in Barnwell, South Carolina (the Barnwell Facility or Site).

PROCEDURAL BACKGROUND

Chem-Nuclear began the disposal of low-level radioactive waste at the Barnwell Facility in 1971 pursuant to License No. 097, issued by DHEC in accordance with 24A S.C. Code Ann. Reg. 61-63, "Radioactive Materials." On April 27, 2000, Chem-Nuclear submitted a renewal application for License No. 097. DHEC issued its decision to renew the license and that decision was subsequently challenged by Petitioner and another environmental advocacy organization, Environmentalists, Inc. on March 30, 2004.[1] After the ALC held a hearing on the merits, the ALC concluded that Petitioner failed to present evidence warranting the reversal of the renewal of License Number 097.[2]

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[1] Environmentalists, Inc. was dismissed for lack of standing on Chem-Nuclear's pre-trial Motion for Summary Judgment.

[2] The ALC also ordered Chem-Nuclear to conduct a study to address concerns raised during the hearing on the scientific and economic feasibility of employing or implementing certain designs and operational procedures at the Site. That study was done by Chem-Nuclear and submitted to DHEC on April 11, 2006 and sent to the parties.

Petitioner appealed the 2005 Order.[3] The South Carolina Court of Appeals rendered its decision on March 10, 2010 in Sierra Club v. SCDHEC and Chem-Nuclear Sys., LLC, 387 S.C. 424, 693 S.E. 2d.13, (Ct. App. 2010) affirming the portions of the ALC Order concluding that the Petitioner failed to present sufficient evidence to establish that Chem-Nuclear was not in compliance with DHEC Regulation 61-63, Part VII, Sections 7.10.1 through 7.10.4, and that Petitioner failed to present evidence demonstrating Chem-Nuclear violated Section 7.18 and the ALARA[4] standard therein. Nevertheless, the Court of Appeals remanded this case to the ALC to make a specific ruling on whether Chem-Nuclear is in compliance with DHEC Regulation 61-63, Part VII, Sections 7.10.5 through 7.10.10, 7.11, and 7.23.6.[5] Id.. Significantly, the Court of Appeals instructed the ALC to apply the factual findings from its 2005 Order in determining these issues.

DISCUSSION

In designing, building, and operating the Barnwell Disposal Facility, Chem-Nuclear is required to adhere to DHEC Regulation 61-63, particularly Part VII. 24A S.C. Code Ann. Reg. 61-63. Part VII establishes procedural requirements and performance objectives applicable to any method of land disposal, and sets specific technical requirements for near-surface disposal of radioactive waste. 24A S.C. Code Ann. Reg. 61-63, Secs. 7.1, 7.1.3. As noted above, the Court of Appeals directed the ALC to apply the Findings of Fact from the 2005 Decision to address

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DHEC acknowledged receipt of study on September 20, 2006, and concurred with the report's evaluation of the issues on April 10, 2008.

[3] Sierra Club filed its appeal with the DHEC Board. However, Act 387 of 2006 changed the appeals process such that appeals from the ALC are filed with the S.C. Court of Appeals. Chem-Nuclear filed a petition with the S.C. Supreme Court in its original jurisdiction to determine whether the Board or the Court of Appeals had jurisdiction to hear the Sierra Club appeal. The Supreme Court determined that the Board lacked jurisdiction and the appeal was transferred to the Court of Appeals. See Sierra Club v. SCDHEC and Chem-Nuclear Sys., LLC, 387 S.C. 424, 693 S.E. 2d 13 (Ct. App. 2010).

[4] ALARA is an acronym for "as low as is reasonably achievable" and, as used in the regulations governing radioactive materials, means "making every reasonable effort to maintain exposures to radiation as far below the dose limits [provided by regulation] . . . as is practical." 24A S.C. Code Ann. Regs. 61-63, § 3.2.6 (Supp. 2004)

[5] The Court of Appeals affirmed the ALC's decision that the Sierra Club failed to present sufficient evidence to establish that Chem-Nuclear was not in compliance with Sections 7.10.1, 7.10.2, 7.10.3, and 7.10.4. Therefore, the remaining Sections of 7.10 (Sections 7.10.5 through 7.10.10).must be considered.

sections of Part VII of DHEC Regulation 61-63 on remand. Therefore, the following discussion and conclusions address those sections relying entirely upon the findings fact in the 2005 Order.[6]

In addition, this Court may take action consistent with the appellate court ruling, but matters decided by the appellate court cannot be reheard, reconsidered, or relitigated; the decision of the appellate court is final as to all questions decided. Ackerman v. McMillan, 324 S.C. 440, 443, 477 S.E. 2d 267, 268 (Ct. App. 1996); see also Prince v. Beaufort Mem'lHosp., 392 S.C. 599, 606, 709 S.E. 2d. 122, 126 (Ct. App. 2011) ("[A] trial court has no authority to exceed the mandate of the appellate court on remand."). Furthermore, this court recognizes that in reaching its decision, Petitioner, as the party challenging DHEC's decision to renew Chem-Nuclear's license, bears the burden of proof. Leventis v. S.C. Dep't of Health and Envtl. Control, 340 S.C. 118, 132-33, 530 S.E.2d 643, 651 (2000).

Regulation 61-63, Section 7.10

The Court of Appeals instructed the ALC to make a specific ruling on whether Chem-Nuclear is in compliance with DHEC Regulation 61-63, Part VII, Sections 7.10.5 through 7.10.10. However, Petitioner agrees that Judge Geathers concluded that the disposal practices meet the ALARA requirement. Also, according to Petitioner, it agrees that Judge Geathers found that "Chem-Nuclear [was required to] provide 'long-term care funds' as part of [its] license."[7] Therefore, Petitioner does not dispute that Chem-Nuclear complied with Sections 7.10.5 and 7.10.9. I thus conclude that the license meets the requirements of Sections 7.10.5 and 7.10.9 and do not address those sections further. The remaining issues are addressed below.

Section 7.10.6

24A S.C. Code Ann. Reg. 61-63 Sec. 7.10 sets forth, in pertinent part, that:

> A license for the receipt, possession, and disposal of waste containing or contaminated with radioactive material will be issued by the Department upon finding that:

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[6] Notably, in their proposed orders the parties referenced facts in the Record that were not made findings of fact by Judge Geathers in the 2005 Decision. Following the unappealed instructions of the Court of Appeals, those references were not considered by this court. Furthermore, to avoid constant reference to and quoting of the 2005 Decision, the Findings of Fact in that Decision have not been quoted in this decision. Accordingly, "finding" refers to the factual findings in the 2005 Decision.

[7] Judge Geathers's finding actually states that the license was amended to require an annual review of the "long-term care funds." However, Petitioner obviously inferred, and reasonably so, that because the license here required long-term care funds to be reviewed annually, and the license was issued, that Chem-Nuclear had made financial arrangements for the payment of those long-term care funds, which would satisfy Section 7.10.9. Consequently, Petitioner concluded in its Proposed Order that the license issued to Chem-Nuclear complied with Section 7.10.9.

* * *

> 7.10.6 The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

Section 7.10.6 is a qualitative standard designed to ensure that the public's health and safety are protected through the long-term stability of the disposed waste and disposal site. Long-term stability is achieved at the Site through the use of vaults for waste placement, and backfilling methods around the vaults to minimize subsidence. The Site utilizes three types of reinforced concrete disposal vaults into which disposal containers are placed. When the vaults are filled and closed, the backfill material is placed in the void space around the vaults to enhance long-term stability of the entire trench system. Filling void space also minimizes the potential for subsidence of the enhanced cap that is installed over the vaults.

The Barnwell Facility incorporated engineered barriers into its design and operations. These engineered barriers, which include the use of vaults to stabilize the trenches and for the containment of waste forms and the installation of impermeable caps on inactive trenches, have enhanced site performance and support Chem-Nuclear's predictions for a continually declining trend in radioactive releases to the general environment. These changes were made under the oversight of a DHEC-commissioned Blue Ribbon panel of experts who reviewed the various iterations of the Environmental Radiological Performance Verification (ERPV)[8] to determine if Chem-Nuclear was accurately predicting site performance. The Petitioner does not refute the findings and conclusions of the ERPV and the Blue Ribbon Panel, on whom DHEC relied in renewing the license for the Barnwell Facility. Based on the ERPV, the Panel concluded that "the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and into the long-term future."

Chem-Nuclear has also recorded a Restrictive Covenant and Easement on three parcels of property, which include the property where the compliance point is located. This Covenant

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[8] Chem-Nuclear developed a predictive model, known as the Environmental Radiological Performance Verification (ERPV) model to predict the maximum concentration of tritium at the compliance monitoring point for the Barnwell Site.

states that the property is intended as a buffer and prohibits the use of groundwater under and surface water on the property without written consent from DHEC. The purpose of these limitations is to provide long-term protection to the public from any possible exposure to radioactive material in the surface waters at the compliance point. This institutional control provides reasonable assurances that public health and safety is protected while the Barnwell Facility is operational as well as after it is closed.

Therefore, the facts support a conclusion that renewal of License 097 is consistent with the requirements of Section 7.10.6. Chem-Nuclear has provided reasonable assurances, through a demonstration of institutional controls, disposal site design, facility operations, and site closure, that the waste is stabilized. Furthermore, the facts also failed to establish that the renewal of Chem-Nuclear's license constitutes an unreasonable risk to the health and safety of the public.

Section 7.10.7

Section 7.10.7 requires a demonstration by Chem-Nuclear that provides reasonable assurance that the applicable technical requirements of Part VII will be met. 24A S.C. Code Ann. Reg. 61-63 Sec. 7.10.7. Petitioner relies on finding 47 in Judge Geathers's Order to conclude that defects exist in the vaults and trenches that allow tritium and other radioactive materials to seep into the ground and groundwater and migrate to Mary's Branch Creek. However, there are extensive findings that demonstrate the technical requirements of Part VII have been met. They include, among others, the following:

a) An extensive system of groundwater monitoring wells in and around the disposal area of the Barnwell site;

b) Drainage features in all three trench designs to monitor any water infiltration or accumulation in the trenches;

c) Segregation of waste through the use of engineered trench designs;

d) Improvements in waste forms and containers, the use of vaults, and enhanced capping to successfully reduce the amount of tritium that is migrating to groundwater;

e) The use of concrete disposal vaults and a multi-layer cap as the two primary design features to provide for long-term performance...;

f) Engineered barriers, including vaults and caps, which are now standard technology at the Barnwell Facility; and,

g) The use of disposal vault lids that serve as the intrusion barriers required for Class C waste.

In addition, the iterations of the ERPV with resulting review and conclusions of the Blue Ribbon panel of experts satisfy the requirements of Sec. 7.10.7. Furthermore, the findings provide that "no concrete evidence was presented to show that the Barnwell Site design and operations are inadequate to protect the public health and safety because they fail to provide reasonable assurances that the general population will be protected from releases of radioactivity above the limits established in Regulation 61-63, § 7.18."

I conclude that the iterations of the ERPV, the findings and conclusions of the Blue Ribbon Panel, and the resulting Technical Evaluation Report produced by DHEC provide reasonable assurance that the applicable technical requirements of Part VII will be met.

Section 7.10.8

Section 7.10.8 provides that before Chem-Nuclear can receive its license the Department must find that: "The applicant's proposal for institutional control provides reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27." 24A S.C. Code Ann. Reg. 61-63 Sec. 7.10.8. Petitioner premises its conclusion that Chem-Nuclear failed to meet the requirements of the provision on the supposition that the license fails to comply with Section 7.10.6. Thus, Petitioner avers that since Section 7.10.6 is violated, Section 7.10.8 is similarly violated. However, as explained above, I do not find that Chem-Nuclear violated Section 7.10.6.

Furthermore, the following findings regarding each provision at issue reflect that Chem-Nuclear complied with Section 7.10.8. For instance, Section 7.10.3 requires reasonable assurances that the effluent standard set forth in Section 7.18 – the standard for releases of concentrations of radioactive materials – is met. In the context of Section 7.10.8, the requirements of Section 7.10.3 must be met over the long-term, even after the facility is closed. There is no evidence of any actual release resulting in exposure above the regulatory limits to any member of the general public and there are no known incidents of such releases since the inception of the facility. Rather, the data demonstrates a trend of decreasing concentrations of tritium in Mary's Branch Creek and in groundwater down gradient from the disposal area; and the predictions of the ERPV show a similar decline as site performance is predicted into the future.

Section 7.10.4 requires reasonable assurances of protection from inadvertent intruders as is required under Section 7.19. In the context of Section 7.10.8, the requirements of Section 7.10.4 must be met over the long-term, even after the facility is closed. However, the findings reflect that that no evidence was presented to demonstrate that the design and operation of the Barnwell Facility fails to protect inadvertent intruders. In fact, the findings show a fence at the entry point prevents the general public from accessing Mary's Branch Creek at the compliance point; there are no consumers of the water; and a restrictive covenant and easement on three parcels of property protect the compliance point from access by the general public. Additionally, the concrete disposal vault lids that are used serve as intrusion barriers. In sum, I find that no concrete evidence was presented to show that the Barnwell Site design and operations are inadequate to protect the public health and safety because they fail to provide reasonable assurances that inadvertent intruders are protected in accordance with Regulation 61-63, § 7.19.

Section 7.10.5 references compliance with the standards of Part III of R. 61-63. Compliance is partially addressed through meeting the performance objective in Section 7.19, as addressed above. However, Part III of R. 61-63 also requires compliance with ALARA. When considered in the context of Section 7.10.8, the applicant is required to demonstrate compliance with Part III of R. 61-63 after closure of the facility. The findings demonstrate that Chem-Nuclear has complied with ALARA. In fact, Chem-Nuclear has made efforts to minimize exposure to radiation as far below the dose limits as is practical.

Section 7.10.6 requires the applicant to demonstrate reasonable assurances of long-term stability of the disposed waste and disposal site. When considered in the context of Section 7.10.8, the applicant is required to demonstrate that the waste and disposal site are stable after the facility is closed. The stability of the waste in the trenches is addressed in Findings 81-103 of the 2005 Decision. In particular, Chem-Nuclear places backfill material in the void space between the vaults. Filling void space minimizes the potential for subsidence of the enhanced cap. Following backfill, vaults are covered with additional soil material and clay cap. Chem-Nuclear installs the initial clay cap to minimize the infiltration of surface water into the trench. Grass may be planted on the initial cap to control erosion. Chem-Nuclear installs the final multi-layer enhanced cap after completion of waste disposal in a trench.

Section 7.11.8 also references Section 7.27. Section 7.27 sets forth the requirements for institutional controls – land ownership, environmental monitoring, periodic surveillance, and the

availability of funds to provide for institutional controls. Physical access to the Site must also be controlled. DHEC may determine the period of institutional controls, but such controls may not be relied upon for more than 100 years following transfer of control of the Site to the owner.

Chem-Nuclear operates the Site pursuant to a 99-year lease with the State, fulfilling the requirement of 7.27.2. Furthermore, changes incorporated into the renewal of License No. 097 included a requirement for "an annual review of the decommissioning and long-term care funds." This requirement addresses the "administration of funds to cover the costs" of institutional controls included in Section 7.27.2.

Chem-Nuclear has installed and continues to maintain an extensive system of groundwater monitoring wells in and around the disposal area of the Barnwell Site. Chem-Nuclear has access to reliable data through a system of groundwater monitoring wells and thirty years of historical data, and has applied this data in extensive modeling efforts to predict Barnwell Site performance two thousand years into the future. Importantly, the ERPV was also developed to predict the future performance of the facility; and the conclusions of the Blue Ribbon Panel reviewing the ERPV are that the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and **into the long-term future.** Chem-Nuclear also has recorded a Restrictive Covenant and Easement on three parcels of property which are intended to be a buffer to the Site. The Covenant also prohibits the use of groundwater underneath, and surface water on, the property without prior written consent of DHEC.

I therefore find that Chem-Nuclear has satisfied the requirements of Section 7.10.8 by providing reasonable assurances of the availability of institutional controls that meet the objectives of Sections. 7.10.3-7.10.6 and Section 7.27.

Section 7.10.10

24A S.C. Code Ann. Reg. 61-63 Sec. 7.10.5 sets forth, in part, that:

> A license for the receipt, possession, and disposal of waste containing or contaminated with radioactive material will be issued by the Department upon finding that:
>
> * * *
>
> 7.10.10 The applicant's Quality Assurance Plan describing the methods and procedures used to ensure that the disposal units are constructed in accordance with the approved designs and applicable standards and that the waste complies with the requirements of this regulation and the license.

This section does not require evidence of compliance or non-compliance with the requirement that the disposal units be constructed according to "the approved designs and applicable standards." Also, this section does not require evidence of compliance or non-compliance with the regulation and license requirements governing waste. Rather, 7.10.10 only requires that a description of the methods and procedures to be implemented in these areas be set forth in a Quality Assurance Plan submitted by the applicant. The question of whether these methods and procedures successfully ensure that the disposal units are properly constructed, or put differently, whether "the disposal units are constructed in accordance with the approved designs and applicable standards . . .", and that the waste complies with the regulation and license requirements, will be a determination made under 7.11.11.

Here, Chem-Nuclear set forth in the Quality Assurance Plan it submitted a description of the methods and procedures that it would implement. The current, approved disposal technology at the Barnwell Facility is enhanced shallow land burial with the primary engineered barriers being disposal trenches, disposal vaults, and enhanced caps. There are extensive findings that describe the use of this technology. The findings describe the methods and procedures used to ensure that the disposal units are constructed and utilized in accordance with requirements for those engineered barriers. Restrictions on waste forms and characteristics also have been imposed over the last twenty years that have increased the reliability and waste isolation capabilities of the facility. The findings therefore support a conclusion of law that the requirements of 7.10.10 are met. Furthermore, in its Proposed Order, Petitioner failed to make any specific conclusions of law with respect to compliance with Section 7.10.10.

Regulation 61-63, Section 7.11

24A S.C. Code Ann. Reg. 61-63 Sec. 7.11 governs "Conditions of Licenses." The Court of Appeals ruled that the ALC must also address compliance with Section 7.11 because it "imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to address whether Chem-Nuclear is in compliance with Section 7.11." 387 S.C. at 435. Nevertheless, it is clear that some sections of 7.11 are not applicable to this licensing decision in that they address transfer, assignment, revision and termination of the license, record-keeping, closure of the facility, and inspection of the facility. Indeed, the Court of Appeals apparently recognized that potentiality when it specifically identified and listed Sections 7.11.9, 7.11.10 and 7.11.11 in its discussion of the merits. Petitioner also does not

dispute that Chem-Nuclear complied with 24A S.C. Code Ann. Reg. 61-63 Secs. 7.11.1 through 7.11.8. Furthermore, Petitioner presents no objection as to Chem-Nuclear's compliance with 24A S.C. Code Ann. Reg. 61-63 Sec. 7.11.12. I therefore conclude that the license meets the requirements of Sections 7.11.1 through 7.11.8 and Section 7.11.12 and will not address those sections further. The remaining sections are addressed below.

Section 7.11.9

In 1995, Part VII of Regulation 61-63 underwent substantial revisions to require engineered barriers for all waste classes disposed at the Barnwell Facility. Accordingly, Section 7.11.9 now provides that:

> The disposal facility shall incorporate engineered barriers for **all** waste classifications. The engineered barriers shall be designed and constructed to complement and improve the ability of the disposal facility to meet the performance objectives in this part.

24A S.C. Code Ann. Reg. 61-63 Sec. 7.11 (emphasis added). The "performance objectives" are specifically referenced in Section 7.17, and embodied in Section 7.18 - 7.21.[9]

The disposal technology currently used at the Site is most accurately described as enhanced shallow land burial with engineered barriers: the primary engineered barriers being disposal trenches, disposal vaults, and enhanced caps. The license required Chem-Nuclear to use disposal vaults for all waste classes and to construct enhanced caps on all existing and future trenches at the Barnwell site. An "engineered barrier" is defined as "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives of this part. This shall include above or below grade vaults or equivalent structures." S.C. Code Ann. Reg. 61-63 Sec. 7.2.9. Engineered barriers are now standard technology at the Barnwell Facility. These changes require that (1) all waste be placed in concrete disposal vaults and (2) enhanced caps be placed on all trenches. The use of engineered barriers (e.g. the enhanced caps) has reduced water intrusion into the trenches. More specifically, Section 7.11.9 requires the engineered barriers be designed and constructed so as to improve the ability of the disposal facility to meet the following objectives:

- Section 7.18 – the effluent standard. The findings demonstrate that the compliance standard of Section 7.18 is addressed through the incorporation

[9] In their reply to Respondents' proposed order, Petitioner asserted that performance objectives are also found in Section 7.11.11. Regardless of whether the criteria in Section 7.11.11 is or is not a performance objective under Section 7.11.9, it is nevertheless addressed below.

and use of engineered barriers. For instance, the use of vaults to stabilize the trenches, the containment of waste forms, and the installation of impermeable caps on inactive trenches have enhanced site performance and supports Chem-Nuclear's predictions for a continually declining trend in radioactive releases to the general environment. Furthermore, Petitioner presented no evidence to demonstrate that Chem-Nuclear failed to adhere to the effluent standard in Section 7.18.

- Section 7.19 – protection of inadvertent intruders. The findings demonstrate that the Barnwell Disposal Facility properly protects inadvertent intruders. The first point of potential exposure from release into the environment of tritium is at the compliance point, Mary's Branch Creek. Access to the compliance point is restricted by a fence and heavy vegetation. Restrictions have also been imposed prohibiting the use of groundwater and surface water in the vicinity of the compliance point. Within the disposal site, the engineered barriers and disposal vault lids serve as an intrusion barrier. Chem-Nuclear has minimized any potential of subsidence of the enhanced cap. Finally, no evidence was presented to demonstrate that inadvertent intruders were in danger of exposure.

- Section 7.20 – protection of individuals during operations – Section 7.20 requires Chem-Nuclear to comply with ALARA and protect individuals during disposal operations. The findings state that Chem-Nuclear performs monitoring and analysis to ensure that its workers are protected and that the Blue Ribbon Panel concluded that the Barnwell Facility poses "a minimal risk." The findings also reflect that Chem-Nuclear implemented ALARA and balanced the benefit of proposed disposal methods and technology with the potential risks associated with worker exposure.

- Section 7.21 – Disposal Site Stability at Closure – Section 7.21 requires that the engineered barriers satisfy the objective of stability of the disposal site. Certainly, the use of engineered barriers as described in the findings provides significantly more stability than early disposal practices which involved "unreliable containment and waste forms." The earthen enhanced cap is now multi-layered. Chem-Nuclear has developed and documented, through its procedures, backfilling methods to maximize filling of voids around vaults, and has enhanced long-term stability of the entire trench system. Furthermore, filling void spaces minimizes the potential for subsidence of the enhanced cap.

Therefore, Respondents demonstrated that the design and construction of the engineered barriers meet the pertinent performance objectives for all waste classifications under Section 7.11.9. Moreover, Petitioner's Proposed Order merely referenced Section 7.11.9 but did not make any conclusions of law regarding noncompliance with Section 7.11.9.

Section 7.11.10

24A S.C. Code Ann. Reg. 61-63 Sec. 7.11.10 requires that:

> The engineered barriers shall be designed and constructed of materials having physical and chemical properties so as to provide reasonable assurance that the barriers will maintain their functional integrity under all foreseeable conditions for at least the institutional control period. No reliance may be placed on the engineered barriers beyond the institutional control period.

This section is concerned with the materials making up the engineered barriers, specifically whether those materials had physical and chemical properties that would "reasonabl[y] assur[e]" the satisfaction of the objectives set forth in 7.11.11 "under all foreseeable conditions for at least the institutional control period." Whether the design of the barriers and the way the concrete was used, i.e. the construction of the barriers, were able to meet the objectives is a question arising under 7.11.11.

Here, the findings speak to compliance with Section 7.11.10 in that since 1995, the Barnwell Facility's design has utilized disposal vaults made of concrete and a multi-layer cap as the two primary design features to provide for long-term performance, similar to the North Carolina proposed design. The modules or vaults provide for the structural stability for the enhanced caps. Indeed, because the vaults are made of concrete, they are reasonably assured to "maintain their functional integrity under all foreseeable conditions for at least the institutional control period." The findings reflect that the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and into the long-term future. Furthermore, Petitioner's Proposed Order merely referenced Section 7.11.10 but did not rely on any factual findings or make any conclusions of law regarding noncompliance with its terms. In sum, no concrete evidence was presented to demonstrate that the materials used in the design and construction of the engineered barriers at the Barnwell Site are inadequate to protect the public health and safety because they fail to provide reasonable assurances that the general population will be protected from releases of radioactivity.

Section 7.11.11

24A S.C. Code Ann. Reg. 61-63 Sec. 7.11.11 sets forth twelve forth additional objectives applicable to disposal units and engineered barriers. Petitioner does not dispute that Chem-Nuclear complied with Sections 7.11.11.8 through 7.11.11.12. I thus conclude that the license meets the requirements of Sections 7.11.11.8 through 7.11.11.12 and do not address those

sections further. The remaining issues (Sections 7.11.11.1 through 7.11.11.7) are addressed below.

Subsection 7.11.11.1

Subsection 7.11.11.1 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed "to minimize the migration of water onto the disposal units." A "disposal unit" is defined as "a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal, the unit is usually a vault or a trench." S.C. Code Ann. Reg. 61-63 Sec. 7.2.8. Chem-Nuclear currently uses three engineered trench designs: Class A; Class B/C; and slit-type trench.

The Class A trench is the largest of the three. The floor in that trench is sloped to the corner locations, and a drainage system is installed to facilitate monitoring of water infiltration entering the trench. The Class B/C trench is used for disposal of primarily Class B and Class C wastes. A French drain and sump system on the floor of the B/C trench allows monitoring of any water that accumulates in the trench. The slit trench is used for disposal of irradiated hardware and large-quantity sealed sources. The entire slit trench floor is filled with coarse drain sand and sloped to one end. Standpipes to monitor water accumulation are installed periodically along the length of the trench.

A multi-layer enhanced cap is installed following completion of disposal in a trench or a group of adjacent trenches. The enhanced cap consists of the initial clay cap overlain by polyethylene and bentonite materials, a sand drain layer, and general soil materials for vegetation growth. The initial clay cap minimizes the infiltration of surface water into the trench. Likewise, the concrete disposal vault lids serve as intrusion barriers required for Class C waste. Grass may be planted on the initial cap to control erosion.

For all trench types, Chem-Nuclear uses backfilling methods to maximize filling of voids around vaults to enhance the long-term stability of the entire trench system. Chem-Nuclear also implements a surface water management plan to manage precipitation collected in trenches. Water is pumped into adjacent trenches to ensure that it does not come into contact with waste or disposal units. Water may also be pumped into an adjacent lined pond. More importantly, though Petitioner points to findings that recognize water may migrate of into the disposal units there are no findings that Chem-Nuclear has failed to minimize that intrusion. Therefore, the trenches are designed and constructed to prevent the flow of surface water from coming in

contact with waste, and the findings related to disposal practices at the Barnwell Facility demonstrate that the objective of minimizing the migration of water onto the disposal units was established.

Subsection 7.11.11.2

Subsection 7.11.11.2 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed "to minimize the migration of waste or waste contaminated water out of the disposal units." Petitioner argues that because the concrete vaults allow water to flow out of the vault and drain into the trench, they fail to minimize the migration of waste or waste contaminated water out of the disposal units. An important component of minimizing the migration of waste or waste contaminated water out of the disposal units is to minimize the migration of waste or waste contaminated water into the disposal units. Accordingly, in reviewing this criterion, all the above facts addressed under Subsection 7.11.11.1 are relevant. Furthermore, the findings reflect a much greater effort to minimize the migration of waste or waste contaminated water out of the disposal units.

Here, the disposal containers at the Barnwell Facility are placed inside concrete disposal vaults which are in the trenches. The concrete disposal vault lids serve as intrusion barriers for the waste placed inside them. The exception is large components, such as steam generators and pressurizers, which, because of their size, qualify as disposal vaults and are placed directly into the trenches. DHEC must review and approve a placement plan for large components prior to acceptance of the component for disposal. After the vaults are filled and closed, Chem-Nuclear places backfill material in the void space between the vaults to minimize the potential for subsidence of the enhanced cap. After backfilling, the vaults are covered with additional soil material and an initial clay cap to minimize the infiltration of surface water into the trench. Chem-Nuclear installs a final multi-layer enhanced cap after completion of waste disposal in the trench.

All of these steps are designed to minimize the infiltration of water into the vaults which in turn minimizes the migration of waste or waste-contaminated water out of them. While the ALC found that drainage holes in the floors of the vaults "can also allow water to rise up into the containers," the fact is that the drainage holes in the floors of the vaults will allow water to drain out of the vault and into the trench drainage system. The trench drainage system is installed to facilitate monitoring of water infiltration entering the trench. Furthermore, though the finding

clearly reflect that clay-sand trench bottoms are not designed to prevent the migration of liquids out of the bottom of trenches, but rather, are designed to be partially impermeable and allow liquids to infiltrate the soil below the trenches, there is no finding that Chem-Nuclear's waste disposal design is faulty or fails to minimize the migration of waste or waste contaminated water out of the disposal units.

Petitioner points out various means it believes are obvious ways to minimize migration into and out of the vaults. However, there are no findings addressing the efficacy of their proposals. To the contrary, a major component of their argument was dismissed by the findings. Petitioner argues that the North Carolina design, created by Chem-Nuclear, demonstrates that sealing the vaults to prevent contact between the waste and water would be one step towards minimizing this water migration and groundwater contamination. Nevertheless, the findings set forth that there is no information to evaluate the North Carolina design because it was never issued a license and constructed, no facility in the United States uses this design, and the design feature of "assured isolation" is theoretical only. In fact, DHEC specifically asked the Blue Ribbon Panel to consider whether Chem-Nuclear should change its designs and operations to use other technologies, including the North Carolina design and assured isolation. The Panel concluded that the potential changes would provide only incremental improvement, if any, in performance. Moreover, the findings clearly reflect that assured isolation is a storage concept, rather than a disposal concept. In fact, the restrictions on waste forms and characteristics that have been imposed at the Barnwell Facility over the past twenty years have increased the accompanying reliability and waste isolation capabilities of the facility.

Petitioner also argues that the fact that improvements in the waste disposal procedure has successfully reduced the amount of tritium concentration at the compliance point, simply "does not get to the heart of the technical requirements that the disposal units and engineered barriers be designed and constructed to minimize contact of waste with water and surrounding earth."[10] I agree with Petitioner that those facts alone do not establish that the migration of waste or waste contaminated water out of the disposal units is being minimized. That assertion however fails to recognize that the reduction of the migration of tritium is evidence as to whether Chem-Nuclear's effort to minimize the migration of waste or waste contaminated water out of the

[10] Monitoring data demonstrates a declining trend in tritium concentration at the compliance point.

disposal units is successful. Moreover, the above findings reflect a much greater effort to minimize the migration of waste or waste contaminated water out of the disposal units.

In sum, the findings do not reflect that Chem-Nuclear failed to minimize the migration of waste or waste contaminated water out of the disposal units.

Subsection 7.11.11.3

Subsection 7.11.11.3 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed to detect "water and other liquids in the disposal units." Petitioner avers that Chem-Nuclear failed to meet this objective. However, to that end, Petitioner simply cited the subsection without any reference to findings that supported its claim. To the contrary, the findings reflect that all trenches are constructed with sloping floors and French drains that transport water away from the disposal units/vaults. The Class A trench, the largest of the three trench types, is sloped to trench corner locations, and a trench drainage system is installed to facilitate monitoring of water infiltration entering the trench. A French drain and sump system on the floor of the B/C trench facilitates monitoring of any water that accumulates in those trenches. The entire slit trench is filled with coarse drain sand and sloped to one end. Standpipes are installed periodically along the length of the trench to monitor water accumulation. As part of the enhanced cap construction, trench standpipes; wellhead protective pads; and trench corner and identification markers are installed as the final step in the capping process. Therefore, I find that all trenches are designed to allow monitoring of water infiltration entering the trenches and thus the engineered barriers satisfy the performance objective for detection of water and other liquids in the disposal units.

Subsection 7.11.11.4

Subsection 7.11.11.4 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed to temporarily collect and retain "water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." Though Petitioner cited Subsection 7.11.11.5, its arguments reflect that it actually avers that Chem-Nuclear failed to meet the objective under 7.11.11.4. However, Petitioner simply cited the content of Subsection 7.11.11.4 without any reference to findings that supported its claim. To the contrary, the findings reflect that though rainwater can collect in an open trench at the Barnwell Facility, Chem-Nuclear implements a surface water management plan to manage precipitation collected

in trenches. Water is pumped into adjacent trenches to ensure that it does not come into contact with waste or disposal units. Water may also be pumped into an adjacent lined pond. The trenches are also designed to prevent the flow of surface water from coming into contact with waste. Based on this surface water management plan, Chem-Nuclear has demonstrated that the trenches are designed to meet the performance objective of allowing temporary collection of water and retention of water to allow for the detection and removal or other remedial measures without resulting contamination.

Subsection 7.11.11.5

Subsection 7.11.11.5 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed to facilitate "remedial methods without disturbing other disposal units." [11] Here the finding reflect the use of three engineered trench designs for the three classes of waste (Class A, Class B/C, and slit-type) ensures that waste is appropriately segregated for disposal. The position of each vault in the trench is recorded in the Waste Manifest Data System, also facilitating remedial work that may need to occur. Large components are placed in the trench intact in accordance with a trench placement plan, again ensuring that if remediation is required, the location of the vaults and large components is known. Trench standpipe, wellhead protective pads, and trench corner and identification markers are installed as the final step in the capping process.[12]

Subsection 7.11.11.6

Petitioner asserted in its Proposed Order that Chem-Nuclear failed to comply with Subsection 7.11.11.6 "given that the waste is not presently isolated." Petitioner expounded upon that proposition further in its Reply, pointing out that "the radioactive tritium has entered the surrounding soil and traveled by underground water from the disposal units and into Mary's Branch Creek."

Subsection 7.11.11.6 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed to provide "reasonable assurance that the waste will be isolated for at least the institutional control period." By regulation, the institutional control

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[11] As noted above, Petitioner's Proposed Order mistakenly describes Subsection 7.11.11.4 as Subsection 7.11.11.5 and leaves out any argument as to whether Chem-Nuclear complied with Subsection 7.11.11.5. Nevertheless, in light of the confusion, Chem Nuclear's compliance with Subsection 7.11.11.5 is addressed herein.

[12] The identification markers also serve to mark the boundaries of the trenches, thus facilitating the use of remedial methods without disturbing other disposal units.

period is 100 years. S.C. Code Ann. Reg. 61-63 Sec.7.27.2. Waste isolation includes isolation from inadvertent intruders, and this is accomplished through the use of engineered barriers. As noted before, with the exception of large components, incoming waste is in containers that are then placed within nine-inch thick concrete vaults that are buried under enhanced caps. DHEC regulation requires that the "intruder barriers," specifically the vaults, be designed to protect against an inadvertent intrusion for at least 500 years. S.C. Code Ann. Reg. Sec. 7.24.2. The disposal vault lids also serve as an intrusion barrier for Class C waste buried within. Furthermore, no concrete evidence was presented to show that the Site design and operations are inadequate to protect the public health and safety because they fail to provide reasonable assurances that inadvertent intruders are protected in accordance with Section 7.19 of DHEC Regulation 61-63.

Waste isolation in Section 7.11.11 also refers to isolation from the general environment. In the early years at the Barnwell Facility, the acceptable waste disposal practices for low-level radioactive waste disposal facilities resulted in tritium releases into the trenches. These early disposal practices included unreliable containment and waste forms, including packaging in paper and cardboard containers. The changes in design and operations at the Barnwell Facility – the use of vaults to stabilize the trenches, the use of high-integrity polyethylene disposal containers to contain waste forms, the elimination of liquid waste forms, and the installation of impermeable caps on inactive trenches – have enhanced site performance so as to support Chem-Nuclear's predictions of a continually declining trend in radioactive releases to the general environment. And it is equally clear that it is imprudent to attempt to uncover or excavate these containers and waste in order to provide better containment of the existing waste.

Subsection 7.11.11.7

Subsection 7.11.11.7 requires that the disposal units and the incorporated engineered barriers shall be designed and constructed to prevent "contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units." Petitioner asserts that the Chem-Nuclear Site fails to comply with Section 7.11.11.7 because Judge Geathers found that the disposal practices are specifically designed to allow waste to infiltrate into the surrounding earth." The complete finding stated:

> The bottoms of the trenches at the Chem-Nuclear site are lined with clay sand or sandy clay that is neither compacted nor designed to be impermeable. In fact, the liner sand is not a low-conductively soil and is not designed to prevent the

migration of liquids out of the bottom of trenches, but rather, is designed to be partially impermeable and is designed to allow liquids to infiltrate the soil below the trenches.

That finding, however, did not state that Chem-Nuclear's waste disposal design is faulty or fails to minimize the migration of waste or waste contaminated water out of the disposal units.

Furthermore, the finding in the above subsections involving the efforts and implication of preventing water intrusion into the vaults are incorporated herein. In addition, the findings do reflect that the bottoms of the trenches at the Barnwell Site are indeed lined with **partially impermeable** clay sand or sandy clay, and that the trenches are designed with trench drainage systems that move water out from the trenches. More importantly, the changes to the license in 1995 included requiring all waste containers to be placed in concrete disposal vaults, with the exception of large components, as approved by DHEC. I find that placement of waste in a waste container and a reinforced concrete vault further prevents contact between waste and the surrounding earth. Therefore, the objective of preventing contact between waste and the surrounding earth has been demonstrated.

Regulation 61-63, Section 7.23.6

24A S.C. Code Ann. Reg. 61-63 Sec. 7.23.6 provides that:

> The disposal site shall be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

Petitioner argues that the renewal license violates Section 7.23.6 because it is not designed to minimize the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal. Petitioner contends that this assertion is supported by Judge Geathers's finding that the trench bottoms are lined with sand and the storage vaults have holes in them, which allows the movement of water into the underlying earth, groundwater and surface water. Petitioner further noted in their Reply that Judge Geathers found that "the concrete vaults are not sealed against water intrusion. The floors of the vaults have holes to allow water to drain from the vaults, and the lids of the vaults are not grouted or otherwise sealed to prevent water intrusion. The drainage holes in the floors of the vaults can also allow water to rise up into the containers."

Notably, as with the similar provisions above, Section 7.23 does not prohibit any contact of water with waste, but rather provides that the site design shall "**minimize** to the **extent practicable** the contact of water with waste . . . ." (Emphasis added). The Barnwell Facility utilizes numerous mechanisms to minimize the exposure of waste with water. The following findings set forth several pertinent facts regarding the disposal units and engineered barriers that exist regarding the requirements of Section 7.23.6.

- Casks containing the waste are prepared for off-loading from the transport vehicles, and inspection of the casks include checking the rain cover;
- Inspections of the containers continue as they are unloaded and placed in the reinforced concrete disposal vaults;
- High-integrity polyethylene disposal containers are used to contain waste forms;
- The vaults provide for the structural stability for the enhanced caps;
- When the vaults are filled and closed, backfill material fills the void spaces between the vaults to stabilize them;
- The vaults are covered with additional soil and a clay cap that is used to minimize infiltration of surface water into the trenches. Grass may be planted to control erosion;
- The final, multi-layer enhanced cap is installed after completion of waste disposal in the trenches, and impermeable caps are installed on inactive trenches;
- Of the three types of trenches (Class A, Class B/C, and slit trench) the Class A trench is the largest, and its floor is sloped with a trench drainage system to facilitate monitoring of water infiltration entering the trench;
- The Class B/C trench has a French drain and sump system on the floor to allow monitoring of any water that accumulates in the trench;
- The slit trench floor includes standpipes to monitor water accumulation along the length of the trench;
- Chem-Nuclear implements a surface water management plan to manage rainwater collected in the trenches. Water is pumped to adjacent trenches to ensure it does not come into contact with waste or disposal vaults. Water may also be pumped to an adjacent pond; and
- Chem-Nuclear has installed an extensive groundwater monitoring system in and around the disposal area of the Barnwell site.

The findings also recognized that the changes in design and operations at the Barnwell facility implemented over the past ten years have enhanced site performance so as to support

Chem-Nuclear's predictions of a continually declining trend in radioactive releases to the general environment. That decline obviously has occurred as a result of the reduced contact of water with waste. The findings further note that the Blue Ribbon Panel concluded that current disposal practices are adequate and that potential changes the Panel was asked to consider (including above-ground earth-mounded bunker designs, and assured isolation) would provide only incremental improvement, if any, in performance.

Furthermore, Section 7.23.6 distinguishes between "water" and "standing water" for three different phases of operations at the Barnwell Facility - "storage," "disposal," and "after disposal." Any "storage" of waste is temporary at the Barnwell Facility. Depending on the type of shipment and waste type, the transport vehicle will be directed to either the Cask Maintenance Building (CMB) or the appropriate trench for disposal. Inspections of casks and preparations for off-loading are undertaken at the CMB. The cask is then directed to the trench for disposal into concrete vaults within the trench. Based on the practice of inspecting and preparing waste for disposal within the CMB, Chem-Nuclear minimizes the contact of water with waste prior to off-loading the waste into the trench.

I also find that Chem-Nuclear has minimized the possibility of contact between waste and standing water in the trenches during disposal. "The bottoms of the trenches at the Chem-Nuclear site are lined with clay sand or sandy clay that is neither compacted nor designed to be impermeable. In fact, the liner sand is not a low-conductivity soil and is not designed to prevent the migration of liquids out of the bottom of trenches, but rather, is designed to be partially impermeable and is designed to allow liquids to infiltrate the soil below the trenches."[13]

I further find that Chem-Nuclear has minimized the possibility of contact between waste and standing, or percolating, water after disposal. The design of the trench provides for filtration of any standing water. Chem-Nuclear implements a surface water management plan specifically to "manage precipitation collected in its trenches." In addition, concrete vaults are designed to allow water to flow out of the vault and drain into the trench in order to infiltrate the soil. And, while the initial and enhanced cap is designed to minimize water intrusion, any water or rainfall

[13] Petitioner actually uses these facts in its Proposed Order to support its argument. However, if water permeates the bottom of the trenches due to this sandy clay material, then it would prevent water from standing in the trenches, and would thus prevent standing water from coming into contact with waste. Nevertheless, the concern of this section is not with having standing water, but with the water's contact with waste.

penetrating the enhanced cap, the initial cap, the vault lid, and the vault, will ultimately drain through these engineered barriers and infiltrate into the soil.

Therefore, the findings reflect that Chem-Nuclear is in compliance with Section 7.23.6.

CONCLUSION

Petitioner must demonstrate, by a preponderance of the evidence, that renewal is not authorized based on the ALC's factual findings in the 2005 Decision as applied to the sections of R. 61-63 discussed above. Sierra Club v. SCDHEC and Chem-Nuclear Sys., LLC, 387 S.C. 424, 693 S.E.2d 13 (S.C. App. 2010). However, Petitioner has failed to carry that burden, as this Court finds and concludes that the factual findings in the 2005 Decision, when applied to 24A S.C. Code Ann. Reg. 61-63 Secs. 7.10.5-7.10.10, 7.11, and 7.23.6, demonstrate that the Barnwell Facility is compliant with these regulations and that renewal of License No. 097 was proper.

ORDER

IT IS HEREBY ORDERED that DHEC's decision to renew Radioactive Material License No. 097 issued to Respondent Chem-Nuclear Systems, LLC, for the operation of the low-level radioactive waste disposal facility in Barnwell, South Carolina, is **AFFIRMED**

AND IT IS SO ORDERED.

Ralph King Anderson, III
Chief Administrative Law Judge

July 20, 2012
Columbia, South Carolina

CERTIFICATE OF SERVICE

I, E. Harvin Belser Fair, hereby certify that I have this date served this Order upon all parties to this cause by depositing a copy hereof, in the United States mail, postage paid, in the Interagency Mail Service, or by electronic mail to the address provided by the party(ies) and/or their attorney(s).

E. Harvin Belser Fair
Judicial Law Clerk

July 20, 2012
Columbia, South Carolina

The Supreme Court of South Carolina

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CLERK OF COURT

BRENDA F. SHEALY
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July 21, 2011

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Re: Sierra Club v. SC DHEC & Chem-Nuclear
2004-AL-07-0126

Dear Counsel:

The Court has issued the following Order on your Petition for Writ of Certiorari in the above entitled matter:

"Petition for Writ of
Certiorari Denied.

s/ Jean H. Toal C.J.
For the Court

Justice Kaye G. Hearn,
not participating

July 21, 2011."

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By copy of this letter we are advising all interested parties of the action of the Court in this matter.

Very truly yours,

Daniel E. Shearouse
BS

CLERK

DES/dmh

cc: Jacquelyn Sue Dickman, Esquire
James S. Chandler, Jr., Esquire
Amy E. Armstrong, Esquire
Robert Guild, Esquire
The Honorable Jana E. Shealy
The Honorable Tanya Gee

THE STATE OF SOUTH CAROLINA

In The Court of Appeals

Sierra Club, Appellant,

v.

South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC., Respondents.

Appeal From Richland County

John D. Geathers, Administrative Law Court Judge

Opinion No. 4654
Heard November 21, 2009 – Filed March 10, 2010

AFFIRMED IN PART AND REMANDED IN PART

James S. Chandler, Jr., and Amy E. Armstrong, both of Pawleys Island, for Appellant.

Elizabeth M. Crum, Jacquelyn Sue Dickman, Sara S. Rogers, all of Columbia, Evander Whitehead, of North Charleston, and Mary D. Shahid, of Charleston, for Respondents.

LOCKEMY, J.: The Sierra Club appeals the Administrative Law Court's (ALC) determination that it failed to present sufficient evidence to warrant a revocation of Chem-Nuclear's license renewal. This case involves whether Chem-Nuclear was in compliance with certain Department of Health and Environmental Control (DHEC) regulations. Specifically, the Sierra Club argues Chem-Nuclear's current disposal practices fail to comply with section 7.11, concerning engineered barriers, of regulation 61-63 (Supp. 2009). Additionally, the Sierra Club maintains Chem-Nuclear's current disposal practices fail to comply with section 7.23.6, concerning separating water from waste, of regulation 61-63 (1992). Finally, the Sierra Club maintains Chem-Nuclear failed to comply with all requirements set forth in section 7.10 of regulation 61-63 (Supp. 2009). The ALC did not rule on whether Chem-Nuclear was in compliance with section 7.11, 7.23.6, and all requirements of 7.10; accordingly, we cannot review whether the ALC erred. The ALC found the Sierra Club failed to present sufficient evidence that established Chem-Nuclear was not in compliance with sections 7.10.1, 7.10.2, 7.10.3, and 7.10.4 and found the Sierra Club failed to present evidence demonstrating Chem-Nuclear violated section 7.18 and the ALARA test. We find there is sufficient evidence in the record to support these findings and affirm. However, we remand this case to the ALC for a ruling on whether Chem-Nuclear's current waste disposal practices are in compliance with sections 7.11, 7.23.6, and 7.10.5-7.10.10

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of regulation 61-63.

BACKGROUND

South Carolina is an agreement state for the disposal of low-level radioactive waste (LLRW) under the United States Atomic Energy Act. 42 U.S.C §2021 (2005). In 1969, South Carolina became an agreement state after it enacted the Atomic Energy and Radiation Control Act, codified in sections 13-7-10 through 13-7-460 of the South Carolina Code (Supp. 2009). Federal and state laws require LLRW disposal facilities be located on state-owned land. 24A S.C. Code Reg. 61-63, § 7.27.1 (1992). In accordance with section 7.27.1, Chem-Nuclear leases the land from the state for a term of ninety-nine years and is in the business of disposing LLRW at the Barnwell facility. Chem-Nuclear began disposal operations at the Barnwell site in 1971 pursuant to license number 97. Since 1971, Chem-Nuclear has been the only operator of the Barnwell facility, and prior to the present action, Chem-Nuclear renewed its license seven times. The Barnwell facility is licensed and overseen by South Carolina through DHEC. To continue operations at the Barnwell site, Chem-Nuclear must follow certain regulations.

PROCEDURAL HISTORY

In 2000, Chem-Nuclear timely submitted its renewal application for license number 97 to DHEC. Thereafter, DHEC published a notice concerning a public hearing on the Chem-Nuclear renewal application. After holding a public hearing, on March 15, 2004, DHEC renewed Chem-Nuclear's license. The Sierra Club and Environmentalists, Inc., another environmental organization, challenged DHEC's decision to the ALC on April 1, 2004. Chem-Nuclear filed pre-trial motions for summary judgment, arguing the petitioners lacked standing because they could not prove an injury in fact from the continued operation of the disposal facility at the Barnwell plant. The ALC dismissed only Environmentalists, Inc., from the action for lack of standing and found the Sierra Club had standing.

Subsequently, the Sierra Club petitioned for administrative review and requested an adjudicatory hearing. In its petition, the Sierra Club challenged DHEC's decision and maintained the proposed license, as conditioned, failed to adequately protect public health, safety, and the environment. As conditioned, the Sierra Club argued DHEC authorized Chem-Nuclear to continue nuclear waste management and disposal practices at the Barnwell landfill that failed to maintain radiation releases to the public as low as reasonably achievable. The Sierra Club cited to federal and state statutes as well as to DHEC regulations in support of its assertion. Finally, the Sierra Club maintained its members would suffer injuries in fact in the form of lost property values and diminished health, safety, and use and enjoyment of their property and natural resources.

On appeal, the ALC reviewed DHEC's decision de novo and noted the Sierra Club, as Petitioner, carried the burden of proving its case by a preponderance of the evidence. The ALC noted the requirements necessary for DHEC to issue a license by citing to regulation 61-63 of South

Carolina Code of Regulations (Supp. 2008). In particular, the ALC cited section 7.18 of regulation 61-63 which provides: "Reasonable efforts should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable (ALARA)."

Ultimately, the ALC found the Sierra Club failed to present evidence warranting the reversal of the renewal of license no. 97 based on section 7.10.1 of regulation 61-63, which requires that the issuance of the license not constitute an unreasonable risk to the health and safety of the public. Additionally, the ALC found the Sierra Club failed to present sufficient evidence to warrant the reversal of license number 97's renewal because Chem-Nuclear's disposal practices failed to satisfy the requirements of section 7.10.2 and 7.10.3 of the regulation 61-63. Third, the ALC found the Sierra Club failed to demonstrate that Chem-Nuclear's operations at the Barnwell Facility did not comply with section 7.10.4 of regulation 61-63, which addresses the protection of inadvertent intruders on the site. Finally, the ALC found the Sierra Club failed to show that Chem-Nuclear violated section 7.18 and the ALARA standard therein. The ALC ruled accordingly because Chem-Nuclear and DHEC demonstrated adherence to ALARA, as set forth in regulation 61-63, sections 3.4.2 and 7.18, by taking appropriate measures to address tritium migration from the Barnwell facility and the potential for releases from other radionuclides that are contained in the waste burial site.

However, the ALC found the Sierra Club raised legitimate issues and presented evidence suggesting further studies were needed to evaluate the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell site that will: (1.) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches; (2.) provide temporary dry storage facilities for the storage of waste received during wet conditions; and (3.) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible. In order to address these concerns; the ALC ordered Chem-Nuclear to conduct studies to address the concerns within 180 days.

Thereafter, the Sierra Club filed a motion to reconsider and to alter or amend the ALC's findings and conclusions. In its motion, the Sierra Club argued the ALC failed to address issues brought before the court. Additionally, the Sierra Club argued there were several inconsistencies between some of the findings and the conclusions. Specifically, the Sierra Club maintained there was a fundamental disconnect between the portion of the ALC's order that sustained the decision to renew Chem-Nuclear's license and the portion of the order that required Chem-Nuclear to conduct further studies. In its motion for reconsideration, the Sierra Club specifically mentioned sections 7.11 and 7.23.6 of regulation 61-63 and argued Chem-Nuclear's current disposal practices are not in compliance with these sections. The ALC did not specifically rule on the Sierra Club's motion but generally denied their motion for reconsideration.

The Sierra Club appealed the ALC's decision to the DHEC Board for review because prior appellate procedures were in effect. All parties expected the DHEC Board to review the ALC's decision at its July 2006 meeting; however, on July 1, 2006, the General Assembly amended the

appeals procedures for permits and licenses issued by DHEC and other agencies. In order to determine the Act's effect on its case, Chem-Nuclear then filed a petition with the South Carolina Supreme Court. In response, our supreme court issued an opinion indicating the DHEC Board no longer had jurisdiction to hear the case and directed DHEC to transfer the appeal to this court. Chem-Nuclear Sys., LLC v. S.C. Board of Health & Envtl. Control, 374 S.C. 201, 648 S.E.2d 601 (2007). This appeal follows.

STANDARD OF REVIEW

The standard of review for a court reviewing the decision of the ALC is set forth in the Administrative Procedures Act. S.C. Code Ann. § 1-23-610 (Supp. 2009). "The review of the administrative law judge's order must be confined to the record." § 1-23-610 (B). Under section 1-23-610 (B), our court may affirm or remand the case for further proceedings. Additionally, this court may reverse or modify the decision of the ALC if its findings, conclusions, or decisions are:

(a) in violation of constitutional or statutory provisions;
(b) in excess of the statutory authority of the agency;
(c) made upon unlawful procedure;
(d) affected by other error of law;
(e) clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or
(f) arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion.

§1-23-610 (B). The decision of the ALC should not be overturned unless it is unsupported by substantial evidence or controlled by some error of law. Original Blue Ribbon Taxi Corp. v. S.C. Dept. of Motor Vehicles, 380 S.C. 600, 604, 670 S.E.2d 674, 676 (Ct. App. 2008). "Substantial evidence, when considering the record as a whole, would allow reasonable minds to reach the same conclusion as the [ALC] and is more than a mere scintilla of evidence." Id. at 605, 670 S.E.2d at 676.

LAW/ANALYSIS

The Sierra Club argues Chem-Nuclear's landfill fails to comply with certain DHEC regulations that require the use of engineered barriers to isolate the wastes from water and the surrounding earth. Specifically, the Sierra Club contends Chem-Nuclear's landfill fails to meet the technical requirements of sections 7.10, 7.11, and 7.23.6 of regulation 61-63. In response, DHEC argues the ALC, in determining whether a license should be renewed, must apply the criteria set forth in section 7.10 of regulation 61-63 rather than apply criteria set forth in sections 7.11 and 7.23.6. Assuming sections 7.11 and 7.23.6 are applicable to Chem-Nuclear's license renewal, DHEC argues the Sierra Club failed to preserve these issues for review. Even if preserved, DHEC maintains the Sierra Club misapprehends the legislative intent of regulation 61-63. We address each issue and sections 7.10, 7.11, and 7.23.6 in turn.

I. Applicability of sections 7.11 and 7.23.6

As Chem-Nuclear and DHEC first argue, section 7.10 specifically applies to "Requirements for Issuance of a License." In contrast, the scope of section 7.11 applies to "Conditions of Licenses," while the scope of section 7.23 applies to "Disposal Site Design for Near-Surface Disposal." We find section 7.11 is an extension of section 7.10 as the Sierra Club argues. Furthermore, Chem-Nuclear is the only LLRW plant in the state, and it appears the scope of regulation applies broadly. See section 1.1 of regulation 61-63 (stating "[e]xcept as otherwise specifically provided, these regulations apply to all persons who receive, possess, use, transfer or acquire any radioactive material . . . "). Therefore, we believe Chem-Nuclear must be in compliance these regulations as a whole.

II. Preservation

Next, Chem-Nuclear and DHEC argue the Sierra Club's first issue is not preserved for review. Specifically, the Respondents maintain the Sierra Club failed to raise RHA 7.11 or RHA 7.23 in its prehearing statement and never amended its prehearing statement to include the regulations at issue. In support of its assertion, Chem-Nuclear cites McNeely v. South Carolina Farm Bureau Mutual Insurance Co., 259 S.C. 39, 190 S.E.2d 499 (1972). The only pertinent section of the McNeely opinion states: "The estoppel issue argued by appellant in his brief was not made by the pleadings nor raised in the exceptions. Accordingly that issue is not before this Court." Id. at 41, 190 S.E.2d at 499.

We do not find McNeely, an insurance case, persuasive. Specifically, we do not believe McNeely holds that, as a general rule, only those claims presented in a prehearing statement will be considered on appeal. Instead, we find the general preservation rule, that an issue must be raised to and ruled upon in order to be preserved for review, should apply. See Brown v. S.C. Dep't of Health & Envtl. Control, 348 S.C. 507, 519, 560 S.E.2d 410, 417 (2002) ("[I]ssues not raised to and ruled on by the AL[C] are not preserved for appellate consideration."). Therefore, we must determine whether this issue was properly before the ALC.

As Chem-Nuclear argues, the Sierra Club did not specifically mention section 7.11 or section 7.23.6 in its prehearing statement. However, the Sierra Club raised overall compliance with regulation 61-63 in its prehearing statement. Specifically, in its prehearing statement under "specific statutory and regulatory provisions giving rise to the controversy," the Sierra Club cites DHEC regulations 61-72 and 61-63. Additionally, in its prehearing statement, under "issues to be presented for determination, including any claims or defenses expected to be raised" the Sierra Club includes: "Whether the proposed renewal license would violate state and federal environmental law and regulations . . . ." The Sierra Club then specifically mentions certain sections of the regulations. Accordingly, we construe these statements broadly to include the applicable sections of regulation 61-63.

Furthermore, we believe the Sierra Club overcame the "ruled upon" requirement for preservation.

Here, the Sierra Club submitted a post-trial motion requesting the ALC rule on these issues which the ALC generally denied without addressing specific issues. Pursuant to Rule 40 of the South Carolina Administrative Law Court (2009): "Issues raised on appeal but not addressed in the [final] order are deemed denied." Therefore, under the current version of the Administrative Law Rules, because these issues are deemed "denied" they satisfy the "ruled upon" preservation requirement. See id.

As additional support for the "ruled upon" preservation requirement, we look to Pye v. Fox, 369 S.C. 555, 633 S.E.2d 505 (2006). In Pye, the South Carolina Supreme Court identified a ruling by a trial court or a post-trial motion as the two ways to preserve an issue for appeal. 369 S.C. at 566, 633 S.E.2d at 511. The Pye court held an issue was preserved for review when Pye raised such issue to the trial court through a Rule 59(e) motion. 369 S.C. at 565, 633 S.E.2d at 510. Though the trial court never ruled on the issue the motions raised, the Pye court found the issue was preserved by stating: "[A]n exception to this rule exists where an issue is raised but not ruled upon at a Rule 59(e) hearing." Id. (emphasis in original). In its holding, the court noted lawyers cannot force trial courts to address an issue, and a proper Rule 59 request is sufficient without a specific judicial decision on the issue. Id. at 566, 633 S.E.2d at 511. Therefore, because the Sierra Club properly filed a Rule 59(e) motion with the ALC, we believe these issues are preserved even though the ALC did not specifically rule on them.[1]

III. Issues on the Merits

a. Section 7.11 Regarding Engineered Barriers

The Sierra Club's first main argument is that Chem-Nuclear's current disposal practices fail to comply with the technical requirements of section 7.11 of regulation 61-63. Specifically, section 7.11.9 requires Chem-Nuclear to "incorporate engineered barriers for all waste classifications. The engineered barriers shall be designed and constructed to complement and improve the ability of the disposal facility to meet the performance objectives in this part." Additionally, section 7.11.10 states:

> The engineered barriers shall be designed and constructed of materials having physical and chemical properties so as to provide reasonable assurance that the barriers will maintain their functional integrity under all foreseeable conditions for at least the institutional control period. No reliance may be placed on the engineered barriers beyond the institutional control period.

Furthermore, pursuant to section 7.11.11 through 7.11.11.7, Chem-Nuclear's disposal practices are required to be designed to meet the following objectives:

(1.) to minimize the migration of water onto the disposal units.
(2.) to minimize the migration of waste or waste contaminated water out of the disposal units.
(3.) detection of water and other liquids in the disposal units.
(4.) temporary collection and retention of water and other liquids for a time sufficient to allow

for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil.

(5.) facilitation of remedial methods without disturbing other disposal units.

(6.) reasonable assurance that the waste will be isolated for at least the institutional control period.

(7.) prevention of contact between the waste and the surrounding earth, except for earthen materials which may be used for backfilling within the disposal units.

The Sierra Club contends the ALC's factual findings establish that Chem-Nuclear's landfill fails to comply with section seven. Specifically, the Sierra Club argues "the landfill design fails to achieve the 'isolation of wastes from the biosphere inhabited by man and his food chains' and fails to meet the technical requirements of section 7.10 and 7.11." In particular, the Sierra Club argues the engineered barriers do not:. (1.) minimize the migration of water into the disposal units; (2.) minimize the migration of waste or waste contaminated water out of the disposal units; (3.) provide for the detection of water and other liquids in the disposal units; (4.) provide for the temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil; and (5.) prevent the contact between the waste and the surrounding earth.

We remand this issue to the ALC and instruct it to apply its factual findings to the technical requirements of these regulations. Specifically, we believe section 7.11 imposes additional compliance requirements for Chem-Nuclear such that the balancing test of ALARA would not be sufficient to addresses whether Chem-Nuclear is in compliance with section 7.11. We cannot determine whether the ALC erred without a specific ruling. Accordingly, we find it proper to first give the ALC an opportunity to rule on whether Chem-Nuclear was in compliance with section 7.11.

b. Section 7.23 Regarding Contact of Water and Waste

The Sierra Club's second main argument is that Chem-Nuclear's disposal practices fail to comply with section 7.23.6 of regulation 61-63. Specifically, section 7.23.6 states: "The disposal site shall be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal." The Sierra Club argues Chem-Nuclear is in violation of section 7.23.6 because its landfill is not designed to minimize the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal. The Sierra Club expressed serious concern regarding several of Chem-Nuclear's vaults and trenches that have no cover or roof such that rain can fall directly into the vault. The ALC also noted the rainfall problem and stated: "The problems caused by rainfall are compounded . . . and [r]ainfall that accumulates in the trenches eventually percolates into the soil, and drives the groundwater movement that is carrying tritium and other radioactive materials into Mary's Branch Creek."

We also remand this issue to the ALC with specific instructions to apply its factual findings to the technical requirements of section 7.23.6. We find section 7.23.6 imposes additional compliance requirements for Chem-Nuclear. Without a specific ruling, we cannot determine whether the ALC erred. Accordingly, we remand the issue to the ALC to give it opportunity to rule on whether Chem-Nuclear was in compliance with section 7.23.6.

c. Section 7.10 and "ALARA"

The Sierra Club also argues section 7.10 of regulations 61-63 requires Chem-Nuclear to comply with ten directives. The Sierra Club argues at length that Chem-Nuclear is required to comply with all subsections of section 7.10 based on the conjunction "and" at the end of subsection 7.10.8. Specifically, section 7.10 states:

7.10.1 The issuance of the license will not constitute an unreasonable risk to the health and safety of the public;

7.10.2 The applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property;

7.10.3 The applicant's proposed disposal site, disposal design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in 7.18;

7.10.4 The applicant's proposed disposal site, disposal site design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected in accordance with the performance objective in 7.19;

7.10.5 The applicant's proposed land disposal facility operations, including equipment, facilities, and procedures, are adequate to protect the public health and safety in that they will provide reasonable assurance that the standards for radiation protection set out in Part III of these regulations will be met;

7.10.6 The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure;

7.10.7 The applicant's demonstration provides reasonable assurance that the applicable technical requirements of this part will be met;

7.10.8 The applicant's proposal for institutional control provides reasonable assurance that such control will be provided for the length of time found necessary to ensure the findings in 7.10.3 through 7.10.6 and that the institutional control meets the requirements of 7.27; and

7.10.9 The financial or surety arrangements meet the requirements of this part.

7.10.10 The applicant's Quality Assurance Plan describing the methods and procedures used to

ensure that the disposal units are constructed in accordance with the approved designs and applicable standards and that the waste complies with the requirements of this regulation and the license. (emphasis added).

Section 7.18 states:

Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 millirems (0.25 mSv) to the whole body, 75 millirems (0.75 mSv) to the thyroid, and 25 millirems (0.25 mSv) to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable. (emphasis added).

Section 3.2.6 defines "as low as is reasonably achievable" as:

[M]aking every reasonable effort to maintain exposures to radiation as far below the dose limits in this part as is practical consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

In considering the above mentioned sections of regulation 61-63, the ALC found the Sierra Club failed to present sufficient evidence that established Chem-Nuclear was not in compliance with sections 7.10.1, 7.10.2, 7.10.3, and 7.10.4. Additionally, the ALC found the Sierra Club failed to present evidence demonstrating Chem-Nuclear violated section 7.18 and the ALARA test. On the issues the ALC addressed, specifically the first four subsections of section 7.10, we affirm and give deference to the ALC's findings. For the subsections the ALC failed to address, specifically the remaining subsections of 7.10, we remand these questions to the ALC for a final determination as to whether Chem-Nuclear was in compliance with the entirety of 7.10.

CONCLUSION

In considering this appeal, we first find that sections 7.11 and 7.23.6 of regulation 61-63 apply to the present action and require Chem-Nuclear to comply with additional directives. Secondly, we hold these compliance issues are preserved for our review and believe the Sierra Club overcame the "raised to" and "ruled upon" preservation requirements. Having reasoned that sections 7.11 and 7.23.6 apply to the issues at hand and further having decided that the Sierra Club's issues are preserved for our review, we remand this case to the ALC. At this point, we cannot address whether the ALC erred without giving it an opportunity to issue a specific ruling on whether Chem-Nuclear's disposal practices were in compliance with sections 7.11, 7.23.6 and subsections of 7.10 that the ALC did not address. On remand, we instruct the ALC that sections 7.11 and 7.23.6 impose additional compliance requirements for Chem-Nuclear and further instruct the

ALC to apply its factual findings to these sections of regulation 61-63. We affirm the ALC's decision that the Sierra Club failed to present sufficient evidence that established Chem-Nuclear was not in compliance with sections 7.10.1, 7.10.2, 7.10.3, and 7.10.4 as well as its finding that the Sierra Club failed to present evidence demonstrating Chem-Nuclear violated section 7.18 and the ALARA test. Accordingly, the decision of the ALC is

AFFIRMED IN PART AND REMANDED IN PART.

HEARN, C.J., and CURETON A.J., concur.

[1] We note the South Carolina Supreme Court recently found Rule 59(e) applicable to ALC actions. See Home Med'l Sys., Inc. v. S.C. Dept. of Revenue, 382 S.C. 556, 562-63, 677 S.E.2d 582, 586 (2009).

STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAW COURT

Sierra Club, Petitioner, vs. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	**FINAL ORDER AND DECISION** **DOCKET NO. 04-ALJ-07-0126-CC**

APPEARANCES:

Robert Guild, Esquire
James S. Chandler, Jr., Esquire
For Petitioner

Jessica J.O. King, Esquire
Evander M.E. Whitehead, Esquire
For Respondent South Carolina Department of Health and Environmental Control

M. Elizabeth Crum, Esquire
Sara S. Rogers, Esquire
Mary D. Shahid, Esquire
Ariail B. Kirk, Esquire
For Respondent Chem-Nuclear Systems, LLC

STATEMENT OF THE CASE

In the above-captioned matter, Petitioner Sierra Club requested a contested case hearing to challenge the most recent determination of Respondent South Carolina Department of Health and Environmental Control (Department or DHEC) to renew South Carolina Radioactive Material License No. 097 issued to Respondent Chem-Nuclear Systems, LLC (Chem-Nuclear) for the operation of the Barnwell Low-Level Radioactive Waste Disposal Facility in Barnwell County, South Carolina (Barnwell Facility or Barnwell Site). Petitioner contends that the current practices used for the disposal of low-level radioactive waste at the Barnwell Facility do not ensure that the public's exposure to radioactive materials, both at present and in the future, is as low as is reasonably

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achievable, and thus do not meet regulatory standards. In particular, Petitioner claims that the current disposal methods at the Barnwell Site do not adequately prevent the migration of radioactive particles from the Site into the groundwater and other waters surrounding the property. The Department and Chem-Nuclear maintain that the disposal practices at the Barnwell Facility do meet all applicable regulatory standards, including the requirement that exposures to the public be kept as low as is reasonably achievable.

PROCEDURAL BACKGROUND

On April 27, 2000, Chem-Nuclear timely submitted its renewal application for License No. 097. After DHEC determined that it had sufficient information and documentation for the license renewal, it published a notice concerning a public hearing on the Chem-Nuclear renewal application. On December 11, 2003, DHEC held a public hearing on the license renewal and accepted public comments. On March 15, 2004, the Department issued its determination to renew the license. That decision was challenged by Petitioner and another environmental advocacy organization, Environmentalists, Inc., on March 30, 2004, and transmitted to the South Carolina Administrative Law Court (ALC) on April 1, 2004.

Respondent Chem-Nuclear filed pre-trial motions for summary judgment based on its arguments that Petitioner and Environmentalists, Inc., lacked standing to pursue this case as they could not demonstrate an injury-in-fact from the continued operation of the disposal facility at the Barnwell Site. Prior to commencing the contested case hearing in this matter, this Court issued an order granting, in part, Chem-Nuclear's motion and dismissing Environmentalists, Inc., as a petitioner in this case for lack of standing.

A hearing on the merits of this case was held at the ALC in Columbia, South Carolina, on February 16, 17, 18, and 25, 2005. At the hearing, Petitioner presented the testimony of an expert witness, Dr. Duncan Howe; Chem-Nuclear presented the testimony of two expert witnesses, Dr. Dade Moeller and Dr. Vernon Ichimura, and the testimony of William House, the Vice-President of Regulatory Affairs for Chem-Nuclear; and DHEC presented the testimony of Henry Porter, Assistant Director of the Department's Division of Waste Management.

FACTUAL BACKGROUND

Chem-Nuclear began the disposal of radioactive waste at the Barnwell Facility in 1971 pursuant to License No. 097. Over the intervening years, the license has been amended forty-eight times, including seven renewals of the license. These amendments have reflected improvements in the disposal methods and operations at the Barnwell Facility.

The Barnwell Facility is licensed and overseen by the State of South Carolina through DHEC pursuant to the State's status as an "Agreement State" with the Nuclear Regulatory Commission under the United States Atomic Energy Act of 1954. South Carolina became an Agreement State in 1969 when it enacted the Atomic Energy and Radiation Control Act and promulgated regulations governing the disposal and handling of radioactive waste. The federal government retains exclusive jurisdiction over the disposal of high-level radioactive waste. The Barnwell Facility is located on property owned by the state and leased to Chem-Nuclear pursuant to a ninety-nine-year lease. The original lease was executed in 1971 and has been amended several times. Federal and state laws require that low-level radioactive waste disposal facilities be located on government-owned property.

In 2000, the South Carolina General Assembly enacted the Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act. With this enactment, South Carolina joined the Atlantic Low-Level Radioactive Waste Compact along with Connecticut and New Jersey. The Barnwell Facility also became the designated regional disposal facility for the Atlantic Compact, with 800,000 cubic feet of disposal capacity guaranteed for waste generated in Connecticut and New Jersey and sufficient capacity reserved for South Carolina generators. The Compact Act significantly changed Chem-Nuclear's relationship with the state. Pursuant to the Act, the South Carolina Budget and Control Board is authorized to set rates annually for waste disposal at the Barnwell Facility and to approve special rates. Previously, these rates were set by Chem-Nuclear in response to market competition. Further, the South Carolina Public Service Commission is required by the Compact Act to establish annually the "allowable costs" necessary for the operations of the Barnwell Facility. Most significantly, under the Act, the state receives all revenue from the operation of the Barnwell Facility, less allowable costs, a twenty-nine-percent operating margin on certain allowable costs, and certain other statutory deductions.

The Compact Act also establishes limits on the volume of waste that can be accepted at the Barnwell Site. For the four years of disposal operations between Fiscal Year 2004-2005 and Fiscal Year 2007-2008, the maximum amount of waste volume that can be received per year at the site is reduced from 50,000 cubic feet in Fiscal Year 2004-2005 to 35,000 cubic feet in Fiscal Year 2007-2008. In addition to these declining volumes, waste volumes in Fiscal Year 2008-2009 will be dramatically reduced—and similar reductions will continue for thirty years, or until the conclusion of operations at the Barnwell Site—as Chem-Nuclear will be restricted to disposing only waste received from Atlantic Compact states during that time. Under current estimates, Chem-Nuclear expects to receive only approximately 8000 cubic feet of waste per year from Fiscal Year 2008-2009 until the closure of the Barnwell Facility.

FINDINGS OF FACT

Having carefully considered all testimony, exhibits, and arguments presented at the hearing of this matter, and taking into account the credibility and accuracy of the evidence, I make the following Findings of Fact by a preponderance of the evidence:

Background

1. Respondent Chem-Nuclear is a wholly-owned subsidiary of Duratek, Inc. Chem-Nuclear operates a low-level radioactive waste disposal facility located approximately five miles west of the City of Barnwell in Barnwell County, South Carolina. (House Prefiled Test. at 1.)

2. The Barnwell Site is located on approximately 235 acres of property owned by the State of South Carolina and leased to Chem-Nuclear through the State Budget and Control Board. (House Prefiled Test. at 13.)

3. The Barnwell Facility began disposal operations in 1971. Chem-Nuclear has been the only operator of the Barnwell Facility since its inception. (House Prefiled Test. at 14.)

4. South Carolina's regulatory authority over radioactive waste is derived from a formal agreement with the United States Atomic Energy Commission (now the Nuclear Regulatory Commission (NRC)). This Agreement authorizes South Carolina to regulate certain nuclear materials in quantities not sufficient to form a critical mass. States that entered into such agreements are referred to as "Agreement States." (House Prefiled Test. at 14.)

5. South Carolina became an Agreement State in 1969 and promulgated its earliest version of Regulation 61-63 in that year. (House Prefiled Test. at 14.)

6. In 1982, the NRC promulgated 10 C.F.R. Part 61, "Licensing Requirements for Land Disposal of Radioactive Wastes," which became effective in December 1983. As an Agreement State, South Carolina was required to adopt regulations compatible with 10 C.F.R. Part 61 and did so by amending Regulation 61-63. (House Prefiled Test. at 15.)

7. An Agreement State may promulgate regulations more stringent than federal regulations, but it must, as a minimum, have regulations that are compatible with federal requirements.

8. Since 1971, DHEC has imposed additional requirements on the Barnwell Facility through a series of amendments to the conditions of Chem-Nuclear's license. (House Prefiled Test. at 15, 25.)

9. In 1995, Part VII of Regulation 61-63, the part that regulates low-level radioactive waste disposal facilities, underwent substantial revisions to require engineered barriers for all waste classes disposed at the Barnwell Facility. DHEC required the use of disposal vaults for all waste classes and codified the requirement for enhanced caps on all disposal trenches at the Barnwell Site. Thus, Regulation 61-63 became more stringent than 10 C.F.R. Part 61. (House Prefiled Test. at 15.)

10. Part of the impetus for this regulatory change was the DHEC Board's knowledge of an application made by Chem-Nuclear to construct a low-level radioactive waste disposal facility in North Carolina and of the design that Chem-Nuclear incorporated in that application. (Hr'g Tr., Vol. IV, at 192-93.)

11. In 1980, the United States Congress passed the Low-Level Radioactive Waste Policy Act. The Act established three major policies: (1) each state is responsible for low-level radioactive waste generated within its borders; (2) states can form interstate compacts to manage low-level radioactive waste generated with the compact; and (3) a compact cannot refuse to accept low-level radioactive waste until Congress has ratified the compact. Pursuant to the Act, South Carolina joined the Southeast Compact and the Barnwell Facility was designated as the regional disposal facility for the compact. (House Prefiled Test. at 16.)

12. In 1986, Congress amended the Act to specify certain milestones for new site development. Consequently, North Carolina was selected to host the new regional disposal facility for the Southeast Compact. Chem-Nuclear was selected as the contractor for the facility and developed an application to obtain a license for a low-level radioactive waste facility in North Carolina. (House Prefiled Test. at 16.)

13. In 1992, the South Carolina General Assembly enacted legislation to allow the Barnwell Site to continue as the regional facility for the Southeast Compact until December 31, 1995. However, by 1995, it became apparent that the North Carolina site would not be approved, and the South Carolina legislature enacted legislation that withdrew the state from the Southeast Compact. (House Prefiled Test. at 17.)

14. After the state withdrew from the Southeast Compact, the Barnwell Facility began accepting waste from all states except North Carolina. (House Prefiled Test. at 17.) Then, in 2000, the South Carolina General Assembly enacted the Atlantic Compact Act, S.C. Code Ann. §§ 48-46-10 et seq. (Supp. 2004) ("Compact Act"), and South Carolina joined the Atlantic Compact along with Connecticut and New Jersey. In accordance with the Compact Act, declining annual volume limits were imposed on the Barnwell Facility. After Fiscal Year 2007-2008, the Barnwell Facility cannot accept any out-of-compact waste, and it is predicted that the volume of in-compact waste to be disposed at the Barnwell Facility will be approximately 8000 cubic feet per year. (House Prefiled Test. at 20.)

15. The Compact Act also substantially changed the level of state involvement in the Barnwell Facility. Under the Compact Act, the Budget and Control Board, rather than Chem-Nuclear, sets disposal rates for both in-region and out-of-region generators. (House Prefiled Test. at 19.)

16. In addition, the Compact Act requires that the South Carolina Public Service Commission determine the annual allowable costs for operating the Barnwell Facility. (House Prefiled Test. at 20.) Pursuant to S.C. Code Ann. § 48-46-40(D), Chem-Nuclear must remit all revenue from operations at the Barnwell Facility annually to the state, minus allowable costs and an operating margin of twenty-nine percent (29%) on certain allowable costs. (House Prefiled Test. at

20.)

Permitting History

17. In designing, building, and operating the Barnwell Facility, Chem-Nuclear is required to adhere to 24A S.C. Code Ann. Regs. 61-63 (1992 & Supp. 2004), particularly Part VII of those regulations. (House Prefiled Test. at 15; Hr'g Tr., vol. IV, at 182-85.)

18. Chem-Nuclear is authorized to receive, store, and dispose of low-level radioactive waste at the Barnwell Facility in accordance with the conditions of DHEC Radioactive Material License No. 097. The license has been amended forty-eight times, including seven renewals, since it was first issued in 1969. DHEC has used such amendments to add conditions to Chem-Nuclear's license and to modify the operational requirements for the Barnwell Facility. (House Prefiled Test. at 25-26.)

19. Prior to the instant matter, there have not been any administrative challenges to previous amendments or renewals of Chem-Nuclear's license.

20. As discussed in Finding of Fact #9 above, major revisions in 1995 to Part VII of Regulation 61-63 necessitated substantive amendments to Chem-Nuclear's license to require the construction of enhanced caps on all existing and future trenches at the Barnwell Site and the placement of all classes of wastes in vaults. (House Prefiled Test. at 18.)

21. On April 27, 2000, Chem-Nuclear timely submitted its application for the renewal of License No. 097. (House Prefiled Test. at 13.)

22. In reviewing the application, DHEC imposed new application requirements on Chem-Nuclear that are not specifically provided for in Regulation 61-63, Part VII, and that were not imposed in earlier renewal requests. These requirements include a comprehensive assessment of site performance (i.e., the Environmental Radiological Performance Verification or ERPV) and a review of Chem-Nuclear's methodologies and conclusions in a predictive site assessment by a "Blue Ribbon" panel of experts appointed by DHEC. In addition, DHEC provided public notice of the renewal application and conducted a public hearing on the application. DHEC also issued the Technical Evaluation Report, a decision document that elaborated on the technical basis for renewal of the permit. (DHEC Ex. #5, 22, 23, and 24; Hr'g Tr., vol. IV, at 133-35.)

23. On March 15, 2004, DHEC issued its renewal of License No. 097. This renewal included few substantive changes to the design and operation of the Barnwell Facility. The only changes to the license were (1) an amendment to the waste volumes allowed into the Facility to ensure consistency with the requirements of S.C. Code Ann. § 48-46-40; (2) an update to the list of authorized Facility users; (3) a requirement for sampling water that may be collected from waste disposal containers during the inspection of the containers to verify that what is on the manifest matches what is detected in the water; (4) a requirement for an annual review of the decommissioning and long-term care funds; and (5) a requirement that Chem-Nuclear place special conditions on waste acceptance criteria, including a certification statement from a responsible individual at the company or nuclear power plant generating the waste. (Hr'g Tr., vol. IV, at 153-54.)

Tritium

24. Tritium is a radioactive isotope of hydrogen which moves through the groundwater at the Barnwell Site as part of individual water molecules. Hydrogen is the key element in water and tritium exchanges with hydrogen in water. This process causes tritium to migrate with water and with groundwater. (Ichimura Prefiled Test. at 15.)

25. Tritium is contained in and comes from the low-level radioactive waste which has been disposed of at the Barnwell Site. (Ichimura Prefiled Test. at 15.)

26. Precipitation in and on the disposal trenches drives tritium into the groundwater beneath the Site. (Ichimura Prefiled Test. at 16.)

27. Tritium has a relatively short half-life. One half-life for tritium is 12.3 years. Tritium decays to one-fourth of its original quantity in 24.6 years. (Ichimura Prefiled Test. at 7.)

28. For any radionuclide, less than one percent remains after ten half-lives. (Chem-Nuclear Ex. #22.) Tritium located within the boundary of the Barnwell Site today will decay to negligible amounts of radioactive material in 120 years.

29. Tritium was initially discovered in trenches at the Barnwell Facility in 1974. Tritium migration from the trenches is referred to as the "tritium plume." Tritium was released into the trenches as a result of early disposal practices, which included unreliable containment and waste

forms. A considerable amount of biological waste containing mostly tritium and carbon 14 radioisotopes was packaged in paper or cardboard containers. Unfortunately, the containment and waste forms used during earlier operations at the site were acceptable at that time, and the disposal practices at Barnwell during those early years were identical to practices at Hanford and other low-level radioactive waste disposal facilities. (House Prefiled Test. at 36; Hr'g Tr., vol. I, at 164-65.)

30. It is undisputed that it is inadvisable to attempt to uncover or excavate these containers and waste in order to provide better containment. (Hr'g Tr., vol. II, at 117.)

31. Chem-Nuclear has installed an extensive system of groundwater monitoring wells in and around the disposal area of the Barnwell Site. (Ichimura Prefiled Test. at 12-14.)

32. Because of the geology and topography of the Barnwell Site and surrounding area, the groundwater encounters the surface and forms a stream (or spring) known as Mary's Branch Creek. This spring occurs outside the boundary of the property owned by the state and on property owned and controlled by Chem-Nuclear. In order to determine regulatory compliance, DHEC has approved Chem-Nuclear's compliance point in the surface waters of Mary's Branch Creek downstream of the spring. This approval is based on the recognition that this is the first point where a hypothetical member of the public might receive a dose of radiation. (Hr'g Tr., vol. II, at 209.)

33. The regulatory limit for releases is provided in 24A S.C. Code Ann. Regs. 61-63, § 7.18 (1992):

> Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 millirems (0.25 mSv) to the whole body, 75 millirems (0.75 mSv) to the thyroid, and 25 millirems (0.25 mSv) to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

34. The tritium concentrations in Mary's Branch Creek are converted to a dose by use of a ratio to the effluent concentrations allowed in 24A S.C. Code Ann. Regs. 61-63, § 3.53 tbl. 2, cl. 2 (Supp. 2004).

35. Tritium is, by far, the most significant source of radioactive material from the Barnwell Facility in the groundwater. (Petr. Ex. #29A, at 17, para. 13.)

36. Certain groundwater samples collected from within the Barnwell Site boundary show high concentrations of tritium. However, the regulatory limit applies to releases of radioactive materials to the general environment and is set to protect the public. Therefore, groundwater samples within the Barnwell Site boundaries where there is no risk of public exposure are not appropriate samples for evaluating compliance. (Hr'g Tr., vol. IV, at 159-60.)

37. The compliance point approved by DHEC—the surface waters of Mary's Branch Creek immediately at or adjacent to Chem-Nuclear's property boundary—is an appropriate point of compliance in that it provides for measuring compliance consistent with Regulation 61-63, § 7.18. (Ichimura Prefiled Test. at 11.)

38. Chem-Nuclear conducts regular sampling of the water in Mary's Branch Creek to determine if there has been a release that violates the regulatory limit of Regulation 61-63, § 7.18. The measured concentration must be converted to a dose measured in millirem.

39. The highest recorded concentration of tritium detected in Mary's Branch Creek was from a sample collected in July 2001, which was 1.1×10^5 picoCuries per liter (pCi/L). (Ichimura Prefiled Test. at 16.) A picoCurie ("pCi") is 2.22 disintegrations, i.e., radioactive decay, per minute. In other words, if material with one pCi of radioactive material that emitted gamma rays, a typical form of radiation, were held next to a typical Geiger counter, the counter would click once every five minutes. In contrast, if a Geiger counter was turned on in the open air anywhere in South Carolina, the Geiger counter would click between 80 and 100 times a minute. (Ichimura Prefiled Test. at 16.)

40. Mary's Branch Creek is fed by springs containing groundwater migrating from the Barnwell site. (Ichimura Prefiled Test. at 10-11.)

41. The hypothetical dose from tritium in Mary's Branch Creek is 5.7 mrem or approximately one-fifth of the regulatory limit. (Ichimura Prefiled Test. at 17.)

42. The general public is restricted from access to the waters of Mary's Branch Creek at the location of the compliance point. The area is secured by a fence to prevent entry from unauthorized personnel and is heavily vegetated. (Ichimura Prefiled Test. at 18.)

43. There are no known consumers of the water in Mary's Branch Creek located in and

around the compliance point. (Moeller Prefiled Test. at 26; Ichimura Prefiled Test. at 18-19.)

44. Chem-Nuclear has recorded a Restrictive Covenant and Easement on three parcels of property, which include the property where the compliance point is located. This Covenant states that the property is intended as a buffer, and prohibits the use of groundwater under and surface water on the property without written consent from DHEC. (Chem-Nuclear Ex. #38.)

45. Further, there are no known private or public drinking water wells immediately downgradient of the Barnwell Site, between the Site and the Savannah River Facility. (Ichimura Prefiled Test. at 18-19.)

46. Improvements in waste forms and containers, the use of vaults, and enhanced capping have succeeded in reducing the amount of tritium that is migrating to groundwater. (Ichimura Prefiled Test. at 18.) However, it must be noted that at some monitoring stations tritium levels have actually increased between 1997 and 2001. And, when the data concerning the tritium levels is compared to rainfall data as gauged by water table levels, it seems that the tritium concentrations have been varying with the amount of rainfall, and not necessarily varying as a result of new storage methods at the facility.

47. The concrete vaults at the Barnwell Facility are not sealed against water intrusion. The floors of the vaults have holes to allow water to drain from the vaults, and the lids of the vaults are not grouted or otherwise sealed to prevent water from entering the vault. Further, when waste is buried underground, a particularly rainy period will moisten the soil around the buried waste, even with enhanced capping. And, the water table rises during wet periods, as documented by monitoring measurements at the Chem-Nuclear site. The Barnwell site receives an average of 47 inches of rain per year; by comparison, desert environments like central Washington where U.S. Ecology has its waste disposal site receive only 10 or 11 inches of rainfall per year. (Howe Prefiled Test. at 17-18.)

48. The problems caused by rainfall are compounded because, when Chem-Nuclear is filling a vault, the vault has no cover or roof, so rain can fall directly into the vault during the loading period. (Hr'g Tr., vol. III, at 24.) Rainfall that accumulates in the trenches eventually percolates into the soil, and drives the groundwater movement that is carrying tritium and other radioactive materials into Mary's Branch Creek. (Hr'g Tr., vol. III, at 24-26.)

49. Dr. Ichimura testified that elevated tritium levels were first detected in monitoring wells at Chem-Nuclear in 1982 (Hr'g Tr., vol. IV, at 11), and the ERPV summary document notes that "[t]ritium was first measured in the disposal trench sumps in 1974 and in on-site monitoring wells in 1978" (DHEC Ex. #19, at 4). In 1980, Chem-Nuclear predicted that if any radionuclides leaked from the landfill cells, it would take more than 424 years for those radionuclides to reach Mary's Branch Creek. (Hr'g Tr., vol. IV, at 13-14.) However, the actual travel time turned out to be only twenty years. (Hr'g Tr., vol. IV, at 15.)

50. In 2001, during the review of the re-issuance of the Chem-Nuclear license, DHEC staff presented Chem-Nuclear with an interrogatory advising Chem-Nuclear to "review and revise all trench construction details, plans, specifications, and procedures and revise to account for the decline in waste receipts." (Hr'g Tr., vol. III, at 50.) In particular, the Department informed Chem-Nuclear that "[c]onsideration should be given to protection of the open trenches from direct rainfall and runoff such as temporary covers." (Hr'g Tr., vol. III, at 50.) Chem-Nuclear responded to the Department's request by describing what it characterized as several conceptual trench designs to address the Department's concerns. (Hr'g Tr., vol. III, at 50.) The conceptual designs included temporary roofs to keep water out of the trenches and vaults. (Hr'g Tr., vol. III, at 51.) In June 2001, Chem-Nuclear informed DHEC that it would take up to two years to evaluate the conceptual designs and obtain approvals to implement them. (Hr'g Tr., vol. III, at 52-53.) However, to date, Chem-Nuclear has not completed its evaluation and has not submitted final designs to DHEC for review and approval. (Hr'g Tr., vol. III, at 53.)

51. Chem-Nuclear is nearing the end of the use of Trench 86, which is a large trench that is difficult to cover with a roof. Trench 86 will likely be full within two years. Chem-Nuclear anticipates using smaller trenches in the future. (Hr'g Tr., vol. III, at 83-84.)

52. The Barnwell Facility has already witnessed the highest concentrations of tritium in Mary's Branch Creek at the compliance point. This concentration, referenced in Finding of Fact #39 above, is depicted on Chem-Nuclear's Exhibit 26. That exhibit also depicts sampling data received since July 2001. This data demonstrates a trend of decreasing concentrations of tritium in Mary's Branch Creek and in groundwater downgradient from the disposal area. (Ichimura Prefiled Test. at

17-18.)

53. Some groundwater monitoring data show high concentrations of tritium, primarily collected from Zone 1 nearest the disposal trenches. Zone 1 is the shallow groundwater zone that is typically thirty feet to seventy feet beneath the disposal Site area. Zone 1 is the vertical transport zone for water, which has a travel time from the bottom of the trench of approximately ten years through Zone 1. (Ichimura Prefiled Test. at 13-14.)

54. Zone 2 is the location where groundwater flows primarily horizontally from beneath the disposal Site to Mary's Branch Creek. Groundwater travel time beneath the disposal trenches through Zone 1 and Zone 2, and into Mary's Branch Creek is approximately twenty years.

55. Although the license issued to Chem-Nuclear requires it to maintain a separation of at least five feet between the bottom of the trenches and the highest groundwater level, there have been at least two instances when the groundwater rose up into the trenches, as indicated by groundwater levels recorded in adjacent monitoring wells. (Hr'g Tr., vol. IV, at 46-48.)

56. The monumental hazardous conditions that can result from tritium and other radioactive materials leaching into the soils, and, in turn, into the groundwater, cannot be ignored. For example, Dr. Ichimura described an incident that occurred at some in time in late 1998 or early 1999, when Chem-Nuclear pumped water from a landfill trench that resulted in the contamination of neighboring property occupied by the St. Paul Church. (Hr'g Tr., vol. IV, at 49.) The St. Paul Church is located southeast of the Chem-Nuclear Site. (Hr'g Tr., vol. IV, at 50.) Tritium contamination was discovered on the church property around March 1999. The contamination resulted from the pumping of water from Chem-Nuclear's Trench 86. The pumped water ponded on the Chem-Nuclear property and then percolated through the soil and into the groundwater. While Chem-Nuclear is not certain of exact time of the contamination, the contaminated groundwater migrated to the church property and contaminated the groundwater there. After detecting and confirming the presence of tritium contamination on the church property, Chem-Nuclear engaged in remediation activities that included the excavation of around 13,000 cubic yards of soil from the church property, and the replacement of the contaminated soil with uncontaminated soil. While Chem-Nuclear is uncertain of the source of the tritium that contaminated the church property, Dr.

Ichimura testified that "it is trench water, and it probably becomes contaminated by the fact that there is some residual tritium on, say, vaults and waste packages that might have a little bit of water on them as a result of rain, and they were removed from the trenches without the analysis of tritium." (Hr'g Tr., vol. IV, at 55.)

ERPV

57. Because of the Southeast Compact and the 1995 deadline imposed by the General Assembly for continued operation of the Barnwell Facility, DHEC requested that Chem-Nuclear prepare site assessments and predictive models demonstrating future performance of the Site after closure. This assessment is called the Environmental Radiological Performance Verification, or the "ERPV." (Hr'g Tr., vol. IV, at 145-46.)

58. Even though DHEC initially requested Chem-Nuclear's site performance assessments in anticipation of closure, it continued this requirement as a condition for renewal of License No. 097. In addition, DHEC commissioned and funded the Blue Ribbon Panel, a panel of experts in a variety of disciplines, including, but not limited to, disciplines related to radiation and radiation protection, performance assessments, and dose assessments. The purpose of the Blue Ribbon Panel was to review the various iterations of the ERPV to determine if Chem-Nuclear was accurately predicting site performance. (Hr'g Tr., vol. IV, at 118, 149-50.)

59. The findings and conclusions of the ERPV, and the findings and conclusions of the Blue Ribbon Panel, on whom DHEC relied in renewing the License for the Barnwell Facility, were not refuted by Petitioner. Rather, Petitioner advocates the use of several proposed and currently used disposal technologies that are different from those used at Barnwell. These technologies include above-grade bunker disposal, below-grade bunker disposal, and assured isolation.

60. While the maximum measured tritium concentration, measured on July 18, 2001, results in a hypothetical dose of 5.7 mrem per year at the compliance point, the maximum predicted tritium concentration, based on the ERPV, would result in a dose of 13 mrem per year at the compliance point. (Chem-Nuclear Ex. #25, at 15.) This is the maximum predicted dose that will occur over a two-thousand-year period. (Chem-Nuclear Ex. #25, BEDL-03-003, at 10-11.)

61. The Blue Ribbon Panel was critical of Chem-Nuclear's overly conservative assumptions underlying its predictions. The Panel recommended removing several conservative assumptions in order to obtain a more accurate prediction. Two important potential sources of unnecessary conservatism identified by the Panel were Chem-Nuclear's failure to consider the decay of key radionuclides in their projections, and certain assumptions related to the modeling and theoretical analysis of groundwater flow. (Hr'g Tr., vol. IV, at 214.)

62. Chem-Nuclear implemented the recommendations of the Blue Ribbon Panel and adjusted its prediction. The most significant adjustment was that Chem-Nuclear accounted for the decay rate of tritium. (Chem-Nuclear Ex. #25.) Once tritium decay is assumed, the maximum predicted dose is reduced to 13 mrem per year. (Hr'g Tr., vol. IV, at 95-96.)

63. The Blue Ribbon Panel also concluded that Chem-Nuclear may not have sufficiently modeled some long-lived radionuclides. (Chem-Nuclear Ex. #28.)

64. The ERPV selected certain long-lived radionuclides, both alpha and beta, and modeled them for 2000 years. (Chem-Nuclear Ex. #25; Hr'g Tr., vol. IV, at 148.)

65. The Blue Ribbon Panel generally considered the ERPV's predictions to be reliable since it is based on thirty years of data derived from two hundred or more sampling points. (Chem-Nuclear Ex. #28.)

66. Based on the ERPV, the Panel concluded that the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and into the long-term future. (Chem-Nuclear Ex. #28, at 3.)

Design of the Proposed North Carolina Facility

67. The facility for which Chem-Nuclear sought licensure in North Carolina is described as an earth-mounded bunker design. (House Prefiled Test. at 58.) The design included large disposal modules with infiltration collection and detection systems in the floor. The incoming waste containers were to be loaded and grouted in uniform concrete waste packages. A monitoring gallery for human access inspection was provided between each double row of disposal modules. Engineered earthen covers that included a synthetic liner were provided over the disposal modules.

This system included a drainage layer and a synthetic liner as a secondary monitoring system. (House Prefiled Test. at 48-49; Hr'g Tr., vol. II, at 87-90, 192.)

68. The North Carolina regulatory requirements for low-level radioactive waste disposal are different in some respects from the South Carolina requirements. Because of these requirements, the North Carolina facility would have had to be designed and located on the site so that the bottom of the facility would be at least seven feet above the seasonal high water table. At certain locations on the North Carolina proposed site, the seasonal high water table was determined to be near the land surface. Therefore, the design of the facility to be mostly above-grade resulted from the proximity of the water table to the land surface. (House Prefiled Test. at 48-49; Hr'g Tr., vol. II, at 196-97.)

69. By contrast, Regulation 61-63 requires a five-foot separation between the waste and the water table at the Barnwell Site. Since the seasonal high water table at Barnwell is farther below the land surface than the seasonal high water table at the proposed North Carolina site, disposal at the Barnwell Facility can be, and is, below grade. (House Prefiled Test. at 48-49; Hr'g Tr., vol. II, at 197.)

70. Since 1995, the Barnwell Facility design has utilized concrete disposal vaults and a multi-layer cap as the two primary design features to provide for long-term performance, similar to the North Carolina proposed design. The modules or vaults provide for the structural stability for the enhanced caps. The enhanced caps reduce, but do not eliminate, water intrusion into the trenches. (House Prefiled Test. at 49; Hr'g Tr., vol. III, at 103.)

71. The secondary systems for monitoring and infiltration collection and detection in the North Carolina design included the capability for leachate removal. The Barnwell Facility design does not include such capability because of concerns regarding the radioactive exposure to workers handling and processing the leachate under ALARA standards and because such a capability is not required by DHEC regulations. (Hr'g Tr., vol. II, at 90; House Prefiled Test. at 49-50.)

72. Engineered barriers, including vaults and caps, are now standard technology at the Barnwell Facility. (House Prefiled Test. at 49-50.)

73. North Carolina did not issue a license for the proposed Chem-Nuclear design, and the proposed facility was never constructed. Accordingly, no information exists to evaluate the performance of the proposed design. (Hr'g Tr., vol. III, at 79; Hr'g Tr., vol. IV, at 236-37.)

74. There are no other facilities in the United States that utilize the proposed North Carolina design, which Petitioner endorses. (Hr'g Tr., vol. III, at 158.)

75. The low-level radioactive waste disposal facilities that are operating, have been recently licensed, or are currently in the licensing process are all using or propose to use enhanced shallow land burial. A low-level radioactive waste facility recently proposed in California was licensed for shallow land burial, but it was not constructed. The U.S. Ecology facility at Hanford, Washington, uses conventional shallow land burial. The Envirocare of Utah facility uses shallow land burial for disposal of Class A waste. The license application submitted to the State of Texas by Waste Control Specialists on August 2, 2004, provides for land disposal with concrete canisters for all classes of waste. (House Prefiled Test. at 51.)

76. In addition to the design proposed in North Carolina, Petitioner endorses the concept of assured isolation. This concept is theoretical, derived from an article published in the September 1995 edition of the journal, RadWaste. (Petr. Ex. #21.) Assured isolation is a storage concept, rather than a disposal concept. (Hr'g Tr., vol. II, at 175-76, 179.)

77. Regulation 61-63, Part VII, sets forth the requirements for disposal of low-level radioactive waste. Part X of Regulation 61-63 provides for the "interim storage" of waste, or storage until permanent emplacement in a disposal facility is available. Presently, there is available disposal capacity at the Barnwell Facility and, therefore, Regulation 61-63, Part X, is inapplicable to its operations. (Hr'g Tr., vol. II, at 183; Hr'g Tr., vol. IV, at 199-201.)

78. DHEC requested the Blue Ribbon Panel to consider whether Chem-Nuclear should change its designs and operations to use other technologies, including but not limited to above-ground earth-mounded bunker designs, like the North Carolina design, and assured isolation, to reflect alternate disposal technologies. (Hr'g Tr., vol. IV, at 202.)

79. The Blue Ribbon Panel concluded that "current disposal practices at the Facility are adequate and that the potential changes the Panel was asked to consider would provide only

incremental improvement, if any, in performance." (Chem-Nuclear Ex. #28; Hr'g Tr., vol. IV, at 202-03.) In particular, the Panel recognized both that most of the inventory that will be disposed of at the Barnwell Facility is already in place, with 27 million cubic feet of waste buried and only 3 million cubic feet of space remaining for new waste, and that the restrictions on waste forms and characteristics that have been imposed over the past twenty years have increased the accompanying reliability and waste isolation capabilities of the facility.

80. The Panel further found that "there remains some regulatory uncertainty about assured isolation," thus rendering it a less viable option for Chem-Nuclear. (Chem-Nuclear Ex. #28, app.)

Current Disposal Practices at the Barnwell Site

81. The disposal technology currently used at the Barnwell Site is most accurately described as enhanced shallow land burial with engineered barriers. The primary engineered barriers are disposal trenches, disposal vaults, and enhanced caps. (House Prefiled Test. at 41.)

82. Chem-Nuclear currently uses three engineered trench designs primarily to segregate waste by dose rates external to the waste packages. The three types of trenches are Class A, Class B/C, and slit-type trench. The last significant changes to trench design came into effect in January 1996 to comply with changes in DHEC's regulations which were incorporated in Amendment 46 of License No. 097. These changes included (1) requiring all waste to be placed in concrete disposal vaults, (2) placing enhanced caps on all trenches, and (3) improving infiltrate water collection in the large Class A trenches. (Chem-Nuclear Ex. #2, at 15-16.)

83. The Class A trench is the largest of the three trench types at the Barnwell Facility. The trench floor is sloped to trench corner locations, and a trench drainage system is installed to facilitate monitoring of water infiltration entering the trench. (Chem-Nuclear Ex. #2, at 15-16.)

84. Waste is generally disposed of in the Class A trench in rectangular and cylindrical reinforced concrete vaults which are stacked up to three high on the trench floor. Voids between vaults are filled with free-flowing soils material, i.e., backfill. As disposal proceeds, filled vaults are covered with a variable amount of general cover soils and an initial clay cap. (Chem-Nuclear Ex. #2, at 15-16.)

85. A multi-layer enhanced cap is installed following completion of disposal in a trench

or a group of adjacent trenches. The enhanced cap consists of the initial clay cap overlain by polyethylene and bentonite materials, a sand drain layer, and general soil materials for vegetation growth. (Chem-Nuclear Ex. #2, at 15-16.)

86. The Class B/C trench is used for disposal of stable wastes, primarily Class B and Class C wastes, not including irradiated hardware and large sealed sources. A French drain and sump system on the floor of the B/C trench allows monitoring of any water that accumulates in the trench. (Chem-Nuclear Ex. #2, at 15-16.)

87. Voids around disposal vaults are filled with free-flowing materials. Vaults are covered, like Class A disposal vaults, with an initial clay cap and then a multi-layer enhanced cap. The enhanced cap is normally installed over several adjacent filled trenches at the same time. The disposal vault lids serve as an intrusion barrier for Class C waste buried within. (Chem-Nuclear Ex. #2, at 15-16.)

88. The slit trench is used for disposal of irradiated hardware and large quantity sealed sources. Trenches are narrow to facilitate remote offloading, shielding, and rapid covering of waste. The size allows a two-high stack of slit trench concrete disposal vaults. (Chem-Nuclear Ex. #2, at 15-16.)

89. The entire slit trench floor is filled with coarse drain sand and sloped to one end. Standpipes to monitor water accumulation are installed periodically along the length of the trench. (Chem-Nuclear Ex. #2, at 15-16.)

90. Disposal vaults in the slit trench are backfilled and covered with clay-rich materials. An enhanced cap identical to that used for Class A and B/C trenches is installed above the backfill materials. The concrete disposal vault lids serve as the intrusion barriers required for Class C waste. (Chem-Nuclear Ex. #2, at 15-16.)

91. For all trench types, Chem-Nuclear has developed and documented, through its procedures, backfilling methods to maximize filling of voids around vaults and to enhance long-term stability of the entire trench system. (Chem-Nuclear Ex. #2, at 15-16.)

92. As part of the enhanced cap construction, trenches are covered with topsoil and seeded with grass. Trench standpipe, wellhead protective pads, and trench corner and identification

markers are installed as the final step in the capping process. (Chem-Nuclear Ex. #2, at 15-16.)

93. Depending on the type of shipment and waste type, the transport vehicle will be directed to either the Cask Maintenance Building (CMB) or the appropriate trench for disposal. (Chem-Nuclear Ex. #2, at 24-26.)

94. Casks are directed to the CMB where the casks are prepared for off-loading. Quality Control inspections are performed on the casks at the CMB. Quality Control inspections include checking the integrity of cask chains and cables, hold-down assembly, rain cover, cask bolts and ratchets, and other cask components. (Chem-Nuclear Ex. #2, at 24-26.)

95. Once all inspections and offload preparations are complete, the cask is then directed to the appropriate trench for off-loading. Cask shipments are directed to the appropriate trench depending on waste classification and/or container dose rates. At the appropriate trench, containers are unloaded into concrete disposal vaults. (Chem-Nuclear Ex. #2, at 24-26.)

96. Chem-Nuclear continues inspecting containers as they are unloaded and placed in the disposal vaults. (Chem-Nuclear Ex. #2, at 24-26.)

97. Large components such as steam generators and pressurizers are disposed of intact. Evaluations qualifying the large components as disposal vaults eliminating the need for concrete vaults are submitted to DHEC for review and approval. Because of their size and weight, large components are brought onto the trench floor with specially designed transport equipment and hardware. (Chem-Nuclear Ex. #2, at 24-26.)

98. Disposal containers are unloaded from vans and casks and placed inside disposal vaults. Three types of reinforced concrete vaults are used: slit trench, rectangular, and cylindrical vaults. The position of each vault is recorded in the Waste Manifest Data Management System. Since large components are qualified as disposal vaults, they are placed directly in the trench. For each large component, Chem-Nuclear develops a trench placement plan that is reviewed and approved by DHEC prior to acceptance of any large component for disposal. Monthly disposal volume reports are prepared and submitted to DHEC. (Chem-Nuclear Ex. #2, at 24-26.)

99. As described above, when the vaults are filled and closed, Chem-Nuclear places backfill material in the void space between the vaults. Filling void space minimizes the potential for

subsidence of the enhanced cap. (Chem-Nuclear Ex. #2, at 24-26.)

100. Following backfill, vaults are covered with additional soil material and clay cap. Chem-Nuclear installs the initial clay cap to minimize the infiltration of surface water into the trench. Grass may be planted on the initial cap to control erosion. Chem-Nuclear installs the final multi-layer enhanced cap after completion of waste disposal in a trench. (Chem-Nuclear Ex. #2, at 24-26.)

101. The concrete vaults at Chem-Nuclear are not sealed against water intrusion. The floors of the vaults have holes to allow water to drain from the vaults, and the lids of the vaults are not grouted or otherwise sealed to prevent water intrusion. The drainage holes in the floors of the vaults can also allow water to rise up into the containers.

102. None of the trenches at the Chem-Nuclear site have an impermeable liner or a leachate collection system.

103. The bottoms of the trenches at the Chem-Nuclear site are lined with clay sand or sandy clay that is neither compacted nor designed to be impermeable. In fact, the liner sand is not a low-conductively soil and is not designed to prevent the migration of liquids out of the bottom of trenches, but rather, is designed to be partially impermeable and is designed to allow liquids to infiltrate the soil below the trenches. (Ichimura Prefiled Test. at 100.)

ALARA

104. ALARA is an acronym for "as low as is reasonably achievable" and, as used in the regulations governing radioactive materials, means "making every reasonable effort to maintain exposures to radiation as far below the dose limits [provided by regulation] . . . as is practical." 24A S.C. Code Ann. Regs. 61-63, § 3.2.6 (Supp. 2004).

105. The contamination data collected at the compliance point is for purposes of protecting the public. Chem-Nuclear also performs monitoring and analysis to ensure that its workers are protected. (House Prefiled Test. at 44-45.)

106. Any ALARA analysis involves balancing the benefit to the general public with the risk associated with worker exposure. (Moeller Prefiled Test. at 36-37.)

107. The changes in design and operations at the Barnwell Facility implemented over the

past ten years—the use of vaults to stabilize the trenches, the use of high-integrity polyethylene disposal containers to contain waste forms, the elimination of liquid waste forms, and the installation of impermeable caps on inactive trenches—have enhanced site performance so as to support Chem-Nuclear's predictions of a continued declining trend in radioactive releases to the general environment. (Moeller Prefiled Test. at 22-23.)

108. There is no evidence of any actual release resulting in an exposure above regulatory limits to any member of the general public as a result of the operations at the Barnwell Facility. There are no known incidents of such releases since the inception of the Facility. (House Prefiled Test. at 21.)

109. The definition of ALARA in Regulation 61-63 contemplates that a facility will make all practical and reasonable efforts to keep the exposure of radiation to the environment and the public as low as possible. Because of this requirement, neither DHEC nor Chem-Nuclear can simply be satisfied with sampling data that reveal releases below the regulatory limit. (Hr'g Tr., vol. IV, at 124, 160.)

110. Chem-Nuclear has made efforts to maintain exposure to radiation as far below the dose limits as is practical. Chem-Nuclear has access to reliable data through a system of groundwater monitoring wells and thirty years of historical data, and has applied this data in extensive modeling efforts to predict Barnwell Site performance two thousand years into the future. And, these modeling efforts have been confirmed by a panel of experts. Further, Chem-Nuclear has undertaken a variety of measures over the years to enhance Site performance. Compliance data demonstrates that these measures are effective. (Hr'g Tr., vol. IV, at 180-82.)

111. The regulatory definition of ALARA also weighs "the economics of improvements in relation to benefits to the public health and safety." There is no evidence in the record demonstrating that the alternative disposal or storage methods proposed by Petitioner satisfy this calculus. There is no performance data available on the "assured isolation storage facilities" or "above-ground disposal facilities" recommended by Petitioner, as such facilities have not been constructed in the United States. (Hr'g Tr., vol. II, at 158.) Further, Petitioner did not offer any evidentiary support to establish the economic viability of these alternate disposal methodologies.

112. The alleged improvements to be attained by such facilities will only apply to the small volume of waste that Chem-Nuclear is statutorily authorized to receive until 2008 and the even smaller amount expected to be received after 2008. Petitioner does not advocate changing the technology for waste that has already been disposed of at the Barnwell Site. (Hr'g Tr., vol. II, at 117-19; Howe Prefiled Test. at 14.)

113. The Blue Ribbon Panel concluded that most of the releases into Mary's Branch Creek are the result of waste disposed of at the Barnwell Site a number of years ago, prior to the development of the disposal practices discussed above. Any change in operations and design will have no effect on the transport of radionuclides from waste already disposed of at the Barnwell Facility. (Hr'g Tr., vol. II, at 86; Chem-Nuclear Ex. #28, app.)

Compliance

114. The Barnwell Facility has been inspected weekly by DHEC for at least the past ten years. (Hr'g Tr., vol. III, at 87-88; Hr'g Tr., vol. IV, at 115-16.)

115. Petitioner, through discovery, was provided access to all of DHEC's compliance reports. Petitioner introduced into evidence records of DHEC's compliance visits on only ten different dates. These dates appeared to follow heavy rainfall in the Barnwell area. (Hr'g Tr., vol. III, at 89; Petr. Ex. #10.) Such rainfall is not, however, uncommon in Barnwell, and highlights the potential for ground and surface water contamination caused by the collection of rainwater in the open disposal trenches and on the radioactive waste waiting to be buried at the site.

116. Photographs taken during DHEC inspections revealed rainwater collecting in open trenches. Trenches are designed to prevent the flow of surface water from coming in contact with waste. (Hr'g Tr., vol. III, at 89-90.)

117. Chem-Nuclear implements a surface water management plan to manage precipitation collected in its trenches. Water is pumped into adjacent trenches to ensure that it does not come in contact with waste or disposal vaults. Water may also be pumped into an adjacent lined pond. (Hr'g Tr., vol. III, at 89.)

118. Certain photographs provided by Petitioner depicted conditions in Trench 86. There is available disposal area in Trench 86 that measures approximately 75 feet by 200 feet. Chem-

Nuclear anticipates closing Trench 86 within two years. (Hr'g Tr., vol. III, at 84.)

Other Applicable Regulatory Standards

119. No concrete evidence was presented to establish that the renewal of License No. 097 constitutes an unreasonable risk to the health and safety of the public. (Hr'g Tr., vol. IV, at 182-84; DHEC Ex. #25; Chem-Nuclear Ex. #16.)

120. The licensee, Chem-Nuclear, is qualified to carry out disposal operations at the Barnwell Site. Chem-Nuclear's qualifications are evident from its Exhibit Number 7, from the compliance history of the Barnwell Site, and from the extensive modeling and monitoring efforts undertaken by the Chem-Nuclear staff. (DHEC Ex. #25; Chem-Nuclear Ex. #16; Hr'g Tr., vol. IV, at 184-85.)

121. No concrete evidence was presented to demonstrate that the Barnwell Site design and operations are inadequate to protect the public health and safety because they fail to provide reasonable assurances that the general population will be protected from releases of radioactivity above the limits established in Regulation 61-63, § 7.18. (Ichimura Prefiled Test. at 32; DHEC Ex. #25; Chem-Nuclear Ex. #16.)

122. No concrete evidence was presented to show that the Barnwell Site design and operations are inadequate to protect the public health and safety because they fail to provide reasonable assurances that inadvertent intruders are protected in accordance with Regulation 61-63, § 7.19. (Chem-Nuclear Ex. #16; DHEC Ex: #25; Hr'g Tr., vol. IV, at 185.)

123. This Court agreed with Chem-Nuclear in its Motion in Limine that any testimony from Petitioner regarding legislative diversion of monies from the Long-Term Care Fund to other uses was not relevant for determination of the validity of this permit appeal.

CONCLUSIONS OF LAW

Based upon the foregoing Findings of Fact, I conclude the following as a matter of law:

Jurisdiction and Burden of Proof

1. This Court has jurisdiction over this matter pursuant to Article I, Section 22, of the South Carolina Constitution and the South Carolina Administrative Procedures Act. See S.C. Const. art. I, § 22; S.C. Code Ann. § 1-23-600(B) (Supp. 2004); S.C. Code Ann. § 1-23-310 et seq. (2005).

Pursuant to that jurisdiction, an administrative law judge presides over all hearings of, and serves as the finder of fact in, contested DHEC permitting cases. See Marlboro Park Hosp. v. S.C. Dep't of Health & Envtl. Control, 358 S.C. 573, 577, 595 S.E.2d 851, 853 (Ct. App. 2004) (citing Brown v. S.C. Dep't of Health & Envtl. Control, 348 S.C. 507, 512, 560 S.E.2d 410, 413 (2002)).

2. In presiding over a contested case, the administrative law judge conducts a *de novo* hearing with the presentation of testimony and evidence and issues a decision with detailed findings of fact supporting the decision. See Marlboro Park Hosp., 358 S.C. at 579, 595 S.E.2d at 854.

3. Petitioner, as the moving party challenging the Department's decision to renew Chem-Nuclear's license, bears the burden of proving its case by a preponderance of the evidence. See Leventis v. S.C. Dep't of Health & Envtl. Control, 340 S.C. 118, 132-33, 530 S.E.2d 643, 651 (Ct. App. 2000) (holding that the burden of proof in administrative proceedings generally rests upon the party asserting the affirmative of an issue); Anonymous v. State Bd. of Med. Exam'rs, 329 S.C. 371, 375, 496 S.E.2d 17, 19 (1998) (holding that the standard of proof in an administrative proceeding is generally the preponderance of the evidence).[1]

4. The weight and credibility assigned to evidence presented at the hearing of a matter is within the province of the trier of fact. See S.C. Cable Television Ass'n v. S. Bell Tel. & Tel. Co., 308 S.C. 216, 222, 417 S.E.2d 586, 589 (1992). Furthermore, a trial judge who observes a witness is in the best position to judge the witness's demeanor and veracity and to evaluate the credibility of his testimony. See, e.g., Woodall v. Woodall, 322 S.C. 7, 10, 471 S.E.2d 154, 157 (1996); Wallace v. Milliken & Co., 300 S.C. 553, 556, 389 S.E.2d 448, 450 (Ct. App. 1990).

5. In weighing the testimonial and documentary evidence presented and making findings of fact thereupon, this tribunal is guided by several general principles to determine whether a proffer

[1] The preponderance of the evidence is "[t]he greater weight of the evidence" or "superior evidentiary weight that, though not sufficient to free the mind wholly from all reasonable doubt, is still sufficient to incline a fair and impartial mind to one side of the issue rather than the other." Black's Law Dictionary 1201 (7th ed. 2001). It is "such evidence as, when considered and compared with that opposed to it, has more convincing force and produces in the mind the belief that what is sought to be proved is more likely true than not true." Alex Sanders & John S. Nichols, Trial Handbook for South Carolina Lawyers § 9.5, at 371 (2d ed. 2001) (citing to Frazier v. Frazier, 228 S.C. 149, 89 S.E.2d 225 (1955)).

of evidence is sufficient to warrant a finding:

> A verdict or finding must be based on the evidence and must be based on the facts proved. Under this well established rule, although difficulty of proof does not prevent the assertion of a legal right, the verdict or finding cannot rest on surmise, speculation, or conjecture. Furthermore, a verdict of the jury or a finding of the court cannot be supported only by guesswork. Also, it has been said that the verdict or finding cannot rest on supposition, assumption, imagination, suspicion, arbitrary action, whim, percentage, or conclusions that are in conflict with undisputed fact.
>
> The evidence on which the verdict or finding is based must be competent, legal evidence received in the course of the trial, credible, and of probative force, and must support every material fact. The decision should be against the party having the burden of proof where there is no evidence, or the evidence as to a material issue is insufficient . . . .

32A C.J.S. Evidence § 1339, at 757-58 (1996) (emphasis added); see also S.C. Code Ann. § 1-23-320(i) (2005) ("Findings of fact shall be based exclusively on the evidence and on matters officially noticed.").

Expert Testimony

6. Under the South Carolina Rules of Evidence, "[i]f scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise." Rule 702, SCRE. An expert is granted wide latitude in determining the basis of his or her opinion, and where an expert's testimony is based upon facts sufficient to form an opinion, the trier of fact must weigh its probative value. Small v. Pioneer Machinery, Inc., 329 S.C. 448, 470, 494 S.E.2d 835, 846 (Ct. App. 1997).

7. "[E]xpert testimony is essential in cases which involve a subject of special technical science, skill, or occupation of which the members of the jury or the trial court are not presumed to be specially informed." 32A C.J.S. Evidence § 729, at 85 (1996). For example, the South Carolina Supreme Court has held that, in medical malpractice cases, "the plaintiff must use expert testimony . . . unless the subject matter lies within the ambit of common knowledge and experience, so that no special learning is needed to evaluate the conduct of the defendant." Pederson v. Gould, 288 S.C. 141, 143, 341 S.E.2d 633, 634 (1986).

8. In general, "expert opinion evidence is to be considered or weighed by the triers of the facts like any other testimony or evidence . . . [;] the triers of fact cannot, and are not required to, arbitrarily or lightly disregard, or capriciously reject, the testimony of experts or skilled witnesses, and make an unsupported finding to the contrary of the opinion." 32A C.J.S. Evidence § 727, at 82-83 (1996). However, the trier of fact may give an expert's testimony the weight he or she determines it deserves. Florence County Dep't of Soc. Servs. v. Ward, 310 S.C. 69, 72-73, 425 S.E.2d 61, 63 (Ct. App. 1992). Further, the trier of fact may accept the testimony of one expert over that of another. See S.C. Cable Television Ass'n v. S. Bell Tel. & Tel. Co., 308 S.C. 216, 417 S.E.2d 586 (1992).

General Regulations Applicable to Radioactive Materials

9. 24A S.C. Code Ann. Regs. 61-63, § 3.56.1 (Supp. 2004) establishes the classifications and characteristics of low-level radioactive waste for land disposal. This regulation classifies such waste as Class A, B, or C waste, in increasing levels of radioactivity, and requires the consideration of both the concentration of long-lived radionuclides and shorter-lived radionuclides in determining the proper classification of radioactive waste. Id. Under the permitting requirements for the land disposal of low-level radioactive waste, "waste" is generally defined as "those low-level radioactive wastes that are acceptable for disposal in a land disposal facility." 24A S.C. Code Ann. Regs. 61-63, § 7.2.22 (1992).

10. 24A S.C. Code Ann. Regs. 61-63, § 7.10 (1992 & Supp. 2004) sets forth the general requirements for the issuance of a license for the receipt, possession, and disposal of waste containing or contaminated with radioactive material. Under this regulation, such a license may not be issued unless the Department finds, among other things, that:

(1) the issuance of the license will not constitute an unreasonable risk to the health and safety of the public;

(2) the applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property;

(3) the applicant's proposed disposal site, disposal design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure

institutional control are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in [§] 7.18; and,

(4) the applicant's proposed disposal site, disposal site design, land disposal facility operations, including equipment, facilities, and procedures, disposal site closure, and post-closure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected in accordance with the performance objective in [§] 7.19. 24A S.C. Code Ann. Regs. 61-63, §§ 7.10.1 to 7.10.4 (1992).

Section 7.18 of Regulation 61-63 addresses the protection of the general public from releases of radioactivity and provides that:

> Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 millirems (0.25 mSv) to the whole body, 75 millirems (0.75 mSv) to the thyroid, and 25 millirems (0.25 mSv) to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

24A S.C. Code Ann. Regs. 61-63, § 7.18 (1992) (emphasis added). Section 7.19 addresses the protection of individuals from inadvertent intrusion upon a closed disposal site and provides that the "[d]esign, operation, and closure of [a] land disposal facility shall ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed." 24A S.C. Code Ann. Regs. 61-63, § 7.19 (1992).

11. As used in Section 7.18 and in other portions of DHEC's regulations governing radioactive materials,[2] the regulatory requirement that exposure to radioactivity be kept as low as is reasonably achievable (ALARA) means

> making every reasonable effort to maintain exposures to radiation as far below the

[2] See, e.g., 24A S.C. Code Ann. Regs. 61-63, § 3.4.2 (Supp. 2004) (requiring all radioactive materials licensees to "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are as low as is reasonably achievable (ALARA)").

> dose limits in [the applicable regulation] as is practical consistent with the purposes for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

24A S.C. Code Ann. Regs. 61-63, § 3.2.6 (Supp. 2004).

Conclusions as to Petitioner's Allegations of Error

12. Petitioner has presented no evidence so as to warrant reversal of the renewal of License No. 097 based on Regulation 61-63, § 7.10.1, which requires that the issuance of the license not constitute an unreasonable risk to the health and safety of the public. I conclude that no sufficient evidence was presented to establish that the issuance of the license would constitute an unreasonable risk to the health and safety of the public.

13. Similarly, Petitioner has not presented sufficient evidence to warrant the reversal of the renewal of License No. 097, because Chem-Nuclear's disposal practices fail to satisfy the requirements of Regulation 61-63, §§ 7.10.2 and 7.10.3.

14. Further, Petitioner presented no evidence to demonstrate that Chem-Nuclear's operations at the Barnwell Facility do not comply with Regulation 61-63, § 7.10.4, which addresses the protection of inadvertent intruders upon the site. Chem-Nuclear's disposal practices, which include the use of enhanced capping, assure protection for inadvertent intruders.

15. Finally, Petitioner has failed to demonstrate a violation of ALARA, as set forth in Regulation 61-63, §§ 3.4.2 and 7.18. Chem-Nuclear and DHEC have shown adherence to ALARA in the measures taken by Chem-Nuclear to address tritium migration from the Barnwell Facility and the potential for releases from other radionuclides that are contained in the waste buried at the Site.

16. Nevertheless, Petitioner did raise legitimate issues and presented evidence suggesting that further studies are needed to evaluate the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell Site that will (1) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum

extent feasible. In order to address these concerns, Chem-Nuclear shall conduct the studies identified above and submit the results to DHEC within 180 days of the date of this Order. It should be noted that no evidence was presented by either Respondent or the Department that the Blue Ribbon Panel considered any of these particular issues in its report. Moreover, with specific regard to the undeniable "rainfall problem," see Findings of Fact #47, 48, 50, 101, 115, Chem-Nuclear has already considered conceptual designs to keep rainfall out of the trenches, but it failed to complete a report on its research and has not submitted such a report to DHEC, despite its request. See Finding of Fact #50; see also Findings of Fact #46, 49, 56 (discussing Dr. Ichimura's acknowledgement of the contamination problems caused by rainfall during disposal activities at the site).

17. In sum, while Petitioner raised serious concerns regarding the disposal methods and practices authorized by DHEC and employed by Chem-Nuclear for the disposal of low-level radioactive waste at the Barnwell Facility, it could not ultimately meet the heavy burden it carried in this matter. To demonstrate a violation of the regulatory requirements for such disposal, it is not enough to merely show that DHEC has not required, and Chem-Nuclear has not employed, the most protective or most isolating methods of radioactive waste disposal currently available. Rather, the regulatory standards require a highly detailed, highly technical analysis that weighs both the state of the technology of waste disposal and the social and economic costs of various disposal practices to determine whether the methods in question adequately protect the public from exposure to radioactive materials. See, e.g., 24A S.C. Code Ann. Regs. 61-63, § 3.2.6 (defining "ALARA" as a balancing between scientific questions regarding the state of technology and practical considerations including the economics of any improvements, various societal and socioeconomic considerations, and the use of nuclear energy in the public interest). In the instant case, Petitioner did not provide the Court with concrete, competent evidence to demonstrate that the disposal methods permitted under License No. 097 fail to satisfy such regulatory requirements, and, therefore, DHEC's permitting decision must stand.

ORDER

Based upon the Findings of Fact and Conclusions of Law stated above,

IT IS HEREBY ORDERED that DHEC's decision to renew Radioactive Material License No. 097 issued to Respondent Chem-Nuclear Systems, LLC, for the operation of the low-level radioactive waste disposal facility in Barnwell, South Carolina, is **SUSTAINED.** However,

IT IS FURTHER ORDERED that, in light of certain known problems related to the potential for groundwater contamination on and near the site raised during these proceedings, Chem-Nuclear must conduct a study, as outlined above, concerning methods to reduce contact between radioactive waste and rainfall and other water at its facility, and must submit the results of that study to DHEC within 180 days of the date of this Order.

AND IT IS SO ORDERED.

JOHN D. GEATHERS
Administrative Law Judge
1205 Pendleton Street, Suite 224
Columbia, South Carolina 29201-3731

October 13, 2005
Columbia, South Carolina

CERTIFICATE OF SERVICE
This is to certify that the undersigned has this date served this order in the above entitled action upon all parties to this cause by depositing a copy hereof, in the United States mail, postage paid, or in the Interagency Mail Service addressed to the party(ies) or their attorney(s).

This 13th day of October 2005

By: _____
Judicial Law Clerk

STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAW COURT

Sierra Club, Petitioner, vs. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	**ORDER DENYING MOTION FOR RECONSIDERATION AND TO ALTER OR AMEND ORDER** **DOCKET NO. 04-ALJ-07-0126-CC**

On October 24, 2005, Petitioner filed a Motion to Reconsider and to Alter or Amend Findings and Conclusions with regard to this Court's October 13, 2005 Final Order and Decision in the above-captioned matter. The Court finds the motion to be contentious and manifestly without merit. Therefore,

IT IS HEREBY ORDERED that Petitioner's motion to reconsider and alter or amend the final Order in this case is **DENIED.**

AND IT IS SO ORDERED.

JOHN D. GEATHERS
Administrative Law Judge

November 1, 2005
Columbia, South Carolina

CERTIFICATE OF SERVICE
This is to certify that the undersigned has this date served this order in the above entitled action upon all parties to this cause by depositing a copy hereof, in the United States mail, postage paid, or in the interagency Mail Service addressed to the party(ies) or their attorney(s).
This 1st day of November 2005
By: _____ Judicial Law Clerk

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STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAW COURT

Sierra Club, Petitioner, vs. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	)	**ORDER GRANTING PARTIAL SUMMARY JUDGMENT** **DOCKET NO. 04-ALJ-07-0126-CC**

In the above-captioned case, Petitioner Sierra Club and another environmental advocacy organization, Environmentalists, Inc., requested a contested case hearing to challenge the decision of Respondent South Carolina Department of Health and Environmental Control (Department or DHEC) to renew South Carolina Radioactive Material License No. 97 to Respondent Chem-Nuclear Systems, LLC (Chem-Nuclear), to permit the continued operation of the Barnwell Low Level Radioactive Waste Disposal Facility in Barnwell County, South Carolina. In particular, the Sierra Club and Environmentalists, Inc., contend that the renewed license fails to adequately protect public health and the environment by authorizing continued nuclear waste management and disposal practices at the Barnwell facility that do not maintain radiation releases to the public that are as low as reasonably achievable. Pet'r Prehearing Statement ¶ 1; see 24A S.C. Code Ann. Regs. 61-63 § 3.4.2 (Supp. 2004) (requiring radioactive materials licensees to "use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the general public that are as low as is reasonably achievable (ALARA)"). Respondents DHEC and Chem-Nuclear maintain that the radioactive material license for the Barnwell facility was properly renewed under the applicable statutory and regulatory requirements, including those of Regulation 61-63.

CROSS MOTIONS FOR SUMMARY JUDGMENT

On February 4, 2005, Respondent Chem-Nuclear filed a Motion for Summary Judgment on the ground that the Sierra Club and Environmentalists, Inc., could not establish that any of their

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members would suffer an injury in fact from the renewal of the radioactive materials license for the Barnwell facility, and therefore lacked standing to bring this contested case proceeding. In response, Sierra Club and Environmentalists, Inc., filed a cross-motion for summary judgment on the basis that they had, in fact, demonstrated a sufficient injury to their members so as to grant the organizations standing to bring this case. In support of these motions for summary judgment, the parties relied upon the depositions taken of Ruth Thomas, the president of Environmentalists, Inc., and several members of the Sierra Club, all of whom had been identified as witnesses who could establish standing for the organizations, as well as the deposition of the Sierra Club's expert witness.

In these depositions, four members of the Sierra Club testified to the following facts: they receive their water for drinking, cooking, and bathing from the Beaufort-Jasper Water Authority, which draws its water from the Savannah River; the water drawn from the Savannah River by the Beaufort-Jasper Water Authority contains noticeable levels of tritium (and possibly other radionuclides), albeit levels that fall within state and federal guidelines for safe drinking water; and the Barnwell Low Level Radioactive Waste Disposal Facility, which lies upriver from the Beaufort-Jasper Water Authority, has released tritium (and possibly other radionuclides) into a creek that feeds into the Savannah River. In addition, one of the Sierra Club members testified that he kayaked in the Savannah River. These members admitted that they had not yet suffered any demonstrable physical harm from the tritium in their drinking water, their property values had not been diminished by the tritium in their water, and they had not limited their use of the Savannah River, either recreationally or as a source of drinking water through the Beaufort-Jasper Water Authority, because of the tritium levels in the water. Nonetheless, these members attested to their serious concerns regarding the impact upon their health and welfare of their ingestion of tritium and other radionuclides in their drinking water. See generally Depositions of Allyn Schneider, Joe Whetstone, Harriet Keyserling, and Janet Wedlock. In her deposition, Ruth Thomas, the president of Environmentalists, Inc., did not identify any members of Environmentalists, Inc., who would be directly affected by any releases of radioactive materials from the Barnwell facility; rather, she stated that her primary concern, and the primary concern of the other members of Environmentalists, Inc., that she identified, was the transportation of nuclear materials on South Carolina roadways in route to disposal at the Barnwell facility. In particular, she articulated concerns related to the consequences of possible accidents

involving trucks transporting radioactive waste and other potential harms caused by radiation escaping from such trucks as they travel South Carolina's roads. See Deposition of Ruth Thomas. Finally, the Sierra Club's expert witness, Duncan Howe, discussed the elevated levels of tritium in the Savannah River. Based upon these depositions and for the reasons set forth below, I find that members of the Sierra Club have demonstrated a sufficient injury in fact such that the Sierra Club has standing to bring this challenge to the renewal of Chem-Nuclear's license. However, I further find that Environmentalists, Inc., has not established that any of its members have a cognizable injury to fact caused by the operations of the Barnwell facility to entitle the organization to standing in this case.

STANDING

A motion to dismiss or a motion for summary judgment based upon a party's lack of standing implicates the jurisdiction of this tribunal.[1] As such, this tribunal's inquiry into this jurisdictional question must be thorough, because "it is the duty of the court to assure that it renders no decision in a matter when it has no authority to act." State v. Johnston, 327 S.C. 435, 438, 489 S.E.2d 228, 230 (Ct. App. 1997), rev'd on other grounds, 333 S.C. 459, 510 S.E.2d 423 (1999); see also Bridges v. Wyandotte Worsted Co., 243 S.C. 1, 8, 132 S.E.2d 18, 21 (1962) ("[E]very court has the power and

[1] While the matter is not entirely free from doubt in this state, see Richard Seamon, Administrative Agencies: General Concepts and Principles, in South Carolina Administrative Practice and Procedure 1, 66-67 & n.301 (Randolph Lowell & Stephen Bates eds., 2004), it does appear that a challenge to a party's standing to bring an action implicates the subject matter jurisdiction of the court hearing the matter. See Bardoon Properties, NV v. Eidolon Corp., 326 S.C. 166, 169 n.3, 485 S.E.2d 371, 373 n.3 (1997) (drawing a distinction between the concept of real party in interest, which is not a jurisdictional matter, and the concept of standing to sue, and citing to several authorities that draw a similar distinction and treat standing as a jurisdictional matter); Lennon v. S.C. Coastal Council, 330 S.C. 414, 417-18, 498 S.E.2d 906, 907-08 (Ct. App. 1998) (citing to Bardoon and treating a party's lack of standing as a jurisdictional matter, because "South Carolina courts, like the federal courts, require a justiciable case or controversy before any decision on the merits can be reached"); Seamon, supra (noting that "[a]s an essential element of court power, standing would presumably implicate subject matter jurisdiction"); but see Baird v. Charleston County, 333 S.C. 519, 530 n.7, 511 S.E.2d 69, 75 n.7 (1999) (stating, in a footnote in a discussion on standing, that "[t]he right of a plaintiff to maintain a suit, while frequently treated as going to the question of jurisdiction, goes, in reality, to the right of the plaintiff to relief rather than the jurisdiction of the court to afford it").

duty to determine whether or not it has jurisdiction of a cause presented to it for determination . . . ."), overruled in part on other grounds by Sabb v. S.C. State Univ., 350 S.C. 416, 567 S.E.2d 231 (2002). Here, the Sierra Club has established standing to pursue this matter, but Environmentalists, Inc., has not.

In the absence of specific statutory or regulatory criteria addressing standing before an administrative tribunal, the principles governing standing to bring a lawsuit are applicable to an analysis of whether a person has standing to participate in an administrative proceeding. See, e.g., Beaufort Realty Co. v. Beaufort County, 346 S.C. 298, 551 S.E.2d 588 (Ct. App. 2001) (applying precedent regarding standing to bring a lawsuit to analyze whether an organization had standing to appeal a zoning decision to the Beaufort County Zoning Board of Appeals); Anchor Point, Inc. v. Shoals Sewer Co., 308 S.C. 422, 428, 418 S.E.2d 546, 549 (1992) (co-mingling the concepts of standing and real party in interest, but relying upon general standing doctrine to find that a sewer company had standing to apply to the Public Service Commission for a rate establishment); see also Seamon, supra, at 74 (noting that certain South Carolina case law "suggests that precedent on standing to bring a lawsuit may be relevant to analysis of standing to participate in an agency proceeding"). Here, as there are no specific statutes or regulations addressing who has standing to request a contested case to challenge the renewal of a radioactive materials license, the general principles of standing to bring a lawsuit may be applied to determine whether the Sierra Club and Environmentalists, Inc., have standing to bring their challenges to the renewal of Chem-Nuclear's license before this Court.

In analyzing questions of standing, the South Carolina Supreme Court has adopted the federal law of standing, and, in particular, the three-prong test for standing enunciated by the United States Supreme Court in Lujan v. Defenders of Wildlife, 504 U.S. 555 (1992). See Sea Pines Assoc. for the Prot. of Wildlife, Inc. v. S.C. Dep't of Natural Res., 345 S.C. 594, 550 S.E.2d 287 (2001); see also Beaufort Realty Co. v. Beaufort County, 346 S.C. 298, 551 S.E.2d 588 (Ct. App. 2001) (also applying the three-part Lujan test to a question of standing). Under this test, a party must satisfy the following requirements in order to establish standing:

> First, the plaintiff must have suffered an 'injury in fact'–an invasion of a legally protected interest which is (a) concrete and particularized and (b) actual or imminent, not 'conjectural' or 'hypothetical'. Second, there must be a causal connection

between the injury and the conduct complained of the injury has to be "fairly . . . trace[able] to the challenged action of the defendant, and not . . . th[e] result [of] the independent action of some third party not before the court." Third, it must be 'likely,' as opposed to merely 'speculative,' that the injury will be 'redressed by a favorable decision.'

Sea Pines, 345 S.C. at 601, 550 S.E.2d at 291 (quoting Lujan) (alteration in original). Further, "[w]hen an organization is involved, the organization has standing on behalf of its members if one or more of its members will suffer an individual injury by virtue of the contested act." Sea Pines, 345 S.C. at 600-01, 550 S.E.2d at 291; see also Beaufort Realty Co., 346 S.C. at 301, 551 S.E.2d at 589 ("An organization has standing to bring suit on behalf of its members when its members would otherwise have standing to sue in their own right, the interests at stake are germane to the organization's purpose, and neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit.") (citing Hunt v. Washington State Apple Adver. Comm'n, 432 U.S. 333 (1977)). In the instant case, the Sierra Club has sufficiently established that it has standing to bring its challenge to the renewal of Chem-Nuclear's license before this tribunal.

The crux of Chem-Nuclear's motion for summary judgment is that the injuries alleged by the members of the Sierra Club and Environmentalists, Inc., are purely conjectural and are neither concrete and particularized nor actual and imminent. See Mem. in Supp. of Resp't Chem-Nuclear Systems, LLC's Mot. for Summ. J. at 6. However, the injuries described by the members of the Sierra Club who draw their drinking water from the Savannah River are concrete, particularized, and actual or imminent. There is a wealth of case law finding that the sort of concerns raised by the members of the Sierra Club who were deposed in this case are sufficient to establish an "injury in fact" for standing purposes. See, e.g., Friends of the Earth, Inc. v. Laidlaw Envtl. Servs., Inc., 528 U.S. 167, 180-86 (2000) (granting Friends of the Earth standing to bring suit to enforce Laidlaw's compliance with a permit allowing wastewater discharge into the North Tyger River near Roebuck, South Carolina, where members of Friends of the Earth refrained from recreating in and around the river because of their reasonable concerns regarding harmful pollution in the river); Duke Power Co. v. Carolina Envtl. Study Group, 438 U.S. 59, 73-74 (1978) (granting citizens' groups standing to challenge a federal act related to liability for accidents at nuclear power plants because of the proposed construction of nuclear power plants by Duke Power in the vicinity of two nearby lakes and

holding that "the emission of non-natural radiation into [the citizens'] environment would also seem a direct and present injury, given our generalized concern about exposure to radiation and the apprehension flowing from the uncertainty about the health and genetic consequences of even small emissions like those concededly emitted by nuclear power plants."); Nuclear Energy Inst., Inc. v. Envtl. Prot. Agency, 373 F.3d 1251, 1265-66 (D.C. Cir. 2004) (finding that an environmental organization had standing to challenge the EPA radiation-protection standards for burying nuclear waste at the Yucca Mountain facility in Nevada because one of its members lived and worked eighteen miles from Yucca Mountain and alleged that "EPA's failure to adopt more stringent radiation-protection standards will permit hazardous radionuclides from the buried waste to contaminate his community's ground-water supplies, causing adverse health effects"); Friends of the Earth, Inc. v. Gaston Copper Recycling Corp., 204 F.3d 149, 152-161 (4th Cir. 2000) (granting Citizens Local Environmental Action Network (CLEAN) standing to bring a citizen suit against Gaston Copper for illegally releasing metal pollutants into a creek in Lexington County, South Carolina, where one of its members lived along the creek and curtailed his activities in and around the creek and an adjoining pond because of his reasonable concerns about the pollutants in the water). In the case at hand, the Sierra Club members have stated reasonable concerns regarding their health as a result of the elevated levels of tritium and other radionuclides in the water they drink and in the river in which at least one of them recreates. And, "[t]hese health and recreational interests are constitutionally recognized as cognizable bases for injury in fact." Gaston Copper, 204 F.3d at 156-57; see also S.C. Wildlife Fed'n v. S.C. Coastal Council, 296 S.C. 187, 190, 371 S.E.2d 521, 523 (1988) (finding that environmental groups had standing to challenge a development project involving wetlands because the groups "alleged an individualized injury in the adverse effect of a specific decision of the Coastal Council on their members' use and enjoyment of the fish and wildlife of the wetlands").[2]

[2] Moreover, these members of the Sierra Club need not prove that they have presently suffered physical harm, that the tritium levels in the Savannah River have caused environmental harm to the river, or that their property values have quantifiable diminished to establish an injury in fact from the tritium in the Savannah River. See Laidlaw Envtl. Servs., 528 U.S. at 181 (noting that the relevant showing for standing purposes "is not injury to the environment but injury to the plaintiff" and holding that a group had standing because "the affiant members' reasonable

However, no members of Environmentalists, Inc., have stated such an injury in fact. No members of Environmentalists, Inc., have alleged or demonstrated any direct exposure to tritium or other radionuclides released from the Barnwell facility, nor have any members of Environmentalists, Inc., alleged or demonstrated any other concrete or particularized harm, whether actual or imminent, stemming from the activities at the Barnwell facility. Rather, the concerns of the members of Environmentalists, Inc., at least as identified in this proceeding, are focused on the potential harms that could result from an accident or other incident on South Carolina's roadways involving a truck transporting nuclear waste to the facility. This sort of generalized, hypothetical, and prospective harm, based upon a concern that is not particular to any individual, but shared by South Carolinians generally, is simply insufficient to establish an injury in fact to provide Environmentalists, Inc., with standing to pursue this matter. See, e.g., Beaufort Realty Co., 346 S.C. at 302-03, 551 S.E.2d at 590. Therefore, because Environmentalists, Inc., cannot satisfy the first threshold of the standing requirements—i.e., the demonstration of an injury in fact—it must be dismissed as a petitioner in this case, as reflected in the amended caption above.

Further, while Chem-Nuclear only argues that the Sierra Club has failed to demonstrate an injury in fact, it is clear that the injury articulated by the Sierra Club members is, to some extent, fairly traceable to Chem-Nuclear's Barnwell facility, and that the injury would be redressed by the relief the Sierra Club seeks. The members of the Sierra Club have stated that the Barnwell facility has released tritium and other radionuclides into a creek that feeds into the Savannah River, the source of their drinking water. While the Barnwell facility may not be the source of all of the tritium and radionuclides found in the Club members' drinking water, to the extent that a significant amount of tritium and radionuclides from the facility have found their way into that water, those pollutants have increased the injuries complained of by the members—and that increase in harm is traceable to Chem-Nuclear. Furthermore, an order from this tribunal requiring the Barnwell facility to store its waste in a manner that prevents or substantially reduces such releases of tritium and other

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concerns about the effects of [Laidlaw's] discharges, directly affected those affiants' recreational, aesthetic, and economic interests"); Gaston Copper, 204 F.3d at 160-61 (stating that "[t]hreatened environmental injury is by nature probabilistic" and holding that a group had standing where one of its members had "reasonable fear and concern about the effects of Gaston Copper's discharge . . . [which] directly affect[ed] his recreational and economic interests").

radionuclides—and thus granting the Sierra Club the relief it seeks—would redress, at least to some extent, the injuries articulated by the Sierra Club members.

Therefore, because members of the Sierra Club have demonstrated a cognizable injury in fact to their health and recreational interests that results, at least in part, from the release of certain pollutants from Chem-Nuclear's Barnwell facility under its current license requirements and that would be redressed by an order imposing more stringent storage requirements upon the facility, the Sierra Club has standing to bring this challenge to the renewal of Chem-Nuclear's license to operate that facility by DHEC.

ORDER

For the reasons set forth above,

IT IS HEREBY ORDERED that Petitioners' and Respondent Chem-Nuclear's cross-motions for summary judgment are **GRANTED IN PART AND DENIED IN PART**, in that this tribunal finds that Petitioner Sierra Club has standing to bring this contested case proceeding, but that Environmentalists, Inc., does not have such standing and must be dismissed as a petitioner in this case.

AND IT IS SO ORDERED.

JOHN D. GEATHERS
Administrative Law Judge
Post Office Box 11667
Columbia, South Carolina 29211-1667

February 15, 2005
Columbia, South Carolina

CERTIFICATE OF SERVICE
This is to certify that the undersigned has this date served this order in the above entitled action upon all parties to this cause by ~~depositing a copy hereof~~, hand delivery in the United States mail, postage paid, or in the Interagency Mail Service addressed to the party(ies) or their attorney(s).

This 16th day of February 2005

By: _____
Judicial Law Clerk

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STATE OF SOUTH CAROLINA
BEFORE THE BOARD OF HEALTH AND ENVIRONMENTAL CONTROL

Sierra Club and Environmentalists, Inc. Petitioners, -vs- South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	)

PETITION FOR ADMINISTRATIVE REVIEW

RE: License Renewal for S.C Radioactive Material License No. 097
Barnwell Low Level Radioactive Waste Disposal Facility

TO: SOUTH CAROLINA BOARD OF HEALTH AND ENVIRONMENTAL CONTROL:

The Petitioners, Sierra Club and Environmentalists, Inc. hereby petition the Board of the Department of Health and Environmental Control ("DHEC"), pursuant to DHEC Regulation 61-72, for an adjudicatory hearing to review and reject the proposed License Renewal for S.C Radioactive Material License No. 097 issued to Respondent Chem-Nuclear Systems, LLC, to permit continued operation of the Barnwell Low Level Radioactive Waste Disposal Facility. Petitioners challenge the failure of the proposed license, as conditioned, to adequately protect the public health, safety and the environment by authorizing continued nuclear waste management and disposal

practices at the Barnwell landfill which fail to maintain radiation releases to the public as low as reasonably achievable. Such practices include the shallow land burial in unlined trenches below the water table of highly radioactive wastes shipped to Barnwell, South Carolina from generators thousands of miles away. Far more protective management practices are readily available but are not required by this proposed license.

In support of this Petition, the Petitioners submit the following:

1. The Petitioners not-for-profit conservation advocacy organizations whose members are citizens and residents of South Carolina who own property, reside and use natural resources in the vicinity of the Barnwell Low Level Radioactive Waste Disposal Facility and routes used in the transportation of nuclear waste to the facility. The Petitioners' members breathe the air, drink, use and enjoy the waters for aquatic life, fish consumption; primary and secondary contact recreation, use and enjoy property and other natural resources in the vicinity of the Barnwell Low Level Radioactive Waste Disposal Facility and routes used in the transportation of nuclear waste to the facility which will be at risk of harm from the continued nuclear waste management and disposal practices authorized by this license renewal.

The Petitioners' members would be injured and adversely affected in the use and enjoyment of their property, by the lowering of the value of their properties, and in their use and enjoyment of the clean air and waters and other natural resources in the vicinity of the Barnwell facility and its transportation routes.

2. The Petitioners would be adversely affected by the release of radiation from the Barnwell facility and from the shipments of nuclear wastes transported to the facility. Measurable amounts of radiation continue to escape from the poorly designed and

operated burial trenches at the facility, contaminating the groundwater and the surface waters of the state, including Mary's Branch which flows into the Savannah River. The contamination of Mary's Branch and the Savannah River from Barnwell facility's radiation discharge threatens the use of these waters for the catching and consumption of fish, the use for primary and secondary contact recreation, such as swimming and boating, and the health of aquatic life. Such contamination deters Petitioners' members from their use and enjoyment of these natural resources.

3. The legal authorities and jurisdictional basis for this adjudicatory hearing are: (1) the Atomic Energy Act, 42 U.S.C. §§ 2014, et seq., (2) the South Carolina Administrative Procedures Act, S.C. Code Ann. §§ 1-23-310, et seq.; (4) the South Carolina Pollution Control Act, S.C. Code Ann. §§ 48-1-10, et seq.; (5) South Carolina Atomic Energy and Radiation Control Act, SC Code §§ 13-7-10, et seq.; and (6).DHEC Regulations R 61-72 and R. 61-63, "Radioactive Materials," including requirements to maintain radiation doses to members of the public that are as low as reasonably achievable (ALARA), § 3.4.2; to assure against unreasonable risk to the health and safety of the public, § 7.10.1; requirements for operator experience and qualifications, Section 7.10.2; for adequate facility design and operations, § 7.10.3; for facility closure and post-closure control, § 7.10.4; and for adequate financial assurances, § 7.10.9.

4. The Petitioners received actual notice of the DHEC Staff approval of the subject license renewal on or about March 16, 2004.

5. Petitioners are informed and believe that the proposed license renewal would violate state and federal environmental law and regulations.

6. As a direct and proximate result of the nuclear waste management and disposal authorized by this license renewal the Petitioners will suffer injury in fact in the form of lost property values; injury to their health and safety and use and enjoyment of their property and natural resources.

7. To the extent required by law the Petitioners agree to be subject to cross examination.

PRAYER FOR RELIEF

WHEREFORE, Petitioners request that the Board of the Department of Health and Environmental Control, after referring this matter to the Administrative Law Judge Division for an evidentiary hearing, issue its order reversing the staff decision to approve the subject license renewal or, in the alternative, imposing such additional and more stringent license conditions as may be required to adequately protect public health, safety and the environment.

March 29, 2004

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STATE OF SOUTH CAROLINA
ADMINISTRATIVE LAW COURT

Sierra Club and Environmentalists, Inc., Petitioners, -v- South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	PREHEARING STATEMENT ALJ NO. 04-ALJ-07-0126-CC

1. **Nature of proceeding:**

Contested case seeking review of Radioactive Material License No. 097 issued to Chem-Nuclear Systems, LLC

2. **Statutory provision(s) conferring jurisdiction on the Administrative Law Court:**

Regulation 61-72
SC Code Ann. Sections 1-23-600, -610
Rules of Procedure, Administrative Law Court

3. **Statutory provision(s) giving rise to the controversy (specific to the agency):**

42 U.S.C. §§ 2014, et. seq.
S.C. Code §§ 13-7-10, et. seq.
S.C. Code Ann. §§ 48-1-10, et. seq.
S.C. Code Ann. Reg. 61-63

4. **Issues to be presented for determination, including claims or defenses expected to be raised:**

Petitioners challenge the adequacy of license conditions, site suitability, facility performance, and failure to maintain radiation releases to the public as low as reasonably achievable. The Department will defend the decision to reissue Radioactive Material License No. 097 as amended in its entirety.

5. **Action requested of the Court:**

The Department seeks an order affirming the license in its entirety.

6. **Brief summary of facts to be presented at the hearing:**

Chem-Nuclear Systems, LLC, operates a low-level radioactive waste disposal site near Snelling, SC, pursuant to Radioactive Material License 097. This license was originally issued in 19xx and has been reissued periodically. Chem-Nuclear applied for reissuance at the end of the previous license term. DHEC staff reviewed the application, supporting documents, and the compliance history of the site and determined that operation in accordance with conditions set forth in Amendment 49 of the license would meet the requirements of Regulation 61-63 and would be protective of human health and the environment. The Department expects to offer testimony regarding the regulatory basis for license conditions, the facility's compliance with license conditions and applicable regulations, and the basis for the decision to reissue License 097.

7. **Summary of motions expected to be raised at the hearing:**

None known at this time. DHEC reserves the right to make appropriate motions as the case progresses.

8. **List of proposed witnesses and exhibits:**

Witnesses:
Henry Porter
Rodney Wingard
Josephine Stephens

Bureau of Land and Waste Management
SC DHEC
2600 Bull Street
Columbia, SC 29201

Exhibits see Attachment A

9. **Statement regarding the necessity for discovery:**

Standard discovery, including 30(b)(6) and expert depositions.

10. Estimated time required for hearing:

Three days.

May 11, 2004
Columbia, SC

SAMUEL L. FINKLEA, III
SC Bar #2015; DSC #815
South Carolina Department of
Health and Environmental Control
2600 Bull Street
Columbia, SC 29201
(803)898-3350

Attachment A

The following documents comprise the Department's file on Amendment 49 of License 097. Not all documents will necessarily be offered as exhibits or admissible.

[undated]	ERPV Review Panel members
[undated]	Jones, comments on draft Amendment 49
[undated]	notice of public hearing on Amendment 49
[undated]	Response to comments, November 12, 2003 - January 15, 2004
[undated]	summary of response to 2/29/04 FOI request
[undated]	DHEC, public notice of license renewal, 097
4/18/97	ref DHEC ltr 02/24/97. Comments on CNS draft "Verification of Performance Objectives"
08/25/97	ref ltr Lohaus to Autry 04/18/97.
12/15/97	ref meetings 02/10/97, 07/07/97, & 10/09/97. Transmits BEDL-97-023, ERPV.
01/05/98	completed review of BEDL-97-023 submitted 12/15/97.
10/14/99	requests approval to conduct closure activities
10/22/99	ref CNS 10/14/99. Approval for closure activities.
4/27/00	House to Autry, renewal application with attachments
4/27/00	transmits BEDL 99-001, Rev. 1. [CNS claim of 'Proprietary']

4/28/00	receipt CNS 4/27/00 application for renewal License 097.
6/20/00	transmits copy ERPV, BEDL-00-010.
7/15/00	initial review, "Interim Site Stabilization and Closure Plan, 1999 Revision" recommendations
8/15/00	ref DHEC 7/31/00. Justification proprietary vs non-proprietary, 1999 Closure Plan
9/6/00	Porter to House, first round of interrogatories
10/06/00	submits 2000 version Interim Site Stabilization and Closure Plan
10/17/00	received 2000 Interim Site Stabilization and Closure Plan and reviewed responses DHEC ltr 7/15/00.
10/18/00	transmits ERPV, BEDL-00-002 [CNS claim of 'Proprietary']. Addresses recommendations in BEDL-99-001, Rev. 1 submitted 04/27/00.
11/17/00	response to Mike Gandy of DHEC. Proprietary nature of ERPV report.
2/6/01	House to Porter, response to 9/6/00 interrogatories
5/4/01	Moeller to Porter, "Report of the Blue Ribbon Panel ..."
5/23/01	report of Blue Ribbon Panel.
6/8/01	House to Porter, response to 9/6/00
10/22/01	BEDL-01-012, Work Plan...Blue Ribbon Panel Recommendations for ERPV for review
11/15/01	ref CNS 10/22/01. BEDL-01-012, Work Plan to Address Blue Ribbon Panel Recommendations... ERPV
02/14/03	additional info: draft Technical Evaluation Report (TER)
02/14/03	ref CNS application 04/27/00. Additional info, renewal License 097, amendment 49.
05/01/03	request to eliminate $3M bond to provide financial assurance for closure and decommissioning
06/04/03	additional info, 5/01/03 request to eliminate $3M bond (closure and decommissioning)
07/02/03	submits BEDL-03-002, Report Addressing Blue Ribbon Panel Recommendations. [CNS claim of 'Proprietary']
12/11/03	sign-in sheet, public hearing

12/11/03	Moore to Porter, comments on draft Amendment 49
12/11/03	transcript of public hearing
12/18/03	Kelly to Porter, comments on draft Amendment 49
12/19/03	Moore to Porter, comments on draft Amendment 49
12/19/03	Lipoti to Porter, comments on draft Amendment 49
12/22/03	Thomas to Hamm, document review request
12/26/03	Thomas, comments on draft Amendment 49
12/29/03	House to Porter, comments on draft Amendment 49
12/30/03	Porter to Thomas re extension of comment period
1/9/04	Rushe to Porter; comments on draft Amendment 49
1/10/04	Thomas to Benton, document review request
1/13/04	"List of Questions from Ruth Thomas"
1/14/04	Howell to Porter, comments on draft Amendment 49
1/15/04	Thomas to Porter, comments on draft Amendment 49
1/15/04	Bush to Porter, comments on draft Amendment 49
1/15/04	Lohaus to Porter re technical assistance request
2/5/04	Sierra Club press release
2/25/04	Wingard to Howell re FOI request
2/29/04	Thomas to Hamm, FOI request
3/15/04	License No. 097, Amendment 49 [amending the license in its entirety]
3/15/04	Porter to House, transmitting License No. 097, Amendment 49
3/15/04	Porter to various individuals re issuance of Amendment 49
3/15/04	Technical Evaluation Report

STATE OF SOUTH CAROLINA

BEFORE THE ADMINISTRATIVE LAW COURT

Sierra Club and Environmentalists, Inc. Petitioners, v. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	)	Docket No. 04-ALC-07-0126-CC **PREHEARING STATEMENT OF RESPONDENT CHEM-NUCLEAR SYSTEMS, LLC**

In response to the Order for Prehearing Statements issued by the Honorable John D. Geathers on April 19, 2004, Respondent Chem-Nuclear Systems, LLC, ("CNS") respectfully submits the following:

1. The nature of this proceeding:

This proceeding involves the appeal of a decision by the South Carolina Department of Health and Environmental Control ("DHEC" or the "Department") to renew CNS' Radioactive Material License No. 097 ("Renewal License") authorizing it to continue to operate the Barnwell Low-Level Radioactive Waste Disposal Facility (the "Facility") in Barnwell County, South Carolina.

2. The statutory provision(s) conferring subject matter jurisdiction to the Court:

a. South Carolina Administrative Procedures Act, S.C. Code Ann. §§ 1-23-500 et seq. (Supp. 2003);

b. Rules 1 and 11, Rules of Procedure of the Administrative Law Court; and

c. 25 S.C. Code Ann. Reg. 61-72 (Supp. 2003).

3. The specific statutory and regulatory provisions giving rise to the controversy:

a. 42 U.S.C. §§ 2014 et seq.;

b. Pollution Control Act, S.C. Code Ann. §§ 48-1-10 et seq. (1987 and Supp. 2003);

c. Atomic Energy and Radiation Control Act, S.C. Code §§ 13-7-10, 13-7-30, and 13-7-40 (1976 and Supp. 2003); and

d. 24A S.C. Code Ann. Reg. 61-63 (1976 and Supp. 2003), §§ 7.4-7.9, 7.10, and 7.12.

4. The issues to be presented for determination, including any claims or defenses expected to be raised:

Petitioners have raised issues regarding whether the Renewal License determination is in compliance with the provisions cited in response to Paragraph 3 above. Petitioners contend that the proposed licensure conditions do not adequately protect the public health, safety and environment because the allowed practices do maintain radiation releases to the public "as low as reasonably achievable" ("ALARA"). CNS will present evidence that will: 1) demonstrate that its request for renewal and the conditions imposed thereon meet all applicable requirements of Regulation 61-63; and 2) demonstrate that the conditions of the Renewal License protect the public health, safety and environment and comply with regulatory requirements.

There may be other claims or defenses raised. However, because discovery is in the early stages, CNS will supplement this Prehearing Statement as additional claims or defenses may be identified.

5. The action requested of the Court, if any:

CNS respectfully requests that this Court uphold DHEC's decision to issue the Renewal License.

6. A brief summary of the facts to be presented at the hearing:

The Facility is licensed and overseen by the State of South Carolina, through DHEC, pursuant to the State's status as an "Agreement State" with the United States Nuclear Regulatory Commission under the federal Atomic Energy Act. South Carolina became an Agreement State in 1969. It assumed this authority by statute by enacting S.C. Code Ann. § 13-7-10 et seq. (1976 and Supp. 2003) and implemented this authority by promulgating Regulation 61-63. The federal government retains exclusive jurisdiction over high-level waste.

CNS began disposal operations at the Facility in 1971 pursuant to License No. 097. This License has been renewed 7 times. The License was renewed by the Department in 1971, 1973, 1975, 1978, 1982, 1985, and 1995 without challenge to the sufficiency of the licensure conditions, site suitability, or any other matter. License No. 097 has also been amended 48 times to reflect improvements in disposal methods at the Facility. These improvements include

better containers, improved stability of waste, more stable trench designs, application of engineered vaults, and requirements for enhanced caps over all disposal trenches.

The Facility is located on property owned by the State of South Carolina and leased to CNS pursuant to a 99-year lease. The original lease was entered into in 1971 and has been amended several times. Federal and State law requires that low-level radioactive waste disposal facilities be located on government-owned property.

In 2000, the South Carolina General Assembly enacted the "Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act" ("Compact Act"), Act No. 357, S.C. Code Ann. §§ 48-46-10 et seq. (Supp. 2003). By enactment of this legislation, South Carolina joined the Atlantic Low-Level Radioactive Waste Compact along with the States of Connecticut and New Jersey. The Facility also became the designated regional disposal facility for the Atlantic Compact, guaranteeing 800,000 cubic feet of disposal capacity to Connecticut and New Jersey and ensuring sufficient capacity for South Carolina generators. See S.C. Code Ann. § 48-46-60 (Supp. 2003).

The Compact Act also significantly changed CNS' relationship with the State of South Carolina. While the Facility has always been located on State property and has been subject to State environmental regulation, the Compact Act fundamentally changed the status of the Facility vis-à-vis the State. Pursuant to the Compact Act, the Budget and Control Board is authorized to set rates for

waste disposal at the Facility, which are adjusted annually, and to approve special rates. See S.C. Code Ann. § 48-46-40(A) (Supp. 2003). Previously, rates were set by CNS in response to market competition. The Public Service Commission is directed by the Compact Act to establish the "allowable costs" necessary for operations of the Facility. See S.C. Code Ann. § 48-46-40(B) (Supp. 2003). Allowable costs are adjusted by the PSC on an annual basis. Most significantly, the State receives all revenue from operation of the Facility, minus allowable costs, a twenty-nine percent (29%) operating margin for CNS, and certain other statutory deductions. See S.C. Code Ann. § 48-46-40(D) (Supp. 2003). Thus, as a result of passage of the Compact Act, CNS moved from being a competitor in a private marketplace to being, in essence, a contractor operating the Facility for the State of South Carolina.

On April 27, 2000, CNS timely submitted its renewal application for License No. 097. DHEC held a public hearing on the License renewal on December 11, 2004, and approved renewal of the License on March 15, 2004. That decision was appealed by Petitioners. This matter was transmitted to the Administrative Law Court on April 1, 2004.

CNS will present evidence to show that the License Renewal is in compliance with all applicable regulatory requirements and that the Facility is being operated in accordance with such requirements. CNS will further present evidence to show that DHEC properly considered all information submitted

regarding the Renewal License and correctly determined that the License should be renewed.

7. A summary of any motions expected to be raised at the hearing and the appropriate authority underlying the motion:

At this time, Respondent is unaware of the necessity for trial motions. However, Respondent reserves the right to supplement its response.

8. A list of proposed witnesses and exhibits:

a. Proposed witnesses include:

William B. House
Vice President
Regulatory Affairs
Chem-Nuclear Systems, LLC
140 Stoneridge Drive, Fifth floor
Columbia, South Carolina 29210

Vernon T. Ichimura, Ph.D.
Senior Manager, Environmental Programs
Chem-Nuclear Systems, LLC
740 Osborn Road
Barnwell, South Carolina 29812

CNS may call additional witnesses depending on the information obtained during discovery and will continue to supplement this Prehearing Statement as necessary. CNS reserves the right to call any witness listed as a witness by any of the other parties herein.

b. Proposed exhibits include:

Portions of the DHEC file regarding the Renewal License. Other exhibits have not been identified at this time. CNS will supplement this Prehearing Statement as additional exhibits are identified.

9. A statement regarding the necessity for discovery, if any:

CNS will serve standard interrogatories, requests for production of documents, and requests for admission. CNS anticipates deposing one or more of Petitioners' witnesses or other persons identified through discovery.

10. The estimated time required of the hearing:

CNS estimates that this hearing will likely take three (3) days.

Respectfully submitted,

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Post Office Box 11390
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By: Sara S. Rogers

Attorneys for Respondent Chem-Nuclear Systems, LLC

May 10, 2004

Columbia, South Carolina

STATE OF SOUTH CAROLINA
BEFORE THE ADMINISTRATIVE LAW JUDGE DIVISION

Sierra Club and Environmentalists, Inc. Petitioners, -vs- South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, LLC, Respondents.	)	Docket No. 04-ALJ-07-0126-CC

PETITIONERS' PREHEARING STATEMENT

Petitioners submits the following Prehearing Statement, reserving the right to amend and supplement said Statement during the course of these proceedings:

1. The nature of this proceeding. This is an appeal by Petitioners not-for-profit conservation advocacy organizations from the decision by the South Carolina Department of Health and Environmental Control (DHEC) to renew S.C Radioactive Material License No. 097 issued to Respondent Chem-Nuclear Systems, LLC, to permit continued operation of the Barnwell Low Level Radioactive Waste Disposal Facility. Petitioners challenge the failure of the proposed license, as conditioned, to adequately protect the public health, safety and the environment by authorizing continued nuclear waste management and disposal practices at the Barnwell landfill which fail to maintain

radiation releases to the public as low as reasonably achievable. Such practices include the shallow land burial in unlined trenches below the water table of highly radioactive wastes shipped to Barnwell, South Carolina, from generators thousands of miles away. Far more protective management practices are readily available but are not required by this proposed license.

2. Statutory provision(s) conferring subject matter jurisdiction to the Division (1) The South Carolina Administrative Procedures Act, S.C. Code Ann. §§ 1-23-310, et seq.; (2) DHEC Regulation 61-72.

3. The specific statutory and regulatory provisions giving rise to the controversy (1) the Atomic Energy Act, 42 U.S.C. §§ 2014, et seq., (2) the South Carolina Administrative Procedures Act, S.C. Code Ann. §§ 1-23-310, et seq.; (4) the South Carolina Pollution Control Act, S.C. Code Ann. §§ 48-1-10, et seq.; (5) South Carolina Atomic Energy and Radiation Control Act, SC Code §§ 13-7-10, et seq.; and (6) DHEC Regulations R 61-72 and R. 61-63, "Radioactive Materials."

4. The issues to be presented for determination, including any claims or defenses expected to be raised Whether the DHEC permit renewal decision is arbitrary, capricious, an abuse of discretion, clearly erroneous, unsupported by substantial evidence, in violation of constitutional or statutory provisions, made upon unlawful procedure or affected by other error of law? Whether the proposed renewal license would violate state and federal environmental law and regulations including requirements to maintain radiation doses to members of the public that are as low as reasonably achievable (ALARA), § 3.4.2; to assure against unreasonable risk to the health and safety of the public, § 7.10.1; requirements for operator experience and

qualifications, Section 7.10.2; for adequate facility design and operations, § 7.10.3; for facility closure and post-closure control, § 7.10.4; and for adequate financial assurances, § 7.10.9 ?

5. The action requested of the Division, if any. Issuance of an order reversing the decision of the DHEC Staff and providing for the denial of the subject license.

6. A brief summary of the facts to be presented at the hearing.

The Petitioners' members breathe the air, drink, use and enjoy the waters for aquatic life, fish consumption, primary and secondary contact recreation, use and enjoy property and other natural resources in the vicinity of the Barnwell Low Level Radioactive Waste Disposal Facility and routes used in the transportation of nuclear waste to the facility which will be at risk of harm from the continued nuclear waste management and disposal practices authorized by this license renewal.

The Petitioners' members would be injured and adversely affected in the use and enjoyment of their property, by the lowering of the value of their properties, and in their use and enjoyment of the clean air and waters and other natural resources in the vicinity of the Barnwell facility and its transportation routes.

The Petitioners would be adversely affected by the release of radiation from the Barnwell facility and from the shipments of nuclear wastes transported to the facility. Measurable amounts of radiation continue to escape from the poorly designed and operated burial trenches at the facility, contaminating the groundwater and the surface waters of the state, including Mary's Branch which flows into the Savannah River. The contamination of Mary's Branch and the Savannah River from Barnwell facility's radiation discharge threatens the use of these waters for the catching and consumption

of fish, the use for primary and secondary contact recreation, such as swimming and boating, and the health of aquatic life. Such contamination deters Petitioners' members from their use and enjoyment of these natural resources.

The proposed license, as conditioned, fails to adequately protect the public health, safety and the environment by authorizing continued nuclear waste management and disposal practices at the Barnwell landfill which fail to maintain radiation releases to the public as low as reasonably achievable. Such practices include the shallow land burial in unlined trenches below the water table of highly radioactive wastes shipped to Barnwell, South Carolina, from generators thousands of miles away. Far more protective management practices are readily available but are not required by this proposed license

7. A summary of any motions expected to be raised at the hearing and the appropriate authority underlying the motion None at this time.

8. A list of proposed witnesses and exhibits.

Proposed Witnesses: Susan Corbett, Chair, Sierra Club, John Bachman Group; Virginia Sanders, Sierra Club Conservation Staff; Ruth Thomas, President, Environmentalists, Inc.; Dr. Duncan Howe; Certified Health Physicist;; employees and agents of DHEC, Chem-Nuclear Systems, LLC, and facility generators with knowledge of relevant facts.

Proposed Exhibits: Those documents in the possession of the Department constituting the administrative record upon which the proposed decision is based; records in the possession of the license applicant and its agents reflecting relevant facts regarding the subject facility and its health, welfare and environmental impacts.

9. A statement regarding the necessity for discovery, if any. Petitioners expect to seek discovery of the applicant, the Department and others with relevant information consisting of interrogatories, requests for production and for entry and inspection, depositions and admissions.

10. The estimated time required for the hearing. Three days.

May 4, 2004

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Environmentalists, Inc.
1339 Sinkler Road
Columbia, SC 29206
(803) 782-3000

Robert Guild
314 Pall Mall
Columbia, SC 29201
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Attorneys for the Petitioner Sierra Club

STATE OF SOUTH CAROLINA

BEFORE THE BOARD OF HEALTH AND ENVIRONMENTAL CONTROL

Sierra Club, Petitioners, vs. South Carolina Department of Health and Environmental Control and Chem-Nuclear Systems, Respondents.	)	Docket No. 04-ALC-07-0126-CC **PETITION FOR REVIEW OF THE FINAL ORDER AND DECISION OF THE ADMINISTRATIVE LAW JUDGE**

The Petitioner, Sierra Club, hereby petitions the Board of Health and Environmental Control for review of the Final Order and Decision dated October 13, 2005, and the Order Denying Motion for Reconsideration and to Alter or Amend Order, dated November 1, 2005, of the Administrative Law Court in this matter.

This case involves the DHEC staff's decision to issue a renewal license to Chem-Nuclear Systems ("Chem-Nuclear") for the operation of the radioactive waste landfill at Barnwell, South Carolina. The initial stage of Sierra Club's appeal was heard by Administrative Law Judge John Geathers in a 4-day hearing held on February 16-18 and 25, 2005. Pursuant to Section 1-23-610 of the South Carolina Administrative Procedures Act, Sierra Club now requests that the DHEC Board review the decision of the Administrative Law Court, and to reverse and remand the decision because it is affected by errors of law and clearly erroneous in view of the reliable, probative and substantial evidence on the whole record.

In support of this petition, the Sierra Club submits the following:

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Clerk of DHEC Board

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DHEC
EXHIBIT 26

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
RADIOACTIVE MATERIAL LICENSE

Pursuant to the Atomic Energy and Radiation Control Act, Section 13-7-40 et. seq. of S.C. Code of Laws of 1976 as amended and Supplements thereto, and the South Carolina Department of Health and Environmental Control Regulation 61-63 Radioactive Material (Title A), and in reliance on statements and representations heretofore made by the applicant, a license is hereby issued authorizing the licensee to receive, acquire, possess, and transfer radioactive material listed below; and to use such radioactive material for the purpose(s) and at the place(s) designated below. The license is subject to all applicable rules of the South Carolina Department of Health and Environmental Control now or hereafter in effect and to any conditions specified below.

Amendment No. 49 amends

LICENSEE	3. License Number
1. Name: Chem-Nuclear Systems, LLC. Barnwell Waste Management Facility	097 in its entirety
2. Address: 740 Osborn Road, Barnwell, S.C. 29812	4. Expiration Date: March 15, 2009

5. Radioactive Material (Element and Mass Number)	6. Chemical and/or Physical Form	7. Maximum Radioactivity and/or quantity of material which licensee may possess at any one time.
A. Any Radioactive material excluding source material and special nuclear material	A. Dry packaged radioactive waste except as authorized in this license.	A. 50,000 curies
B. Source material	B. Dry packaged radioactive waste except as authorized in this license.	B. 60,000 pounds
C. Special Nuclear Material	C. Dry packaged radioactive waste except as authorized in this license.	C. 350 grams total of ^{235}U or 200 grams ^{233}U or 200 grams of plutonium or any combination of these provided the sum of the ratios of the quantities does not exceed unity.

8. Authorized Use:

A., B. and C.

Radioactive material as low-level radioactive waste may be received, stored, and disposed of by enhanced shallow land burial in approved engineering barriers (vaults) unless otherwise specifically authorized by the Department . The licensee shall not receive an annual volume of more than the authorized limits of South Carolina Code of Laws of 1976, as amended.

Unless otherwise authorized by the Department, only radioactive waste consigned for burial shall be received at the location specified in Condition No. 9 of this license. The maximum radioactivity and/or quantity of radioactive material indicated in Item 7. A, B, and C applies to the above-ground activities.

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

License Number 097
Amendment Number 49

General Conditions

9. Unless otherwise specified, the authorized place of use is a site located approximately five miles northwest of Barnwell, South Carolina, in the Seven Pines School District, Red Oak Township, Barnwell County, South Carolina within the boundary of the land area described in Lease agreement dated April 6, 1976, as amended.

10. The licensee shall comply with the provisions of the South Carolina Department of Health and Environmental Control (SC DHEC) Regulation 61-63, Radioactive Material, (Title A), Part I - General Provisions; Part II - Licensing of Radioactive Materials; Part III - Standards for Protection Against Radiation; Part VI - Notices, Instructions, and Reports to Workers; Inspections, and Part VIII - Licensing Requirements for Land Disposal of Radioactive Waste; Department Regulation 61-83, Transportation of Radioactive Waste Into or Within South Carolina.

11. Unless otherwise specified in this license, the licensee shall make no changes in the internal safety audits, Safety Review Board, ALARA Review Committee, Site Criteria, or procedures governing these specific activities without approval from the Department.

12. Operations authorized by this license shall be conducted in accordance with Chem-Nuclear Systems (CNS) procedures and subsequent revisions and additions approved by the Department. However, the licensee may upon notification to the Department but without Department approval, make minor changes to these procedures provided that:

A. The change does not alter requirements of any other license condition in this license;

B. The change does not increase the potential for personnel exposure;

C. The change does not diminish operational safety;

D. The change does not increase the potential for release of radioactive material to unrestricted areas; and

E. The change does not reduce the licensee's record keeping and reporting system.

The licensee shall maintain records of these changes including evaluations which provide the basis for the change.

13. The licensee shall ensure that all site personnel have satisfactorily completed the training program requirements as specified in the Duratek/Chem-Nuclear Systems Complex Training Program. Changes and additions to the program shall be submitted to the Department for review. Time intervals for personnel indoctrination, training, examinations, certification, retraining specified in CNS Procedure S20-AD-004, "Barnwell Complex Personnel Training", shall not be changed without Department approval.

14. Operations shall be conducted by or under the supervision of: William A. Veronee, (RSO), James W. Latham, Joseph J. Still, William B. House, Michael J. Benjamin, E. Wayne Inabinett, Edward F. Boyles, Jr. or other individuals designated by the licensee's Radiation Safety Officer upon successful completion of the licensee's training program and approval by the licensee's Safety Review Board.

15. The Department shall be notified by the licensee, for concurrence and approval, of any potential foreign involvement or ownership of the licensee. The licensee shall to the extent necessary, continue the employment of all personnel involved in the operation of the Barnwell Waste Management Facility in accordance with all requirements in the license and applicable regulations and, in the event replacement of employees becomes necessary, only individuals of comparable qualifications and experience will be hired.

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16. A documented weekly inspection of site operations and the restricted area of the site for compliance with applicable conditions of this license shall be conducted by a named authorized user in Condition 14 or other individual approved by the Department.

17. The transportation of radioactive materials and radioactive waste within the State of South Carolina shall be in accordance with applicable regulations of the United States Department of Transportation (US DOT), the United States Nuclear Regulatory Commission (US NRC), Section RHA 2.22, Department Regulation 61-63, Radioactive Material (Title A), and Department Regulation 61-83, "Transportation of Radioactive Waste Into or Within South Carolina".

18. The licensee shall maintain all records and shipment manifest pertinent to the transportation, receipt, and disposal of radioactive material at the location specified in Condition 9 of this license until authorization is given by the Department for transfer or disposal of such records.

19. The licensee shall maintain records for each shipment of waste disposed of at the site. The records shall conform with the requirements of RHA 7.32.1 Department Regulation 61-63, Radioactive Material (Title A). The licensee shall maintain the records required in the Department Regulations 61-63 and 61-83, and 10 CFR Part 61 at the disposal facility in readable form to include electronic and microfilm, and stored in an environmentally controlled facility to prevent damage.

20. A monthly site receipt and burial activities report shall be submitted no later than the 10th day following the month to the Assistant Director, Division of Waste Management, Bureau of Land & Waste Management, SC DHEC, 2600 Bull Street, Columbia, SC 29201.

21. Except as specifically provided otherwise by this license, the licensee shall possess and use radioactive material described in Items 5, 6, and 7 of this license and conduct site operations in accordance with statements, representations, operating procedures, and disposal criteria, heretofore made by the licensee or his authorized representative in application and subsequent to issuance of SC Radioactive Material License No. 097, and amendments thereto.

Receipt, Acceptance and Inspection Conditions

22. The licensee shall not accept radioactive waste for storage or disposal unless the shipper has completed the required information for the waste shipment on the US NRC Uniform Low-Level Radioactive Waste Manifest Forms 540 (Shipping Paper), 541 (Container and Waste Description), and 542 (Manifest Index and Regional Compact Tabulation) as applicable, or approved equivalent forms.

The licensee shall not accept radioactive waste for storage or disposal unless the generator of such waste has a valid, unsuspended Radioactive Waste Transport Permit issued by the SC DHEC.

24. The licensee shall not accept radioactive waste for storage or disposal unless the shipper has provided a properly executed Department Form, DHEC-803, Radioactive Waste Shipment Certification Form, Part I and II. Shipments consisting of more than 75 cubic feet or containing more than one (1) curie shall also be accompanied by a properly completed and executed Department Form, DHEC-802, Radioactive Waste Prior Notification and Manifest Form. Changes to the shipment identification number on the forms may be made by the licensee, provided that the Department is notified of the change no later than the last day of the month for which the shipment was originally scheduled. Forms shall not be carried over more than one month.

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Radioactive Material License
Supplementary Sheet

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Amendment Number 49

25. The licensee shall only accept radioactive waste shipments for storage or disposal which have been inspected by a representative of the Department. The licensee shall assist the Department in inspection, sampling and analysis of the waste as deemed necessary by the Department to ensure compliance with the requirements of this license. The licensee shall perform radiological analysis of liquids found in waste packages and interstitial spaces of shipping casks as deemed necessary by the Department.

26. Notwithstanding other conditions of this license, the licensee shall not accept radioactive waste for storage or disposal unless he has received advanced written notification of any waste shipment containing unusual hazards or potential hazards including but not limited to, physical, gaseous, chemical, pyrophoric, or excessive removable contamination on the disposal containers shipped inside casks or excessive internally contaminated casks, and unexpected high radiation levels at the disposal container surface.

27. The licensee shall immediately notify the Department of the Department's on-site representative of any waste shipments where a violation of applicable regulations or license conditions has been found.

28. The licensee shall notify the shipper and the Department when any shipment of radioactive waste or part of a shipment has not arrived within one day after the advance copy of the shipment manifest or shipping papers was received by the licensee.

29. The licensee shall notify the shipper when it has been determined that a radioactive waste shipment or part of a shipment cannot be accepted for disposal by the licensee. The licensee shall notify the waste generator/shipper before the end of the next business day if a shipment has failed to arrive at the disposal facility within the 24-hour time frame indicated in the advance notification or manifest.

30. The licensee shall acknowledge receipt of the waste within seven days of acceptance for disposal by returning a signed copy of the shipment manifest or shipping papers to the shipper. The licensee shall indicate on the returned copy of the shipment manifest or shipping papers any discrepancy between the waste description listed on the manifest or papers and the waste materials received in the shipment.

Waste Characteristics and Waste Form Conditions

31. The licensee shall not accept any radioactive waste for storage or disposal unless the shipper has marked each disposal container, as specified by the licensee, to identify its classification as either Class A, stable or unstable (S or U), Class B, or Class C waste, and certifies that the waste materials have been classified and prepared in accordance with the following waste classification table:

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
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Waste Classification Table

RADIONUCLIDES	CONCENTRATION LIMITS IN CURIES/CUBIC METER*		
Table I (long-lived)	Class A	Class B	Class C
C-14	0.8		8
C-14 in activated metal	8		80
Ni-59 in activated metal	22		220
Nb-94 in activated metal	0.02		0.2
Tc-99	0.3		3
I-129	0.08		0.08
	CONCENTRATION LIMITS IN NANOCURIES/GRAM		
Alpha emitting transuranics with half-life greater than 5 years	10		100
Ra-226	10		100
Pu-241	350		3500
Cm-242	2000		20000
	CONCENTRATION LIMITS IN CURIES/CUBIC METER*		
Table II (short-lived)	Class A	Class B	Class C
Total of all with half-life less than 5 years	700	700	700
H-3	40	40	7000
Co-60	700	700	7000
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4600

*curies/cubic meter is equivalent to microcuries/cubic centimeter

A. The concentration of a radionuclide or radionuclide mixture may be averaged over the volume of the waste and, if used, the solidification agent or matrix if the waste form is a homogenous mixture. The concentration of radionuclides in filters/sealed sources encapsulated with a solidification agent or matrix shall be averaged over the volume of the filter/sealed source not the solidification agent. The volume of packaging, containers, liners, or overpacks shall not be included in this calculation, nor shall the volume of the waste mixture be artificially increased with the addition of non-dispersible solids or objects even if considered as waste.

If expressed in units of nanocuries per gram, concentration may be averaged over the weight of the waste and, if used, the solidification agent if homogenous, except in the case of encapsulation of filters which shall be over the weight of the filter. The weight of packaging, containers, liners, or overpacks shall not be included in this calculation, nor shall the weight of the waste mixture be artificially increased by the addition of heavy, non-dispersible solids or objects even if considered as waste.

B. The waste is Class A if none of the listed radionuclides are present.

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C. There are no upper limits in Class B waste for the first three radionuclides listed in Table II.

D. There are no Class B values for the first nine (9) radionuclides listed; their presence classifies the waste as either Class A or Class C according to their concentrations.

E. The waste class for mixtures of radionuclides is determined by deriving for each radionuclide the ratio between its concentration in the mixture and its concentration limit in the table and adding the resulting ratio values for each radionuclide group. All limits used in the calculation must be for the same waste class. The sum of the ratios for each group must be less than or equal to 1.0 or the waste is of a higher classification than that used for the calculation.

F. If Class C limits are used in the calculation and the sum of the ratios for either group is equal to or exceeds 1.0, the waste is not acceptable for disposal without prior written approval from the Department.

G. If the concentration of any single radionuclide exceeds Class C values in the table, the waste is not acceptable for disposal without prior written approval from the Department.

H. Concentrations for C-14, Ni-59, Ni-63, and Nb-94 in activated metal must be evaluated for any irradiated metal component, filters and filter material associated with spent fuel pools.

I. Waste containing radium may be accepted only if the requirements of condition 44 of this license are met.

32. A. Unless otherwise specified in this license, the licensee shall not receive any liquid radioactive waste regardless of the chemical or physical form. Absorbent materials may be placed in packages of dry, solid waste to absorb unintentional and incidental amounts of liquids. Further, liquids in the interstitial spaces of transport casks and containers shall be removed to the extent practical.

B. Solidified or dewatered radioactive waste shall have no detectable free standing liquids in excess of one-half percent (0.5%) by waste volume of non-corrosive liquids per container.

C. In lieu of the requirements of paragraph B. above, solidified or dewatered waste containing non-corrosive liquids in excess of one-half percent (0.5%) by waste volume, and less than one percent (1%) non-corrosive liquids by waste volume, may be received and disposed of in high integrity containers approved by the Department.

33. A. Unless otherwise specified, the licensee shall only receive aqueous liquids and other applicable waste forms which have been solidified or otherwise stabilized with one of the following solidification media:

a. Vinyl Ester Styrene
b. Cement
c. Bitumen (see Subparagraph E. below)
d. Vinyl Chloride

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B. Solidification media and processes used to stabilize Class A aqueous liquids and other Class A wastes containing isotopes with greater than five (5) year half-lives having a total specific activity if all these isotopes of 1 microcurie/cubic centimeter or greater, and all applicable Class B and C waste, shall meet and have been evaluated in accordance with the "Stability Guidance" requirements of the US NRC Waste Management Division, Technical Position on Waste Form, (Revision 1), dated January 1991, or other evaluation criteria or methods specifically approved by the NRC or the Department.

C. Solidified Class A aqueous liquids and other applicable waste forms with a specific activity of less than 1 microcurie/cubic centimeter, shall meet the requirements of the "Solidified Class A Waste Products" of the NRC Technical Position on Waste Form (Revision 1) dated January 1991.

D. Other solidification media and processes shall be acceptable for which a topical report has been prepared and received approval from the US NRC with concurrence from the Department or approval by the Department.

E. The licensee shall only receive for disposal, full formula, oxidized bitumen (asphalt) solidified waste, which is a free standing monolith as received for disposal, and certified as such by the waste generator.

34. Except as specifically provided in this license, the licensee shall not accept liquid radioactive waste packaged in absorbent materials, or which absorbent materials have been used to absorb liquids rather than properly solidified with an approved media.

35. Regardless of the waste classification of Condition 31, and unless otherwise authorized by the Department, the licensee shall not receive evaporator bottoms or concentrates, resins, sludges, or other waste which may contain free standing liquids, unless they are solidified in accordance with Condition 33, and meet the requirements as specified in Condition 32. Evaporator bottoms or concentrates which contain no free standing water and are not free flowing are acceptable for disposal when processed by a method specifically approved by the Department.

36. The licensee may receive resins and filter media in a dewatered form provided that the free standing liquid requirements of Condition 32 and the requirements of Condition 38 are met.

37. The licensee shall not receive containers of ion exchange resins or filter media (dewatered or solidified) unless records of complete radiological analyses (quantitative and qualitative) are provided. The records must specify the specific activity of each radionuclide expressed in microcuries/cubic centimeter and transuranic radionuclides in nanocuries/gram.

38. Regardless of the waste classification of Condition 31, ion exchange resins and filter media containing isotopes with greater than five (5) year half-lives having a specific activity of all these isotopes of 1 microcurie/cubic centimeter or greater must be stabilized by solidification in accordance with Condition 33 and meet the free standing liquid requirements of Condition 32.B. However, in lieu of solidification, the Department will authorize disposal of these waste forms meeting the free standing liquid requirements of Condition 32.C. in approved high integrity containers or other approved methods of stabilization.

39. Unless specifically provided otherwise, the licensee shall dispose of all classes of wastes in concrete overpacks or vaults which are approved by the Department and provided by the site operator. Void spaces within the waste and between the waste and its packaging shall be reduced to the extent practicable, but in no case shall less than eighty-five percent (85%) of the capacity of the containers be filled for all waste classes unless placed in a High Integrity Container. The licensee may allow a variance from this condition in certain instances, but only after receiving a written justification from the waste generator prior to receiving the waste shipment. Variance justifications and approvals shall be maintained for review by the Department.

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SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
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40. Radioactive waste containing transuranic radionuclides within the limits specified in Condition 31 are acceptable provided that the transuranic radionuclides are evenly distributed within a homogeneous waste form and are incidental to the total radioactivity. Incidental in this condition is defined as not more than one percent (1%) of the total radioactivity. This license does not authorize the receipt or disposal of components or equipment primarily contaminated with transuranic radionuclides on vehicles, equipment, or components, with contamination limits in excess of those specified in Condition 55.

41. Household or industrial smoke or gas detectors containing Americium-241 foils which may exceed the transuranic radionuclide limit specified in Condition 31 of this license may be accepted for disposal provided the entire detector is received for disposal.

42. The licensee shall not receive or dispose of sealed sources or special form radioactive materials containing more than 5 curies of radioactive material with half-lives greater than 5 years except in a container which provides long term containment. Such containers are subject to approval by the Department. Irradiated metal components which have similar characteristics of special form radioactive materials are subject to Department review for disposal containing components.

The licensee may accept the following sealed sources and maximum total activities provided that the sources are encapsulated with a minimum of four (4) inches of cement on all sides having a minimum compressive strength of 2,500 pounds per square inch.

Radionuclide	Maximum Total Activity (microcuries)
C-14	100 SPES
Ni-59	0.01
Nb-94	10
Tc-99	0.01
I-129	10

Radionuclides in Condition 31, Table II

43. The licensee shall not receive toluene, xylene, dioxane, scintillation liquids which exhibit hazardous properties or other organic liquids or solids with similar chemical properties except as specified below:

A. Containers which have contained any of the liquids mentioned above are acceptable for disposal after treatment as specifically authorized by the Department.

B. The ash and/or residue from the incineration of these wastes are acceptable in accordance with Condition 45 of this license.

44. Unless otherwise authorized by the Department the licensee shall not receive any radioactive waste containing Radium except for:

A. Radium contained in solid homogeneous waste forms in which the Radium activity is incidental (incidental is defined as not more that one percent of the total activity) and the concentration of Radium has not been technologically enhanced or,

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B. Radium contained in the following devices: self-luminous dials, hands of dials, timepieces, compasses, and electron tubes provided that the entire device is received and buried, or

C. Radium contained in biological research waste, or

D. Radium sources specifically approved by the Department.

45. The licensee shall not receive radioactive waste in the forms of incinerator ash or powder which may be dispersible unless solidified with a media specified in Condition 33 of this license, or packaged to prevent dispersion as specifically approved by the Department. In lieu of solidification, these waste forms may be received in high integrity containers approved by the Department, provided the waste is rendered nondispersible with a binding matrix.

46. Radioactive waste containing chelating agents between 0.1 percent and 8 percent by weight in the waste as received for disposal shall be in High Integrity Containers or shall be stabilized by solidification with a media specified in Condition 33 of this license or an alternative method specifically approved by the Department.

47. The licensee may only receive gaseous radioactive materials of Krypton 85, Xenon 133, and Tritium for burial provided they meet the following criteria:

A. For Krypton 85 and Xenon 133:

a. Burial containers must be US DOT specification cylinders or US Nuclear Regulatory Commission approved sealed sources.

b. Internal pressure of containers may not exceed 14 atmospheres.

c. Total activity of contents shall not exceed 100 curies each.

B. For Tritium:

a. Only sources approved by the US NRC or an Agreement State may be received for disposal.

b. The source/device must be received intact.

c. The internal pressure of the source/device shall not exceed 1.5 atmospheres.

d. Sources/devices must be packaged to prevent breakage.

e. The maximum activity per disposal container shall not exceed 1000 curies.

f. Devices requiring stabilization based on waste classification (using the volume of the source/device only) must be placed in a high integrity container or encapsulated with an appropriate stabilization media.

48. A. Unless otherwise authorized, the licensee shall not receive for storage nor disposal any mixed low-level radioactive waste defined as waste that satisfies the definition of low-level radioactive waste specified in the Low-Level Radioactive Waste Policy Amendments Act of 1985 (P.L. 99-240), and contains waste that either (1) is listed as hazardous waste in Subpart D, 40 CFR 261, or (2) causes the waste to exhibit any of the hazardous waste characteristics identified in Subpart C, 40 CFR Part 261.

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B. The licensee may however receive waste that has been treated by acceptable methods to render it nonhazardous and therefore not subject to the jurisdiction of the Resource Conservation and Recovery Act (RCRA). Waste which may contain discrete quantities of hazardous or toxic materials may be evaluated for disposal by the licensee and such evaluations provided to the Department for consideration of approval.

49. The licensee shall not receive radioactive waste that is readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperature, or of explosive or exothermic reaction with water.

50. The licensee shall not receive radioactive waste which contains or is capable of generating quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with condition 47 of this license.

51. The license shall not receive or dispose of any pyrophoric material or flammable solids. These materials contained in waste shall be treated, prepared and packaged to be nonflammable and the final waste form rendered nonpyrophoric and nonflammable prior to transportation and receipt.

52. The licensee shall not receive or bury oil or petroleum based materials in any physical form. However, this does not prohibit the receipt and disposal of waste containing incidental or trace amounts of oil or petroleum based materials which have been absorbed, provided that the amount of absorbed oil and petroleum based materials does not exceed one percent (1%) by waste volume in a container.

53. The licensee shall not receive radioactive waste containing hazardous biological, pathogenic, or infectious material unless treated to reduce to maximum extent practicable the potential hazard from the materials. In addition, radioactive waste containing biological, pathogenic, or infectious material shall be doubly packaged in new or properly recertified containers which meet the general packaging requirements of DOT as follows:

A. First, the inner container having a capacity of 56 gallon or less shall have a water tight liner at least 4 mils thick hermetically sealed after filling.

B. The biological material shall be thoroughly layered in the inner container in a ratio of thirty (30) parts biological material to at least one (1) part slaked lime and ten (10) parts absorbent, which shall be agricultural grade 4 vermiculite or medium grade diatomaceous earth, or other adsorbents that have received approval from the Department by volume. The addition of formaldehyde is strictly prohibited.

C. The closure on the inner container shall be a standard lid with securely attached ring and bolt. Lever locks are not acceptable.

D. Unless otherwise authorized by the Department, the outer container, which shall have a volume of at least 1.5 times the inner container shall be filled initially with at least 4 inches of absorbent material, specified in B., the inner container in an upright position, and the remaining volume filled with the absorbent material, then securely closed and properly sealed.

54. Unless otherwise authorized by the Department, the licensee shall receive Special Nuclear Material (SNM) as authorized in Conditions 5, 6, 7, and 8 of this license in 55 gallon or larger containers only. Any SNM shipment in which there is evidence that SNM is missing or that the waste packages have been tampered with in transport shall be received by the licensee and safely stored pending notification to the Department. The licensee shall not dispose of such packages unless authorized by the Department.

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Contamination Limit Conditions

55. For receipt at the Barnwell Site, all shipments shall comply with contamination control limits as prescribed in US DOT Regulations, 49 CFR 173.443.

Enclosed radioactive material transport vehicles used solely for transporting radioactive materials and marked "For Radioactive Material Use Only" and accessible surface of transport casks and trailer shall not be released from the site if contamination limits exceed the following:

A. Fixed contamination of 1.0 mR/hr on contact with the interior surface or 2 mR/hr at 1 meter from the interior surface.

B. Removable contamination of 2200 dpm/100 sq. cm. Beta-gamma, or 220 dpm/100 sq. cm. Alpha. This applies to interior and exterior surfaces.

C. Fixed contamination of 0.2 mR/hr on contact with any exterior surface.

Internally contaminated (fixed or removable) shipping casks released from the site are subject to applicable shipping regulations of the US DOT. The licensee shall inform the recipient of such casks of the contaminated nature of the cask. Shipping documentation for the casks must be maintained by the licensee for review by the Department.

56. Vehicles used solely for transporting radioactive material and are not marked "For Radioactive Material Use Only" shall not be released from the site if the contamination limits exceed the following:

A. Fixed contamination of 0.5 mR/hr at any accessible surface.

B. Removable contamination of 2200 dpm/100 sq. cm. Beta-gamma, or 220 dpm/100 sq. cm. Alpha.

57. Vehicles or items for unrestricted use shall not be released from the site if the contamination limits exceed the following unless specifically authorized by the Department:

A. Fixed contamination of 0.1 mR/hr at any accessible surface.

B. Removable contamination of 220 dpm/100 sq. cm. Beta-gamma, or 22 dpm/100 sq. cm. Alpha.

58. The licensee shall perform decontamination on vehicles, equipment, or components, with contamination limits in excess of those specified in Condition 56 in a controlled environment.

59. The licensee shall not use its vehicle wash-down facility for any vehicles or equipment with removable contamination limits in excess of those specified in Condition 56 unless specifically approved by the Department.

General Packaging Conditions

60. All radioactive waste shall be packaged and loaded in accordance with applicable US DOT Regulations, US NRC Regulations 10 CFR Part 71, the requirements of this license, and the disposal site criteria.

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61. Unless otherwise authorized, all radioactive waste shall be received and buried in closed containers. Containers which have been altered, and solidification or encapsulation media intended to serve as containers or container closures, are not acceptable unless approved by the Department. Loose radioactive waste and solidification residuals within shipping casks or other reusable containers are prohibited.

62. The licensee shall not receive any package to be used as the final burial container that is corroded to the point of degradation or damage. Any package used as the final burial container shall be of such material construction that there will be no significant chemical, galvanic, or other reaction among the packaging components, or between the packaging components and the package contents.

63. The licensee shall, to the extent practicable, repair or repackage any damaged package used as the final burial container if such packages are approved for acceptance by the Department.

64. Prior to burial, the licensee shall, to the extent practicable, remove all liquids from waste packages found in excess of allowable limits if such packages are approved for acceptance by the Department.

65. The licensee shall not receive shipments of radioactive materials unless appropriate lifting devices of sufficient length has been provided and securely attached to containers and palletized shipments within a cask.

66. The licensee is not authorized to open any packages at its facility except for the following:

A. For purposes of repairing or repackaging damaged container(s).

B. For purposes of inspecting to insure compliance with this license.

C. For purpose of returning outer shipping containers.

D. For purposes of confirming package contents.

Site Design, Construction and Maintenance Conditions

67. Construction of waste burial trenches shall be in accordance with CNS Procedure S20-AD-008, "Trench Construction" and Department approved drawings and specifications. Any changes to these drawings, specifications, or procedures must have approval from the Department before implementation.

68. The licensee shall not begin construction of any trench prior to approval of the Department as to location, trench bottom elevation and intended use.

69. The licensee shall not initiate burial operations in newly excavated trenches until the Department has inspected and approved the trenches. Trench construction inspections shall be performed in accordance with CNS Procedure S20-AD-008, "Trench Construction" and any additional inspections deemed necessary by the Department.

70. Trench backfill and completion shall be performed in accordance with CNS Procedure S20-AD-008, "Trench Construction".

71. A. Completed trenches shall at no time be used for stockpiling large volumes of earth not withstanding provisions for a final grading plan.

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B. The licensee shall design trench covers to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.

72. Open trenches to include trenches under construction and partially filled trenches shall be protected to prevent surface water runoff from entering active trenches. Radioactive waste shall not be placed into trench areas where water has accumulated. Burial of radioactive waste into trenches with unusual amounts of surface water runoff shall immediately cease until the origin of water has been determined and corrective action taken.

73. The licensee shall use proper surface water management techniques on the site to insure that:

A. Erosion is minimized.

B. Surface runoff is directed away from the trenches.

C. Accumulation of standing water is minimized.

D. Standing water in the immediate disposal area is prevented.

74. All monitoring wells and sumps shall be sufficiently capped or covered to prevent the introduction of extraneous material or infiltration of water. All well and sump pipes shall be protected from damage.

75. The licensee shall perform inspections of completed trenches and capped areas in accordance with CNS Procedure S20.OP-007 – Completed Trench Inspection Procedure – to ascertain any erosion, settling, cracking, subsidence, or loss of ground cover/grasses and make corrections immediately. Documentation of the inspection findings and all repairs even if the repairs were performed as a routine maintenance function shall be made and incorporated into a permanent record and submitted with the stabilization plan for final site closure.

76. The licensee shall initiate closure and stabilization measures as each trench is filled and covered. Interim or final grades shall be established at no more than one year following final trench burial operations. Completed trenches shall be continuously and properly maintained to control erosion. Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.

77. The licensee shall use any reasonable means, including but not limited to fencing and security personnel, to prevent unauthorized entry into the restricted area of the site.

78. The boundaries and locations of each disposal trench shall be accurately located and mapped by means of a land survey. Temporary trench boundary markers and trench identification markers shall be erected upon completion of backfill operations until permanent markers are installed.

79. A series of markers, one at the end of each completed trench and on each corner, shall be installed upon completion of the seeding of trench covers. End monuments shall be constructed of granite. Trench corner markers shall be constructed in accordance with CNS Drawing No. B-215-C-0010. The following information shall be reported to the Assistant Director, Division of Waste Management, Bureau of Land & Waste Management, SC DHEC, 2600 Bull Street, Columbia, SC 29201:

A. Total activity of radioactive material in curies total amount of source material in pounds, and total amount of special nuclear material in grams in the trench.

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B. Date of completion of the burial operations; and

C. Volume of waste in the trench.

Burial Operation Conditions

80. Unless specifically authorized by the Department, the licensee shall not exhume previously buried waste.

81. All waste shall be placed in vaults which will provide additional structural stability. Structural evaluations for large components may be submitted to the Department for review and with concurrence from the Department will not require disposal in a vault. The licensee shall construct the vaults in accordance with procedures, drawings, standards, and a quality assurance plan that have received approval from the Department.

82. The disposal trenches and vaults shall be designed and constructed to meet the following objectives:

A. to minimize the migration of water onto the disposal trench;

B. to minimize the migration of waste or waste contaminated water out of the disposal units.

C. to detect water or other fluids in the trenches for assessment and potential remedial measures.

D. to facilitate remedial activities without disturbing other disposal trenches.

E. to provide reasonable assurance that the waste will be isolated for at least the institutional control period.

F. to prevent contact between the waste and the surrounding earth, except for earthen materials used for backfilling within the disposal unit.

83. Wastes designated as Class C pursuant to Condition 31 of this license, shall be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or shall be disposed of with intruder barriers that are designed to protect against inadvertent intrusion for at least 500 years. Such intruder barrier designs must be specifically approved by the Department.

84. The licensee shall handle and emplace packages of radioactive waste in disposal trenches in such a manner that maintains packaging integrity during handling, emplacing, and subsequent backfilling. Waste packages deposited in trenches shall be protected from any adverse operations which may cause damage to them.

85. The licensee shall emplace disposal vaults in such a manner to minimize voids between vaults and permit voids between vaults to be filled with earth to reduce future trench subsidence.

86. The licensee shall be a "Registered User" of all licensed casks delivered to the site containing radioactive waste for disposal.

87. At least one health physics technician shall be present during all waste handling, offloading, and disposal operations.

88. The licensee shall maintain radiation levels at the edge of the open trenches at or below 100 mR/hr.

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89. Licensee personnel shall wear appropriate protective clothing, apparatus, and gloves at all times while handling or disposing of radioactive waste.

90. Vaults shall be covered within six (6) months of being filled with waste unless otherwise approved by the Department.

91. The licensee shall bury containers of Krypton 85 and Xenon 133 gaseous radioactive materials in upright positions within concrete overpacks or vaults. Each gas container shall be disposed in different overpacks or vaults unless otherwise authorized by the Department.

92. Unless specifically authorized, the licensee shall not store any package containing radioactive waste for a period greater than six months from the date of receipt of the package prior to burial. Radioactive waste shall not be stored in the disposal trench area or an open environment for a period greater than ten (10) days from receipt, and shall be protected from damage and inclement weather conditions.

Environmental Surveillance Conditions

93. The licensee shall conduct an on-site monitoring and environmental monitoring program capable of detecting the potential contribution of radioactive material and hazardous constituents from the site to the environment. The monitoring program shall be performed in accordance with ONS procedures.

94. Should any samples taken from the monitoring wells, or air samples reveal increases in the concentration of radioactive material over that determined prior to commencement of the burial operations, the licensee shall perform further surveys to determine whether or not the increase is due to the land burial operations. The licensee shall notify the Assistant Director, Division of Waste Management, Bureau of Land & Waste Management, SCDHEC, within 48 hours of any such increases.

95. The licensee shall submit results of all scheduled environmental sampling and analysis to the Department quarterly.

96. Monitoring wells shall be placed outside the trenches but in the trench area. Specific locations shall be determined through consultation with the Department. All wells shall be grouted, sealed and capped.

97. As radioactive material buried may not be transferred by abandonment or otherwise, unless specifically authorized by the Department, the expiration date of this license applies only to the above ground activities and to authority to bury radioactive material wastes at the site specified in Condition 9. The license continues in effect and the responsibility and authority for possession of buried radioactive material waste continues until the Department finds that the plan established for preparation of the Barnwell Site for transfer to another person has been satisfactorily implemented in a manner to reasonably assure protection of the public health and safety and the Department takes action to terminate the licensee's responsibility and authority under this license. All requirements for environmental monitoring, site inspection, maintenance and site security continue whether wastes are being buried or not.

98. The licensee shall develop a site closure and stabilization plan that addresses, as a minimum, the following performance objectives:

A. Bury all waste in accordance with the requirements of the license.

B. Dismantle, decontaminate, as required, and dispose of all structures, equipment, and materials that are not to be transferred to the site custodian.

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C. Document the arrangements and the status of the arrangements for orderly transfer of site control and for long term care by the government custodian. Also document the agreement, if any, of state or federal governments to participate in, or accomplish, any performance objective. Specific funding arrangements to assure the availability of funds to complete the site closure and stabilization plan must be made.

D. Direct gamma radiation from buried wastes should be essentially background.

E. Demonstrate by measurement and/or model during operations and after site closure that concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals will not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public.

F. Render the site suitable for surface activities during custodial care. Planned custodial care may be limited to activities such as vegetation control, minor maintenance, and environmental monitoring. However, use of the site surface for activities such as parking lots may be planned. Final conditions at the site must be acceptable to the government custodian and compatible with its plan for the site.

G. Demonstrate that all trench elevations are above water table levels taking into account the complete history of seasonable fluctuations.

H. Eliminate the potential for loss of site or trench integrity due to factors such as erosion, surface water, wind, subsidence, and frost action. For example, an overall site surface water management system must be established for humid sites to drain rainwater and snowmelt away from the burial trenches. All slopes must be sufficiently gentle to prevent slumping or gullying. The surface must be stabilized with established short rooted grass, rock, riprap, or other measures. Trench caps must be stabilized to minimize erosion, settling, or slumping of caps.

I. Demonstrate that trench markers are in place, stable, and keyed to benchmarks. Identifying information must be clearly and permanently marked.

J. Compile and transfer to the Department complete records of site maintenance and stabilization activities, trench elevation and locations, trench inventories, and monitoring data for use during custodial care for unexpected corrective measures and date interpretation.

K. Establish a buffer zone surrounding the site sufficient to provide space to stabilize slopes, incorporate surface water management features, assure that future excavation on adjoining areas would not compromise trench or site integrity, and provide working space for unexpected mitigating measures in the future. The buffer zone must also be transferred to the custodial agency. The buffer zone may generally be less than 300 feet but not less than 100 feet.

L. Provide a secure passive site security system (e.g., a fence) that requires minimum maintenance.

M. Stabilize the site in a manner to minimize environmental monitoring requirements for the long-term custodial phase and develop a monitoring program based on the stabilization plan.

N. Investigate the causes of any statistical increases in environmental samples which have occurred during operation and stabilization. In particular, any evidence of unusual or unexpected rates or levels of radionuclide or hazardous constituent migration in or with the groundwater must be analyzed and corrective measures implemented.

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O. Eliminate the need for active water management measures, such as sump or trench pumping and treatment of the water to assure that wastes are not leached by standing water in the trenches.

P. Evaluate present and zoned activities on adjoining areas to determine their impact on the long-term performance of the site and take reasonable action to minimize the effects.

99. An interim site closure and stabilization plan, assessment of current operating practices, and the long term care plan for the site shall be submitted for review one year prior to the expiration date listed in Condition 4 of this license. The plan shall be consistent with Condition 98 of this license and shall include demonstration that funds are being set aside or other measures being taken are adequate to finance site closure and long term care. The plan shall also include preliminary estimates of costs, environmental impacts, data needs, personnel needs, material and equipment needs, planned documentation and quality assurance, and detailed plan for trench locations and elevations, expected capacities, planned surface contours, and buffer zones.

100. The licensee shall periodically assess the adequacy of the Decommissioning Trust accounts and any other financial mechanisms to assure that sufficient funds are available to complete the remaining activities required to close and stabilize the site in accordance with the latest revision of the site closure plan. The licensee shall provide an annual report of this assessment in accordance with RHA 7.30.3 to the Department by June 30.

For the South Carolina Department of Health and Environmental Control

Date of Issuance March 15, 2004

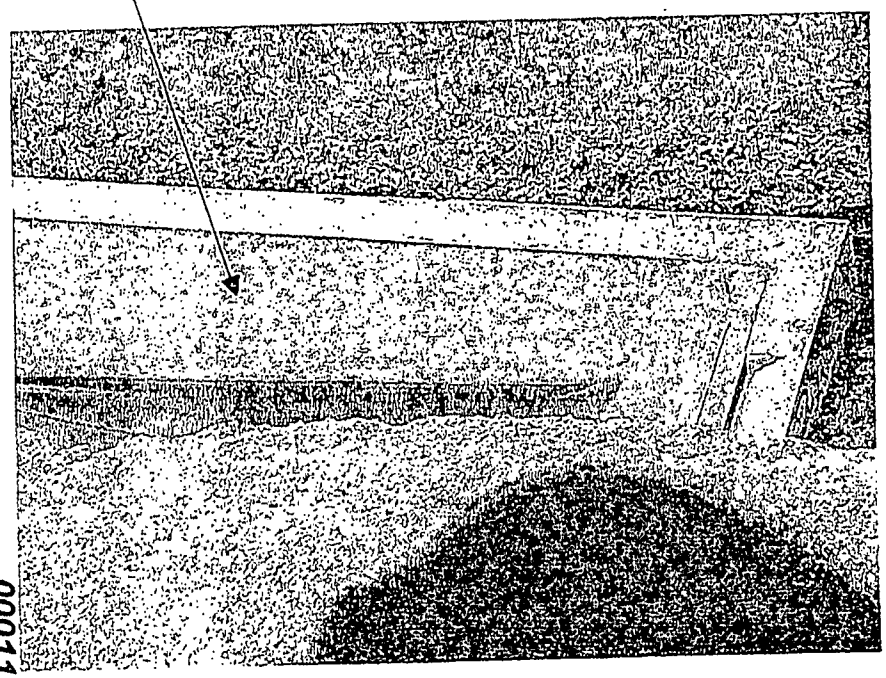
By: _____

Henry J. Porter, Assistant Director
Division of Waste Management
Bureau of Land and Waste Management

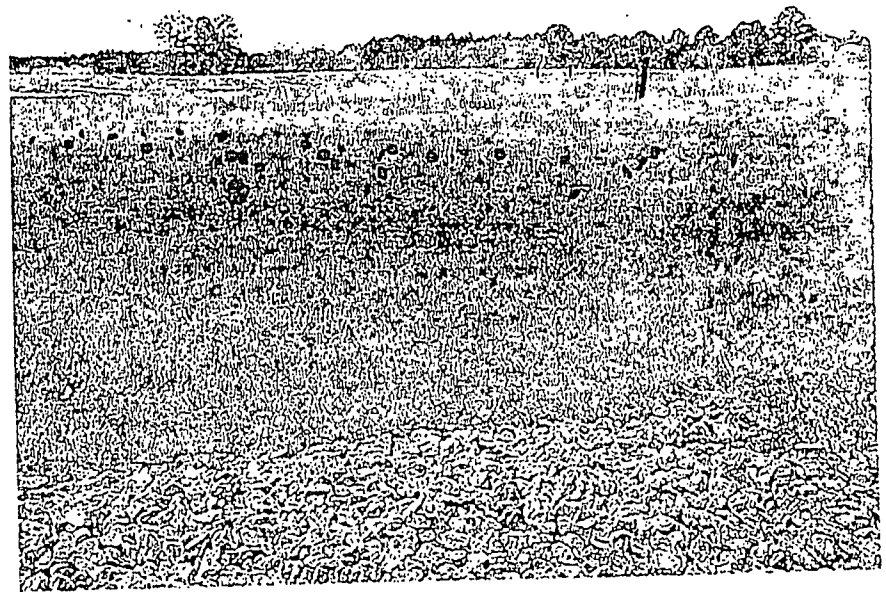
CNS Site Inspection

March 28, 2003

Water level in vault after the 6" rain



Last Bottom Vault in Slit Trench 20



Settled area northeast corner Cap 2

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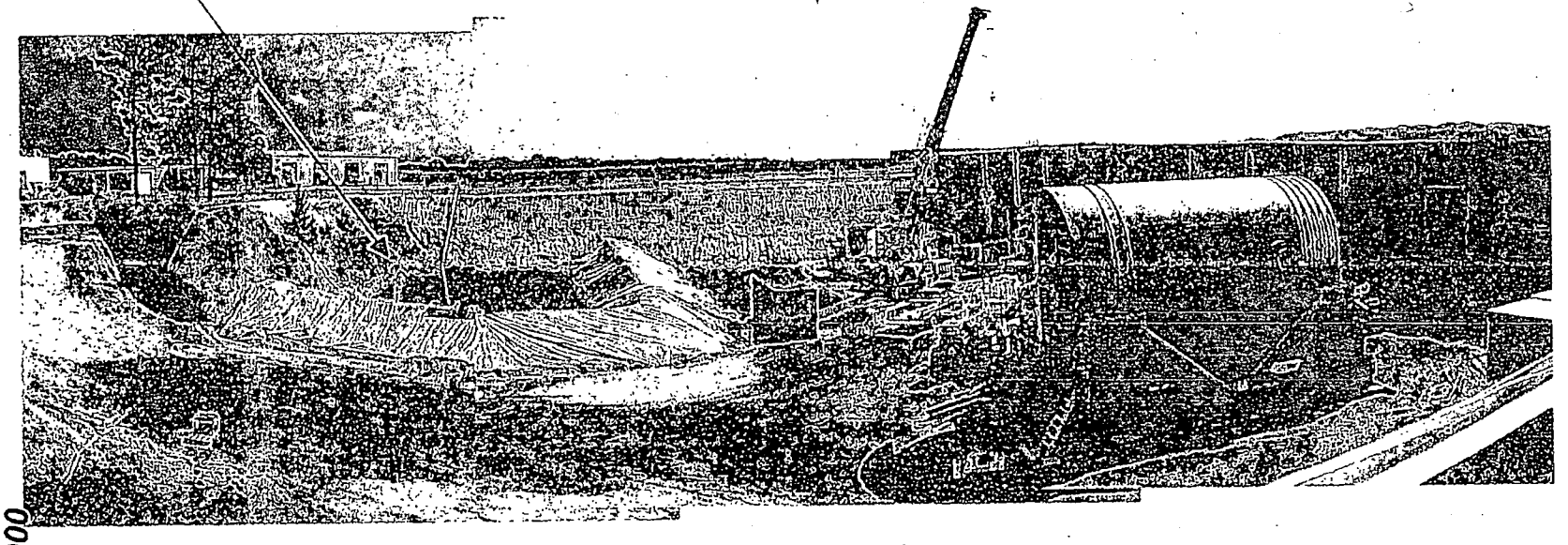
CNS Site Inspection

June 12, 2003



Trench 86 looking north

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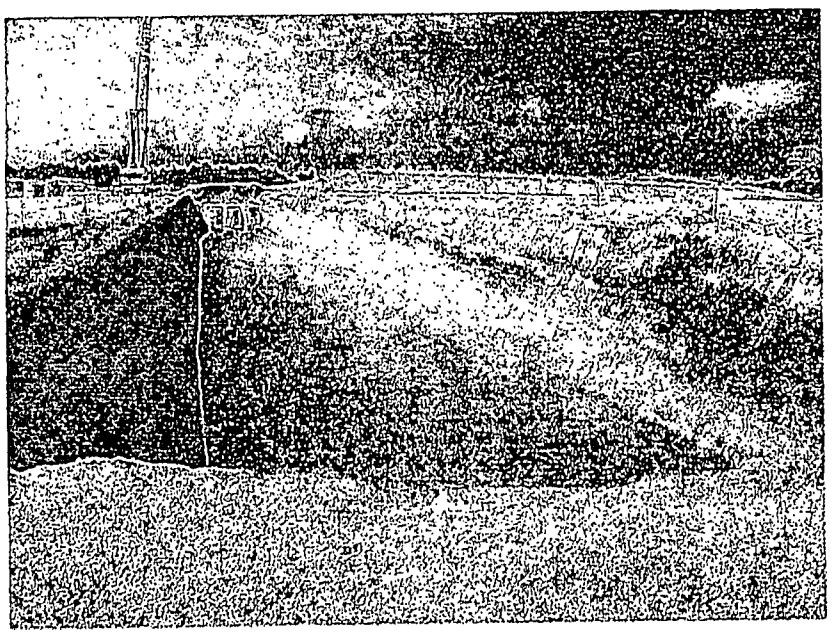
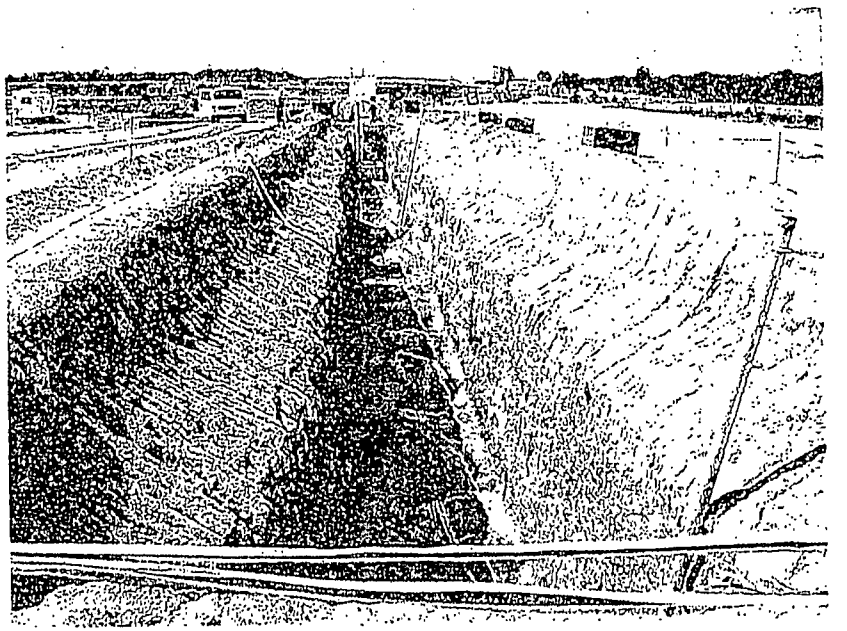
CNS Site Inspection

June 12, 2003



Trench 95 looking south



Slit Trench 21 looking south

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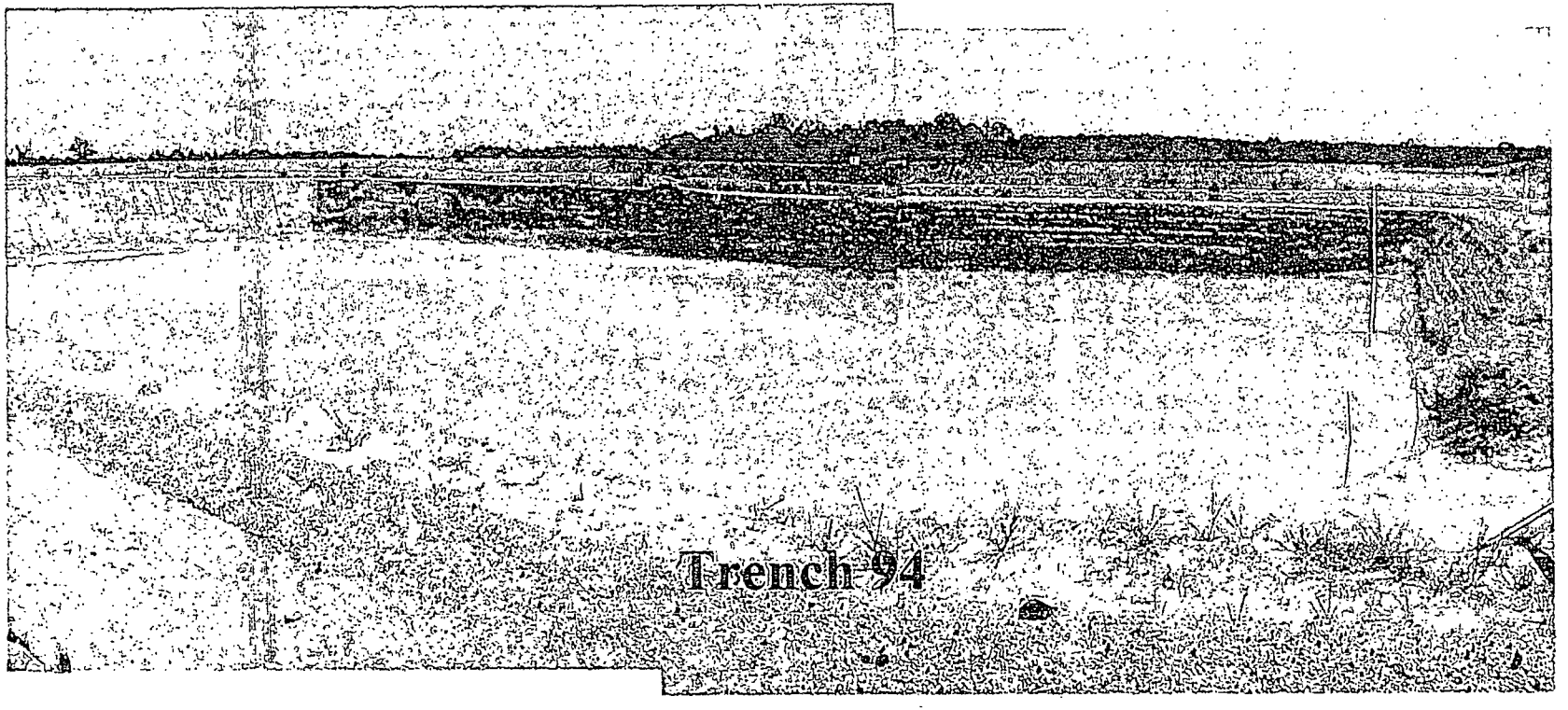
CNS WEEKLY SITE INSPECTION REPORT 7/18/03



The water within Trench 94 is the result of direct rainfall. No water has been pumped from or to the B/C trench. It was previously reported in the 6/27/03 Weekly Site Inspection Report that water was pumped from the holding ponds to T. 94, however, this never occurred.

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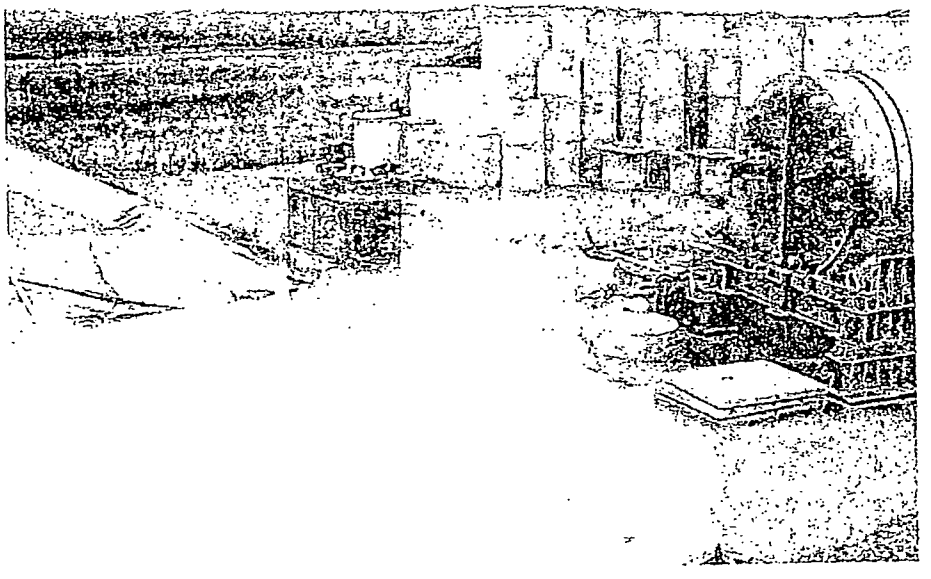

TR 86

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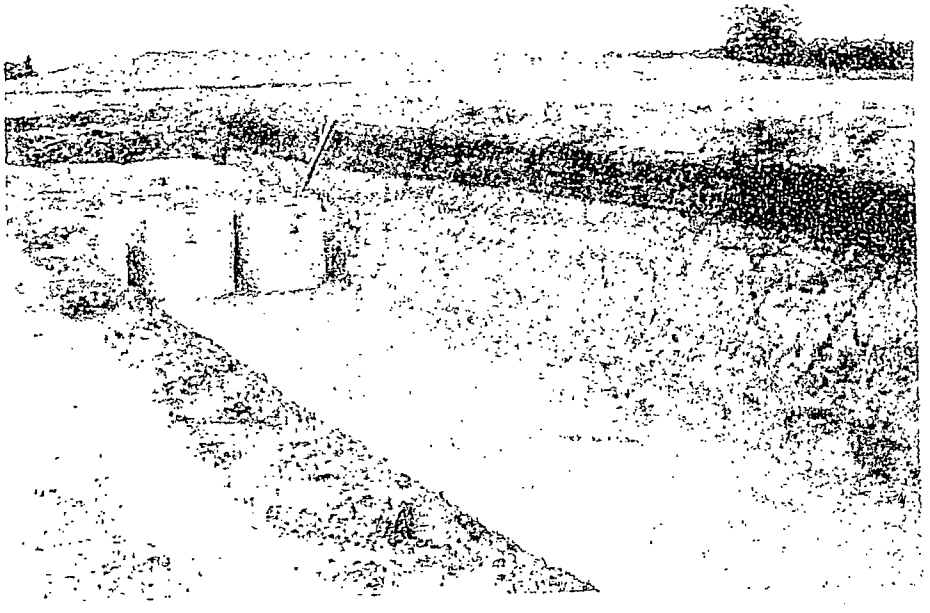

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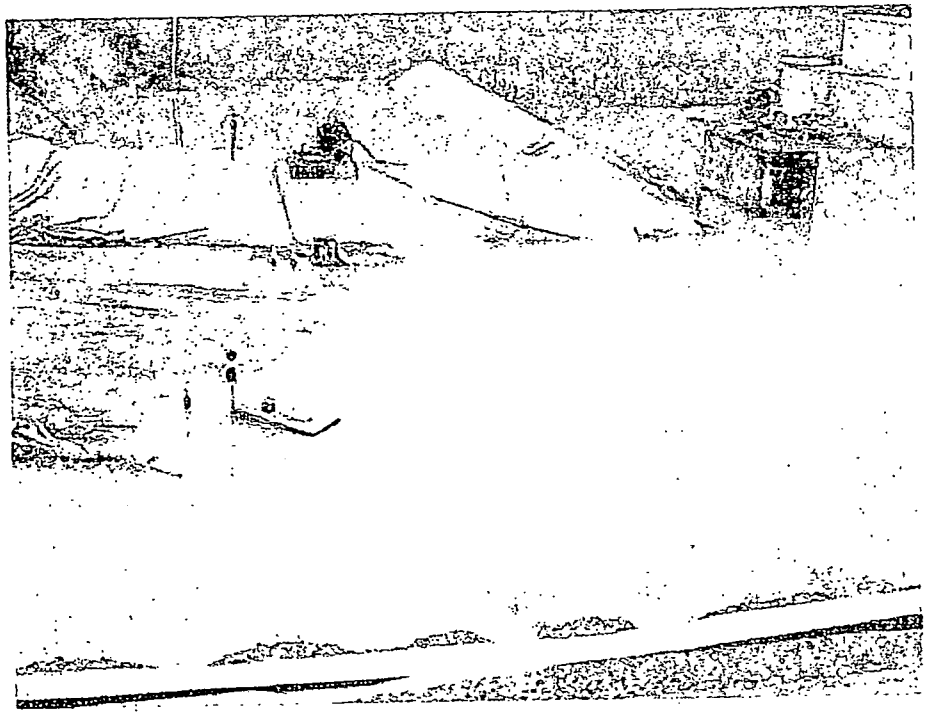

TR86

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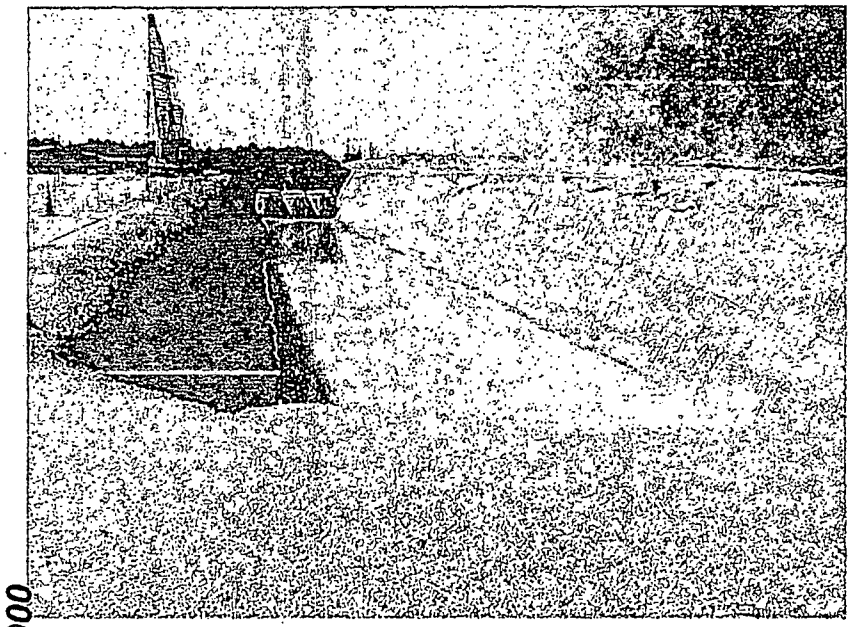
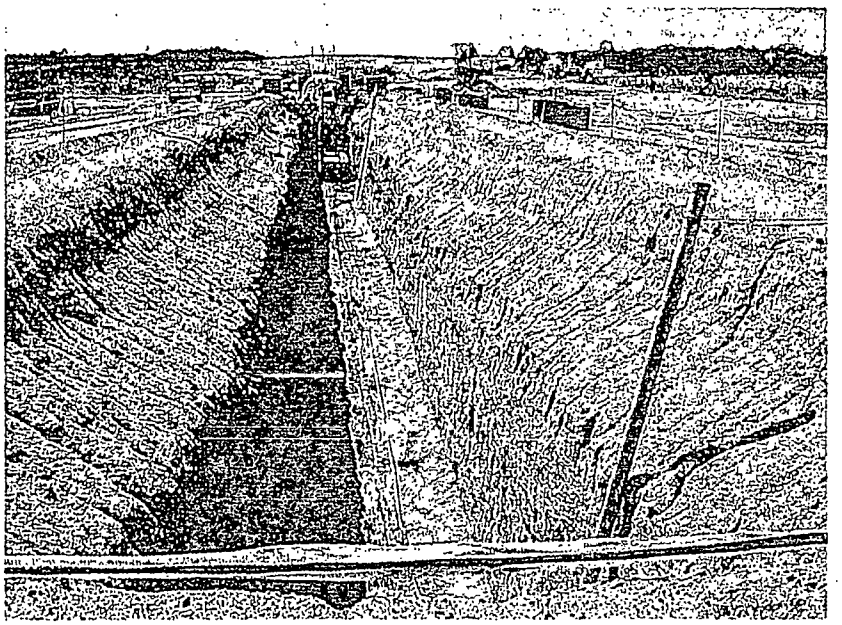
CNS Site Inspection

August 28, 2003



Trench 95 looking south



Slit Trench 21 looking south

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Certificate of Counsel

The undersigned does hereby certify that this Record on Appeal complies with SCRAP Rule 210.

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Attorney for the Appellants

May 13, 2013

Georgetown, SC

THE STATE OF SOUTH CAROLINA

In the Court of Appeals

APPEAL FROM THE ADMINISTRATIVE LAW COURT

Ralph King Anderson, III, Administrative Law Judge

RECEIVED
MAY 15 2013
SC Court of Appeals

Case No. 04-ALJ-07-0126-CC

Sierra Club . . . . . Petitioner/Appellant,

vs.

South Carolina Department of Health and Environmental Control and
Chem-Nuclear Systems, ... Respondents.

CERTIFICATE OF SERVICE

I hereby certify that on this date I served the foregoing RECORD ON APPEAL upon counsel for the Respondents, by placing copies of same in the United State Mail, addressed to:

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Claire H. Prince, Esquire
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May 13, 2013

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