STATE OF SOUTH CAROLINA
IN THE
COURT OF APPEALS

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

Sierra Club,

Appellant,

v.

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

Respondents.

INITIAL JOINT BRIEF OF THE RESPONDENTS, CHEM-NUCLEAR SYSTEMS, LLC AND SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL

Stephen P. Groves, Sr., Esquire
Mary D. Shahid, Esquire
Sara S. Rogers, Esquire
NEXSEN PRUET, LLC
205 King Street, Suite 400
Charleston, South Carolina 29401
Telephone: 843.720.1725
Telecopier: 843.414.8206

Attorneys for the Respondent, Chem-Nuclear Systems, LLC

Jacquelyn S. Dickman, Esquire
Deputy General Counsel
Claire H. Prince, Esquire
Office of General Counsel
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201
Telephone: 803.898.3350
Telecopier: 803.898.3367

Attorneys for the Respondent,
South Carolina Department of Health and Environmental Control

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B. Whether The Disposal Technology Utilized At The Barnwell Facility Meets The Regulatory Definition Of "Disposal" By Ensuring The Isolation Of Wastes In Compliance With The Regulatory Requirements?

C. Whether The ALJ Misconstrued The Regulatory Requirements In Concluding The Factual Findings From The 2005 ALC Order Support Affirmance Of The Renewal Of Operations License 097?

II. STATEMENT OF THE CASE

The Respondents, Chem-Nuclear Systems, LLC ("Chem-Nuclear") and South Carolina Department of Health and Environmental Control ("SCDHEC" or "the Department"), adopt the Statement of the Case submitted by the Appellant, Sierra Club, and supplements the Statement of the Case as follows.

In its Final Order and Decision issued 13 October 2005, reviewed by this Court of Appeals, Administrative Law Judge John D. Geathers approved renewal of Chem-Nuclear's license for operation of the low-level radioactive waste disposal facility in Barnwell, South Carolina. Judge Geathers, however, ordered Chem-Nuclear to conduct a study and submit the results to SCDHEC. This study included evaluation of "the scientific and economic feasibility of employing or implementing designs and operational procedures at the Barnwell Site that will (1) shelter the disposal trenches from rainfall and prevent rainfall from entering the trenches, (2) provide temporary dry storage facilities for the storage of wastes received during wet conditions, and (3) provide for sealing and grouting the concrete disposal vaults to prevent the intrusion of water to the maximum extent feasible."[1] Chem-Nuclear followed Judge Geathers' directive and sent the report[2] to SCDHEC on 11 April 2006.

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[1] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193 (S. C. Admin. Law. Judge.Div., filed 13 October 2005).

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

This Court of Appeals affirmed in part, and remanded in part the 2005 ALC Order back to the ALC.[3] On remand this Court of Appeals "instructed the ALC to apply the factual findings from its 2005 Order in determining . . whether Chem Nuclear is in compliance with DHEC Regulation 61-63, Part VII, Sections 7.10.5 through 7.10.10, 7.11, and 7.23.6." (*2012 Final Order*, p.2).[4]

The ALC, the Honorable Ralph King Anderson, III, concluded that "[the Sierra Club] must demonstrate, by a preponderance of the evidence, that renewal is not authorized based on the ALC's factual findings in the 2005 Decision as applied to the sections of R. 61-63 discussed above." (*2012 Final Order*, p.22). Judge Anderson concluded that "[the Sierra Club] failed to carry that burden, as this [ALC] finds and concludes that the factual findings in the 2005 Decision, when applied to 24A *S. C. Code Ann. Reg.* 61-63, [§§] 7.10.5-7.10.10, 7.11, and 7.23.6, demonstrate that the Barnwell Facility is compliant with these regulations and that renewal of License No. 097 was proper." (*2012 Final Order*, p.22).

III. STATEMENT OF THE FACTS

Chem-Nuclear operates a low-level radioactive waste ("LLRW") disposal facility in Barnwell County, South Carolina (the "Barnwell Facility") on property generally contiguous to the Savannah River Site.[5] Chem-Nuclear began disposal

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

[4] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 439, 693 S.E. 2d 13, 20-21.

[5] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *3, para. 1. The Savannah River Site historically produced the basic material used in the fabrication of nuclear weapons.

operations at the Barnwell Facility in 1971 pursuant to License No. 097.**6** Chem-Nuclear has been the only operator of the Barnwell Facility since 1971.**7** SCDHEC has renewed License No. 097 seven times.**8** Including the seven renewals, License No. 097 has been amended 48 times.**9** The most recent license renewal, constituting the 49th amendment, is the subject of the underlying contested case.**10**

In 2000, almost 30 years after disposal operations commenced at the Barnwell Facility, the South Carolina Legislature enacted the *Atlantic Interstate Low-Level Radioactive Waste Compact Implementation Act* (the "*Compact Act*").**11** Through this legislation, the South Carolina joined the Atlantic Low-Level Radioactive Waste Compact (the "Atlantic Compact") along with Connecticut and New Jersey. The Barnwell Facility became the designated regional disposal facility of LLRW for the Atlantic Compact. The *Compact Act* established declining limits on LLRW volumes that can be disposed of at the Barnwell Facility.**12** Beginning in Fiscal Year 2008-2009, the *Compact Act* limited the Barnwell Facility to disposal of in-region LLRW only, which resulted in substantial reductions of waste volumes entering the facility. The Barnwell Facility has received only approximately 8000

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6 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *3, para. 3.

7 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *3, para. 3.

8 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *5, para. 18.

9 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *5, para. 18.

10 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *5, para. 18.

11 *See* S.C. Code Ann. §§ 48-46-10, *et seq.*

12 S.C. Code Ann. § 48-46-40(A)(6).

cubic feet per year of LLRW, or less, from the three Atlantic Compact states since Fiscal Year 2008-2009 as compared to previous rates as high as 1.2 million cubic feet per year.**13**

It is undisputed that tritium, a radioactive isotope of hydrogen, moves through groundwater at the Barnwell Facility.**14** Tritium migrates with rainwater and groundwater.**15** Tritium was initially discovered in the trenches at the Barnwell Facility in 1974 and with the benefit of an extensive system of groundwater monitoring wells a tritium "plume" has been mapped.**16** Groundwater becomes surface water in Mary's Branch Creek, outside the boundaries of the property owned by the State of South Carolina and leased by Chem-Nuclear, but within the confines of property adjoining the disposal facility and owned by Chem-Nuclear.**17** The first point in Mary's Branch Creek where a hypothetical member of the public might receive a dose of radiation is the compliance point for purposes of SCDHEC's monitoring.**18** The compliance point approved by SCDHEC is an appropriate point of compliance in that it provides for measuring compliance

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13 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **2-3.

14 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **6-7, paras. 24-35.

15 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 24.

16 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 27; *11, para. 65.

17 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 32.

18 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 32.

consistent with Section 7.18 of the regulation.**19** Tritium has a travel time through groundwater of 20 years between the trenches and Mary's Branch Creek.**20** Tritium has a half-life of 12.3 years and decays to approximately one-fourth of its original quantity of radiation in 24.6 years.**21**

The regulatory limit for exposure to radioactive materials is the equivalent of an annual dose of 25 millirems ("mrem") to the whole body.**22** The highest concentration of tritium detected in Mary's Branch Creek, from a sample taken in July 2001, resulted in a hypothetical annual dose of 5.7 mrem, well below the regulatory limit.**23** Sampling data at the 2005 ALC hearing provided evidence that since July, 2001, there had been a declining trend in tritium concentration at the compliance point.**24**

The tritium plume originated as a consequence of early disposal practices.**25** A considerable amount of waste disposed during the early years of operations of the Barnwell Facility was packaged in unreliable containment and waste forms like

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19 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 32, 37-38.

20 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *9, para. 49.

21 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 27.

22 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 33. *See also* 24A S.C. Code Ann. Regs. 61-63, § 7.18.

23 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 39.

24 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 39; *8, para. 41; *9, para. 52.

25 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 29.

paper or cardboard.**26** The use of engineered barriers, groundwater travel time, and decay have ensured that tritium concentrations at the compliance point remain well below regulatory limits.**27** In 1995, *Part VII* of *R. 61-63* was amended to require engineered barriers for all waste disposed at the Barnwell Facility.**28** The primary engineered barriers used at the Barnwell Facility since 1995 are concrete vaults and enhanced capping of trenches.**29**

Waste is transported to the Barnwell Facility in casks, or containers, such as high-integrity polyethylene disposal containers**30** which are placed in rectangular and cylindrical reinforced concrete vaults stacked up to three high on the trench floor.**31** Voids between vaults are backfilled for stability within the trench and the vaults are covered with a clay cap.**32** Once trenches are filled they are covered with an enhanced cap consisting of clay overlain by polyethylene and bentonite materials, sand, and topsoil to allow for vegetation growth.**33** The concrete vaults are not sealed against water intrusion and the vault floors contain holes to allow

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26 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 29.

27 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 46.

28 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *4, para. 9.

29 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *5, para. 20; *12, para. 72.

30 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 107.

31 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **13-14, paras. 82-84.

32 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *14, para. 84.

33 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *14, para. 85.

holes to allow water to drain from the vaults.**34** The bottoms of the trenches are lined with sandy clay that is not compacted nor designed to be impermeable.**35** Rather, it is designed to allow water to migrate from the bottom of the trench.**36**

The declining trend in groundwater concentrations of tritium near trenches constructed with engineered barriers, attributed to better containment of waste, demonstrates that Chem-Nuclear has successfully minimized contact between waste and rain water.**37** Moreover, Chem-Nuclear has implemented a surface water management plan to manage precipitation collected in the trenches.**38** Water is pumped, when necessary, into adjacent trenches or a lined pond.**39**

The Sierra Club has appealed on the basis that the law**40** requiring Chem-Nuclear to ***minimize*** contact between waste and rain water means that Chem-Nuclear must prevent ***any and all*** contact between waste and rain water (*i.e.*; there can be ***no contact*** whatsoever). Rain undisputedly enters the trenches at the Barnwell Facility which are still active and open.**41** However, through the use of

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34 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 47; *15, para.101.

35 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **13-15, paras. 81-103.

36 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **13-15, paras. 81-103.

37 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 107.

38 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, **16-17, paras. 105-113.

39 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *17, para. 117.

40 *See* 24A S.C. Code Reg. § 61-63, Part VII.

41 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 49; *15, para. 101.

engineered barriers, as discussed herein, Chem-Nuclear has significantly minimized the contact between waste and rain water,**42** although it hasn't been eliminated. Groundwater travel time, engineered barriers, and decay rates of radioactive materials operate to insure that any release of radioactive material is well below regulatory limits.

Importantly, the compliance point, or point of release, is located on property controlled by Chem-Nuclear.**43** Access to the Mary's Branch Creek at the point of release is restricted as the area is fenced and heavily vegetated.**44** There are no known consumers or users of Mary's Branch Creek in and around the compliance point.**45** The property, including Mary's Branch Creek, is the subject of a Restrictive Covenant prohibiting the use of the groundwater and surface water as a drinking water source.**46** Moreover, there are no known drinking water wells downgradient of the Barnwell Facility.**47**

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42 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *17, para. 117.

43 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 32.

44 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, paras. 32, 27; *8, para. 42.

45 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 43.

46 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 44.

47 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, paras. 42-45.

IV. ARGUMENT AND CITATION OF AUTHORITY

Standard of Review

The Sierra Club asserts S. C. Code Ann. § 1-23-380 establishes this Court of Appeals' standard of review. On the contrary, the review standard specifically applicable to an ALC's final order and/or decision is set forth in S. C. Code Ann. § 1-23-610. That statute provides:

> **(B)** The review of the administrative law judge's order must be confined to the record. The court may not substitute its judgment for the judgment of the administrative law judge as to the weight of the evidence on questions of fact. The court of appeals may affirm the decision or remand the case for further proceedings; or, it may reverse or modify the decision if the substantive rights of the petitioner have been prejudiced because the finding, conclusion, or decision is:
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> **(a)** in violation of constitutional or statutory provisions;
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> **(b)** in excess of the statutory authority of the agency;
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> **(c)** made upon unlawful procedure;
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> **(d)** affected by other error of law;
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> **(e)** clearly erroneous in view of the reliable, probative, and substantial evidence on the whole record; or
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> **(f)** arbitrary or capricious or characterized by abuse of discretion or clearly unwarranted exercise of discretion.**48**

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48 *See* S. C. Code Ann. § 1-23-610(B).

Here, the Sierra Club claims that the ALJ committed legal error on remand when he concluded that Chem-Nuclear's disposal practices complied with the law.[49] Sierra Club alleges legal error because undisputedly rainwater may come into contact with waste and then infiltrate the groundwater. Sierra Club claims that proper construction of these regulatory requirements would lead to a conclusion that they are violated upon a demonstration of water coming into contact with waste. It is the Sierra Club's analysis which is legally flawed, not that of the ALJ, as will be discussed herein.

A. *The ALJ Correctly Applied The Relevant Findings Of Fact From The 2005 ALC Order To Conclude That Chem-Nuclear Complied With The Remanded Portions Of The Regulation And SCDHEC's Decision To Renew The Operating License Was Proper.*

The Sierra Club contends that the ALJ "discarded" findings from the *2005 ALC Order* that are material to compliance with specific regulations, "re-weighed" the evidence, and "ignored" some facts in favor of others. (*Appellant's Brief*, p.30). Specifically, Sierra Club highlights certain findings that it believes should have been relevant to the ALJ's conclusions on remand. (*Appellant's Brief*, p.10). These findings concern the North Carolina model, tritium contamination in Mary's Branch Creek, the vault design, and the study required by the *2005 ALC Order*. (*Appellant's Brief*, pp.10-13).

Regarding the North Carolina model which the Sierra Club has steadfastly argued *should* be the standard for compliance, the ALJ correctly noted that there is no information to evaluate the North Carolina design since it was never

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[49] *See* 24A S.C. Code Ann. Reg. §§ 61-63 Part VII - 7.10.6, 7.10.8, 7.11.11, and 7.23.6

constructed, a license was never issued, there is no facility that uses the design, and the design feature of "assured isolation" exists only in theory (*2012 Final Order*, p.15).**50** Rather than focus on the North Carolina model, the ALJ examined current disposal practices and technologies to determine if they comply with the requirements for license renewal, including extensive application of the factual findings to the objectives of minimizing contact between waste and water in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11 and minimizing to the extent practicable the contact of water with waste during storage, disposal and after disposal pursuant to Section 7.23.6. (*2012 Final Order*, pp.9-22).

Second, the ALJ did not ignore the fact that earlier disposal practices at the Barnwell Facility resulted in tritium contamination in the groundwater leading to Mary's Branch Creek. The ALJ stated that "[i]In the early years at the Barnwell [F]acility, the acceptable waste disposal practices for low-level radioactive facilities resulted in tritium releases into the trenches. These early disposal practices included unreliable containment and waste forms, including packaging in paper and cardboard containers." (*2012 Final Order*, p.18).**51** The ALJ applied the findings from the *2005 ALC Order* that reflect that "[t]he changes in design and operations at the Barnwell facility . . the use of vaults to stabilize the trenches, the use of high-integrity polyethylene disposal containers to contain waste forms, the elimination of liquid waste, and the installation of impermeable

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50 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *12, paras. 73-74; *13, para. 76.

51 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 29.

caps on inactive trenches – have enhanced site performance so as to support Chem-Nuclear's predictions of a declining trend in radioactive releases to the general environment." (*2012 Final Order*, p.18).**52** Acknowledging that past disposal practices, even though in compliance with the regulation at that time, contributed to the releases of tritium to groundwater does not negate the findings that show disposal practices and technology have changed and improved significantly since then. (*2012 Final Order*, p.18).**53**

Third, the Sierra Club asserts the ALJ ignored relevant findings concerning the vault design and the contact of waste with water, specifically focusing on the fact the vaults are not grouted and sealed against water intrusion and have holes in the bottom. (*Appellant's Brief*, p.13). In fact, the ALJ reviewed relevant findings concerning the vaults and the trench system, and applied these findings to the license requirements in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 that provide for "minimizing to the extent practicable" the contact of water with waste in the design and construction of the disposal units (vaults) and engineered barriers. (*2012 Final Order*, p.20).

The ALJ also applied the findings concerning the vaults and the engineered barriers to the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11 and the seven objectives for the engineered barriers. These objectives contain qualitative standards for minimizing contact of water with waste and, in

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52 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 107.

53 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 107.

turn, the ALJ rightly concluded Chem-Nuclear and the operating license complied with these objectives. (*2012 Final Order*, pp.13-19).

Finally, the Sierra Club continues to cite the study required by the *2005 ALC Order* concerning methods to reduce contact between waste and rainfall and other water at the facility.**54** The decision of the ALC in 2005 sustaining SCDHEC's decision to renew Chem-Nuclear's operating license was not conditioned upon the study or its results. Rather than focusing on the study, Judge Anderson correctly applied the factual findings concerning the Blue Ribbon panel of experts' review of the Environmental Radiological Performance Verification (ERPV) which concluded that "the Barnwell Facility poses a minimal risk to either the environment or members of the public, both today and in the long-term future." Notably, the Appellant did not refute the findings and conclusions of either the ERPV or the Blue Ribbon Panel. (2012 Final Order, pp.4, 6).**55**

The Court of Appeals instructed the ALJ to make a ". . . ruling on whether Chem-Nuclear's ***current*** waste disposal practices are in compliance with *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11, 7.23.6, and 7.10.5-7.10.10 by applying the factual findings from the *2005 ALC Order*. (*2012 Final Order*, p.2) (Emphasis

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54 Chem-Nuclear submitted a proposed outline in response to the 2005 ALC Order; SCDHEC concurred with the outline in December 2005; the study was submitted to SCDHEC in April 2006, and receipt by SCDHEC was acknowledged in September 2006; SCDHEC's response to the report was issued in April 2008.

55 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *11, para. 66.

added).**56** In reaching its conclusions, the ALJ did not discard findings from the *2005 ALC Order*, re-weigh the evidence, or ignore some facts in favor of others. Rather, the ALJ applied the factual findings to the technical requirements of the remanded sections of the regulation, and appropriately concluded that the Barnwell facility license is compliant with the regulations, and the license renewal is proper. That the ALJ did not cite every factual finding in the *2005 ALC Order* or employ all of the findings relied upon by Appellant does not mean that the ALJ committed errors of law. It simply means that the factual findings, in total and in context, support the conclusions reached by the ALJ.

B. The Disposal Technology Utilized At The Barnwell Facility Meets The Regulatory Definition Of "Disposal" By Ensuring The Isolation Of Wastes In Compliance With The Regulatory Requirements.

The Sierra Club's pervading argument against the operating license renewal for the Barnwell facility is that the disposal**57** technology does not isolate waste from the environment. The Sierra Club appends a dictionary definition of "isolation" to waste disposal, asserting that "this license approval must be viewed in the context of disposal that will ensure that wastes are isolated, separated and quarantined from man's biosphere and food chain." (*Appellant's Brief*, pp.8, 21). This narrow rendition of disposal and waste isolation is inaccurate, contradicts the plain language of the regulation, and misses the contextual connections

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56 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 387 S.C. 424, 439, 693 S.E. 2d 13, 20-21.

57 S.C. Code Ann. Reg. § 61-63, Sec. 7.2.6 provides that "Disposal" means "the isolation of wastes from the biosphere inhabited by man and his food chain by emplacement in a land disposal facility."

between the regulatory definitions and the licensing requirements of S.C. Code Ann. Reg. § 61-63.

S.C. Code Ann. Reg. § 61-63 does not contain a definition of "isolation" or "waste isolation," however, in the context of the regulation and in particular the sections on remand, isolation of wastes in a land disposal facility means the disposal of waste in a manner that is expected to provide adequate protection of human health and the environment. That is why S.C. Code Ann. Reg. § 61-63, Sec. 7.10.6 requires SCDHEC issue the operating license upon a finding that the Barnwell Facility's disposal site design, operations, closure, and post-closure institutional control "are adequate to protect the public health and safety..." (*2012 Final Order*, p.4). The ALJ noted that this section is a qualitative standard designed to ensure that the public's health and safety are protected through the long-term stability of the disposed waste and disposal site. (*2012 Final Order*, p. 4). In finding Chem-Nuclear had complied with this section, the ALJ correctly focused on (1) the findings regarding the use of engineered barriers and (2) the mechanisms that afford a buffer against the risk of exposure to the general public. (*2012 Final Order*, pp.4, 5).

The use of engineered barriers for the underground burial of wastes serves to isolate waste from man's biosphere as contemplated in the disposal definition. As the ALJ correctly noted, the current disposal technology at the Barnwell Facility is most accurately described as enhanced shallow land burial with engineered barriers: the primary engineered barriers being disposal

trenches, disposal vaults, and enhanced caps. (*2012 Final Order*, p.10).**58**. The Barnwell Facility is a "near-surface disposal facility" which means a "land disposal facility in which waste is disposed of within approximately the upper 30 meters of the earth's surface."**59** Engineered barriers are defined as man-made structures or devices intended to improve the land disposal facility's ability to meet the performance objectives in Part VII of the regulation, and include above or below grade vaults or equivalent structures.**60**

The engineered barriers used to isolate waste must be designed and constructed to *complement and improve* the ability of the disposal facility to meet the performance objectives.**61** (Emphasis added). As the ALJ discussed in his review of S.C. Code Ann. Reg. § 61-63, Sec. 7.11.9, these objectives include S.C. Code Ann. Reg. § 61-63, Sec. 7.18, which specifically provides that concentrations of radioactive material may be released to the general environment so long as it does not exceed the dose rate and reasonable efforts are made to maintain releases of radioactively in effluents to the general environment "as low as is reasonably achievable," S.C. Code Ann. Reg. § 61-63, Sec. 7.19, protection from inadvertent intruders, S.C. Code Ann. Reg. § 61-63, Sec. 7.20, protection of individuals during operations to maintain radiation exposures "as low as is reasonably achievable," and S.C. Code Ann. Reg. § 61-

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58 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *13, para. 81.

59 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *13, para. 81. *See also* S.C. Code Ann. Reg. § 61-63, Sec. 7.2.17.

60 *See* S.C. Code Ann. Reg. § 61-63, Sec. 7.2.9.

61 *See* S.C. Code Ann. Reg. § 61-63, Sec. 7.11.9.

63, Sec. 7.21, disposal site stability at closure to eliminate, "to the extent practicable" the need for ongoing maintenance after closure . (*2012 Final Order*, pp.10-11). If disposal means that there can be absolutely no contact between waste and water, S.C. Code Ann. Reg. § 61-63, Sec. 7.18 would not allow for a dose rate below which concentrations of radioactive material released to the general environment (including, air, groundwater, surface water, soil) is allowable, and S.C. Code Ann. Reg. § 61-63, Sec. 7.20 would not provide that radiation exposure to workers during site operations should be "as low as reasonably achievable." Waste isolation, in the context of the plain language of the regulatory provisions does not contemplate preventing or quarantining all waste from contact with water.

S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11 is a key provision that clearly shows that the objectives for the engineered barriers to accomplish waste isolation are not absolute. The objectives in this section place the concept of waste isolation into a context that acknowledges that shallow land disposal by definition cannot provide absolute isolation from the elements, including rainfall. S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.1, for example, provides that engineered barriers should be designed and constructed to *minimize* the migration of water onto disposal units, and S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.2, provides that they should *minimize* the migration of waste or waste contaminated water out of disposal units.

These objectives do not absolutely prohibit contact with water; rather, they recognize that the goal of the disposal units and engineered barriers is that they be designed and constructed to *minimize* waste to water contact. The ALJ's Order discusses in detail the factual findings that indicate compliance with these objectives. (*2012 Final Order*, pp.12-20).

While buried waste is isolated through the use of engineered barriers, releases of radioactive material (eg. tritium) to the general environment are also isolated through mechanisms that protect the public and the environment. In addition to controlling the disposal site under it operating license, Chem-Nuclear also owns three parcels of property around the site, including the property at the regulatory compliance point at Mary's Branch Creek. (*2012 Final Order*, p.7).**62** There are restrictive covenants and easements on the three parcels of property to protect the compliance point from access by the general public. (*2012 Final Order*, p.7).**63** There is a fence and heavy vegetation at the entry point to prevent the general public from accessing Mary's Branch Creek at the compliance point, and there are no consumers of water from the Creek. (*2012 Final Order*, p.7).**64** All of these mechanisms further ensure waste isolation within the regulatory requirements.

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62 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *7, para. 32.

63 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 44.

64 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 42.

The Sierra Club correctly notes the words of a regulation must be given their plain and ordinary meaning. (*Appellant's Brief*, p.30). That is why it is difficult to understand the Sierra Club's attempt to impose an inaccurate interpretation of disposal and waste isolation onto and as a substitute for the plain language of the regulatory provisions reviewed on remand. By cloaking its fundamental argument in a definition of disposal that is not supported by the language contained in the regulation is to misapprehend the meaning of the regulation and to misconstrue the regulatory requirements that are, in fact, supported by the factual findings from the *2005 ALC Order*. In the following sections, each of the remanded provisions will be discussed in more detail to demonstrate that the ALJ did not commit errors of law in applying the factual findings, and in concluding that Chem-Nuclear is in compliance with the regulations, and SCDHEC's operating license renewal was proper.

C. *The ALJ Did Not Misconstrue The Regulatory Requirements In Concluding That The Factual Findings Form The 2005 ALC Order Support Affirmance Of The Renewal of Operating License 097.*

Remanded Sections: Section 7.10.5 through 10.

The ALJ's final order in this matter addresses *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10,6, 7.10.7, 7.10.8, and 7.10.10. The Sierra Club only contests the ALC's conclusions regarding *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10.6, 7.10.7, and 7.10.8. (Appellant's Brief, p.25).

24A *S.C. Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.10.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.10.6 sets forth the following requirements:

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

The ALJ found that the disposal practices assured the stability of the waste. (*2012 Final Order*, p.7). In addition, the review by the Blue Ribbon panel confirmed Chem-Nuclear's predictions of declining concentrations of tritium flowing into Mary's Branch Creek.**65** Further, the property restrictions placed on the property surrounding the compliance point protected the public's health and safety.**66**

The Sierra Club challenges the ALJ's conclusion regarding the stability of the waste (*Appellant's Brief*, p.24.) arguing that the waste isn't stable because "waste leave[s] the disposal vaults and the trenches and migrate[s]into the groundwater." (*Appellant's Brief*, p.27) "Stability" is defined in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.2.20 as "structural stability" and the ALJ correctly focused on the backfilling between vaults and the caps both of which are used, with the

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65 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *11, para. 65.

66 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 44.

vaults, to provide long-term structural stability for the waste. (*2012 Final Order*, p.7).

There is no finding in the *2005 ALC Order* upon which anyone could reasonably conclude that waste, as defined in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.2.22, is not stable and becomes displaced at the Barnwell Facility. There is no finding in the 2005 Order upon which anyone could reasonably conclude that waste, as defined in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.2.22 is unearthed after burial and that the public is subject to exposure from the unearthed waste. There is reference in the 2005 Findings of Fact that, with regard to earlier unreliable containment, "[i]t is undisputed that it is inadvisable to attempt to uncover or excavate these containers and waste in order to provide better containment."[67]

Tritium, driven by rainwater percolating to ground water, may migrate from the disposal site but, in that process, there is no disturbance of waste or waste forms. And, the incorporation of engineered barriers into the Barnwell Facility, coupled with groundwater travel time and decay rates, results in a release of radioactive material into the environment well below the applicable regulatory limit. The stability or instability of the waste forms has nothing to do with the migration of rain driven tritium through groundwater.

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67 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *6, para. 30.

24A *S.C. Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.10.7

S.C. Code Ann. Reg. § 61-63, *Sec.* Sec. 7.10.7 requires that Chem-Nuclear provide "reasonable assurance that the applicable technical requirements of this part will be met." The Sierra Club concludes that Chem-Nuclear has failed to demonstrate reasonable assurances based on the "extensive findings that the vaults are unsealed and ungrouted allowing water to fall into the vaults; the vaults have holes in the bottom to allow water to migrate out of the vaults; the trenches are designed to allow water to percolate into the groundwater." (*Appellant's Brief*, p.29).

"Engineered barriers" are defined in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.2.9 as "a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives in this part. This shall include above or below grade vaults or equivalent structures." *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11 identifies the "technical requirements" as contemplated in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.10.7, for engineered barriers with the overriding requirement relative to this appeal set forth in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.2 "to minimize migration of waste or waste contaminated water out of the disposal unit." With the incorporation of new disposal techniques and the use of engineered barriers, beginning in 1995, tritium concentrations began to decline at the compliance point.**68** Consequently, Chem-Nuclear has not only provided assurances, but has demonstrated that the

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68 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 107.

engineered barriers satisfy the performance objectives of S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11 and the technical requirements of S.C. Code Ann. Reg. § 61-63, Part VII are met.

24A *S.C. Code Ann. Reg.* 61-63 Part VII, Sec. 7.10.8

S.C. Code Ann. Reg. § 61-63, Sec. 7.10.8 refers to the applicant's proposed institutional controls and the requirement that the applicant provide reasonable assurance the controls are provided for the length of time necessary to protect public health and safety through post-closure. The Sierra Club argues that there were "multiple releases from the site over its history" from which the ALJ should have concluded that the waste is not stable and that exposure of the public is likely. (*Appellant's Brief*, p.28). The Sierra Club further claims that it is irrelevant that a release is below regulatory limits. (*Appellant's Brief*, p.28).

The Sierra Club's claim is a misapprehension of the requirements of S.C. Code Ann. Reg. § 61-63, Part VII. In fact, S.C. Code Ann. Reg. § 61-63, Sec. 7.18 provides that "[c]oncentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants, or animals shall not result in an annual dose exceeding an equivalent of 25 mrems to the whole body, 75 mrems to the thyroid, and 25 mrems to any other organ of any member of the public. Reasonable efforts should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable." The data collected by Chem-Nuclear demonstrates that the groundwater migrating off the disposal site and into the Creek does not exceed the regulatory limits and, therefore, is allowable under

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.18 as a concentration that may be released into the environment. Moreover, Chem-Nuclear strives to reduce any release as low as is reasonably achievable ("ALARA"). Chem-Nuclear has incorporated disposal practices to ensure that any releases are well below allowable limits.

The Sierra Club is inaccurate in stating that the ALJ concluded in the *2005 ALC Order* that there have been "multiple releases from the site over its history." (*Appellant's Brief*, p.28). The only evidence of any releases from the site is the concentration measured at the compliance point, which under *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.18, is authorized, and the release which occurred in 1998-1999 when water pumped from Trench 86 percolated into the groundwater which flowed under a neighboring property. Chem-Nuclear detected and confirmed the release and conducted remediation activities.**69**

The ALJ, in the *2012 Final Order*, relied on the data collected at the compliance point, and the trend of decreasing concentrations of tritium in the groundwater flowing into the Mary's Branch Creek, to conclude that the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.10.8 have been satisfied. The Sierra Club relies on the same data, or evidence of a release to surface water, to argue that Chem-Nuclear has failed to provide the necessary assurances. The Sierra Club, however, ignores that the concentration measured at the compliance point, where groundwater flowing under the Barnwell Facility

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69 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *10, para. 56.

migrates to surface water off-site, is an allowable release under S.C. Code Ann. Reg. § 61-63, Sec. 7.18.

Remanded Sections - *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.

The 2012 Order includes findings and conclusions addressing S.C. Code Ann. Reg. § 61-63, Secs. 7.11.9, 7.11.10, and 7.11.11 1-7. The Sierra Club explains in Footnote 3 it is addressing S.C. Code Ann. Reg. § 61-63, Secs. 7.11.9, 7.11.10 and 7.11.11, but the Sierra Club's appellate brief includes only a discussion of S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11. (Appellant's Brief, p.14) In particular, the Sierra Club addresses S.C. Code Ann. Reg. § 61-63, Secs. 7.11.11.1, 7.11.11.2, 7.11.11.4, 7.11.11.6, and 7.11.11.7.

24A S.C. *Code Ann. Reg.* 61-63 Part VII, *Sec.* 7.11.11.1

In accordance with S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.1, the disposal units and engineered barriers shall be designed and constructed "to minimize the migration of water onto the disposal units." The Sierra Club argues that the engineered barriers "do not prevent water from entering the disposal units." (Appellant's Brief, p.16). There is, however, a difference in meaning between "minimize" and "prevent." "Minimize" is "to reduce to the smallest possible amount, extent, size, or degree." "Prevent" is "to keep from happening." The *American Heritage Dictionary of the English Language*. The regulation imposes a requirement to minimize the migration of water into the vault or trench.[70]

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[70] 24A S.C. Code Ann. Reg. 61-63, Sec. 7.2.8 states that "[d]isposal unit' means a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal, the unit is usually a vault or trench."

The ALJ noted the following to support compliance with S.C. Code Ann. Reg. § 61-63, Sec. 7.11.11.1: 1) the trench facilitates drainage of water, not the collection of water; 2) water accumulation is monitored; 3) Chem-Nuclear implements a surface water management plan to manage precipitation in the trenches; 4) vaults are capped; and 5) trenches are capped. (2012 Final Order, p.___). The Sierra Club relies in its arguments challenging the findings and conclusions of the ALC on the undisputed fact that that the vaults are potentially exposed to rain fall during loading and unloading and the lids are not grouted or sealed. (*Appellant's Brief*, p.16).

It is clear from the ALC factual findings recited in the 2012 Order that Chem-Nuclear has minimized the migration of water into the vault or trench, by facilitating drainage, managing any accumulated standing water, capping the vault, and capping the trench. These facts clearly provide evidentiary support for minimization. The Sierra Club's insistence on sealing or grouting the lids on the vaults supports the Sierra Club's position that the regulation requires elimination of water into the vault or trench, but sealing or grouting is not be necessary to accomplish minimization. The design of the vault allows for drainage of water out of the vault and away from the waste.

24A *S.C. Code Ann. Reg.* §61-63 Part VII, *Sec.* 7.11.11.2

The disposal units (vaults and trenches) must also be designed and constructed to "minimize the migration of waste or waste contaminated water out of the disposal units." The Sierra Club claims Chem-Nuclear's disposal practices fail to minimize the migration of waste or waste contaminated water out of the

disposal units since the units allow for drainage. (*Appellant's Brief*, pp.18-19). Moreover, the Sierra Club claims the ALJ ignored the implication of the finding in the *2005 ALC Order* that some monitoring wells showed increases in tritium concentrations between 1997-2001, and that tritium levels varied with rainfall data. (*Appellant's Brief*, p.19). That finding, however, did not relate to data collected at the compliance point. Instead it related to the extensive groundwater data collected by Chem-Nuclear – 30 years of data for more than 200 sampling points. Clearly Chem-Nuclear has minimized the migration of waste or waste contaminated water out of disposal units since incorporating engineered barriers in its disposal practices. Evidence in 2005 indicating a decline in tritium concentrations at the compliance point since 2001 and a resulting reduction of radioactive material in groundwater support a finding of minimization.

Importantly, *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.2 distinguishes between "waste" and "waste contaminated water." This distinction is relevant since Appellant makes no distinction between the waste placed within the container and the vault, and the waste contaminated water resulting from rainwater coming in contact with waste. Under the regulatory regime applicable to land disposal of radioactive waste, waste contaminated water is distinct from waste. This distinction is important in evaluating Appellant's claims that "waste" isn't properly isolated as required by *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.11.11.6 and 7.11.11.7, discussed below. (*Appellant's Brief*, pp.21–23). The waste forms are isolated, as is demonstrated below. Groundwater migrates under the Barnwell Facility, not the waste forms.

24A *S.C. Code Ann. Reg.* § 61-63 Part VII, *Sec.* 7.11.11.4

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.11.11.4 requires that the engineered barriers be designed to allow for "temporary collection and retention of water and other liquids for a time sufficient to allow for the detection and removal or other remedial measures without the contamination of groundwater or the surrounding soil." The Sierra Club claims that the contamination of groundwater which migrated to the adjacent property is a demonstration that Chem-Nuclear has failed to meet this objective. (*Appellant's Brief*, p.20). In fact, the incident described in the *2005 ALC Order*[71] is demonstrative that Chem-Nuclear has implemented a system of surface water management to prevent the accumulation of water in the trenches. The fact that the "pumped water ponded on the Chem-Nuclear property and then percolated through the soil and into the groundwater" is not indicative of a lack of a surface water management system. It may be indicative of a mechanical or other failure that has since been addressed, but it is clear that a temporary collection system exists. The factual findings in the *2005 ALC Order*, that Chem-Nuclear implements a surface water management plan to manage precipitation, which includes pumping into adjacent trenches or a lined pond,[72] supports the conclusions in the *2012 Final Order* that Chem-Nuclear has satisfied the requirements of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.11.11.4.

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[71] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *10, para. 56.

[72] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *17, para. 117.

24A *S.C. Code Ann. Reg.* § 61-63 Part VII, *Sec.* 7.11.11.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.11.11.6 requires assurances that "the waste will be isolated for at least the institutional control period." The Sierra Club claims the waste isn't isolated "because it is entering the soils and groundwater as a direct result of Chem-Nuclear's disposal practices." (Appellant's Brief, p.21). Restrictions on waste forms and characteristics that have been imposed over the past 20 years (including the use of high integrity containers to contain waste forms and the elimination of liquid waste) have increased the reliability and waste isolation capabilities at the facility.[73] The current waste forms are isolated in disposal containers, including high integrity polyethelene containers, and encapsulated in capped vaults.[74] Upon closure of the Barnwell Facility all trenches are capped with a vegetated land cover.[75] Tritium migrates through the groundwater, released from the trenches, and is released into Mary's Branch Creek but the concentration released is authorized, or permitted, under the applicable regulatory standard.

24A *S.C. Code Reg.* § 61-63 Part VII, *Sec.* 7.11.11.7

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.11.11.7 requires prevention of contact between waste and the surrounding earth. Appellant argues that the infiltration of water into the soil and groundwater beneath the trenches is

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73 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *13, para. 79; *16, para. 107.

74 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 44; *15, paras. 94-95; *16, para. 107.

75 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *15, para. 100.

evidence of failure of Chem-Nuclear to adhere to this design objective. (*Appellant's Brief*, p.23) The ALJ properly concluded that the waste was the item or items placed in the container and stored in a reinforced concrete block. (*2012 Final Order*, pp.18-19). The ALJ concluded that the use of the engineered barriers as described in the findings contained in the 2005 Order, prevented contact between the waste and the surrounding earth. (*2012 Final Order*, pp.18-19). The ALJ also appropriately noted the findings regarding the composition of the trench bottoms, and the design features that move water out of the trenches as further evidence of preventing contact between waste and the surrounding earth. (*2012 Final Order*, p.19).

24A *S.C. Code Ann. Reg.* § 61-63 Part VII, *Sec.* 7.23.6

S.C. Code Ann. Reg. § 61-63, *Sec.* 7.23.6 is the provision that requires the Barnwell site be designed to minimize to the extent practicable the contact of water with waste during storage, disposal, and after disposal. To meet this requirement, waste forms are placed in disposal containers such as high-integrity polyethylene disposal containers, for shipment to the Barnwell facility except for large components which may be placed directly into the trench.[76] The shipping casks holding the disposal containers are off-loaded from the transport vehicles, and may be temporarily stored under cover or taken directly to the disposal unit.[77] The disposal unit is a thick concrete vault placed in the trench.[78] A

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[76] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *8, para. 44; *15, paras. 94-95; *16, para. 107.

[77] Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *14, para. 88; *15, paras. 93-95.

minimum of five-foot separation between the trench and the high water table is required.**79** The bottom of the trench is lined with partially impermeable clay/sand or sandy clay.**80** The disposal container holding the waste is taken out of the cask and placed into the vault.**81** Once the vault is filled and closed with a vault lid that serves as an intrusion barrier, backfill material is used to fill the void spaces between the vaults.**82** Impermeable caps are constructed over inactive trenches.**83** Together, these techniques provide a multi-phased system for waste isolation. The plain language of *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 recognizes the qualitative nature of the requirements for the disposal techniques utilized to accomplish waste isolation. The ALJ carefully noted the three phases of operation at the site – temporary storage, disposal, and after disposal – in concluding that Chem-Nuclear has minimized the possibility of contact with water in each of these phases. (*2012 Final Order*, p.21).

The Sierra Club claims that Chem-Nuclear failed to demonstrate compliance with *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 because "disposal practices at the Barnwell Facility fail ...to prevent contact of waste and water. ...

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78 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *15, para. 98.

79 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *12, para. 69.

80 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *16, para. 103.

81 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *15, para. 95.

82 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *15, para. 99.

83 Sierra Club v. SCDHEC and Chem-Nuclear Systems, LLC, 2005 WL 2997193, *15, para. 100.

The trenches are open and uncovered until they are filled with vaults, and only then are they covered with dirt. The design allows rainfall that accumulates in the trenches to percolate into the soil, and drive the groundwater movement that is carrying tritium and other radioactive materials into Mary's Branch Creek." (Appellant's Brief, p.24). Notably, *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 does not require "prevention." However, the standard in *S.C. Code Ann. Reg.* § 61-63, *Sec.* 7.23.6 is *minimization* "to the maximum extent practicable the contact of water with waste during storage, the contact of standing water with waste during disposal, and the contact of percolating or standing water with wastes after disposal," not the standard applied by the Sierra Club in its arguments on appeal.

The multi-phased system described herein – the use of disposal containers, concrete vaults, and capping – result in minimization of the contact of water with waste during storage, disposal, and after disposal. The disposal practices are designed to prevent the accumulation of water in the trenches – and the resulting exposure between containers, waste forms, and standing water – by insuring that drainage from the vaults and trenches is facilitated.

V. CONCLUSION

In applying S.C. Code Ann. § 1-23-610(B) this Court of Appeals has held that "[a]s to factual issues, judicial review of administrative agency orders is limited to a determination of whether the order is supported by substantial

evidence."[84] Moreover, "[s]ubstantial evidence sufficient to support a finding of the ALC is evidence which, considering the record as a whole, would allow reasonable minds to reach the conclusion that the administrative agency reached."[85] Additionally, in reviewing the application of a statute or regulation, appellate courts apply the "plain meaning rule." "Under the plain meaning rule, it is not the court's place to change the meaning of a clear and unambiguous statute."[86]

There is no issue as to whether the factual findings of the ALC, in 2005, were supported by substantial evidence. This Court of Appeals did not remand the case to the ALC for the taking of additional evidence. Rather, the remand was for the purpose of applying "its factual findings to the technical requirements of" *S.C. Code Ann. Reg.* § 61-63, *Secs.* 7.10.5-7.10.10, 7.11.11, and 7.23.6. The Sierra Club has conceded that there was substantial evidence to support the factual findings in the *2005 ALC Order*. The Sierra Club argues, in this appeal, that the factual findings from the *2005 ALC Order* including findings that rain water is allowed to percolate into groundwater from the bottom of the trenches, and findings that the tritium plume at the facility is attributable to that migration, dictate a conclusion that Chem-Nuclear has not complied with regulatory requirements. But, in order to adopt the Sierra Club's position, this Court of Appeals must substitute

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84 Murphy v. S. C. Dep't of Health and Environmental Control, 396 S. C. 633, 723 S. E. 2d 191 (2012).

85 Greeneagle, Inc., v. S. C. Dep't of Health and Environmental Control, 730 S. C. 2d 869, 871 (Ct.App. 2012).

86 Hampton Friends of the Arts v. S. C. Department of Revenue, 2013 SL 44160 (SC).

the term "prevent" for the term "minimize." The applicable rule of statutory construction articulated above belies the Sierra Club's argument.

Based on the factual findings of the *2005 ALC Order*, as relied on and cited in the *2012 Final Order*, Chem-Nuclear has satisfied the challenged requirements. Minimization is clearly demonstrated by current disposal practices as well as by compliance with the regulatory standard for allowable exposures to radiation and by the site performance which demonstrates that tritium concentrations at the compliance point are well below regulatory limits.

Based upon the foregoing arguments and citation of authority, the Respondents, Chem-Nuclear Systems, LLC, and the South Carolina Department of Health and Environmental Control, respectfully request this Court of Appeals to affirm the decision of the Administrative Law Court in all respects.

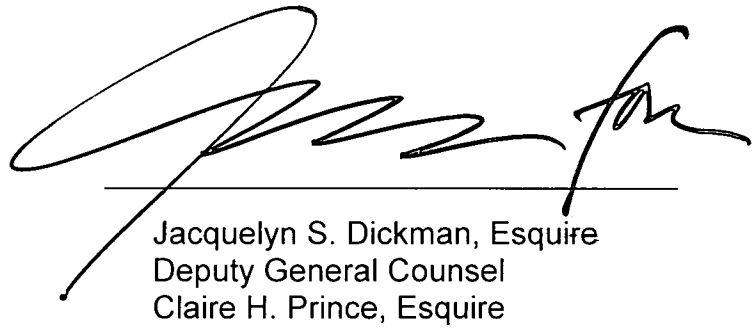
Respectfully submitted:

NEXSEN PRUET, LLC

By:_____

Stephen P. Groves, Sr., Esquire
Mary D. Shahid, Esquire, Esquire
NEXSEN PRUET, LLC
205 King Street, Suite 400
Charleston, South Carolina 29401
Telephone: 843.720.1725
Telecopier: 843.414.8206
E-Mail: sgroves@nexsenpruet.com
mshahid@nexsenpruet.com

Attorneys for the Respondent,
Chem-Nuclear Systems, LLC



Jacquelyn S. Dickman, Esquire
Deputy General Counsel
Claire H. Prince, Esquire
Office of General Counsel
South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, South Carolina 29201
Telephone: 803.898.3350
Telecopier: 803.898.3367

E-Mail: princech@dhec.sc.gov

Attorneys for the Respondent,
South Carolina Department of Health and Environmental Control

Charleston, South Carolina

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