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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.

RECORD ON APPEAL

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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.	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:
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> * * *
>
> 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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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."

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

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
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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

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

FILED
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S.C. ADMIN. LAW COURT

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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

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

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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Attorneys for the Petitioner Sierra Club

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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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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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:

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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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 reduce 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 Section 7.32 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 for 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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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 surfaces.

27. The licensee shall immediately notify the Department or 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 ten days 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 one day of its 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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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	0.008		0.08
	CONCENTRATION LIMITS IN NANOCURIES/GRAM		
Alpha emitting transuranics with half-life greater than 5 years	100		100
Ra-226	100		100
Pu-241	3500		3500
Cm-242	20000		20000
	CONCENTRATION LIMITS IN CURIES/CUBIC METER*		
Table II (short-lived)	Class A	Class B	Class C
Total of all with half-lives 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-226 is 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 where 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, resin, 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 48 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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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 containment requirements.

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 SITES
Ni-59	0.01
Nb-94	10
Tc-99	0.01
I-129	10

Radionuclides in Condition 79, 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 1.5 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 60 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 0.10 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 0.02 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 repair or repackaging damaged containers.

B. For purposes of inspecting to insure compliance with this license.

C. For purposes 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 liquids in the trenches for assessment and potential remedial measures.

D. to facilitate remedial methods 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 an 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 ENS 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 burial 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

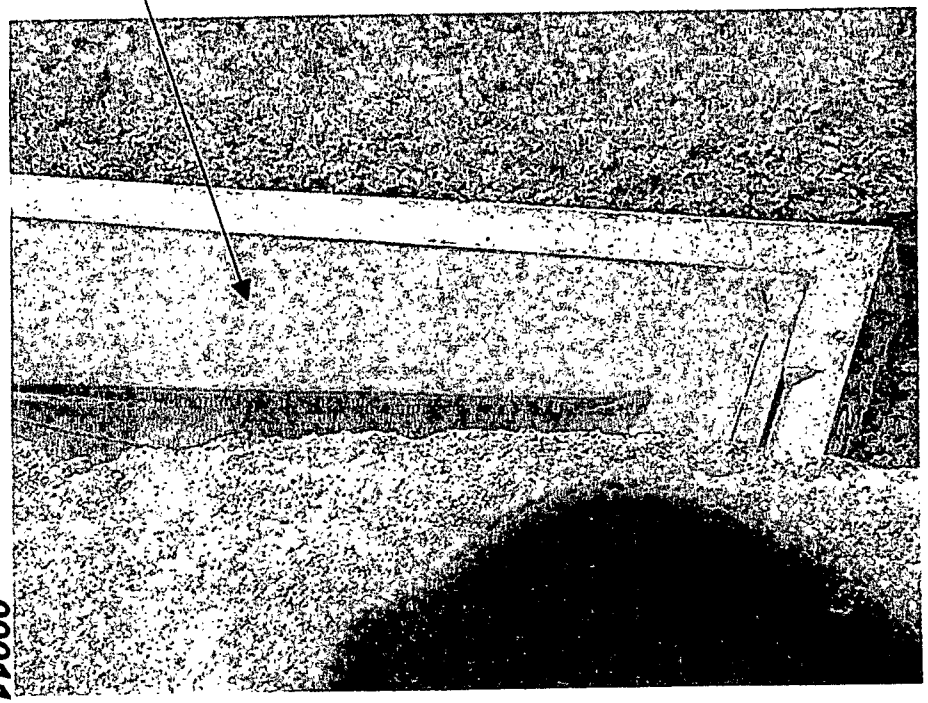
By: _____

Henry J. Porter, Assistant Director
Division of Waste Management
Bureau of Land and Waste Management

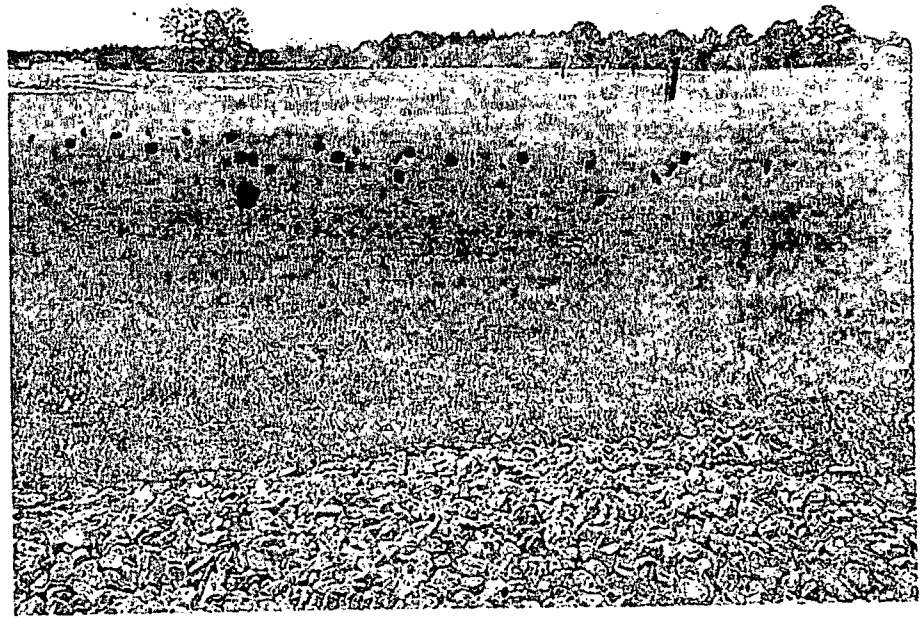
CNS Site Inspection

March 28, 2003

Water level in vault after the 6" rain



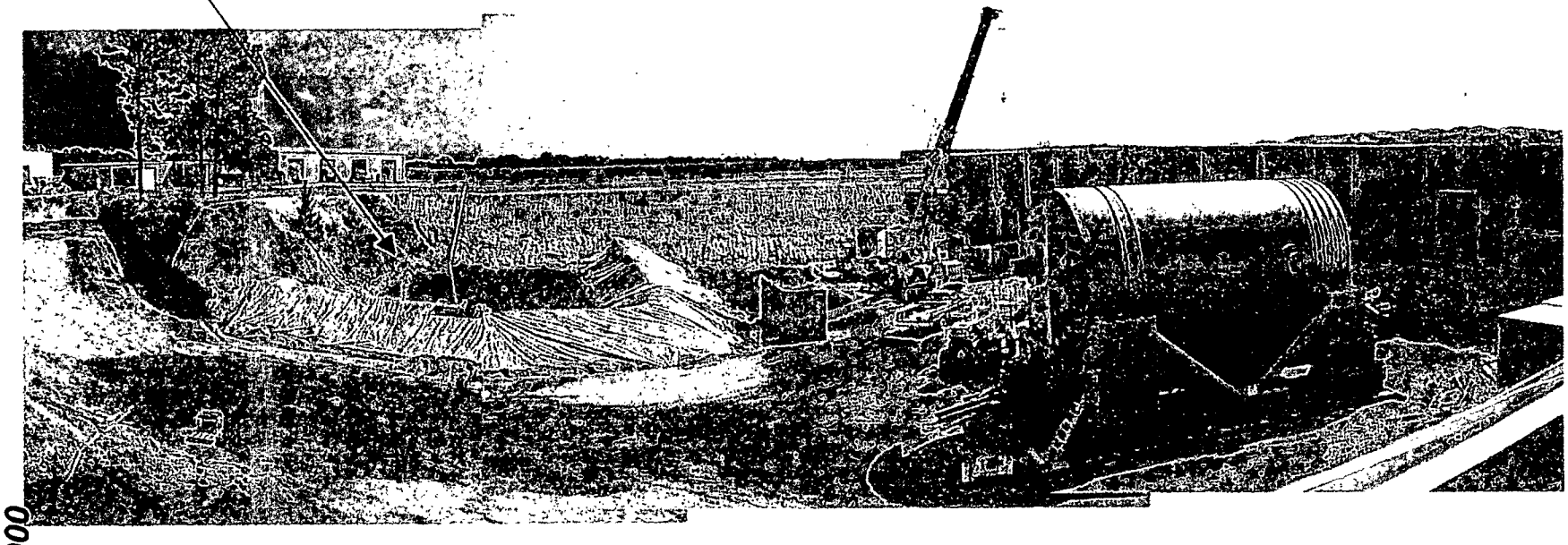
Last Bottom Vault in Slit Trench 20



Settled area northeast corner Cap 2

CNS Site Inspection

June 12, 2003

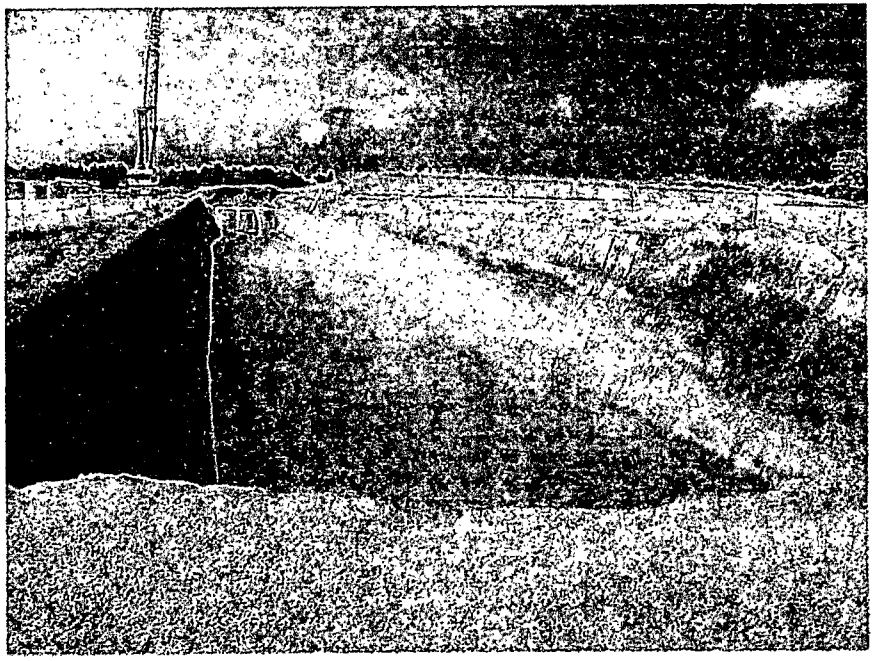


000117

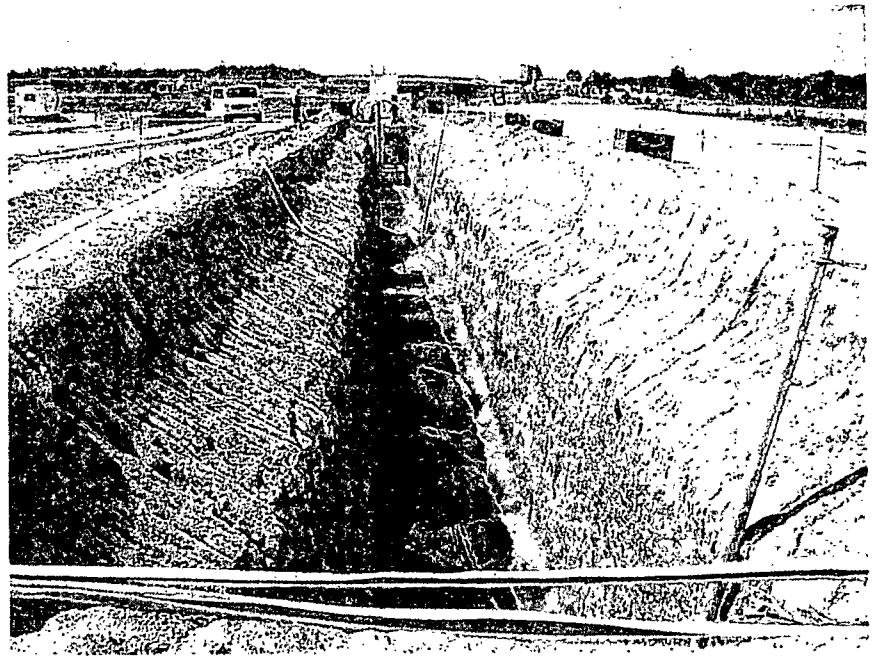
Trench 86 looking north

CNS Site Inspection

June 12, 2003

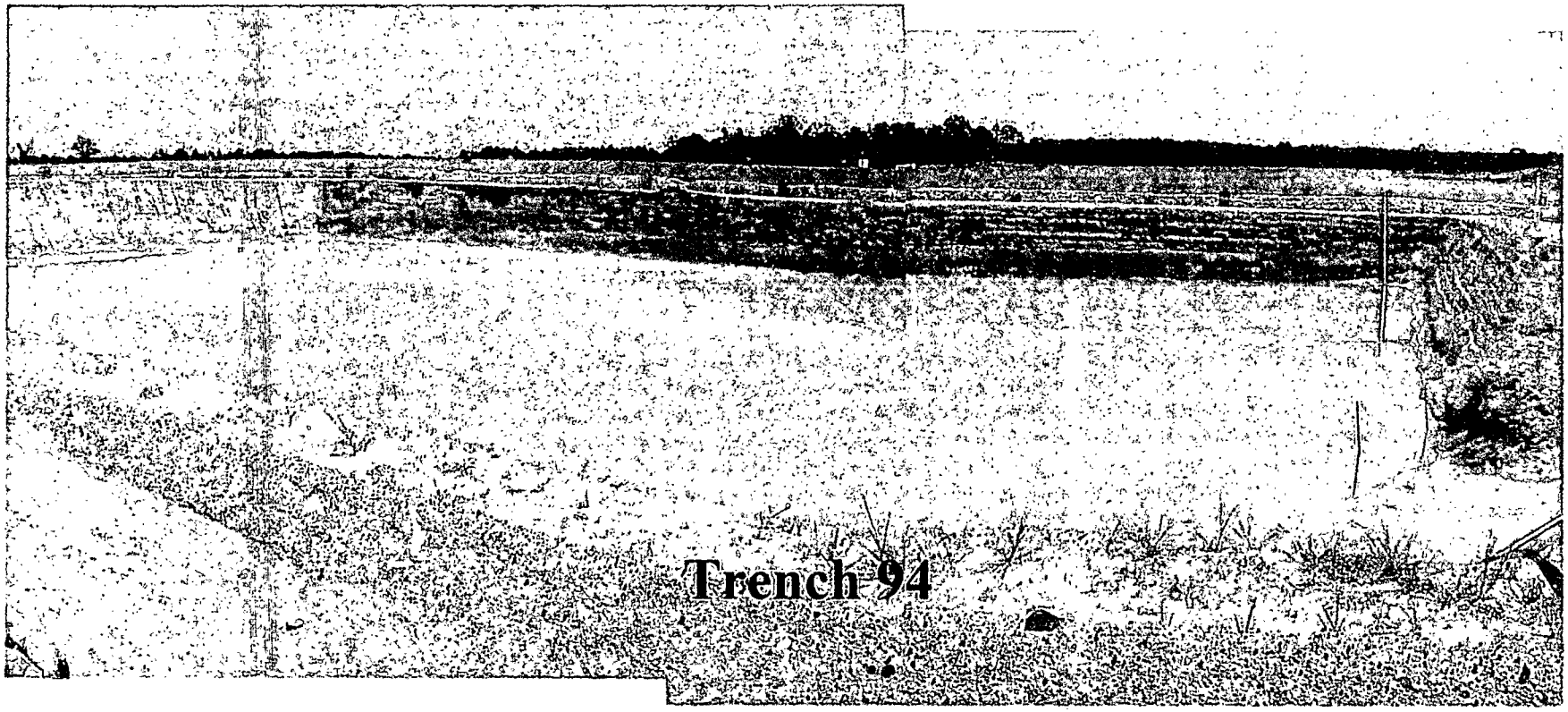


Trench 95 looking south

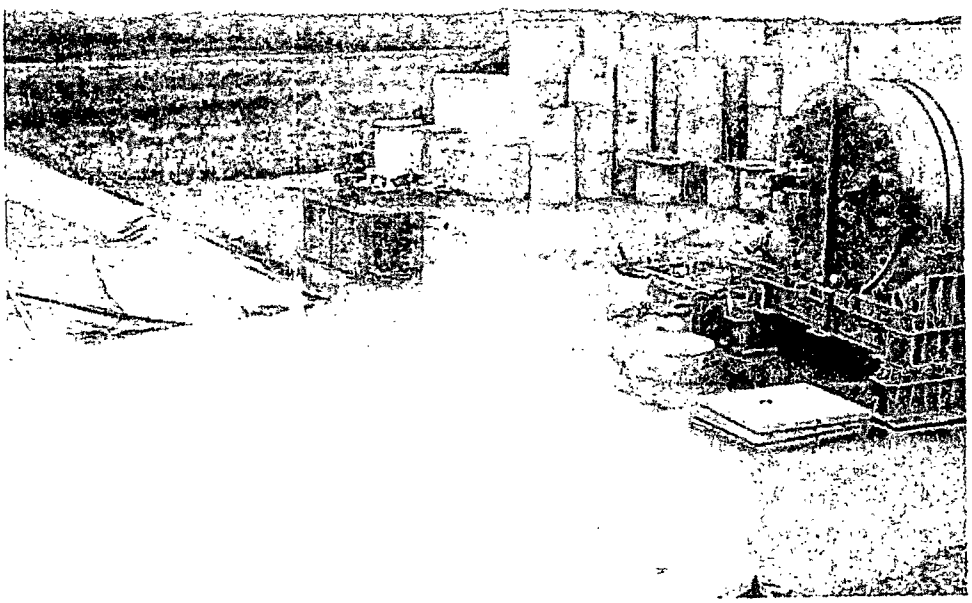


Slit Trench 21 looking south

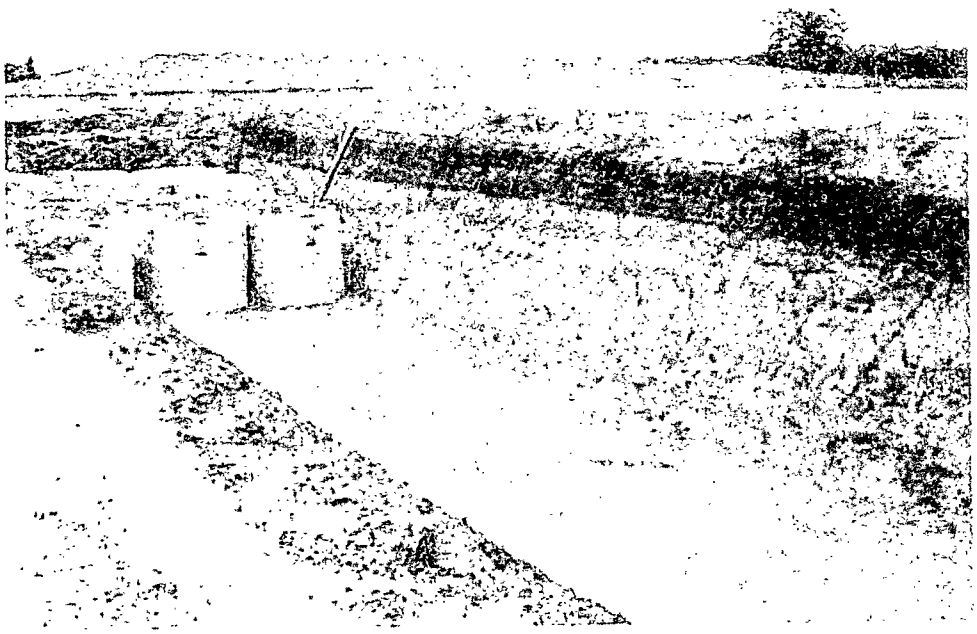
CNS WEEKLY SITE INSPECTION REPORT **7/18/03**



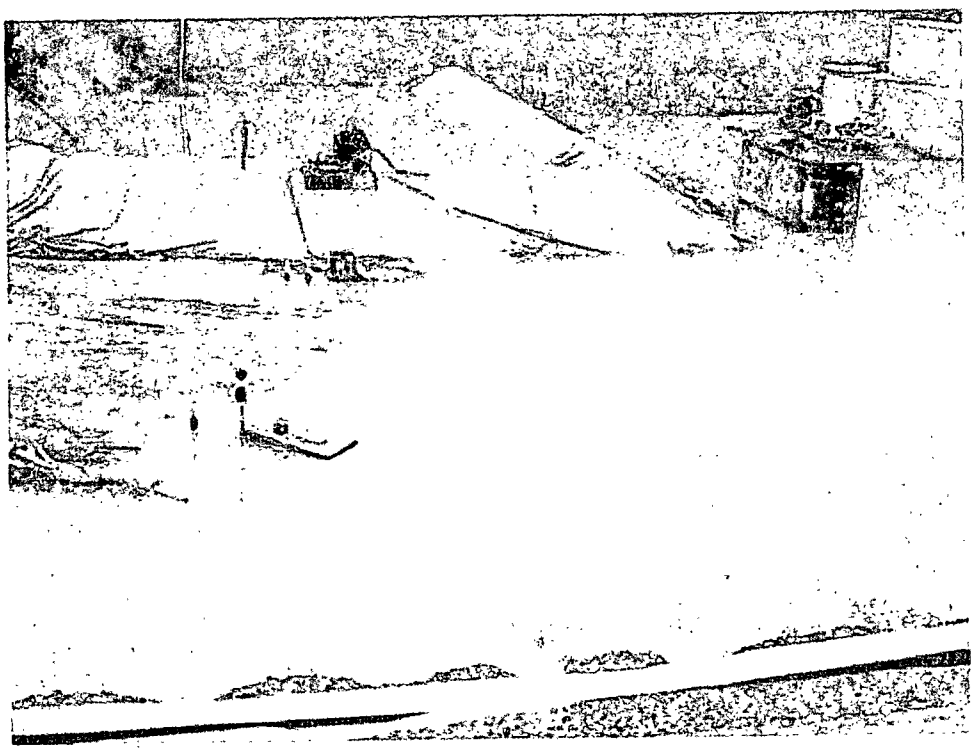
The water within Trench 94 is the result of direct rainfall. No water has been pumped from or to the B/C trench. It was previously reported in the 6/27/03 Weekly Site Inspection Report that water was pumped from the holding ponds to T. 94, however, this never occurred.



TR 86



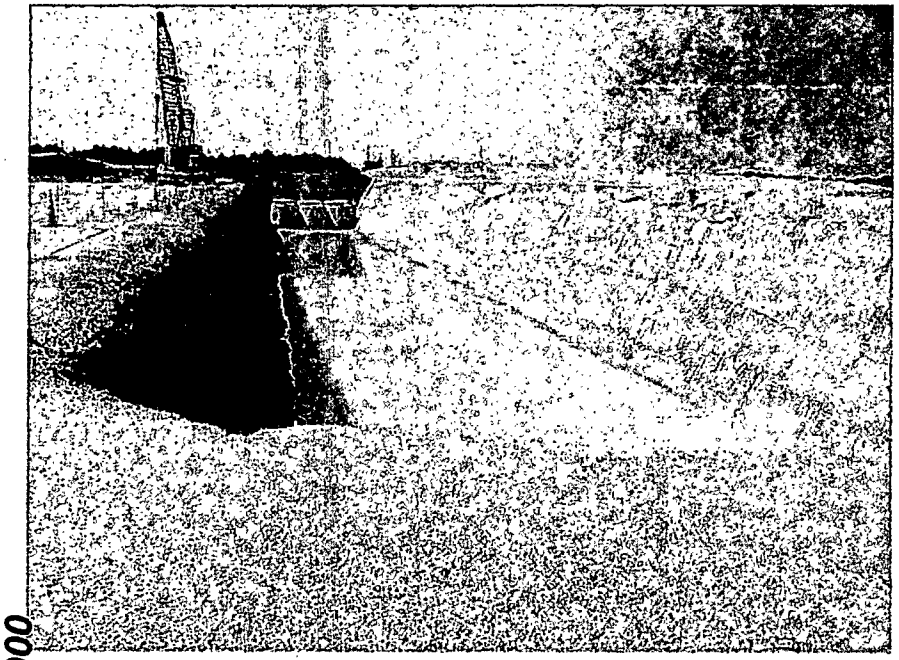
TR95



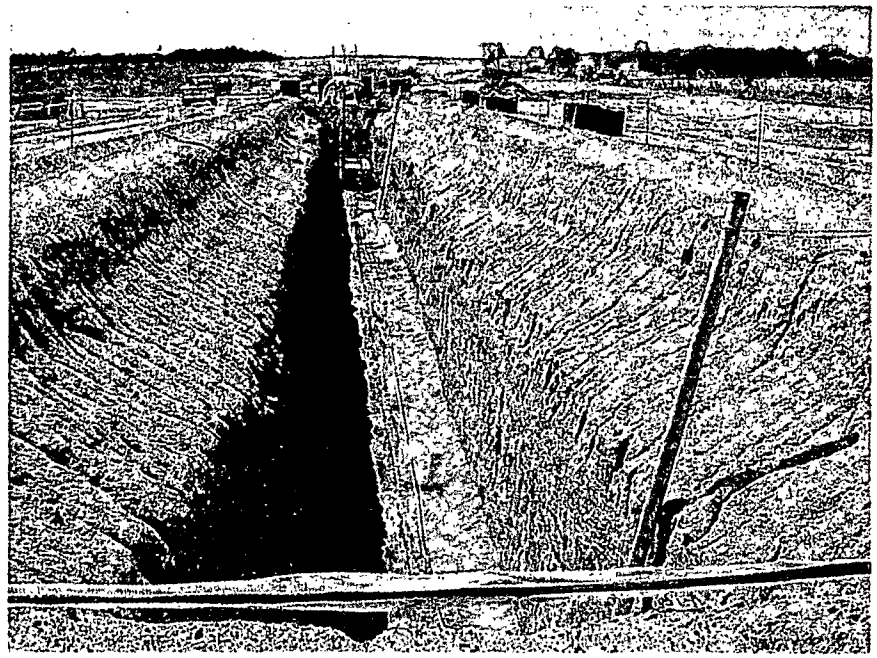
TR86

CNS Site Inspection

August 28, 2003



Trench 95 looking south



Slit Trench 21 looking south

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

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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May 13, 2013