

June 6, 2008

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE SECRETARY

---

In the Matter of	)	
Tennessee Valley Authority	)	
Bellefonte Nuclear Power Plant	)	Docket Nos. 52-014 and 52-015
Units 3 and 4	)	
Combined License	)	

---

**PETITION FOR INTERVENTION AND REQUEST FOR HEARING  
BY THE BELLEFONTE EFFICIENCY AND SUSTAINABILITY TEAM,  
THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE  
AND THE SOUTHERN ALLIANCE FOR CLEAN ENERGY**

**Introduction**

Pursuant to 10 C.F.R. § 2.309, 10 C.F.R. § 52.21 and a notice published by the Nuclear Regulatory Commission (“NRC” or “Commission”) at 73 Fed. Reg. 7611 (February 8, 2008), the Blue Ridge Environmental Defense League (“BREDL”), its chapter Bellefonte Efficiency and Sustainability Team (“BEST”) and the Southern Alliance for Clean Energy (“SACE”) hereby petition for leave to intervene and request a hearing in the above-captioned matter. This petition sets forth with particularity the contentions we seek to raise. As demonstrated below, Blue Ridge Environmental Defense League, BEST and SACE (“Petitioners”) have representational standing, through their members, to make this request.

### **Description of the Proceeding**

This proceeding is concerned with the application for a combined license (“COL”) filed pursuant to 10 CFR Part 52 Subpart C by the Tennessee Valley Authority on October 30, 2007 and supplemented by letters dated November 2, 2007, January 8, 2008 and January 14, 2008. Acceptance of the application for docketing by the NRC was published in 73 Fed. Reg. 4923 (January 28, 2008). Notice of hearing and opportunity to petition for leave to intervene was published in 73 Fed. Reg. 7611 (February 8, 2008). Subsequently, the Bellefonte Efficiency and Sustainability Team, a chapter of the Blue Ridge Environmental Defense League, submitted a motion to suspend the notice of hearing on February 29<sup>th</sup> and a supplemental motion to suspend the hearing notice or request an extension of the deadline to submit petitions for leave to intervene on April 2<sup>nd</sup>. On April 7, 2008 the Commission issued an order granting a 60-day extension for interested persons to file a petition for leave to intervene in the proceeding. 73 Fed. Reg. 19904 (April 11, 2008)

### **Description of Petitioners**

Blue Ridge Environmental Defense League is a regional, community-based non-profit environmental organization founded in 1984 and today has members and projects in Virginia, North Carolina, South Carolina, Tennessee, Alabama and Georgia. BREDL’s founding principles are earth stewardship, environmental democracy, social justice, and community empowerment. BREDL encourages government agencies and citizens to take responsibility for conserving and protecting our natural resources and protecting public health. BREDL also functions as a “watchdog” of the environment,

monitoring issues and holding government officials accountable for their actions.

BREDL is a league of community groups called “chapters.” BREDL and its chapters are unitary, with a common incorporation, financial structure, board of directors and executive officer. BREDL’s chapter Bellefonte Efficiency and Sustainability Team was founded in February 2008 to urge the Tennessee Valley Authority to adopt efficient, sustainable energy options.

The Southern Alliance for Clean Energy (“SACE”) is a nonprofit, nonpartisan membership organization that promotes responsible energy choices that solve global warming problems and ensure clean, safe and healthy communities throughout the Southeast. SACE has members and staff throughout the TVA service territory and across the region, with offices in Tennessee, Georgia, Florida, South Carolina, and North Carolina. SACE has been actively involved in numerous regulatory proceedings TVA has engaged in for over twenty years.

### **Standing**

Pursuant to 10 CFR § 2.309, a request for hearing or petition for leave to intervene must address 1) the nature of the petitioner’s right under the Atomic Energy Act to be made a party to the proceeding, 2) the nature and extent of the petitioner’s property, financial, or other interest in the proceeding, and 3) the possible effect of any order that may be entered in the proceeding on the petitioner’s interest.

Other standing requirements are found in NRC case law. As summarized by the Atomic Safety and Licensing Board (“ASLB”), these standing requirements are as follows:

In determining whether a petitioner has sufficient interest to intervene in a proceeding, the Commission has traditionally applied judicial concepts of standing. *See Metropolitan Edison Co.* (Three Mile Island Nuclear station, Unit 1), CLI-83-25, 18 NRC 327, 332 (1983) (citing *Portland General Electric Co.* (Pebble Springs Nuclear Plant, Units 1 and 2), CLI-76-27, 4 NRC 610 (1976)). Contemporaneous judicial standards for standing require a petitioner to demonstrate that (1) it has suffered or will suffer a distinct and palpable harm that constitutes injury-in-fact within the zone of interests arguably protected by the governing statutes (e.g., the Atomic Energy Act of 1954 (AEA), the National Environmental Policy Act of 1969 (NEPA)); (2) the injury can be fairly traced to the challenged action; and (3) the injury is likely to be redressed by a favorable decision. *See Carolina Power & Light Co.* (Shearon Harris Nuclear Power Plants), LBP-99-25, 50 NRC 25, 29 (1999). An organization that wishes to intervene in a proceeding may do so either in its own right by demonstrating harm to its organizational interests, or in a representational capacity by demonstrating harm to its members. *See Hydro Resources, Inc.* (2929 Coors Road, Suite 101, Albuquerque, NM 87120), LBP-98-9, 47 NRC 261, 271 (1998). To intervene in a representational capacity, an organization must show not only that at least one of its members would fulfill the standing requirements, but also that he or she has authorized the organization to represent his or her interests. *See Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), LBP-98-7, 47 NRC 142, 168, *aff’d on other grounds*, CLI-98-13, 48 NRC 26 (1998).

*Pacific Gas & Electric Co.* (Diablo Canyon Power Plant Independent Spent Fuel Storage Installation), LBP-02-23, 56 NRC 413, 426 (2002)

Standing to participate in this proceeding is demonstrated by the declarations of the following members of the Blue Ridge Environmental Defense League and the Southern Alliance for Clean Energy, people who live within 50 miles of the proposed site who have authorized Petitioners to represent their interests in this proceeding.

For BREDL and BEST:

1. Finn Bille, Chattanooga, Tennessee

2. Thomas E. Camp, Sewanee, Tennessee
3. Cheryl A. Carlson, Huntsville, Alabama
4. Jill Carpenter, Sewanee, Tennessee
5. Reese Danley-Kilgo, Huntsville, Alabama
6. Thomas A. DuBose, Chattanooga, Tennessee
7. Arlyn Ende-Hastings, Sewanee, Tennessee
8. Sara S. Fitzgerald, Tullahoma, Tennessee
9. Jessica Katherine Frazier, Sewanee, Tennessee
10. Peter W. Frogner, Tullahoma, Tennessee
11. John M. Gessell, Sewanee, Tennessee
12. Robert Gottfried, Sewanee, Tennessee
13. Yolande McCurdy Gottfried, Sewanee, Tennessee
14. Gagmar Gundersen, Tracy City, Tennessee
15. Jeannie M. Hacker, Chattanooga, Tennessee
16. Kathleen A. Hamman, Sewanee, Tennessee
17. David Haskell, Sewanee, Tennessee
18. Jack B. Hastings, Sewanee, Tennessee
19. Constance G. Kelley, Sewanee, Tennessee
20. James Patrick Kelley, Sewanee, Tennessee
21. Jacqueline Kidd, Chattanooga, Tennessee
22. Sandra Kurtz, Chattanooga, Tennessee
23. Sue A. Lytle, Tracy City, Tennessee
24. Joshua Mauzy, Sewanee, Tennessee
25. Jack L. Moore, Tullahoma, Tennessee
26. Rosa Lee Moore, Tullahoma, Tennessee
27. Garry L. Morgan, Scottsboro, Alabama
28. Thomas Allen Moss, Huntsville, Alabama
29. David Nazar, Chattanooga, Tennessee
30. Kathleen O'Donahue, Huntsville, Alabama
31. Ann McCulloch Oliver, Sewanee, Tennessee
32. Jennifer J. Raulston, Sewanee, Tennessee
33. William F Reynolds, Chattanooga, Tennessee
34. Jean Scott, Huntsville, Alabama
35. Sandra Shattuck, Huntsville, Alabama
36. Rebecca A. Smith, Huntsville, Alabama
37. Michele Sneed, Huntsville, Alabama
38. Julia Stubblebine, Sewanee, Tennessee
39. Gordon Woodcock, Huntsville, Alabama
40. Linda Woodcock, Huntsville, Alabama

For SACE:

41. John Kimmons, Whitwell, Tennessee
42. Ann McCulloch Oliver, Sewanee, Tennessee
43. William Ross McCluney, Chattanooga, Tennessee

44. William F. Reynolds, Chattanooga, Tennessee

45. Jackie Tipper, Town Creek, Alabama

As demonstrated by the attached declarations, Petitioner's members live near the proposed site, i.e., within 50 miles. Thus, they have presumptive standing by virtue of their proximity to the two new nuclear plants that may be constructed on the site. *Diablo Canyon, supra*, 56 NRC at 426-427, citing *Florida Power & Light Co. (Turkey Point Nuclear Generating Plant, Units 3 and 4)*, LBP-01-6, 53 NRC 138, 146, *aff'd*, CLI-01-17, 54 NRC 3 (2001) In *Diablo Canyon*, the Licensing Board noted that petitioners who live within 50 miles of a proposed nuclear power plant are presumed to have standing in reactor construction permit and operating license cases, because there is an "obvious potential for offsite consequences" within that distance. *Id.* Here, the granting of a combined license ("COL") to TVA would permit the construction and operation of two reactors on the Bellefonte site near Scottsboro, Alabama. Thus, the same standing concepts apply.

The Petitioners' members seek to protect their lives and health by opposing the issuance of a COL to TVA. Petitioners seek to ensure that no COL is issued by the U.S. Nuclear Regulatory Commission unless TVA demonstrates full compliance with the Atomic Energy Act and NEPA.

Further, *locus standi* is based on three requirements: injury, causation and redressability. Petitioners hereby request to be made a party to the proceeding because (1) Construction and operation of a nuclear reactor at Bellefonte would present a tangible and particular harm to the health and well-being of our members living within 50 miles of the site, (2) The NRC has initiated proceedings for a combined license, the granting of

which would directly affect our members, and (3) The Commission is the sole agency with the power to approve, to deny or to modify a license to construct and operate a commercial nuclear power plant.

### **Related Procedural Matters**

#### E-filing Difficult for Some Computer Operating Systems

Sara Barczak with Southern Alliance for Clean Energy attempted to file a Notice of Appearance on March 31, 2008. After filing for a digital certificate with the NRC in advance of the original deadline to intervene and having difficulty moving further in the process, it was eventually discovered with the assistance of NRC IT staff that Mac operating systems are not compatible with the electronic filing process. Apparently those wishing to use the electronic filing system, of which the NRC urges petitioners to do, users must have specific Microsoft operating systems (e.g. XP or Vista). This is a significant problem for the public that do not use these systems. Though there is opportunity to petition to be exempted from the electronic filing process, it seems that an additional option would be for the NRC to develop a process that would allow Mac users the same access that Microsoft users have. Ms. Barczak was advised by NRC staff to install a Microsoft operating system on her computer as she does have a Mac program, "BootCamp," that will allow her to have both a Mac operating system and a Microsoft operating system. She is undergoing that process currently. This technical problem resulted in additional expenses for Microsoft operating system software along with many hours spent dealing with the technical incompatibilities; she is the sole staffer in the Savannah office with no PCs available. Other citizens are likely to experience these

difficulties and we recommend that the NRC investigate ways that could improve the situation.

#### Effectiveness of Communication with Stakeholders

Petitioners wish to raise a related matter regarding access to relevant documents posted at the NRC website. In the words of a member of BEST studying the Bellefonte Environmental Report, “TVA has made it exceedingly difficult for the public to read and understand this report without expensive and advanced computer technology.” The individual who made this comment is a well-educated professional with above average technical ability and experience; his purpose was assisting in the preparation of this petition. We would bring to the Commission’s attention the 2003 report of its Public Communications Task Force which determined that communication with the general public and directly affected parties was “generally poor.” [Report of the Public Communications Task Force, 4.1.3, Merrifield et al, August 6, 2003] Regarding NRC’s website, the task force said, “Although there is a wealth of information on the NRC’s site, a number of enhancements will make it more user-friendly and informative.” It concluded, “Stakeholders differ in their agendas, information needs, access to information, and technological skills. Therefore, customized communications plans need to be developed for each stakeholder and for each situation.” The NRC has not satisfied its obligation to provide information to the public.

#### **Overview of the Contentions to be Raised in this Petition**

A combined license is authorization from the NRC to construct and operate a nuclear power plant at a specific site. Before issuing a COL, the NRC staff must

complete safety and environmental reviews of the application. The COL must comply with provisions of the Atomic Energy Act, the National Environmental Policy Act and NRC regulations. Petitioners wish to intervene in TVA's Bellefonte license application because the operation of two nuclear reactors would endanger over a million people in three states living within 50 miles of the plant. Furthermore, the risk is unnecessary and wholly out of proportion to any possible benefit.

## **LIST OF CONTENTIONS**

Page	Contention
1	CONTENTION ONE: Whether Bellefonte will improve the general welfare, increase the standard of living, or strengthen free competition in private enterprise.
2	CONTENTION TWO: The NRC Fails to Execute Constitutional Due Process and Equal Protection
3	CONTENTION THREE: Plant Site Geology and Hydrology is Not Suitable for Nuclear Reactors: Seismic Concerns Are Not Adequately Addressed, Sinkholes and Karst Terrain,
29	CONTENTION FOUR. Failure to address impact of terrorist attacks.
32	CONTENTION FIVE: The assumption and assertion that uranium fuel is a reliable source of energy is not supported in the combined operating license application submitted by TVA (the applicant) to the U.S. Nuclear Regulatory Commission
34	CONTENTION SIX: Whether Bellefonte will adequately limit atmospheric emissions of radionuclides.
37	CONTENTION SEVEN: Excessive Water Use is Contrary to TVA's Purpose
39	CONTENTION EIGHT: Impacts on aquatic resources including fish, benthic invertebrates, and general aquatic community structure of the project area, Gunter'sville Reservoir, and the Tennessee River Basin.
45	CONTENTION NINE: Alternatives to the Proposed Action Lacking
47	CONTENTION TEN: TVA's Power and Energy Requirements Forecast Fails to Evaluate Alternatives
49	CONTENTION ELEVEN: TVA'S COLA power demand forecast fails to justify need for new nuclear reactors
63	CONTENTION TWELVE: NRC failed to justify need for new units.
65	CONTENTION THIRTEEN: So-called Low Level Radioactive Waste
69	CONTENTION FOURTEEN: Waste Confidence—High Level Nuclear waste from Irradiated Fuel
78	CONTENTION FIFTEEN: Global Warming Impacts are Omitted from the TVA License Application
84	CONTENTION SIXTEEN: Environmental Report's Inadequate Cost Estimate and Cost Comparisons
92	CONTENTION SEVENTEEN: Inadequacy of Environmental Report's Analysis of Human Health Impacts of Irradiated Fuel
95	CONTENTION EIGHTEEN: Inadequacy of Environmental Report's Reliance on Table S-3 Regarding Radioactive Effluents from the Uranium Fuel Cycle
103	Environmental Report's Improper Characterization of Health Effects from Uranium Fuel Cycle as Small and Failure to Adequately Compare Them to Health Effects of Alternative Energy Sources

Exhibit A EPA Vanato Letter

Exhibit B Makhijani

## **CONTENTIONS**

Petitioners hereby set forth with particularity our contentions. We incorporate into our contentions the specific issues of law or fact to be raised, the bases for our contentions and statements of fact or expert opinion in support of our contentions. Further, we demonstrate that the issues we raise are within the scope of the proceeding, that the issues are material to the Commission's licensing responsibilities, and that there exists a genuine dispute between Petitioners and the licensee.

### **CONTENTION ONE: Whether Bellefonte Will Improve the General Welfare, Increase the Standard of Living, or Strengthen Free Competition in Private Enterprise**

#### **Contention**

NRC fails to enforce the existing regulations required to implement the fundamental purpose of the Atomic Energy Act. Further, granting TVA's Bellefonte COL would not improve the general welfare, increase the standard of living or strengthen free competition in private enterprise.

#### **Issue**

A half century ago, when the United States Congress established the Atomic Energy Act, the science and technology of atomic energy were in their infancy. Within a decade the first commercial nuclear power reactors had been built. But after only two decades of operational experience the nuclear power industry was already in decline. The disasters at Three Mile Island and Chernobyl provided virtual bookends to the devastation of Hiroshima and Nagasaki. The Nuclear Regulatory Commission, the scion

of the original Atomic Energy Commission, was formed during the period of waning nuclear fortunes. The current nuclear renaissance is an ill-fated attempt to revive the nuclear dinosaur. The public monies directed to the overweening nuclear industry would be better spent on less costly, cleaner forms of electric power generation.

### Rule

After years of rulemakings, NUREGs and lessons learned, Congress's declared policy is unaltered: "[T]he development, use, and control of atomic energy shall be directed so as to promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise." See 42 U.S.C. 2011.

### Discussion

In the eyes of many, the Nuclear Regulatory Commission suffers from major flaws in carrying out its mission. New reactors suffer from major weaknesses including hardware failures and human error. But the Commission itself is critically flawed as a regulatory body. The public's perception is that the agency lacks true independence; that the NRC staffs' review of license applications and other nuclear industry documents is incomplete and perfunctory; that the procedural process lacks the essential element of justice and impartiality.

#### Hardware failures

The US Government Accountability Office and the NRC Inspector General have issued reports which identify repeated failures in enforcement by the NRC. In 2002 FirstEnergy Nuclear Operating Company discovered a large hole in the Davis-Besse

nuclear plant's reactor vessel. The General Accounting Office labeled this "the most serious safety issue confronting the nation's commercial nuclear power industry since the accident at Three Mile Island in 1979." The GAO concluded, "NRC should have but did not identify or prevent the vessel head corrosion at Davis-Besse because both its inspections at the plant and its assessments of the operator's performance yielded inaccurate and incomplete information on plant safety conditions."<sup>1</sup> A nuclear catastrophe was averted by sheer luck.

Early in 2008 the NRC Office of the Inspector General issued a report which detailed the history of the agency's repeated failure to enforce fire barrier regulations for nuclear reactors. Tests completed in 1993 revealed that fire barriers used in 17 nuclear reactors did not meet federal standards. But the NRC balked and did not order its own tests until 2005; Sandia National Labs determined that the fire barriers supposed to last one hour would fail in just 13 minutes. The Inspector General concluded: "As of December 2007, no fire-endurance tests have been conducted to qualify Hemyc as an NRC-approved 1-hour or 3-hour fire barrier for installation at [nuclear power plants]."<sup>2</sup> The problem remains uncorrected. We would note that the fire at TVA's Browns Ferry nuclear station resulted in fire barrier regulations, standards which apparently the NRC has not enforced since 1980.

Petitioners would agree that enforcement failures at NRC are matters requiring agency-wide correction. However, the immanent nature of failure has particular

---

<sup>1</sup> *Nuclear Regulation: NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown*, General Accounting Office Report, May 2004, <http://www.gao.gov/new.items/d04415.pdf>

<sup>2</sup> *NRC's Oversight of Hemyc Fire Barriers*, Case No. 05-46, Special Inquiry, Office of the Inspector General, January 2008 <http://www.nrc.gov/reading-rm/doc-collections/insp-gen/2008/el-05-46.pdf>

implications for Bellefonte because inadequate Commission oversight causes both safety and economic problems. A COL granted by NRC must, *inter alia*, fulfill the Congressional mandate in 42 U.S.C. 2011, but Petitioners are aware of no agency-wide action which could properly oversee TVA's corrective action plan or quality assurance program before Bellefonte's reactors begin operation. Fifty-one reactor shut-downs longer than one year have occurred; 36 were for safety-related causes which, on average, cost nearly \$1.7 billion each to repair. Among all U.S. utilities, TVA ranks at the top for the number of extended reactor shut-downs. Dave Lochbaum of the Union of Concerned Scientists reported that "Year-plus outages represent prima facie evidence of how far safety levels have been allowed to drop below acceptable levels."<sup>3</sup>

#### Human Factors

Human frailty is a constant companion; however, regarding nuclear technology it is the fatal flaw. People have good days and bad days; they suffer from stress, overwork, fatigue and more. Recently, NRC Chairman Klein, speaking about human error, said: "It should be recalled that the most significant nuclear event in the U.S.—the Three Mile Island incident in 1979—was a result of operator error resulting from inadequate training, and not a faulty design."<sup>4</sup> Moreover, the extent of the human error problem is difficult if not impossible to quantify. A 2001 NRC research document compares the engineering problem to the human failure uncertainties and concludes: "The percentage of hardware

---

<sup>3</sup> *Walking a Nuclear Tightrope: Unlearned Lessons of Year-plus Reactor Outages*, Dave Lochbaum, Union of Concerned Scientists, September 2006

<sup>4</sup> Chairman Dale E. Klein No. S-08-018, Remarks at the North American Energy Summit, University of Texas, San Antonio, May 1, 2008

unavailability due to human error as opposed to random hardware failures is not known.”<sup>5</sup>

If operator error was indeed blameworthy for the accident at TMI, such failure would not be unique to that incident because all reactors have human operators and are therefore susceptible to error. Moreover, the new AP-1000 reactor design and its associated DCD and training regimes have not been tested in the real world. In effect, TVA is asking to conduct an experiment at the Bellefonte site in northern Alabama. Therefore, the NRC is obligated to demonstrate how it will prevent human frailty from turning a mishap at the proposed facility into a catastrophe. In other words, what has the NRC done to eliminate the problem identified in its August 2001 review (*supra*) and what assurances has TVA provided in its COL for operator safety in the licensing of Bellefonte 3 & 4? The issue is particularly relevant to the Bellefonte 3 and 4 licensing process because: (a) it is the leading COL based on the AP-1000 DCD and (b) the proposed reactors constitute an Advanced Nuclear Facility pursuant to Section 638 of the Energy Policy Act of 2005. [Public Law 109-58 (August 8, 2005) 119 STAT. 791, 42 USC 16014]

#### Threats to NRC Independent Review

The NRC’s independence as a regulatory agency suffered a body blow with the enactment of federal risk insurance requirements by Congress. The 2005 Energy Bill has a provision for federal risk insurance to COL license applicants. It states: <sup>6</sup>

(c) COVERED DELAYS.—

---

<sup>5</sup> NRC, *Review of Finding for Human Error Contribution to Risk ion Operating Events*,” August 2001, (INEEL/EXY-01-01166)

<sup>6</sup> 119 STAT. 791 Section 638, Standby Support for Certain Nuclear Stations, 42 USC 16014

(1) INCLUSIONS.—Under each contract authorized by this section, the Secretary shall pay the costs specified in subsection (d), using funds appropriated or collected for the covered costs, if full power operation of the advanced nuclear facility is delayed by—

(A) the failure of the Commission to comply with schedules for review and approval of inspections, tests, analyses, and acceptance criteria established under the combined license or the conduct of preoperational hearings by the Commission for the advanced nuclear facility; or

(B) litigation that delays the commencement of fullpower operations of the advanced nuclear facility.

Under the law, a delay caused by the Commission and its staff, consultants and contractors is a “failure” for which the licensee must be compensated up to a half a billion dollars. Paragraph (d) of the energy bill details the out-of-pocket cost to the Commission:

(d) COVERED COSTS.—

(1) IN GENERAL.—Subject to paragraphs (2), (3), and (4), the costs that shall be paid by the Secretary pursuant to a contract entered into under this section are the costs that result from a delay covered by the contract.

(2) INITIAL 2 REACTORS.—In the case of the first 2 reactors that receive combined licenses and on which construction is commenced, the Secretary shall pay—

(A) 100 percent of the covered costs of delay; but

(B) not more than \$500,000,000 per contract.

Petitioners submit that the Energy bill has imposed upon the Nuclear Regulatory Commission legal requirements which argue against its mandates to ensure public health and safety and protect the environment. For example, a half-billion dollars worth of pressure would be brought to bear if the NRC staff review of TVA’s COLA was about to cause delay. Moreover, our Petition in this matter is litigation covered by the energy bill. Can the Commission grant Petitions for Leave to Intervene and Requests for Hearing without regard to this half-billion dollar Sword of Damocles?

Procedural Shell Games

The adjudicatory licensing process is an opaque, stilted process that has the trappings of a courtroom but too often lacks the element of impartiality. Public hearings are held to satisfy the National Environmental Policy Act, comments are submitted, and the paper exercise seems to be the beginning and the end of the procedure. The following excerpt from an Atomic Safety and Licensing Board Panel transcript is instructive. The ASLBP chairman is addressing an NRC staff attorney during oral arguments in January 2008.<sup>7</sup>

9 ADMIN. JUDGE FARRAR: And you wouldn't say  
10 that's speculative because we haven't resolved it yet.

11 MR. MARTIN: Well, it depends. It depends  
12 what the answer to the RAT was.

13 ADMIN. JUDGE FARRAR: Do you see why  
14 Intervenors have trouble? I mean I hate to say this,  
15 but he word, the phrase has been roaming around my  
16 mind in the last three minutes. Shell game. There's  
17 no way for an Intervenor to sit there and -- if they  
18 had the three of us, the whole Licensing Board Panel  
19 advising them, they'd have no idea when they have to  
20 come \*in, when it's premature and when it's untimely.  
21 They'd have no way of knowing because none of you will  
22 give them a straight answer \*on when they have to come  
23 in and we don't want to sit here until the year 2014  
24 with endless contentions coming at us and your saying  
25 they're premature and/or untimely which we'll get to

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.  
(202) 234-4433 WASHINGTON, D.C. 20005-3701 www~nealrgross.Gom

---

205

1 in a minute on your brief.

234

1 ADMIN. JUDGE FARRAR: Mr. Martin, pages 5-  
2, 10, I guess, of your -- no, 5-11 of your brief. Part  
3 One, you do a remarkable job of saying that this  
4 contention is premature, without using the word

---

<sup>7</sup> 70-3098; ASLBP No.: 07-856-02-MLA-BD01, Rockville, Maryland, January 8, 2008

5 "premature", which was a good thing, because in pages  
6 9 and 10, Part Two, you do a remarkable job of showing  
7 how it's untimely. Which is it, is it both premature  
8 and untimely? And where I'm headed is, can we do this  
9 to these people?

10 I quoted Commissioner Merrifield several  
11 times, former Commissioner Merrifield several times in  
12 the prior decision, because he said how important it  
13 was to deal fairly with the people. So first tell me  
14 how it could be both premature and untimely.

15 MR. MARTIN: And I apologize for the  
16 confusion that obviously created. I think the issue  
17 in the first part of the pleading we were mainly going  
18 for is that we don't believe that this issue is ripe  
19 for review.

20 ADMIN. JUDGE FARRAR: Fine. Okay.

21 MR. MARTIN: Okay.

22 ADMIN. JUDGE FARRAR: I'll give you that.

23 MR. MARTIN: However, the second part  
24 we're saying if you accept this really is an issue,  
25 this issue should have been brought up earlier,

NEAL R. GROSS

COURT REPORTERS AND TRANSCRIBERS 1323 RHODE ISLAND AVE., N.W.  
(202) 234-4433 WASHINGTON, D.C. 20005-3701 www.nealrgross.com

---

235

1 because if you accept that this -- we didn't feel in  
2 any part of the issue --

3 ADMIN. JUDGE FARRAR: If anyone from the  
4 English-speaking world, any other legal system were in  
5 this room, they'd run out screaming hearing you say  
6 that. You all have created this system that you don't  
7 think has to be consistent with the Common Law, the  
8 Principles of Fairness, or the Constitution of the  
9 United States. And you think it's fine to get up here  
10 with these comments.

11 ADMIN. JUDGE McDADE: Was that a question?

12 ADMIN. JUDGE FARRAR: No. That was my  
13 view, half-baked though it may be, but we get these  
14 briefs that have these arguments that have nothing to  
15 do with what any of us have studied in law school.

## Conclusion

Will the NRC adhere to its own Principles of Good Regulation which state: <sup>8</sup>

Independence: Nothing but the highest possible standards of ethical performance and professionalism should influence regulation. However, independence does not imply isolation. All available facts and opinions must be sought openly from licensees and other interested members of the public. The many and possibly conflicting public interests involved must be considered. Final decisions must be based on objective, unbiased assessments of all information, and must be documented with reasons explicitly stated.

**CONTENTION TWO: The NRC Fails to Execute Constitutional Due Process and Equal Protection**

The Fifth Amendment to the US Constitution states, “No person shall...be deprived of life, liberty, or property, without due process of law.” The Fourteenth Amendment adds that the States may not, “deny to any person within its jurisdiction the equal protection of the laws.” In addition to the Atomic Energy Act, the National Environmental Policy Act and other statutes the Nuclear Regulatory Commission must certainly abide by the highest law in the land. However, the agency has violated these rights by applying inequitable standards of protection by treating different people differently and depriving them of Constitutional guarantees.

NRC regulations will not prevent these elevated levels of exposure. The limits for radiation dose to individual members of the public is 100 millirem, a dose which equates to an annual risk of 5 in 100,000 ( $5.0 \times 10^{-5}$ ) and a lifetime risk of 3.5 in 1,000 ( $3.5 \times 10^{-3}$ ). This means that 5 persons could die for every 100,000 members of the public exposed the plant’s ionizing radiation for a year; 3 to 4 persons per 1,000 could die if exposed over a

---

<sup>8</sup> NRC website at <http://www.nrc.gov/about-nrc/values.html>

lifetime. Table of Fatal Cancer Risk from Ionizing Radiation, NRC Below Regulatory Concern Policy, 22 June 1990

Unequal Protection Under the Law: Radioactive exposure standards do not protect all members of the public fairly.

The BEIR VII Committee published morbidity and mortality data in 2006 which show that children have a significantly higher risk of developing cancer from radiation than adults do and women have a higher risk of radiation-induced cancer than men do. BEIR VII found that a lifetime dose of one million person-rem results in a cancer incidence rate of 900 for men and 1370 for women; mortality rates for the same dose are 480 and 660 for men and women, respectively. See Richard R. Monson (Chair) et al. Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII – Phase 2. Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, Board on Radiation Effects Research, National Research Council of the National Academies. Washington, DC: National Academies Press, 2006, page 15.

Regulations limiting carcinogens in other federal agencies are set at much more protective levels. Equal protection under the law must mean that equal standards for protecting public health. The National Research Council published the following analysis:

“Rather than gear criteria to an analytic technique, the agency defined its standards in terms of risk. It proposed that any assay approved for controlling a carcinogenic drug must be capable of measuring residues that present more than an insignificant risk of cancer, and specified a  $10^{-6}$  lifetime risk of cancer as a quantitative criterion of insignificance.”

See *Risk Assessment in the Federal Government: Managing the Process*, Committee on the Institutional Means for Assessment of Public Health, Commission on Life Sciences, National Research Council (1983) ISBN 0-309-03349-7

In a Fourth Circuit Court decision challenging the Price Anderson Nuclear Industries Indemnity Act, plaintiffs raised *inter alia* the issue of due process. In 1978 the Supreme Court overturned the decision of the lower court. Justice John Paul Stevens concurred in the judgment but in a separate opinion said:

With some difficulty I can accept the proposition that federal subject-matter jurisdiction under 28 U.S.C. 1331 (1976 ed.) exists here, at least with respect to the suit against the Nuclear Regulatory Commission, the agency responsible for the administration of the Price-Anderson Act. The claim under federal law is to be found in the allegation that the Act, if enforced, will deprive the appellees of certain property rights, in violation of the Due Process Clause of the Fifth Amendment. One of those property rights, and perhaps the sole cognizable one, is a state-created right to recover full compensation for tort injuries. The Act impinges on that right by limiting recovery in major accidents. [438 U.S. 59, 95] ... But there never has been such an accident, and it is sheer speculation that one will ever occur. For this reason I think there is no present justiciable controversy, and that the appellees were without standing to initiate this litigation. (emphasis added)

Now, there has been such an accident. The Supreme Court decision occurred the year before the partial meltdown at Three Mile Island and the release of the eponymous “China Syndrome.” Justice Stevens continued:

The Court's opinion will serve the national interest in removing doubts concerning the constitutionality of the Price-Anderson Act. I cannot, therefore, criticize the statesmanship of the Court's decision to provide the country with an advisory opinion on an important subject. Nevertheless, my view of the proper function of this Court, or of any other federal court, in the structure of our Government is more limited. We are not statesmen; we are judges. When it is necessary to resolve a constitutional issue in the adjudication of an actual case or controversy, it is our duty to do so. But whenever we are persuaded by reasons

of expediency to engage in the business of giving legal advice, we chip away a part of the foundation of our independence and our strength.

Duke Power Co. v. Carolina Environmental Study Group, 438 U.S. 59 (1978)

Petitioners believe that after thirty years it is time to revisit the issues of due process, equal protection and “the business of giving legal advice.”

**Contention THREE: Plant Site Geology is not Suitable for Nuclear Reactors,**

**Geologic Issues Are Not Adequately Addressed**

Issue

Criteria for geologic criteria in NRC regulations must be met before a combined license may be issued. These criteria are necessary to prevent the construction and operation of nuclear reactors on unstable ground. Information provided by the license applicant must be comprehensive in order to eliminate specific hazards; these are listed in the relevant federal regulations. Failure to account for any of these factors would create potential risks to public safety and health or result in extended shut-downs with associated costs of alternative power to the electric ratepayer. These data are necessary for the Commission to make a sound decision.

Rule

Geologic and seismic criteria are found in 10 CFR § 100.23 and detail the requirements for determining whether a proposed site is acceptable for a nuclear power plant. The regulation unequivocally states the responsibilities of the license applicant for a COL:

Each applicant shall evaluate all siting factors and potential causes of failure, such as, the physical properties of the materials underlying the site, ground

disruption, and the effects of vibratory ground motion that may affect the design and operation of the proposed nuclear power plant.

10 CFR § 100.23 (d)(4) The site criteria include the following assessments: earthquake ground motion, surface tectonic and non-tectonic deformations, seismically induced floods and waves, soil and rock stability, liquefaction potential, slope stability, cooling water supply, and remote safety structure siting.

### Discussion

In its COLA, TVA does provide detailed information about the Bellefonte site's seismicity, tectonics and history of the area.

The Eastern Tennessee seismic zone (ETSZ) is a well defined, northeasterly trending belt of seismicity, 187-mi. long by less than 60-mi. wide, within the Valley and Ridge and Blue Ridge physiographic provinces of eastern Tennessee and parts of North Carolina, Georgia, and Alabama (References 283, 284, 285, and 286). This area, which lies within the 200-mi. radius, is one of the most active seismic regions in the eastern United States. The largest recorded earthquakes in this zone are the 1973 M 4.6 Maryville, Tennessee, earthquake (mb 4.6) (References 216 and 264) and the recent April 2003 M 4.6 Fort Payne earthquake that occurred in northeast Alabama near the Georgia border. [TVA COLA Part 2 FSAR Section 2.5.1.1.4.2.4.2]

The COLA does discuss the site's geologic features; however, according to local experts, the data provided by TVA are insufficient to describe the site. The COLA states:

The BLN site is underlain by limestone, a rock type that weathers primarily by dissolution. Dissolution features, also termed karst features, are common throughout northern Alabama wherever limestone bedrock occurs. Jackson County contains extensive cave systems and sinkhole plains. A total of 1,526 caves are reported in the county (Figure 2.5-303) (Reference 413). Investigations at the BLN site by TVA, both past and present, have not identified large-scale karst features (Reference 201). No natural sinkholes have been identified and no enterable caves have been located. Thick, pure limestones like the Tuscumbia, Monteagle, and Bangor Limestones that host large caverns elsewhere in Jackson County, do not occur at the site. Nevertheless, the underlying impure limestones of the Stones River Group are found to weather primarily by dissolution, and small-scale karst features are present. [TVA COLA Part 2 FSAR Section 2.5.4.1.3 Weathering Processes and Features]

The COLA is incorrect as we will demonstrate below.

### Caves

According to Thomas Moss, Director of the Alabama Cave Survey from 1994 to 2003, the 2007 Alabama Cave Survey database shows 58 caves within 5 miles of Bellefonte, and 1854 caves in Jackson County.

### Sinkholes

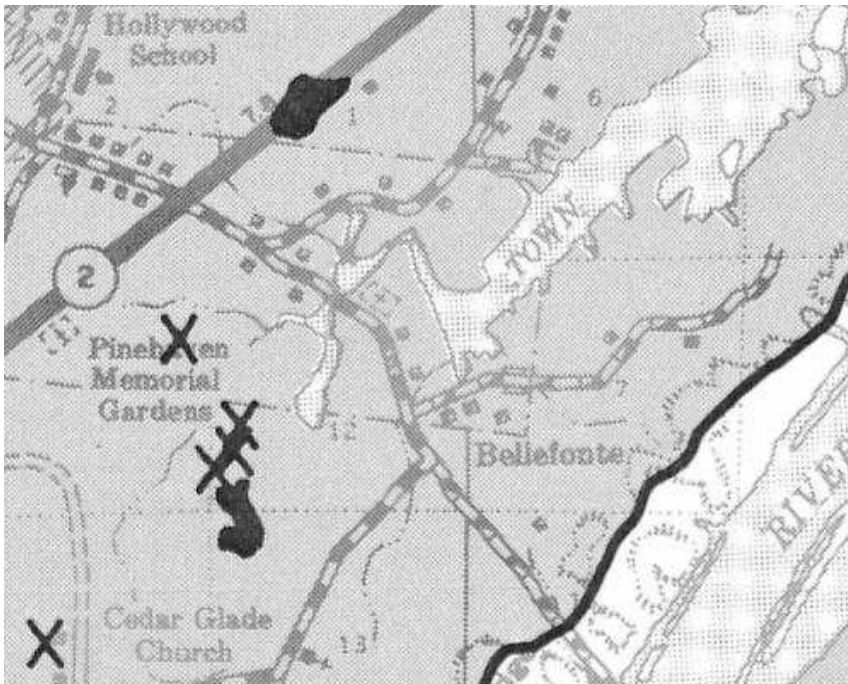
Sinkholes are a geological phenomenon. TVA's COLA reports no "natural" sinkholes but omits "induced" sinkholes, those produced by human activity. A report by the US Geological Survey<sup>9</sup> provides further information:

Sinkholes in Alabama are divided into two categories defined as "induced" and "natural." Induced sinkholes are those related to man's activities whereas natural sinkholes are not. Induced sinkholes are further divided into two types: those resulting from a decline in the water table due to ground-water withdrawals and those resulting from construction. Those resulting from a decline in the water table, the subject of this case history, far outnumber those resulting from all other causes. Information presented here consists of excerpts taken from five reports by the author. These reports, approved for publication by the Director, U.S. Geological Survey, are listed with the references cited in this case history. They resulted from investigations by the U.S. Geological Survey made in cooperation with the Geological Survey of Alabama and/or the Alabama Highway Department.

A 1977 USGS map entitled "Areas in which sinkholes have occurred or can occur in Jackson County, Alabama." The map shows 5 sinkholes to have occurred within two miles of the Bellefonte site and two very large sinkholes at close to the same elevation. Sinkholes may be seen on the topographic map below.

---

<sup>9</sup> Case History No. 9.11. Alabama, U.S.A., by J. G. Newton, U.S. Geological Survey, Tuscaloosa, Alabama



The above map <sup>10</sup> published by the University of Alabama Department of Geography shows sinkholes of two basic sizes: the “X” indicates sinkholes or depressions smaller than 1000 feet across and the irregular marks (two shown in this view) indicate sinkholes or depressions larger than 1000 feet across. According to Dr. Moss, these features are plainly within 1 to 2 miles of the proposed Bellefonte reactors.

### Seismicity

Regulatory Guide 1.208, “A Performance-Based Approach to Define the Site-Specific Earthquake Ground Motion,” states that “while the most recent characterization of any seismic source accepted by the U.S. Nuclear Regulatory Commission (NRC) staff can be used as a starting point for analysis of a new facility, any new information related

---

<sup>10</sup> University of Alabama Department of Geography  
<http://alabamamaps.ua.edu/historicalmaps/counties/jackson/jackson.html>.

to a seismic source that impacts the hazard calculations must be evaluated and incorporated into the probabilistic seismic hazard analysis (PSHA) as appropriate based on the technical information available."

The Bellefonte combined license (COL) site is near the Eastern Tennessee Seismic Zone, which is considered to be one of the most active seismic areas east of the Rocky Mountains. Recent studies have indicated that this seismic zone may have the potential to produce large magnitude earthquakes.

In the Bellefonte COL application, the applicant has not updated the Eastern Tennessee Seismic Zone source models from the 1986 Electric Power Research Institute Seismicity Owners Group (EPRI/SOG) report, although new information on the seismic hazard for the area exists. The staff is concerned that the EPRI/SOG seismic source models for the region may not adequately characterize the potential for larger earthquakes. This concern is due to the low weights for larger earthquakes and low probabilities of activity for the seismic sources assigned by some of the EPRI/SOG expert teams in the mid-1980s.

Section 2.5.2.4.1.3 of the Bellefonte COL application discusses the adequacy of the EPRI-SOG source models based only on the maximum magnitude parameter. Figure 2.5-250 in the application clearly shows that more recent studies place a significantly higher probability on larger maximum magnitude earthquakes. In addition to maximum magnitude, there are several other variables, such as probability of activity, source location, and recurrence that contribute to the overall seismic hazard for the site. The application does not adequately address the effect of the other parameters from these

newer studies on the Bellefonte PSHA. The application does not currently include detailed numerical comparisons of the EPRI-SOG hazard and the newer studies.

The Eastern Tennessee seismic zone, which extends from south west Virginia to north east Alabama, is one of the most active earthquake areas in the Southeast.

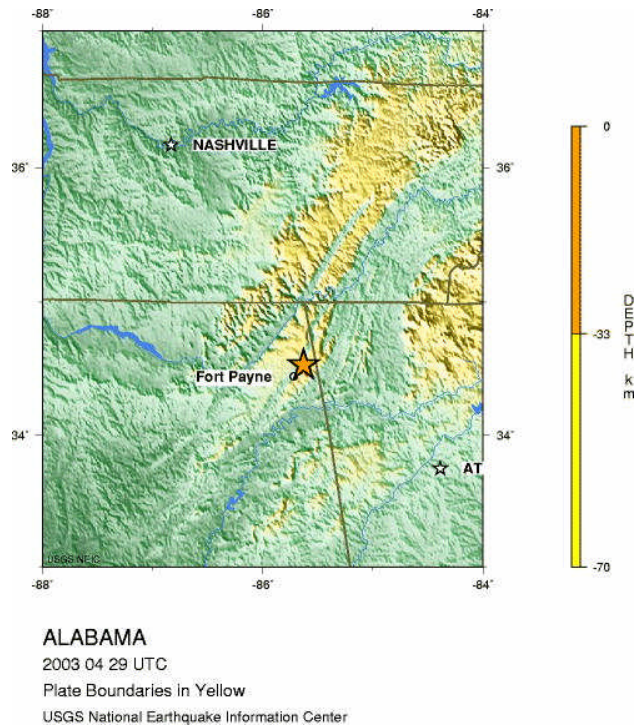
Recent large earthquakes within seismic zone include a magnitude 4.6 that occurred in 1973 near Knoxville and the Fort Payne Earthquake, also a magnitude 4.6 that occurred in 2003, 50 miles ESE of Scottsboro, Alabama.

The Fort Payne quake was not an isolated event. It was the largest earthquake in the largest and second most active seismic zone in the eastern United States: the East Tennessee Seismic Zone. The earthquake was deep enough to suppress significant damage in Fort Payne, the closest community, although this 4.6 magnitude event damaged weaker chimneys and formed cracks in some structures. The community now has many concerns related to this event. A top concern is the community's ability to cope with the potential occurrence of a larger earthquake when the magnitude 4.6 event raised concerns about the impact on essential services like water supplies and potential landslides on nearby mountain slopes.

#### Fort Payne Earthquake Epicenter <sup>11</sup>

---

<sup>11</sup> Map retrieved from Wikipedia April 7, 2008 at [http://en.wikipedia.org/wiki/2003\\_Alabama\\_earthquake](http://en.wikipedia.org/wiki/2003_Alabama_earthquake)



The northeastern part of Alabama is in the Southern Appalachian/East Tennessee Seismic Zone. Earthquakes are common in this area. In recent years there have been numerous small earthquakes in the immediate vicinity of the April 29, 2003 quake. This is the largest earthquake known to have occurred in the East Tennessee Seismic Zone historically and is one of the largest earthquakes known to have occurred anywhere in the southern Appalachians.

Scientific uncertainty exists about the scale of the fault underlying the East TN seismic zone. No active faults are known to reach the surface in the region, although the area is laced with ancient faults that developed as the Appalachian Mountains formed several hundred million years ago. Faults that are mapped at the surface are poorly located at earthquake depths. Accordingly, few, if any, earthquakes in the eastern Tennessee seismic zone can be linked to known faults, and it is difficult to determine if a

specific fault could still slip and cause an earthquake. If a fault lies under the Valley and Ridge region of Southern Appalachia, then the possibility of an earthquake with a magnitude of 5.0 and higher is possible. An earthquake with a magnitude of 5.0 would cause serious damage to a nuclear plant.

#### Conclusion

The combined license application submitted by TVA fails to contain relevant information about geology and seismicity at the proposed Bellefonte site.

### **CONTENTION FOUR. FAILURE TO ADDRESS IMPACT OF TERRORIST ATTACKS**

Before September 11, 2001, the NRC had a policy of refusing to consider the environmental impacts of terrorist attacks in EISs because they are not “reasonably foreseeable.” See LBP-01-35, 54 NRC at 446, quoting *Limerick Ecology Action v. NRC*, 869 F.2d 719, 729 (3<sup>rd</sup> Cir. 1989). But the devastating terrorist attacks on the World Trade Center and the Pentagon showed the policy was no longer viable:

Regardless of how foreseeable terrorist attacks that could cause a beyond-design-basis accident were prior to the terrorist attacks of September 11, 2001, involving the deliberate crash of hijacked jumbo jets into the twin towers of the World Trade Center in New York City and the Pentagon in the Nation’s capital, killing thousands of people, it can no longer be argued that terrorist attacks of heretofore unimagined scope and sophistication against previously unimaginable targets are not reasonably foreseeable. Indeed, the very fact that these terrorist attacks occurred demonstrates that massive and destructive terrorist acts can and do occur and closes the door, at least for the immediate future, on qualitative arguments that such terrorist attacks are always remote and speculative and not reasonably foreseeable.

LBP-01-35, 54 NRC at 446

The NRC has been given new authority in this area, authority which it should use. In 2004, pursuant to a Presidential Directive, the US Department of Homeland Security (“DHS”) delegated to the NRC certain responsibilities in the event of a nuclear or radiological terrorist incident. These include the provision of technical assistance for source term estimation, plume dispersion, and dose assessment calculations. The DHS has developed a National Response Plan to anticipate threats.

In Homeland Security Presidential Directive (HSPD)-5, the President directed the development of a new National Response Plan (NRP) to align Federal coordination structures, capabilities, and resources into a unified, all-discipline, and all-hazards approach to domestic incident management. This approach is unique and far reaching in that it, for the first time, eliminates critical seams and ties together a complete spectrum of incident management activities to include the prevention of, preparedness for, response to, and recovery from terrorism, major natural disasters, and other major emergencies.<sup>12</sup>

The National Response Plan<sup>13</sup> incorporates emergency management, law enforcement, firefighting, public works, public health, emergency medical services, and other elements to manage domestic incidents. Its protocols:

- Save lives and protect the health and safety of the public, responders, and recovery workers;
- Ensure security of the homeland;
- Prevent an imminent incident, including acts of terrorism, from occurring;
- Protect and restore critical infrastructure and key resources;
- Conduct law enforcement investigations to resolve the incident, apprehend the perpetrators, and collect and preserve evidence for prosecution and/or attribution;
- Protect property and mitigate damages and impacts to individuals, communities, and the environment; and
- Facilitate recovery of individuals, families, businesses, governments, and the environment.

---

<sup>12</sup> Tom Ridge, Secretary DHS, Preface to National Response Plan, December 2004

<sup>13</sup> Federal Radiological Monitoring and Assessment Center (FRMAC) website at [http://www.dhs.gov/xprepresp/committees/editorial\\_0566.shtm](http://www.dhs.gov/xprepresp/committees/editorial_0566.shtm), 7 May 2007

Actions taken by the NRC indicate that the agency may now believe terrorist attacks on nuclear facilities are reasonably foreseeable. See *San Luis Obispo Mothers for Peace v. NRC*, 449 F.3d 1016, 1030-31 (9<sup>th</sup> Cir. 2006), cert. denied, 127 S.Ct. 1124 (2007) (“*Mothers for Peace*”). In light of these actions, the NRC no longer has a reasonable basis to claim that the environmental impacts of terrorist attacks need not be considered.

In several post-9/11 decisions the Commission announced that, as a matter of law, it would never consider the environmental impacts of terrorist attacks in its licensing decisions. See, for example, *Pacific Gas and Electric Co.* (Diablo Canyon Independent Spent Fuel Storage Installation), CLI-03-01, 57 NRC 1 (2003); *Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-02-25, 56 NRC 340 (2002). But the Ninth Circuit found the NRC’s position to be unreasonable in every respect in the *Mothers for Peace* decision. The Commission announced it will disregard the Ninth Circuit’s decision in any other location but the Ninth Circuit. (License Renewal Proceeding for Oyster Creek Nuclear Generating Station, Amergen Energy Company, L.L.C CLI-07-08 (February 26, 2006)

Petitioners respectfully submit that the Commission’s policy is unreasonable. For all the same reasons given by the Ninth Circuit in *Mothers for Peace*, Petitioners ask the Commission to admit this contention.

**CONTENTION FIVE: The assumption and assertion that uranium fuel is a reliable source of energy is not supported in the combined operating license application submitted by TVA (the applicant) to the U.S. Nuclear Regulatory Commission**

Issue

TVA fails to discuss the matter of reliability of uranium fuel supply in the COL when asserting that building new nuclear power reactors is a means of achieving a reliable and cost-effective supply of electricity. Federal regulations require an assessment of related fuel cycle costs. 10 CFR § 50.33 (f) The related cost ratio of the power from a power plant that has no fuel is effectively infinite.

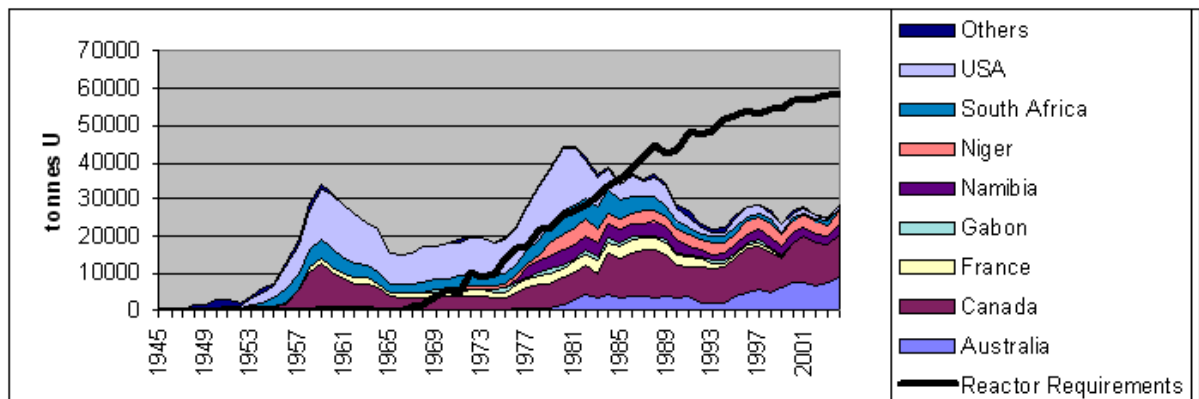
Worldwide uranium consumption (about 67,000 tonnes<sup>14</sup> per year) has exceeded worldwide uranium production for some time. Only about 60% of consumption is currently supplied by annual production;<sup>15</sup> further, actual production of uranium has been effectively level for the last twenty years, as can be seen in the graph below from the World Nuclear Association.<sup>16</sup>

---

<sup>14</sup> World Nuclear Association backgrounder on Uranium Supply posted at: <http://www.world-nuclear.org/info/inf75.html?terms=uranium+supply>

<sup>15</sup> The same authority quotes the production of uranium from mines as being 40,251 tonnes for 2004; 41,702 tonnes for 2005 and 39,429 tonnes for 2006. This leaves a shortfall of uranium to fuel the existing reactors of about 26,000 tonnes. This shortage is being made up by consuming former stockpiles, reprocessing of nuclear weapons uranium, longer reactor cycles and more efficient enrichment processes. The former stockpiles and weapons reprocessing are short term stopgaps and are failing fast.

<sup>16</sup> See World Nuclear Association graph posted at <http://www.world-nuclear.org/info/inf23.html>.



While there are various short-term supplies of uranium such as down-blending from nuclear weapons inventories, none of these are projected to last indefinitely. It is incumbent upon the applicant to address these issues and to support the statements cited below which imply that uranium availability will be sufficient to service the existing worldwide fleet of nuclear power reactors over the current periods of license, and in addition, the proposed Bellefonte 3 & 4.<sup>17</sup>

If there is a plan to address the failure of uranium supply during the license period for Bellefonte 3 & 4 with a substitution of plutonium fuel (MOX or mixed-oxide), this information is also missing from the COL application as filed by the applicant, TVA.

Citations within the COLA that are examples of where the applicant fails to address these issues:

- Tech Specs: Technical Specifications Bases – background on core reactivity assumes that uranium at appropriate level of enrichment will be fuel.

- COLA ER Page 8.2-5 TVA asserts that the region has a history of “reliable, inexpensive electricity”...and explains that it is using a “least-cost approach to generation reliability” while assuming that fuel is available.
- COLA ER Page 8.4-1 Further, a generation reliability model is used to determine the planning reserves needed to maintain the reliability of the power system over the forecast period. Assumes availability of fuel.
- COLA ER 9.2-1 The discussion frames the whole matter of energy planning in terms of reliability. No mention is made of the reliability of uranium as a fuel base.
- COLA ER 9.3-1 States: *“As part of its function as an independent, multipurpose federal corporation established under the TVA Act, TVA provides reliable, low-cost electricity throughout its power service area.”* It is incumbent upon the applicant to support the assumption that the current application is for an energy source that will be reliable.

There are numerous other examples of these assertions and assumptions throughout the COL. Nowhere in the COL does the applicant support these assertions.

**CONTENTION SIX: WHETHER BELLEFONTE WILL ADEQUATELY LIMIT ATMOSPHERIC EMISSIONS OF RADIONUCLIDES**

The License Application submitted by TVA fails to meet the relevant requirements in the National Environmental Policy Act because it will not adequately address pollution impacts and require controls necessary to limit hazardous air pollution necessary for the protection of public health and safety.

### Issue

Radionuclide emissions to the atmosphere are regulated as hazardous air pollutants under Title III of the federal Clean Air Act. National Emission Standards for Hazardous Air Pollutants (NESHAP) are subject to maximum achievable control technology standards (MACT). Specifically, the Bellefonte units as proposed by TVA will not meet Clean Air Act standards because: 1) without maximum achievable control technology, routine emissions from the plant would be excessive especially when considered in addition to the existing site-wide radioactive emission levels and 2) the company does not properly account for the higher levels of morbidity and mortality in females and infants caused by low levels of radiation. The question is: Will the Bellefonte reactors meet national emission standards for radionuclides?

### Rule

Enforcement of the Clean Air Act regulations related to nuclear power plants are delegated to the NRC. Radionuclides are listed as hazardous air pollutants in Section 112 of the Clean Air Act Amendments of 1977 (Public Law 95-95). NRC-licensed facilities must meet requirements of the Clean Air Act [40 CFR Part 61] which limit radionuclide emissions to the atmosphere.

### Discussion

The goal of the radionuclide emission standard is to limit the lifetime risk of induced fatal cancer to a maximally exposed individual to approximately one in 10,000. The implementing regulations translate this into a maximum individual exposure of 10 millirem/year for airborne emissions that result in exposure through any environmental

pathway. 10 CFR § 50 Appx. I This translates into a risk of 5.6 excess fatal cancers/10,000 people. BEIR V, Table 4-2, pp. 172-173. The US EPA develops standards for industries which are major emitters of hazardous air pollutants (HAP) that require the application of controls, known as maximum achievable control technology (MACT). However, no MACT has been issued for radionuclides.

HEPA Filter Unreliability Allows Excess Radionuclide Risks.

According to the TVA COLA [citation], air pollutants are controlled by the heating, ventilation, and air conditioning (HVAC) system and a ventilation system that removes radionuclides and other hazardous materials from gaseous emissions. Airborne pollutants are routed through the HVAC system and ventilation exhaust passes through high-efficiency particulate air (HEPA) filters. But according to Dr. Peter Rickards, a former member of the Centers for Disease Control Advisory Panel on the Idaho National Laboratory (INEEL), HEPA filters are an unreliable means of controlling radionuclide emissions. The HEPA filter's failures include alpha migration, re-entrainment of particles, and alpha recoil through multiple filters. Alpha emitters in nuclear fuel include uranium and plutonium.

“Alpha recoil” is a DOE term, for the ability of alpha emitters, like plutonium, to “creep” through 4 HEPA filters in a row! Nobody knows how much plutonium comes out of the last filter. We need to make the DOE reveal the plutonium releases for normal operations, in a lab. The DOE has known of this problem since the 1970's, but has chosen to ignore it. (Letter from Dr. Peter Rickards to US DOE, November 22, 2002) (Attachment A)

We question the validity of emission reduction efficiencies of HEPA pollution control devices for all atmospheric emission points at Bellefonte. NRC cannot assure that the Bellefonte will meet NESHAP radionuclide emissions limits.

### Conclusion

Until a health protective measure is in place under Section 112, the NRC must determine the control technology before issuing an operating license. Clean Air Act Section 112 <http://www.epa.gov/ttn/atw/112g/112gpg.html>

### **CONTENTION SEVEN: Excessive Water Use Contrary to TVA's Purpose**

#### Issue

Thermoelectric stations require large amounts of water. Nuclear reactors need water for steam condensation, service water, emergency core cooling system, and other functions. Nuclear power plant cooling systems discharge large amounts of heated water into the lake or river, water which often contains radioactivity. Such releases are controlled and monitored; therefore, it is by design and not by accident.<sup>18</sup>

#### Rule

NRC guidance on water availability states, "Where required by law, demonstration of a request for certification of the rights to withdraw or consume water and an indication that the request is consistent with appropriate State and regional

---

<sup>18</sup> *Got Water?* David Lochbaum, Union of Concerned Scientists Issue Brief, December 4, 2007

programs and policies is to be provided as part of the application for a construction permit or operating license.”<sup>19</sup>

### Discussion

The TVA COLA presents an overly optimistic assessment of water use in the Tennessee River Basin. For example, COLA Part 3 ER Section 2.3.2.4 cites Table 2.3-34 “Projected Water Use for the Year 2030 in the Tennessee River Watershed” on page 2.3-109. The table lists the “increase percentage” with the largest increase (56%) as a result of increased public water supply withdrawal. However, current water withdrawal for public supply is just 5% of all basinwide water use (Table 2.3-24). The COLA ER (Section 2.3.2.2.4) states Bellefonte Units 3 and 4 will withdraw 71,021,664 gallons per day. Compared to local surface water users (Table 2.3-31), Bellefonte would dwarf by an order of magnitude all other water users in the Guntersville Watershed save one: the Widows Creek Fossil Plant, also operated by TVA.

According to TVA’s annual report, “the Tennessee Valley continued to experience drought conditions in 2007, which was the driest year in 118 years of record-keeping.”<sup>20</sup> TVA was able to keep its operations afloat by implementing its 2004 Reservoir Operations Policy which provides “river flows to protect aquatic life, keep commercial navigation channels open, provide sufficient water supply, and support power operations.”<sup>21</sup> However, this finger-in-the-dike approach will be undermined if TVA continues to build more nuclear powered electric generating plants.

---

<sup>19</sup> Regulatory Guide 4.7 - General Site Suitability Criteria for Nuclear Power, (Draft issued as DG-4004) Revision 2, April 1998

<sup>20</sup> TVA Annual Report 2007, [http://www.tva.gov/finance/reports/pdf/tva2007\\_annual\\_report.pdf](http://www.tva.gov/finance/reports/pdf/tva2007_annual_report.pdf)

<sup>21</sup> TVA Annual Report 2007, [http://www.tva.gov/finance/reports/pdf/tva2007\\_annual\\_report.pdf](http://www.tva.gov/finance/reports/pdf/tva2007_annual_report.pdf)

Last year drought forced a partial shutdown of TVA's nuclear plant at Browns Ferry, Alabama because of overheated water in the Tennessee River. Unit 2 was shut down completely, and Units 1 and 3 were reduced to 75 percent capacity. Three years ago TVA itself predicted that operations at Browns Ferry would have to be scaled back and could be completely shut down because of overheated discharge water

### Conclusion

In 2007, reduced rainfall in the Southeast began to have a noticeable effect on electric power plants. Lakes are approaching the minimum levels required by the Nuclear Regulatory Commission in the drought-stricken southeastern states. At this time, the dedication of water supply to Bellefonte 3 and 4 is ill-advised, imprudent, wasteful and contrary to the principal purposes for which the Tennessee Valley Authority was created in 1933: that is, river navigability, flood control and agricultural and industrial development. 16 USC 831 Although the Tennessee Valley Authority Act did sanction the production of electric power, it was incidental; electric power was to be provided consistent with flood control and navigation and largely for the purpose of fertilizer manufacture.

### **CONTENTION EIGHT: Impacts on Aquatic Resources Including Fish, Benthic Invertebrates, and General Aquatic Community Structure of the Project Area, Guntersville Reservoir, and the Tennessee River Basin.**

#### Issue

The ER does not adequately address the adverse impacts of operating two additional nuclear reactors on the fishery and aquatic resources of the Tennessee River

basin, Guntersville Reservoir, and the vicinity of Bellefonte Nuclear Plant. In particular, the ER does not provide adequate data to sufficiently address: (1) The condition of resident and potadromous fish and freshwater mussels in the vicinity of the proposed intake and discharge points, Town Creek, Guntersville Reservoir, and Tennessee River basin; (2) Aquatic habitat conditions and flow/habitat relationships in both the project area, as well as in the lower-, middle-, and upper-Tennessee River; and (3) Cumulative impacts on aquatic resources from construction and operation of the proposed new intake and discharge.

#### Basis

Every application for a NRC permit, including a COL, must be accompanied by an Environmental Report, which shall discuss: (1) The impacts of the proposed action; (2) Adverse environmental effects that cannot be avoided; (3) Alternatives to the proposed action; (4) The relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and (5) Any irreversible and irretrievable of resources associated with the proposed action. 10 C.F.R. § 51.45(b)(c). The ER "should contain sufficient data to aid the Commission in its development of an independent analysis" of environmental impacts pursuant to the National Environment Policy Act (NEPA). 10 C.F.R. § 51.45(b).

#### Discussion

The ER concludes that impacts to aquatic resources including fish and mussels are small or non-existent, and do not warrant mitigation. This conclusion is based only on a general list of the Tennessee River fish and mussel species found in Guntersville

Reservoir and does not include an accurate site-specific description of the fish species and their respective life history stages that utilize the reach of the Tennessee River adjacent to Plant Bellefonte where the new intake and discharge structures are proposed. ER § 2.3. The ER relies on studies by TVA that collected data in the vicinity of Plant Bellefonte during original construction and from the fossil-fuel plant up-reservoir, Widow's Creek; however, these studies do not assess the current conditions of the Tennessee River at the proposed intake and discharge sites.

The ER acknowledges that there will be impacts to the upper-Tennessee River aquatic resources because upstream reservoirs will bear the burden of downstream water withdrawal. ER § 2.3.1.2.6 (p. 2.3-10). The ER acknowledges upstream management may also affect BLN operations that then may differentially affect aquatic resources. ER § 2.3.1.3.6 (p. 2.3-18). Additionally, the ER acknowledges that impoundments can significantly affect or be affected by BLN plant operations. ER § 2.3.1.3 (p. 2.3-14). Yet there is no discussion of how these impoundments can significantly affect or be affected by BLN operations beyond stating general descriptions and that the Guntersville Reservoir does not fluctuate more than 2 ft annually. This statement acknowledges significant effects on downstream aquatic resources. Further, TVA's overall conclusion that, "Operations of these dams are not expected to have a direct effect on water quality in the vicinity of the BLN," is inconsistent with statements acknowledged in the ER as summarized above and is therefore erroneous. ER § 2.3.3.4.3 (p. 2.3-48). If these impoundments can affect operation of BLN then their operation most certainly affects

water quality in the vicinity of BLN. Given the profound ramifications of these statements, surely elaboration, investigation, analysis, and discussion are warranted.

The Tennessee River Basin as a whole is considered to be the single most biologically diverse river system for aquatic organisms in the United States, and harbors the highest number of imperiled species of any large river basin in North America with 57 fish species and 47 mussel species considered to be “at-risk” (Master et al. 1998). The Tennessee River supports at least 205 fish species representing 29 families (Etnier and Starnes 1993; Simon and Wallus 2006) including 32 fish species that are found only in the Tennessee River (Simon and Wallus 2006). Just in the upper-basin, 15 fish species are federally listed as endangered or threatened and 50 species are listed under management categories used by four states (Hampson et al. 2000). Within Guntersville Reservoir alone, there has been a 44% decline of freshwater fish captured in TVA sampling since 1994. ER § 2.4.2.4. Of the fish species no longer found in the Guntersville reservoir including, paddlefish, American eel, river carpsucker, quillback carpsucker, highfin carpsucker, silver redhorse, and river redhorse that are migratory species adversely affected by habitat alteration, blocking migration, destroying spawning habitats, altering flow-regimes and by disruption of life history stages by altered flow-regimes and impingement and entrainment of eggs, larvae, and juveniles at power-plants (Pflieger 1975; Hubert et al. 1984; Etnier and Starnes 1993; Rohde et al. 1994). Also, numerous darters and shiner species disappeared from the fish assemblage. These fish species are known to be intolerant of habitat alteration and poor water quality (Angermeier 1995). Further, pre-1960 mussel surveys found 89 species in the lower

Tennessee River Basin, and 94 species of freshwater mussels in the upper Tennessee River (Starnes and Bogan 1988; Vaughan 1997). Since 1960, a 14% decline of mussel species in the lower basin and a 36% in the upper basin has been reported (Starnes and Bogan 1988; Vaughan 1997). In the upper-Tennessee River alone, 30 mussel species are under Federal protection and 52 species are listed for protection by four states (Hampson et al. 2000). In the Guntersville Reservoir section, 14 species of mussel are considered threatened or endangered by the Alabama Department of Conservation and Natural Resources.

The ER does not include recent fish survey data from the Tennessee River adjacent to the Bellefonte site or the specific intake and discharge locations, including discharges into Town Creek. Thus, the ER fails to identify the current temporal and spatial adult fish assemblage and the early life history stages, i.e. ichthyoplankton, in the project area. Similarly, the ER contains no data concerning upstream and downstream migration of potadromous species in this section of the Tennessee River or their habitat utilization within the project area. Likewise, the ER does not address specific temporal and spatial habitat selection and utilization by resident and potadromous fish in the project area. Nor does the ER examine flow-habitat relationships and the potential impacts of the project on habitat availability. Thus, the ER fails to establish a baseline to assess the impacts of the project.

The ER fails to identify and consider direct impacts of the proposed intake structure on aquatic resources including fish and mussels. The ER does not estimate the level of mortality from fish impingement and entrainment in the new intake structure.

Instead, the ER mistakenly relies on the performance standards for cooling water intake structures adopted by EPA pursuant to section 316(b) of the Clean Water Act, 40 C.F.R. § 125.94, as a proxy for calculating the impacts of the intake structure. ER § 5.3.1.1.1. Even if the new intake structure complies with the “best available technology” mandate of the CWA, 33 U.S.C. § 1326(b), the intake structure may still have significant impacts on fishery resources that must be addressed in the ER. 10 C.F.R. 51.45(b).

Additionally, the ER does not adequately address the cumulative impacts on aquatic resources of the new intake structure. Recent and proper sampling at the intake and discharge structures did not occur, and in fact, the ER incorrectly concluded that sampling was “not warranted.” ER § 5.3.1.2.1.

Thus, the ER fails to provide a meaningful basis to evaluate the cumulative impacts of the intake structures on aquatic species. There is no data to determine potential rate of entrainment and impingement for any of the fish species that may inhabit the Tennessee River. In addition, the ER does not adequately describe the design of the existing intake structure or whether it meets current standards for intake velocity or screen mesh size. In fact, the discussion of cumulative impacts associated with the cooling water intake structure does not consider impacts on aquatic species because flawed assumptions led to conclusions of small or no impact and additionally, that no study is warranted.

Finally, the ER does not identify and analyze direct or cumulative impacts on aquatic species resulting from effluent discharges to the Tennessee River, Gunter'sville Reservoir, or Town Creek. No data on temporal or spatial distribution of

ichthyoplankton and the drift community in the vicinity of the discharge structure and thermal plume was presented or available to evaluate potential impacts. Further, a molluskicide will be used as a water treatment chemical and will be discharged into mussel habitat yet the ER does not mention its effects on freshwater mussel or what concentration will be in the discharge plume(s). ER § 5.2.2.2.1.

**CONTENTION NINE: Alternatives to the Proposed Action Lacking**

TVA states, "The options considered as alternative to this proposal are consistent with and bounded by the suite of actions included in TVA's comprehensive analysis of energy supply options to meet anticipated need for power in the power service area of TVA through the year 2020. IRP- Energy Vision 2020 EIS was developed to provide TVA's roadmap or guide for addressing those energy needs with a flexible energy supply plan.

"TVA's preferred option identified in that Final EIS was a portfolio of options drawn from the seven key strategy alternatives. The IRP has provided TVA with a flexible energy supply plan that has subsequently helped guide the strategic actions necessary for TVA to develop needed capacity and to serve its customers efficiently in providing reliable power in the TVA Power Service Area."

In reality, TVA in its pursuit for additional nuclear capacity ignores the letter and spirit of the IRP. The TVA claims to have "updated" the IRP, but TVA has not responded to requests for a copy of that update. The IRP - Energy Vision 2020 summarizes the options that the involved stakeholders preferred:

"Energy Vision 2020 identified a viable mix of conservation programs and options for power plant operations that will be used to responsibly and economically provide energy for sustainable economic growth. For all resource options, the environmental consequences and economic impacts were considered as part of TVA's effort to encourage sustainable economic growth in the region. Strong public support for various options, such as demand-side management, also was considered. Overall the key recommendations of Energy Vision 2020 are:

- Invest in up to 3,000 megawatts of flexible purchases of power
- Convert Bellefonte to an alternative fuel source such as natural gas or coal
- Implement up to 1,450 megawatts of energy efficiency and load management
- Research and develop renewable energy resources - wind, biomass, solar photovoltaics

Additional recommendations, which the TVA Board of Directors has asked the staff to include, are:

- Begin additional flexible demand-side management programs with a potential of 750 megawatts
- Investigate the development of a flexible wind project, a biomass refinery, and a combined garbage and biomass energy facility"

TVA, through its multiple references to Energy Vision 2020 has spun the illusion that this request comes out of an extensive stakeholder involvement process. This is not the case. Upon examination of this document, the NRC will find that the people of the TN Valley want a very different energy future than the one envisioned by TVA.

### Demand Side Management [COLA 9.2.1.3]

TVA states, "In May 2007, TVA's Board of Directors approved a new Strategic Plan. The current-day priorities for the portion of TVA's mission related to energy production focus on improving reliability, managing demand, and reducing environmental impacts. In partnership with customers and others, TVA's new strategic direction includes enhancing efforts to improve energy-efficiency, energy conservation and peak demand reduction over the next five years. Specific targets and elements to implement these efforts are under development. As the goals and program unfold over the next few years, the anticipated reduction in peak demand will be reflected in power supply planning for the TVA system. These enhanced efforts are expected to reduce some of the forecasted demand on the TVA system. These reductions should occur primarily in peak demand, but could have some affect on the demand for baseload, which would be taken into account in future planning for the BLN. What can be and is actually achieved by enhanced efforts remains to be determined. DSM forecasts are current as of February 2007 and do not include changes that may result from TVA's 2007 Strategic Plan approved May 31, 2007." TVA does not even attempt to project a reasonable DSM forecast. This is clearly an inadequate analysis.

### **CONTENTION TEN: TVA's Power and Energy Requirements Forecast Fails to**

#### **Evaluate Alternatives**

##### Issue

The Environmental Report does not adequately evaluate alternatives, including the no-action alternative and does not include any adverse information.

Issue-The issue is whether the Applicant has justified TVA's need for power.

Establishing the need for the power plant is key to developing an EIS for the project and its alternatives. NRC must perform (1) a detailed analysis and evaluation of the applicant's power projections and (2) an independent assessment of forecasts of growth in electricity consumption and peakload demand in the utility's service area. [ESRP 8.2.1]

### Rule

The national Environmental Policy Act requires NRC to evaluate a range of reasonable alternatives and their impacts. See 10 CFR § 51.45. Under this rule, the "no action" alternative must also be considered. Pursuant to § 51.45 (e), the Environmental Report "should not be confined to information supporting the proposed action but should also include adverse information."

### Discussion

The Environmental Report submitted by TVA addresses the no-action alternative in the following manner:

The first option, doing nothing to satisfy the demand for power, is not reasonable. TVA would not be able to maintain an adequate reserve margin, would fail in its public service obligations to provide sufficient power within its service territory, and would jeopardize its commitment to provide capacity to other electric suppliers within Southeastern Electric Reliability Corporation (SERC) by not maintaining an adequate reserve margin.

COLA Part 3 ER 9.1, page 9.1-1.

### Conclusion

For energy supply, negative alternatives include efficiencies and demand-side management which will allow TVA to abandon the nuclear option at Bellefonte. Positive alternatives to nuclear power include solar, wind and other renewable sources of energy.

**CONTENTION ELEVEN: TVA'S COLA POWER DEMAND FORECAST FAILS TO JUSTIFY NEED FOR NEW NUCLEAR REACTORS**

Power and Energy Requirements

COLA 8.2 Power Demand; 8.2.1 Power and Energy Requirements; 8.2.1.1 Methodology

TVA states, "Economic growth is the single most important driver of electricity sales." TVA's long-term forecasts reflect a range of economic growth scenarios varying from 3.6% to 2.7% growth in GRP. However, TVA does not include scenarios for the following economic conditions:

- Growth in ranges from 0.1% to 2.7%.
- Recessionary economic conditions (less than 0% growth in GRP)
- Economic impacts of continuing oil and coal price increases .
- High inflation. In 2007, inflation increased 4.1%, the highest in 17years.

We are currently in or near a recession, the duration of which is unknown. The cost of oil has passed \$120 per barrel and continues to rise. These factors are reshaping global economics, but TVA has not addressed their potential impacts within its service area in any of its forecast scenarios.

TVA states, "Little long-term growth is forecast for current direct-served customers. New industrial customers are assumed to be served by distributors. The most rapidly growing segments of the economy are industries for which large, single installations are not common."

- TVA has not provided an analysis of potential economic scenarios in which its major industrial customers have to reduce or even cease their operation due to changing global factors. TVA's largest direct-served customers are auto assembly plants and aluminum processors.
- Limited and / or diminishing supplies of oil cause oil's price to increase to levels prohibitive for use of private automobiles. In 2007, autoplant output fell by 4.1%. It is a possible scenario that the autoplants in the service area will continue to decrease their production.
- Exhaustion of the supplies of bauxite and the rising price of electricity within the US may cause the aluminum industry to move offshore.

TVA does not provide an adequate analysis of competitive prices within the region. TVA's rates are now equal or comparable to surrounding wholesale power providers.

TVA's wholesale price is no longer competitive. Energy intensive industrial customers will locate in regions with lower energy costs and less price volatility.

- TVA's price will continue to rise as TVA struggles to remain solvent by increasing rates to pay off its large debt.
- TVA as of April 1, 2008 has increased its rates by 12%.

TVA states, "The real price of electricity is forecast to decline in region forecast through end of forecast. Decline in price reinforces higher than average use of electricity."

- TVA does not account for the long term rise of fuel prices.

- TVA does not account for Congressionally mandated carbon tariffs.
- TVA does not account for its need to increase the cost of power to recover its existing \$25 billion debt and the additional accrued debt for its nuclear renaissance.

#### Forecasts of Energy, Capacity, and Load Factors [COLA 8.2.1.2]

TVA is addressing its decreasing system load factor by increasing its base load capacity rather than reducing its peak demand. TVA's peak growth rate is greater than net system growth rate. Instead of using demand response strategies to improve its system load factor, TVA wants to solve its load factor using baseload capacity. The residential peaks are best addressed through energy efficiency and demand response strategies, all of which have been ignored by TVA in these projections. As emphasized by the NRC in its standard review plan, "*The primary benefit of a new nuclear plant is the large quantity of baseload power it can provide. Consequently, analyses of need should focus primarily on energy, rather than peak demand requirements.*"

TVA does not present analysis of perimeter estimates to determine the degree to which they agree with other estimates that are generally available for the region:

- Price of electricity and elasticity of demand.
- Energy efficiency and energy substitution including on-site power production from renewables, combined heat and power, and other distributive technologies.
- Demand scenarios for conditions that incorporate consumer response to power cost changes as new power plants are integrated into the power system

#### Factors Affecting Growth of Demand

[COLA 8.2.2; 8.2.2.1 Economic and Demographic Trends]

### Economic

TVA states that regional growth has historically outpaced national growth because manufacturing product has grown at a faster pace than non-manufacturing product. TVA projects that manufacturing will continue to decline in the region and the low-end service sector will grow. During the forecast period (2007-22), TVA projects that the average GRP growth (2.8%) will be less than the projected national GDP growth (3.1%).

- The Energy Information Administration's *AEO2008* reference case reflects reduced expectations for economic growth. In the *AEO2008* reference case, U.S. gross domestic product (GDP) grows at an average annual rate of 2.6 percent from 2006 to 2030. As TVA's projections are not in line with the *AEO2008* reference case, it must revise its forecast accordingly.
- For all of 2007, the GNP grew 2.2%, significantly below the projected 2.8%. Economists now predict lower, if not negative, growth.

TVA states that regional growth falls deeper and more quickly during an economic downturn due to its relative dependence on manufacturing. As we enter a recessionary period, TVA needs to revise its projections.

TVA projects a steady 1.9% increase in power sales. However, TVA's power sales are declining

- In 2007, TVA projected sale of 181.4 GWh, but it actually sold 174.81 GWh, 1% below plan. The amount sold was 1.5 GWh less than the year before.

- TVA enters its second year of power sales not meeting its one-year projections. TVA projected 6.362 GWh load growth. Its first quarter sales were 96% below plan.

### Population

TVA's discussion of why the service area's population focuses on "migration due to job opportunities."

- TVA focuses on two high end in-migrants: corporate headquarters relocation and retirees, both of which TVA says will serve as engines of regional economic growth.
- A large driver of the increase in regional population will be the influx of Hispanics and a high Hispanic birthrate (TN Department of Health.)
- TVA does not estimate employment by major industries - historic and estimated growth of employment and wages by SIC code and personal income for the relevant utility service area.

### Personal Income

TVA states, "Personal income in the TVA service area is forecast to grow in concert with the expanding economy and population." TVA projects a "2.1% growth in per capita personal income early in planning period to a rate of 1.6% later in the period."

- Lower and middle income households use significantly less energy than higher income households. As most households in Tennessee have flat or declining incomes, these households should be expected to use less electricity.

- The State of TN has the third largest income gap between the highest and lowest income groups. We have the fifth highest gap between high and middle income groups. The bottom fifth in 2003 earned \$14,303, an 18.6% increase since 1980. The top fifth averaged \$110,429, a 70.9% increase since 1980.
- The wealthy in TN are getting wealthier at a rate seven times faster than the poor, ranking it fourth for the fastest growth in income inequality over the past twenty years.
- Even if the per capita personal income should rise, that would not be equitably distributed over the population but concentrated among the wealthiest, if historic trends should continue.
- Wages have declined relative to inflation while productivity levels remain high. The average growth in wages and salaries continue to fall.
- Tennessee median income remained flat in 2005 (the most current year available) and actually declined in some counties. (US Census Report)
- 30% of Tennessean households are eligible for federal assistance with heating and cooling (LIHEAP.)
- The poverty rate in Tennessee is ahead that of the nation, increasing 3.2% from 2000 - 2005 (15.8% of population), while nationally poverty increased 1.8% (13.3% of population.) (US Census report.)

Energy Efficiency and Substitution [COLA 8.2.2.2]

TVA has not estimated the importance of energy efficiency and substitution in the service area by preparing an estimate of the effects of those factors on projected kWh sales and peak demand in the service area for the proposed initial year of plant operation. The TVA long-term forecasts projects no energy efficiency savings throughout the time period. Clearly this represents a traditional utility bias against decreasing energy sales and revenue. Without outside regulators setting energy efficiency goals for utilities, traditional utilities would favor increased generation and sales over efficiency and reduced sales.

TVA has not considered power production from renewables by customers (including thermal uses such as the use of ground source heat pumps in place of conventional air conditioners, passive solar designs for heating and cooling, and building integrated solar and wind power) and combined heat and power. In light of the certain Congressional requirement for utilities to adopt Renewal Portfolio Standards of 15% or more, it is clearly unrealistic for TVA to project no renewable contribution to its generating capacity.

TVA has not adequately considered historic and projected future electricity growth rates in conjunction with comparable trends and forecasts for retail electricity prices. TVA merely states the following without analysis: "The real price of electricity is forecast to again decline in the region through the end of the forecast period for all customer types. Declining real prices reinforce the higher-than-average use of electricity in the states making up the TVA region."

- On April 1, 2008, TVA ratepayers will see a 12% increase in their electric bills. This latest rate increase will cause TVA rates to rise to the mid-range of national electricity prices.
- TVA new rates will make its electricity prices uncompetitive within the region. Most of the bordering states will have lower electricity prices.
- In light of the certain need for a carbon tax to respond to the need for GHG reduction and increasing fuel costs, it is unrealistic for TVA to claim that the real price of electricity will decline through the forecast period.

TVA has not identified those elements that could have contributed to diminished growth during the historic period and in the forecast period for the following:

- increase in energy efficiency including changes in building and appliance codes.
- higher prices of electricity and tariffs that encourage conservation and demand reduction
- economic recession
- milder than usual weather

TVA has not considered the following factors as they contribute to electricity demand growth:

- TVA has not considered the extent to which technological breakthroughs, government legislation and subsidies, and large energy efficiency investments may provide greater energy efficiency savings than have been experienced in the past, especially in the areas of building, appliance, and equipment energy

efficiency codes and standards including voluntary programs such as Energy Star and LEED.

- TVA has not considered the extent to which energy sources or energy conversion systems currently under development may reasonably be expected to compete with significantly reduced use of electricity.
- TVA has not considered the possibility that improvements in energy efficiency would result in offsetting electricity savings and decreased use of electric power.
- TVA has not provided a qualitative assessment as to the effectiveness of energy efficiency improvements in the last several years given industry restructuring, price changes, business cycles, and weather.
- TVA has not identified successful efforts undertaken within the region to promote energy efficiency on the part of customers and with respect to internal use of power transmission and distribution efficiency and demand side management.
- TVA has not presented any other significant factors that could affect the growth of electricity demand in the service area paying particular attention to changes in building, appliance, and equipment energy efficiency codes and standards and economics of self-generation using renewables, use of ground source heat pumps and other renewable resources for thermal end uses such as for heating and cooling, and use of combined heat and power systems.

TVA's data and analyses it submitted is incomplete and does not reflect the effect of energy efficiency and substitution on projected kWh sales and peak demand.

Price and Rate Structures [COLA 8.2.2.3]

TVA has not adequately forecast the growth in the real price of electricity. It makes a statement that the real price will decline without any support analysis: "The real price of electricity is forecast to again decline in the region through the end of the forecast period for all customer types. Declining real prices reinforce the higher-than-average use of electricity in the states making up the TVA region."

TVA has not considered in the ER the effects alternative rate structures that would moderate load growth or reshape load curves relative to peak load pricing, inverted rates, marginal cost pricing, or flattened rates.

- TVA states, "DSM forecasts are current as of February 2007 and do not include changes that may result from TVA's 2007 Strategic Plan approved May 31, 2007."
- TVA states, "TVA is currently examining and discussing with its wholesale customers the development of a season, time-differentiated rate structure that would encourage load management. No timetable has been set for adoption of a new rate structure. Load forecasts for this report are based on the existing EUW (End Use Wholesale) rate structure. "DMS programs are included in the forecast for net system requirements and summer peak load and are forecasted to continue at historical levels."

- Currently, TVA can curtail approximately 43 MW of load upon demand. For a utility that projects a 10,000 MW increase in peak demand, it is irresponsible for it to so completely dismiss demand side management within its forecast period.

- We have learned from responsible TVA sources, that TVA expects to implement these TOU and other DMS rate reform structures within two years. TVA currently has the capacity to model the effect of season, time-differentiated rate structures in its forecast.

- TVA has not provided an analysis of the capability of present and proposed rate structures to promote load management

- It is unrealistic for TVA to project a long term forecast without the moderating effects of DMS programs. Using the available DMS tools available to utilities, demand side management could by itself reduce TVA's peak loads to historic levels.

TVA has provided a completely inadequate analysis of the energy efficiency potential to avoid the need for new capacity.

TVA states, "In partnership with customers and others, TVA's new strategic direction includes enhancing efforts to improve energy-efficiency, energy conservation and peak demand reduction over the next five years. Specific targets and elements to implement these efforts are under development. As the goals and program unfold over the next few years, the anticipated reduction in peak demand will be reflected in power supply planning for the TVA system. These enhanced efforts are expected to reduce some of the forecasted demand on the TVA system. These reductions should occur primarily in peak

demand, but could have some affect on the demand for baseload that would be addressed by the BLN units. What can be and is actually achieved by enhanced efforts remains to be determined but would be taken into account in future planning for the BLN units."

- TVA has not provided a qualitative assessment as to the effectiveness of energy efficiency improvements in the last several years given industry restructuring, price changes, business cycles, and weather.
- TVA has not adequately reviewed successful efforts undertaken within the relevant region to promote energy efficiency on the part of customers and with respect to internal use of power transmission and distribution efficiency and demand side management should be included.
- TVA has not presented other significant factors that could affect the growth of electricity demand in the service area paying particular attention to changes in building, appliance, and equipment energy efficiency codes and standards and economics of self-generation using renewables, use of ground source heat pumps and other renewable resources for thermal end uses such as for heating and cooling, and use of combined heat and power systems.
  - TVA has not accounted for the passage of updated building codes and standards by the TN General Assembly.
  - TVA has not accounted for the development of the TN State Energy Plan announced by an Executive Order by Governor Bredesen.
  - TVA has not accounted for the inevitable Congressional mandated improvements in appliance and equipment efficiency standards.

- TVA has not considered CHP as a significant source of power generation.

TVA has not determined the effect of an aging existing population on the rate of growth of electrical demand.

The NRC must exercise purview of the TVA power demand forecast. No other external entity has this responsibility. The consequences of this lack of oversight causes TVA to arbitrarily raise rates to make the Valley ratepayers pay down its current \$25 billion debt from a failed nuclear program that the agency justified with an unrealistic demand forecast. No other utility in the nation has this complete lack of oversight. Without an NRC analysis of TVA's power demand forecast, the NRC cannot have the assurance that a need for power exists within the TVA service area.

The NRC must conclude that the forecast submitted by the applicant does not properly reflect the effect of energy efficiency and substitution on projected kWh sales and peak demand. TVA's forecast is not current in its failure to capture economic realities and energy trends.

Power Supply [COLA 8.3] *Entire section made unavailable.*

Has the TVA provided an analysis of potential competitors to the proposed project, including other projects, market purchases, and customer-owned generation, including power from distributed renewable generation sources?

New central power plant additions are expected to compete in the future with distributed generation, which is defined as generation scaled to the needs of local areas and located in those areas. Central generation will also compete with customer-owned generation and potentially energy storage. Additions of these kinds of resources are being

facilitated by state and federal incentives, especially for renewable generation, and net metering, which encourages retail customers to self-generate.

Has the TVA considered expected trends towards distributed and self-generation by consumers, such as from combined heat and power projects, building integrated renewable such as solar photovoltaic, small wind turbines, and low temperature geothermal generators. In particular, has TVA considered state and federal policies facilitating development of these resources including tax and other incentives, renewable portfolio requirements, net metering requirements, and utility programs to reduce peak demand, especially programs that encourage customers to operate customer owned generation during peak demand periods?

Has the TVA considered likely policies and trends that encourage growth in distributed- and self-generation which substitutes for power from central power plants? Typical policies include state and federal incentives for development of renewable resources, combined heat and power projects, and fuel cells, as well as renewable portfolio standards and net metering requirements.

Assessment of Need for Power [COLA 8.4] *Figures and Charts unavailable.*

As contended in Sections 8.2 and 8.3, TVA has not demonstrated the need for additional electricity, necessary to satisfy the “useful purpose” requirement. Without an adequate analysis of the region's economic forecast and without any accounting for energy efficiency and demand side management, TVA has not justified the need for additional generating capacity. TVA's forecasts are bare of energy efficiency and demand side management

TVA states, "TVA faces a need for power over the next decade to meet the growing demand for electricity. In light of an expected increase in demand for electricity in TVA's service area and recent purchased power price volatility and provider unreliability, TVA has taken steps to build or acquire new generation. This includes possible construction of BLN."

- TVA has not considered the fact that distributed and self-generation by customers is increasing as power costs increase and the cost of distributed generating systems decrease.
- TVA has not considered the fact that dramatic improvements in electricity use have occurred recently and are projected to continue due to energy efficiency codes for equipment and appliances as well as buildings. As a result, new customers, on average, may have very different usage rates than previous generations of customers.
- TVA has not forecast the effects of a prolonged recession on demand for electricity within TVA's service area.

#### **CONTENTION TWELVE: NRC FAILED TO JUSTIFY NEED FOR NEW UNITS**

In view of the foregoing contention regarding TVA's failure to justify its COL request, it is left to NRC to provide justification for the proposed units at Bellefonte.

TVA is a federal corporation which operates as an unregulated monopoly. It is responsible to no other entity for its policies, programs, forecasts for power and energy requirements, and ratemaking. Existing Congressional oversight is limited to Senate confirmation of board appointees, Congressional approval of increase in the TVA's bond capacity, and the options to remove board members and to hold Congressional hearings.

No state government has any regulatory control over TVA's ratemaking. TVA rates are not subject to review beyond its Board of Directors. The TVA Act does not provide for FERC review, and the courts have held the rates are not subject to judicial scrutiny.

There are no statutory requirements for public involvement in the TVA wholesale rate process. TVA governance has no provision for the residents of the Tennessee Valley or their elected representatives to have formal control over TVA policies and programs except through the President and Congress. TVA's current public involvement programs are voluntary and at the discretion of the Board.

At its September 2007 meeting, the TVA Board approved submitting the BLN 3 and 4 COL applications to the NRC. No other entity other than TVA and NuStart Energy were involved that decision. No public involvement process was even offered before or after the decision was made. Bill McCollom, TVA's Chief Operating Officer, said in November 2007, "At this point no decision has been made whether to build the two generating unit." However, in the ER (Table 1.1-1), TVA anticipates BLN early procurement activities to begin by summer 2009.

The consequences of no outside entity checking on TVA's projections are severe. During the 1970s, TVA projected a large increase in demand growth and launched a nuclear plant construction campaign for 17 units. Because the demand did not materialize and the effectiveness of TVA's energy efficiency programs, the TVA Board cancelled or deferred nine units at a cost to the TVA ratepayers of \$10.9 billion. Bellefonte Units 1 and 2 were cancelled as part of this misjudgment. An additional \$3.3

billion is carried as TVA debt for these two units as deferred generating assets. TVA current debt stands at more than \$25 billion, most of it related to its nuclear debacle.

To underscore the urgency of the request, TVA's 2007 kWh total sales declined from 2006, and the first quarter of 2007 is also down. TVA's projected 1.9% annual increase is already slipping severely behind its forecast. TVA has a peak load problem that could be addressed through demand side management. The purpose for the BLN COL application is fix a declining load factor, a purpose that the NRC itself states cannot justify construction of a nuclear plant.

#### Conclusion

As no other entity with the TN Valley or within the federal government has the responsibility to review and determine the adequacy of TVA's power and energy requirement forecasts, it clearly becomes the responsibility of the NRC to review the adequacy of TVA's claims that the proposed Bellefonte units are needed.

### **CONTENTION THIRTEEN: So-Called Low Level Radioactive Waste**

#### Issue

As of June 30, 2008, no facility in the United States will be licensed and able to accept for disposal, Class B, C or Greater-Than-C radioactive waste from the Bellefonte nuclear and power reactors. The applicant fails to offer a viable plan for how to dispose of Class B, C and Greater than-C so-called "low-level" radioactive waste generated in the course of operations, closure and post closure of Bellefonte 3 & 4.

#### Rule

Regulations for land disposal of radioactive waste are found at 10 CFR § 61

§ 61.3 License required. (a) No person may receive, possess, and dispose of radioactive waste containing source, special nuclear, or byproduct material at a land disposal facility unless authorized by a license issued by the Commission pursuant to this part, or unless exemption has been granted by the Commission under § 61.6 of this part.

§ 61.5 Interpretations. Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

§ 61.6 Exemptions. The Commission may, upon application by any interested person, or upon its own initiative, grant any exemption from the requirements of the regulations in this part as it determines is authorized by law, will not endanger life or property or the common defense and security, and is otherwise in the public interest.

#### Discussion

The applicant, TVA, fails to address how NRC regulations for the disposal of so-called “low-level” radioactive waste from the proposed Bellefonte reactors will be met in the absence of an offsite disposal facility (dump). The Barnwell, South Carolina facility will be closed to out-of-compact waste as of July 1, 2008. The question to be answered by the NRC before granting the COL is: How will the waste be managed according to the regulations? If perpetual or extended on-site storage of these wastes is contemplated, this option is not addressed in the COL application. Further, under the relevant regulations for low-level radioactive waste, *Land disposal facility* means the land, building, and structures, and equipment which are intended to be used for the disposal of radioactive

wastes. 10 CFR § 61.2 Such accommodations would no doubt be provided for radioactive waste at Bellefonte.

Since there is no offsite Part 61 licensed disposal available to TVA, extended on site storage becomes *de facto* onsite disposal. This could significantly increase the safety and security risks of the Bellefonte site. Therefore serious consideration must be given to licensing the site itself under 10 CFR Part 61 (licensed permanent radioactive waste disposal) or Alabama's compatible agreement state regulations.

It is imperative that the safety and security issues of extended onsite storage, *de facto* disposal, be addressed prior to generation of the waste because the "low-level" radioactive waste for which there is no disposal available is the hottest, most concentrated<sup>22</sup> waste in the category.

The issue of radioactive waste management is barely addressed in TVA's COL application. A short section (3.5) of the Environment Report on page 3.5-1 simply describes the generation of radioactive waste during operations and states that the systems are:

"designed to minimize releases from reactor operations to values as low as reasonably achievable (ALARA). These systems are designed and maintained to meet the requirements of 10 CFR Part 20 and 10 CFR 50, Appendix I."

The COLA provides little in terms of the ongoing on-site management and potential environmental impact at the reactor site of keeping so-called "low-level" waste from operations on the site of generation.

---

<sup>22</sup> GAO report indicates some of this waste can give a lethal dose in 20 minutes if exposed unshielded.

Chapter 11 of the FSAR is entitled “Radioactive Waste Management” all of which assumes that there will be a “WAC” (waste acceptance criteria) from a disposal site. The fact that there is not currently a site licensed to take the full range of wastes that Bellefonte 3 & 4 will generate if operated is not mentioned. Section 11.4.5 offers a perfunctory discussion of a “process control program” (PCP) for radioactive waste management:

“Its purpose is to provide the necessary controls such that the final disposal waste product meets applicable federal regulations (10 CFR Parts 20, 50, 61, 71, and 49 CFR Part 173), state regulations, and disposal site waste form requirements for burial at a low level waste (LLW) disposal site that is licensed in accordance with 10 CFR Part 61.”

No explanation is offered for how the applicant will meet this plan in the absence of a licensed disposal site.

If offsite storage and treatment are potential options, it should be noted that “low-level” radioactive waste sent for offsite storage and processing could be returned to Bellefonte, under certain circumstances. This is not addressed in the COL.

### Conclusion

On-site disposal of low-level radioactive waste at Bellefonte 3 and 4 is an unresolved problem which may be outside the letter and the spirit of the relevant laws and implementing regulations. However, we are aware of no specific Commission authorization to re-interpret the meaning of this regulation. 10 CFR § 61.5 Further, we are aware of no exemptions granted by the Commission from the relevant regulation. 10

CFR § 61.6 Therefore, we believe extended waste storage facilities at Bellefonte must be regulated under 10 CFR § 61.

**CONTENTION FOURTEEN: Waste Confidence—High Level Nuclear Waste from Irradiated Fuel**

A: Failure to Evaluate Whether and in What Time Frame Spent Fuel Generated by Bellefonte Units 3 and 4 Can Be Safely Disposed Of  
Contention

The Environmental Report for the TVA COLA is deficient because it fails to discuss the environmental implications of the lack of options for permanent disposal of the irradiated (*i.e.*, “spent”) fuel that will be generated by the proposed reactors if built and operated. Nor has the NRC made an assessment on which TVA can rely regarding the degree of assurance now available that radioactive waste generated by the proposed reactors “can be safely disposed of [and] when such disposal or off-site storage will be available.” Final Waste Confidence Decision, 49 Fed. Reg. 34,658 (August 31, 1984), citing *State of Minnesota v. NRC*, 602 F.2d 412 (D.C. Cir. 1979). Accordingly, the ER fails to provide a sufficient discussion of the environmental impacts of the proposed new nuclear reactors.

Basis

The ER for the proposed new reactors does not contain any discussion of the environmental implications of the lack of options for permanent disposal of the irradiated fuel to be generated by North Anna site. Therefore, it is fatally deficient. *State of Minnesota v. NRC*, 602 F.2d at 416-17.

In the Bellefonte COLA, at Part 3 of the Environmental Report at Chapter 5.7.6 about Uranium Fuel Cycle Impacts, the applicant states “For high-level and transuranic wastes, the NRC notes that these are expected to be buried at a repository and that no release to the environment is expected to be associated with such disposal. The gaseous and volatile radionuclides contained in the spent fuel would have been released and monitored before disposal.”

First, the U.S. Department of Energy recognizes that significant radioactivity releases from a Yucca Mountain repository would in fact occur over time. See, for example, U.S. DOE Office of Civilian Radioactive Waste Management, "NWTRB Repository Panel meeting: Postclosure Defense in Depth in the Design Selection Process," presentation for the Nuclear Waste Technical Review Board Panel for the Repository, January 25, 1999. Also, the U.S. Environmental Protection Agency’s proposed Yucca Mountain radiation release regulations, offering that such regulations extend out to a million years post waste burial, shows that such releases will continue for many hundreds of thousands of years into the future. See United States. Environmental Protection Agency. "40 CFR Part 197: Public Health and Environmental Radiation Protection Standards for Yucca Mountain , Nevada : Proposed Rule." Federal Register, v.70, no.161, August 22, 2005, pages 49014-49065. On the Web at <http://a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/pdf/05-16193.pdf>.

Thus, the Bellefonte COLA's assertion that "no release to the environment is expected to be associated with such disposal" is false.

While TVA may have intended to rely on the NRC's Waste Confidence decision, issued in 1984 and most recently amended in 1999, that decision is inapplicable because it applies only to plants which are currently operating, not new plants. The second finding of the Waste Confidence Decision, as amended in 1999, is that the Commission has

reasonable assurance that at least one mined geologic repository will be available within the first quarter of the twenty-first century, and that sufficient repository capacity will be available within 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of any reactor to dispose of the commercial high-level radioactive waste and spent fuel originating in such reactor and generated up until that time.

Waste Confidence Decision Review: Status, 64 Fed. Reg. 68,005, 68,006 (December 6, 1999). This finding revised the finding in the original decision that a mined geologic repository would be available by the years 2007 to 2009. Clearly, the Commission's finding applies to any existing reactor, including reactors whose licenses are revised or renewed. The Commission gives no indication that it has confidence that repository space can be found for spent fuel and other high-level radioactive waste from new reactors licensed after December 1999.

Moreover, the revised second finding in the 1999 Waste Confidence review statement conspicuously fails to assert confidence in the likelihood that more than one repository will be licensed. In fact, the Commission has backtracked on its original 1984 "Nuclear Waste Confidence Decision," in which the Commission expressed confidence that "one or more" repositories would open between 2007 and 2009. Waste Confidence

Decision, 49 Fed. Reg. at 34,673. The 1999 Status Report states merely that “at least one” repository will open by 2025. 64 Fed. Reg. at 68,006.

It is also clear that the inventory of spent fuel and other high-level radioactive waste being generated by the *current* generation of nuclear reactors is far greater than what can be accommodated in the single repository in which the Commission places its confidence, Yucca Mountain, Nevada. The proposed Yucca Mountain repository can only accept 63,000 metric tons of commercial high-level radioactive waste and irradiated nuclear fuel, at least until a second national repository became operational.<sup>23</sup> Even assuming only 40 years of operations with no operating license renewals and no new nuclear reactors, the U.S. Department of Energy (DOE) has known since at least the mid-1990’s—since before the most recent (1999) NRC review of its “Nuclear Waste Confidence Decision”—that by the year 2030 or so well over 80,000 metric tons of irradiated nuclear fuel generated at commercial nuclear reactors will exist in the U.S. U.S. Nuclear Waste Technical Review Board (“NWTRB”) “Disposal and Storage of

---

<sup>23</sup> Under the Nuclear Waste Policy Act (“NWPA”), 63,000 metric tons is the legal limit for commercial waste storage that can be “disposed of” at Yucca Mountain, Nevada, at least until a second repository is operational elsewhere in the U.S. As the NWPA states at Section 114(d):

The [NRC] decision approving the first such application [for a license to open and operate a repository] shall prohibit the emplacement in the first repository of a quantity of spent fuel containing in excess of 70,000 metric tons of heavy metal or a quantity of solidified high-level radioactive waste resulting from the reprocessing of such a quantity of spent fuel until such time as a second repository is in operation...”

42 U.S.C. § 10134(d). By long-established DOE policy, the first 70,000 metric tons of irradiated nuclear fuel and solidified high-level radioactive waste “disposed of” at Yucca Mountain, Nevada would include 90% commercial nuclear reactor waste, and 10% DOE waste from the nuclear weapons production complex and nuclear energy research activities. 90% of 70,000 metric tons means that only 63,000 metric tons of commercial irradiated nuclear fuel could be “disposed of” at Yucca Mountain, Nevada, at least until a second national repository is operational in the United States. *See* Yucca Mountain EIS at A-1.

Spent Nuclear Fuel: Finding the Right Balance,” Figure 2 at page 11 (March 1996). This is significantly in excess of the “disposal” capacity at Yucca Mountain.

As recently as March, 2008, at the U.S. Nuclear Regulatory Commission’s Regulatory Information Conference, the director of the U.S. Department of Energy’s Office of Civilian Radioactive Waste Management, Ward Sproat III, announced that 63,000 metric tons of commercial irradiated nuclear fuel—enough to fill Yucca to its legal limit—will exist in the U.S. by the spring of 2010. He added that in two to three months, the U.S. Department of Energy will issue a report on the need for a second repository, as called for by the Nuclear Waste Policy Act as Amended. Unless something changes between now and then, Sproat announced, then DOE will find that a second repository is indeed needed.

NRC’s now-routine approval of 20-year license extensions to old commercial nuclear reactors will only increase the quantity of high-level radioactive waste that exceeds the capacity limits at the proposed Yucca Mountain, Nevada repository. In its “Final Environmental Impact Statement for a Repository for Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada,” (Feb. 2002) (hereinafter “Yucca Mountain EIS”), DOE predicted the generation of over 105,000 metric tons of commercial irradiated nuclear fuel by the year 2046. *Id.*, Table A-8, page A-16. While NRC’s standard license extension term is 20 years, the DOE prediction assumed that the term of license extensions would be only 10 years. DOE also assumed no new commercial nuclear reactors in the U.S. Thus, the high-level waste and spent fuel

generated by the *current* generation of reactors will far exceed the capacity of the single repository that the NRC has identified as feasible and likely.<sup>24</sup>

Accordingly, the spent fuel and other high-level radioactive wastes generated at the proposed new reactors could not be “disposed of” at Yucca Mountain unless and until a second national repository is operating. But the Commission has not expressed confidence that a second repository will open. Any spent fuel or other high-level radioactive waste generated after the spring of 2010 (after 63,000 metric tons of commercial irradiated nuclear fuel has been generated) would have nowhere to go, would lack “disposal” space at a repository, unless and until a second repository is opened and operating in the U.S. somewhere other than Yucca Mountain, Nevada – a process that could very well take many decades, based on the experience of trying to open the first repository at Yucca Mountain, Nevada.

Moreover, Congress has not given the NRC any basis for assuming that a second repository will be opened. Section 161(b) of the NWPA provides that: “[t]he Secretary [of Energy] shall report to the President and to Congress on or after January 1, 2007, but

---

<sup>24</sup> Experience also shows that the NRC has been overly optimistic about the opening of the first repository. It took from 1982 (the year the Nuclear Waste Policy Act was passed) until 2002 – 20 full years -- just for the DOE to recommend Yucca Mountain as “suitable” for repository development. This finding, however, has been consistently challenged by the State of Nevada, environmental groups, and numerous scientists. Even before DOE’s suitability determination, the U.S. General Accounting Office (GAO) reported that a repository at Yucca Mountain, Nevada probably could not open to receive waste shipments till 2015 at the earliest, given nearly 300 unfinished scientific and technical studies. GAO-02-191, “Nuclear Waste: Technical, Schedule, and Cost Uncertainties of the Yucca Mountain Repository Project” (December, 2001). DOE later admitted that 2017 was the “best achievable” date for opening Yucca. Currently, however, DOE has admitted that it has no projected opening date for the Yucca repository. *See, e.g.*, U.S. NWTRB, “Technical Report on Localized Corrosion” (November 25, 2003, and Allison M. Macfarlane and Rodney C. Ewing, “Uncertainty Underground: Yucca Mountain and the Nation’s High-Level Nuclear Waste,” the MIT Press, Cambridge, MA, 2006). In addition, several legal challenges have been filed against the Yucca Mountain repository and the proposed standards for operation, including a successful State of Nevada/environmental coalition challenge to the U.S. Environmental Protection Agency’s radiation release regulations for the Yucca repository. On July 9, 2004, the U.S. Circuit Court of Appeals for the District of Columbia ordered EPA to revise its regulations, which EPA has not yet finalized.

not later than January 1, 2010, on the need for a second repository.” 42 U.S.C. § 10172a(b). Section 161(a) also states that: “The Secretary [of Energy] may not conduct site-specific activities with respect to a second repository unless Congress has specifically authorized and appropriated funds for such activities.” 42 U.S.C. § 10172a(a). The Department of Energy has not made a finding that a second repository is needed, nor has Congress specifically authorized or appropriated funds for site-specific activities. However, as mentioned above, DOE OCRWM director Ward Sproat III announced at the NRC RIC in March 2008 that DOE will issue a report in two to three months stating that a second repository is needed.

The Commission’s failure to express confidence that a second repository will be opened any time soon also implicates the third and fourth findings of the Waste Confidence Decision, *i.e.*, that spent fuel and other high-level radioactive waste can be safely stored at reactor sites for up to 30 years. 64 Fed. Reg. at 68,006. If the Commission has no confidence that a repository will open at some reasonable time in the future, it must be assumed that spent fuel may sit at the proposed reactor site for an indefinite period of time. The environmental impacts of such indefinite storage must be evaluated before a Combined Operating License can be granted.

B. Even if the Waste Confidence Decision Applies to This Proceeding, It Should be Reconsidered.

Contention

Even if the Waste Confidence Decision applies to this proceeding, it should be reconsidered, in light of significant and pertinent unexpected events that raise substantial

doubt about its continuing validity, *i.e.*, the increased threat of terrorist attacks against U.S. facilities.

### Basis

In its 1999 “Nuclear Waste Confidence Decision” revision, NRC stated “the Commission would consider undertaking a comprehensive reevaluation of the Waste Confidence findings...if significant and pertinent unexpected events occur raising substantial doubt about the continuing validity of the Waste Confidence findings.” 64 Fed. Reg. at 68,007. Clearly, the catastrophic terrorist attacks upon the United States on September 11<sup>th</sup>, 2001 constituted significant and pertinent unexpected events that raise substantial doubts about the continuing validity of the third and fourth findings of the revised Waste Confidence Decision. These findings are:

3. The Commission finds reasonable assurance that high-level radioactive waste and spent fuel will be managed in a safe manner until sufficient repository capacity is available to assure the safe disposal of all high-level waste and spent fuel. (This finding is identical to the finding in the original Waste Confidence Decision in 1984).
4. The Commission finds reasonable assurance that, if necessary, spent fuel can be stored safely and without significant environmental impacts for at least 30 years beyond the licensed life for operation (which may include the term of a revised or renewed license) of that reactor at its spent fuel storage basin, or at either onsite or offsite independent spent fuel storage installations. (This finding is basically identical to that in the original Waste Confidence Decision with the addition of the consideration of license renewal and spent fuel storage 30 years beyond the licensed life for operation of a reactor).

64 Fed. Reg. at 68,006. The terrorist threat to irradiated nuclear fuel and high-level radioactive waste – whether it is being stored on-site at commercial reactors in storage pools or dry casks; stored in away-from-reactor Independent Spent Fuel Storage Installations; or transported by truck, train, or barge between nuclear plants and off-site

interim storage facilities – demands an evaluation of whether (a) it is appropriate to store spent fuel and other highly radioactive waste for 30 years or more pending availability of a permanent repository, and (b) whether nuclear power should be phased out as quickly as possible as a matter of environmental protection, national security, public safety, and common defense.

The homeland security risks posed by indefinite temporary storage of spent fuel have been recognized by former Energy Secretary Spencer Abraham:

Yucca Mountain is an important component of homeland security. More than 161 million people live within 75 miles of one or more nuclear waste sites, all of which were intended to be temporary. We believe that today these sites are safe, but *prudence demands we consolidate this waste from widely dispersed, above-ground sites into a deep underground location that can be better protected.*

Statement of Spencer Abraham, Secretary of Energy, Before the Energy and Natural Resources Committee, U.S. Senate (May 16, 2002), (the full statement can be viewed and printed from: <http://yuccamountain.org/abraham051602.htm>)

It is undisputed that neither fuel storage pools nor dry storage facilities are designed to withstand the type of determined and sophisticated attack that was carried out on September 11, 2001. In fact, the U.S. National Academy of Sciences documented such security vulnerabilities in its report entitled “Safety and Security of Commercial Spent Nuclear Fuel,” released on April 6, 2005.

To protect against and mitigate the impacts of terrorist attacks, the NRC has developed a system to maintain a constant state of alert, undertaken a comprehensive review of the adequacy of its safety and security regulations, and upgraded its security requirements for all operating nuclear facilities in the United States. Clearly, under

NEPA it is also appropriate to consider whether the Commission continues to have a basis for expressing confidence that stored spent fuel and other high-level radioactive waste is safe from terrorist attacks.

Petitioners are aware that the Commission has ruled that environmental impacts of terrorist attacks are not cognizable under NEPA. *See, e.g., Pacific Gas & Electric Co.* (Diablo Canyon Independent Spent Fuel Storage Installation), CLI-03-01, 57 NRC 1 (2003); *Private Fuel Storage, L.L.C.* (Independent Fuel Storage Installation), CLI-02-25, 56 NRC 340 (2002). Petitioners request that the Commission reconsider this policy, in light of (a) the obvious attractiveness and vulnerability of spent fuel to terrorist attack; (b) the Secretary of Energy's recognition of the relationship between homeland security and assured capacity for timely spent fuel disposal; (c) the Commission's explicit statement in the Waste Confidence status review that it would undertake a comprehensive reevaluation of the Waste Confidence findings if "significant and pertinent unexpected events" occur raising substantial doubt about the continuing validity of the Waste Confidence findings; and (d) the decision of the 9<sup>th</sup> Circuit U.S. Court of Appeals. June 2, 2006 ruling by the U.S. Court of Appeals for the Ninth Circuit in *San Luis Obispo Mothers for Peace (SLOMFP) v. NRC*, 449 F.3d 1016.

Clearly, a Commission reconsideration is warranted.

**CONTENTION FIFTEEN: Global Warming Impacts Are Omitted from TVA License Application—Severe Weather and Carbon Footprint**

## A. Severe Weather Impacts Resulting from Global Warming<sup>25</sup>

### Issue

The risks to nuclear power plants associated with severe weather are not only direct damage to the site and reduced operation and therefore capacity – the risks also originate from the impact of severe weather on the transmission grid and the overall probability of loss of offsite power, and the subsequent duration of such loss. These risks form the base of the calculated risk of station blackout—the primary source of risk of a major reactor accident and have not been addressed by the applicant.<sup>26</sup>

### Rule

Specific portions of the applicant's COL that need to address the increase in severity of weather in the region of the proposed site include:

#### Final Safety Analysis Report:

2 Site Characteristics:

2.3 Meteorology

3 Design of Structures, Components, Equipment and Systems:

3.3 Wind and Tornado Loading,

3.4 Water Level (Flood) Design,

3.5 Missile Projection

---

<sup>25</sup> A basis for raising this contention is found in *The US Economic Impacts of Climate Change and the Costs of Inaction, A Review and Assessment* by the Center for Integrative Environmental Research (CIER) at the University of Maryland, October 2007 [Available on-line at: <http://www.cier.umd.edu/documents/US%20Economic%20Impacts%20of%20Climate%20Change%20and%20the%20Costs%20of%20Inaction.pdf>]

<sup>26</sup> U.S. Nuclear Regulatory Commission, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," NUREG-1150, 1990

## 19: Probabilistic Risk Assessment

### Discussion

The applicant references the Design Control Document for the AP1000 and adopts the contents of chapters where modeling is applied to severe weather impacts such as high winds and water levels. Pages 19.58-1 -- 19.58-3 of the Design Control Document for the AP1000 focus on severe weather impacts. The presentation of raw meteorological data is useful, but does not provide commentary on trends or future projections. Reliance on the DCD in the sections discussing structures, components and systems are devoid of any discussion of the acceleration in severe weather impacts.

The increasing frequency and impact of severe weather-related events is well documented in government agency reports:

“Since 1980, the United States has witnessed 70 natural disasters – including hurricanes, floods, heat waves, and droughts – each causing over \$1 billion in damages. Fifty-eight of these events have occurred since 1990 and 29 have been in the Southeast. Total estimated damages from all of the billion-dollar events are more than \$540 billion.<sup>27</sup>

“Hurricanes and tropical storms are by far the most frequent and destructive of the natural disasters documented by the National Climatic Data Center at NOAA. Other disasters include non-tropical floods, heatwaves and drought, severe weather, fires, freezes, blizzards, ice storms and nor’easters, accounting for 24 of the 70 events and \$308 billion in damages. The Southeast states were hit hardest by these natural disasters, with each state, except Kentucky, experiencing at least 16 events that caused over \$1 billion in damages each. Texas, Alabama, Georgia, Florida, and North Carolina each experienced 21-25 natural disasters from 1980-2006.<sup>28</sup> (emphasis added)

---

<sup>27</sup> Lott, N. and T. Ross. 2006. *Tracking and Evaluating U.S. Billion Dollar Weather Disasters, 1980-2005*. National Climatic Data Center (NCDC) Available online at <http://www1.ncdc.noaa.gov/pub/data/papers/200686ams1.2nlfree.pdf>

<sup>28</sup> U.S. Nuclear Regulatory Commission, "Severe Accident Risks: An Assessment for Five U.S. Nuclear Power Plants," NUREG-1150, 1990

It is laudable that the Probabilistic Risk Assessment analysis recognizes that loss of off-site power should be considered in analysis of severe weather, and further that a worst-case-scenario is analyzed. What is not provided is any analysis that describes the basis for judging the probability of either frequency or intensity of a weather event such that it is possible to assess what data-set is being used. Since other areas of the PRA do give citations, and most of these are from work done in the 1980's it is possible that new models based on a changing and destabilized climate have not been incorporated into the findings of the PRA. This could lead to a false sense of security since Bellefonte 3 & 4 will not even come on-line for another decade, and would operate well into the 21<sup>st</sup> century, during which time even "conservative" climate change models predict significant destabilization of weather patterns. A leading climatologist, Dr. Kerry Emanuel has found significant correlation between the warming of ocean waters and the intensity of storms.<sup>29</sup>

### Conclusion

TVA fails to update its probabilistic risk assessments to reflect an upsurge in severe weather in the Southeast region, including Alabama.

B. TVA failed to analyze the carbon footprint of the construction and operation of Bellefonte 3 and 4 in its environment report.

### Issue

---

<sup>29</sup> Dreifus, Claudia. "With Finding on Storms, Centrist Recasts Warming Debate." The New York Times, January 10, 2006 Posted at: [http://www.nytimes.com/2006/01/10/science/10conv.html?\\_r=1&scp=2&sq=intensity+of+hurricanes&st=nyt&oref=slogin](http://www.nytimes.com/2006/01/10/science/10conv.html?_r=1&scp=2&sq=intensity+of+hurricanes&st=nyt&oref=slogin)

Greenhouse gases rank among the top environmental concerns today. The release of greenhouse gases is part of any major construction operation – as the production of cement, steel, copper and other raw materials and components all contribute to what is generically called the “carbon-footprint” though more accurately it would be the “Greenhouse Gas footprint.” These emissions from many sources in aggregate are contributing to the destabilization of climate on planet Earth. Specifically, the applicant fails to include any discussion of Green House Gas emissions or “Carbon Foot-print” in its environment report.

#### Rule

The relevant discussion would rightly be included in Bellefonte Units 3 & 4 COL Application, Part 3, Environmental Report, 4.0-1 Revision 0 including but not limited to the following sections:

4.0 ENVIRONMENTAL IMPACTS OF CONSTRUCTION,

5.7 URANIUM FUEL CYCLE EFFECTS and

5.5 ENVIRONMENTAL IMPACTS OF WASTE.

#### Discussion

The COL Applicant fails to include an analysis of the emission of Greenhouse gases in the process of the production of raw materials and components, and the transportation of these materials and components and the construction processes required to build Bellefonte 3 & 4.

A further analysis of greenhouse gas emissions, associated with each step in the uranium fuel chain is similarly lacking. The mining of uranium is accomplished using

fossil fuels. The many transportation links in the 6 (mining, milling, conversion, enrichment, re-conversion, fuel fabrication) uranium processing steps prior to shipment to the Bellefonte site have not been analyzed for Greenhouse gas emissions and associated climate impacts. Today there are sometimes additional steps when down-blending and other feedstock sources are utilized in uranium fuel production. Each and every one of the 6 uranium processing steps requires power—and most are currently powered with fossil fuels. The back-end of the nuclear fuel chain also involves transportation and therefore combustion of fossil fuels in moving the so-called low-level waste and someday the high-level waste. Any plans for additional steps of storage or processing of these wastes will increase the associated transportation generated greenhouse gas emissions. In addition, the reprocessing of nuclear fuel generates large quantities of gaseous emissions, all of which need to be evaluated for whether they contribute to climate destabilization.

Many nuclear energy advocates, including those in the Administration and Congress potentially supplying funding for Bellefonte 3 and 4, claim that nuclear power offers a solution to global warming. It is important that all public investment in climate crisis solutions rest on scientifically solid ground. Therefore, Intervenors believe that it is important to include the “carbon-footprint” of construction and operation and dealing with the wastes of Bellefonte 3 and 4 in the consideration of environmental impact.<sup>30</sup>

## Conclusion

---

<sup>30</sup> An excellent resource for conducting such an analysis is the work of Phillip Smith and Willem Storm van Leeuwen, in their report entitled Nuclear Power -- Energy Balance, newly updated in 2008 and posted at: <http://www.stormsmith.nl/>. Their findings include the determination that a key limiting variable in the nuclear fuel cycle impacts on Greenhouse Gas emissions is the relative ease with which uranium is obtained – the harder the rock, the deeper the deposits, the greater the Greenhouse gas emissions.

The review of environmental impacts of Bellefonte 3 and 4 is not complete. Acceptance of this contention would allow interveners assist in providing a more complete case record.

**CONTENTION SIXTEEN: Environmental Report's Inadequate Cost Estimates and Cost Comparisons**

In comparing the costs of the proposed Bellefonte nuclear plant to alternative energy sources such as wind and solar, TVA dismisses alternative energy sources such as wind and solar on the ground that they cost much more than nuclear power. According to TVA, an unnamed "recent study" of the "overall costs of generation of electricity" gave cost estimates of \$0.0266 to \$0.0328 per kWh for nuclear, in comparison to \$0.09/kWh to \$0.23/kWh for solar energy, and \$0.03/kWh to \$0.05/kWh for wind. Environmental Report at 9.2-38. But TVA's cost comparison is inadequate to satisfy the National Environmental Policy Act ("NEPA") or NRC regulations at 10 C.F.R. § 51.45(c) because it fails to provide reasonably up-to-date and accurate information regarding the costs of nuclear power, the costs of alternative energy sources, and the financial risks posed by the election of nuclear power as an energy source. TVA also presents internally contradictory costs of nuclear energy, with one set (in Chapter 10 of the Environmental Report at 10.4-19) at \$36 to \$83 per MWh (or \$0.036 to \$0.083 per kWh) being much higher than the one cited above from Chapter 9). We will use the \$36 to \$83 range as the one intended by TVA, because more cost details are provided for this estimate in the Environmental Report and it is less unreasonable than the Chapter 9 values.

1. *Nuclear energy cost data are seriously obsolete.* TVA asserts that it has chosen a range of \$2850 to \$3200 per kilowatt as a reasonable cost estimate for the costs of the proposed new nuclear power plant. Environmental Report at 10.4-7. But no recent (2007 or 2008) reference for cost of nuclear power is cited. The main references used are the MIT study, published in 2003 and the University of Chicago study, published in 2004. Environmental Report at 10.4-12 and -13. There have been serious escalations in the real capital cost of nuclear power since that time. There has also been a large increase in the real spot market price of uranium, as well as considerably greater volatility in that price. These elements together make the NRC's estimates of the cost of nuclear power an incorrect and misleading basis for comparison with the alternatives.

For instance, in late 2007 Florida Power and Light estimated the total capital cost of a new AP1000 units (including escalation during construction) to be between \$5,492 and \$8,041 per kW.<sup>31</sup> These estimates were based on a prior study done by TVA itself, adjusted for real cost escalation at different rates. In contrast the range considered by TVA is narrow -- \$2,850 to \$3,200 per kW. Environmental Report at 10.4-7. Note that the highest capital cost in the Environmental Report is much lower than the FPL's lowest value. The FPL values imply an electricity cost of about \$120 to \$170 per MWh (12 to 17 cents per kWh), even if fuel cost escalations of the last year are ignored. As another example of a recent cost estimate (though not as up to date as the Florida Power and

---

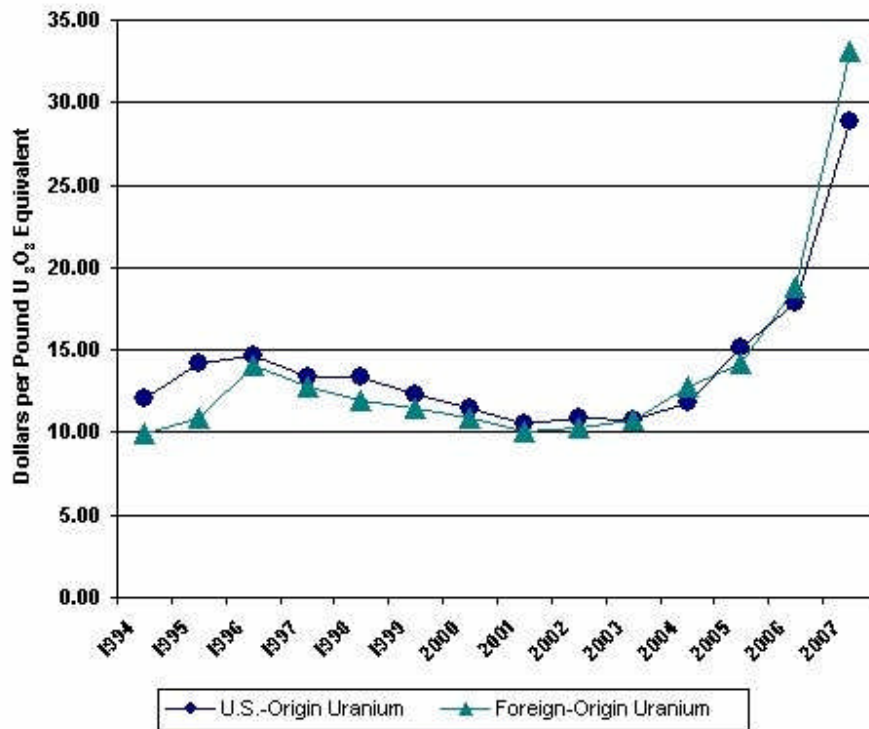
<sup>31</sup> Direct Testimony of Steven D. Scroggs, Florida Power & Light Company, before the Florida Public Service Commission, Docket No. 07\_\_\_\_-EI (October 16, 2007) ("FPL 2007 Testimony"). On the Internet at <http://www.psc.state.fl.us/dockets/cms/docketFilings2.aspx?docket=070650>, (document number 09467-07, Exhibit SDS-8). Note that the docket number is as cited on the document.

Light estimate), a Keystone Center Joint Fact Finding on nuclear energy, in which nuclear industry representatives participated, concluded that nuclear energy would cost between \$83 and \$110 per MWh (Keystone Center, *Nuclear Power Joint Fact Finding* (Keystone, Colorado, June 2007) (available on the Web at [http://www.keystone.org/spp/documents/FinalReport\\_NJFF6\\_12\\_2007\(1\).pdf](http://www.keystone.org/spp/documents/FinalReport_NJFF6_12_2007(1).pdf)). By contrast, the Environmental Report cites a levelized cost range of only \$36 to \$83 per MWh. *Id.* at 10.4-19.<sup>32</sup>

In addition to the capital costs of nuclear power being underestimated, the fuel costs and operation and maintenance costs are also unreasonably low. For instance, the Environmental Report uses 2003 fuel costs of \$4.35 per MWh, as cited in the University of Chicago study. *Id.* at 10.4-7. As can be seen from the chart below, however, 2003 was the low point in uranium prices.

---

<sup>32</sup> It should be noted that the Environmental Report's discussion of nuclear energy costs are inconsistent. The "overall costs" of nuclear energy are given as "\$0.0266 to \$0.0328" on page 9.2-38 of the ER. This range is the same as \$26.60 to \$32.80 per MWh. However, as noted above, the ER gives a completely different range of \$38 to \$83 per MWh on page 10.4-19. This indicates that the ER has not had quality assurance on even the most important points relating to making a sound comparison with alternatives.



Source: Energy Information Administration at  
<http://www.eia.doe.gov/cneaf/nuclear/umar/summaryfig2.html>

The weighted average cost of uranium for US power plants has more than tripled to \$35 per pound of U<sub>3</sub>O<sub>8</sub> (also called yellow cake) since 2003. The spot market price of yellow cake in between June 2007 and May 2008 has been much higher, fluctuating between about \$60 and \$135 per pound.

In sum, careful estimates of the costs of nuclear energy, based on industry and government data, indicate far higher costs than the range of \$36 to \$83 per MWh shown in the Environmental Report.

2. *Costs of renewable energy sources are not properly evaluated.* The Environmental Report states solar energy costs to be 9 to 23 cents per kWh, or \$90 to \$230 per MWh. *Id.* at page 9.2-38 and at pages 9.2-12 and 9.2-13. These costs are fairly realistic representation of large or (in the case of solar PV) intermediate- and large-scale installations at present. However, unlike nuclear, coal, natural gas, and wind turbine costs, the costs of solar-generated electricity have been declining rapidly. Given that the lead time for building solar capacity is much shorter than nuclear, a static cost comparison with solar is an incorrect basis for making a decision in favor of nuclear. .

The Environmental Report states that wind generation cost is 3 to 5 cents per kWh (p. 9.2-38) – or \$30 to \$50 per MWh. The average of this range is \$40 per MWh, which is much lower than the Environmental Report’s estimated average of \$60.50 per MWh for nuclear. Taken at face value, wind energy should be preferred to nuclear based on the costs cited in the Environmental Report.

However, the range of wind energy costs is also low compared to current costs of wind turbine installations. These capital costs of wind power have also escalated in the past few years. A more reasonable range for wind generated electricity costs would be \$80 to \$120 per MWh. Even so, this cost is generally lower than the presently estimated costs of electricity from AP1000 units. The intermittency of wind-generated electricity can be overcome by increasing standby capacity. Only modest increases in standby capacity are required even if wind energy contributes as much as 15 to 20 percent of total electricity generation (See for example EnerNex Corporation et al, *Final Report - 2006 Minnesota Wind Integration Study, Volume I* (prepared by: EnerNex Corporation for the

Minnesota Public Utilities Commission) Table 1 at xvii (November 30, 2006). On the Web at [http://www.puc.state.mn.us/docs/windrpt\\_vol%201.pdf](http://www.puc.state.mn.us/docs/windrpt_vol%201.pdf) This study concluded that reserves in Minnesota would have to be increased from 5 percent to 7.05 percent to accommodate as much as 25 percent wind, provided the wind resources were adequately dispersed. .

3. *Financial risk factors.* The Environmental Report does not consider several financial risk factors. First, the long lead time of nuclear power puts a larger premium on electric power forecasts. In times of financial turbulence, with volatile fuel prices, rising capital costs, uncertainty about the direction of interest rates, and a declining value of the dollar, forecasts of electricity demand 10 to 15 years in the future can be substantially wrong. This has some historical precedent. Rising fuel prices and stagflation in the mid-1970s resulted in a sudden decline in electricity growth rates. This was compounded by the high interest rates and further increases in oil prices in 1979-1980. Long lead time power plants, notably nuclear power plants, were cancelled by the dozen, resulting in costs of tens of billions of dollars to ratepayers and bondholders.

The present situation is broadly similar, though there are some differences in details. The risk of power plants that have both long lead times and high capital costs are the greatest, followed by the risk of persistent high natural gas prices. If an electricity forecast is incorrect, TVA might wind up with surplus capacity, which would result in greater costs to ratepayers and considerable economic harm. Again, there is a specific parallel with respect to TVA from the 1970s, when TVA was had 14 nuclear power reactors under construction at the same time. Eight of them, including Bellefonte Units 1

and 2, were cancelled because of declining electricity growth rates, after billions of dollars had been spent on them.

At the present time, there are clear alternatives available in the form of power plants that have much shorter lead times and that can be built more modularly. Solar photovoltaics built on commercial rooftops and parking lots can be built in modules of one to a few MW and have construction times on the order of a year or even less. Hence, new capacity can be closely tailored to rising demand (apart from the issue of reserve capacity and/or storage – see below).

Solar thermal power plants can be built in modules of a few tens of megawatts to a few hundred megawatts. The lead time for such power plants is about three years.

Second, the Environmental Report does not consider the financial risks implicit in the rapidly declining costs of technology to generate electricity from solar energy. Concentrating solar power and solar PV are the only costs that have been declining rapidly, in contrast to nuclear, wind, and other sources of electricity. The Department of Energy projects that if capacity increase goals are achieved, it would “put the U.S. industry on track to reduce the cost of electricity produced by PV from current levels of \$0.18-\$0.23 per kWh to \$0.05 - \$0.10 per kWh by 2015 – a price that is competitive in markets nationwide.”<sup>33</sup> Even if we assume that the costs in the TVA region would be at the higher end of this cost range due to less favorable insolation conditions, the cost at the high end of the range is still much less than the costs of electricity from new nuclear power plants. It is also considerably lower than the costs of new coal generation, given

---

<sup>33</sup> “DOE Selects 13 Solar Energy Projects for up to \$168 Million in Funding” (March 8, 2007). On the web at <http://www.energy.gov/news/4855.htm>

that significant costs are likely to be imposed for CO<sub>2</sub> emissions in the coming years. For instance, a CO<sub>2</sub> emissions cost of \$50 per metric ton corresponds to a cost of about \$50 per MWh for pulverized coal-fired power plants.

Similarly, the Solar Energy Technologies Program of the DOE estimates that the cost of concentrating solar thermal power (CSP) could be brought down to well under 10 cents by 2020 if there are sufficient orders for such power plants (*Assessment of Potential Impact of Concentrating Solar Power on Electricity Generation*, DOE-GO-102007-2400, February 2007, p. iv). California's renewable energy requirement of 20 percent of its electricity by 2020 has created a spate of orders for both solar PV (250 MW by Southern California Edison over the next five years alone) and CSP, with projects as large as 500 MW.

Finally, the transmission issues associated with large-scale wind generated electricity are also being resolved. For instance, the Electric Reliability Council of Texas (ERCOT) has conducted a transmission optimization study that aims at integrating large amounts new wind power into the electric grid (up to about 18,000 megawatts), up to a total, including existing capacity of nearly 25,000 megawatts.<sup>34</sup>

In such an economic and technological environment, it is likely or very likely that Bellefonte 3 and 4 would become economically obsolete before they come on line, even in the context of the lower insolation in the TVA region.

Additional financial risks that are not considered in the Environmental Report are:

---

<sup>34</sup> *Competitive Renewable Energy Zones (CREZ) Transmission Optimization Study: Attachment A*, ERCOT (April 2, 2008).

- Interest rate risks, since rates could increase at a time when inflationary pressures are on the rise.
- Real cost escalation – costs of raw materials such as steel and cement may continue to rise for a variety of reasons, presenting a risk of cost escalation.
- Foreign exchange risks, since the dollar has been declining for a variety of reasons, and since critical heavy forgings will be imported.
- Risk of delays – Florida Power and Light estimates that for a twin reactor project, a delay of six months delay in its twin reactor project for interest charges alone would be \$400 million to \$600 million.<sup>35</sup>

When all of these financial risks are taken into account, the cost of nuclear power is significantly higher than estimated by TVA. It is also higher than the cost of renewables or is expected to be before the proposed nuclear plant comes on line.

**CONTENTION SEVENTEEN: Inadequacy of Environmental Report’s Analysis of Human Health Impacts of Irradiated Fuel Disposal**

In Chapter 5 of the Environmental Report, TVA addresses the impacts of the uranium fuel cycle, relying on Table S-3 as required by 10 C.F.R. § 51.51. ER at 5.7-1. Table S-3, however, fails to assess the impacts to human health of burying high level waste in a repository. *See* Table S-3, note 1 (“Table S-3 does not include health effects from the effluents described in the Table.”) While TVA claims to have addressed human health impacts and found that they are “SMALL” (Environmental Report, Section 5.7.6 at 5.7-8), TVA’s conclusions are not reasonable or supported by credible evidence. In

---

<sup>35</sup> FPL 2007 Testimony at 52.

fact, the evidence shows that the human health impacts of disposing of spent fuel from the proposed Bellefonte plant are “LARGE.”

This contention is supported by the expert declaration of Dr. Arjun Makhijani (attached as Exhibit A). In addition, BREDL adopts and incorporates by reference the Institute for Energy and Environmental Research’s (“IEER’s”) comments on EPA’s proposed radiation protection standards for the Yucca Mountain repository, which can be found on the Web at: <http://www.ieer.org/comments/waste/yuccaepa.pdf>.

The contention and all of its subparts demonstrate a genuine and material dispute between BREDL and the TVA regarding the significance of the human health environmental impacts of the uranium fuel cycle. The impacts must be assessed with reasonable accuracy in order to ensure that the Environmental Report has an adequate basis for assessing the impacts of licensing the proposed plant and weighing the costs and benefits of alternatives to the proposed plant.

1. TVA concludes that the environmental impacts of high level waste disposal are “SMALL,” based on TVA’s belief that effluents from waste buried in a repository will be within the limits of EPA’s proposed standards. Environmental Report, Section 5.7.6 at 5.7-8. As discussed above in Contention Sixteen, in stating that the impact of spent fuel disposal will be SMALL, using a yardstick of an annual dose of 350 millirem per year (Environmental Report, Section 5.7.6 at 5.7-8), the TVA has not represented the full range of doses that would be experienced by the most exposed people at the time of peak dose in the period between 10,000 years and one million years after disposal. EPA’s proposed standard is actually a probability distribution, in which 350

millirem (or 3.5 mSv) per year is the median dose.<sup>36</sup> This means that half the exposed population at the time of peak dose living in the contaminated zone will be subject to doses below 350 millirem; half will receive higher doses.

The more exposed half of the population could receive doses that are much higher than the median of 350 millirem. For instance, DOE's 2002 Environmental Impact Statement estimates a 95 percentile value of peak dose to be about 600 millirem per year (United States. Department of Energy. *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada. Volume I, Impact Analyses, Chapters 1 through 15*. DOE/EIS-0250. [Washington, DC]: DOE, Office of Civilian Radioactive Waste Management, February 2002, at p. 5-26). Other estimates of performance at Yucca Mountain have yielded even higher dose estimates.

A 95 percentile dose of 600 millirem per year means that five percent of the exposed women would have a lifetime risk of getting cancer equal to or greater than one in 16, and a lifetime fatal cancer risk of equal to or greater than one in 33. This level of risk is completely outside the bounds of any acceptable risks that we impose on our own generation and there is no legal or moral basis for imposing it on generations far into the future. This means that the impacts envisaged in the standard LARGE and not SMALL.

---

<sup>36</sup> The proposed standard states: "DOE will measure the *median* of the distribution of doses against the dose standard beyond 10,000 years, will calculate doses using updated scientific factors, and will incorporate specific direction on analyzing features, events, and processes that may affect performance." Proposed Rule, Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV , 70 Fed. Reg. 49,014 (August 22, 2005) (emphasis added).

Even if the median dose and the corresponding cancer risk to men and women is considered, the risks are unacceptably LARGE and far outside the range of current radiation protection norms – 1 in 36 for cancer incidence and 1 in 72 for fatal cancer risk for a lifetime exposure to the average allowable limit of 350 mrem/year. The EPA has said that much lower risk (*i.e.*, 25 millirem/year, going up to 100 millirem/year) is “unacceptably high.” Ramona Trovato (U.S. Environmental Protection Agency. Office of Radiation and Indoor Air. Office Director.) “Statement on the Nuclear Regulatory Commission's Rule on Radiological Criteria for License Termination.” April 21, 1997. [Given at a hearing at the NRC, Rockville MD, p. 4. Copy attached as Exhibit A].<sup>37</sup>

**CONTENTION EIGHTEEN: Inadequacy of Environmental Report’s Reliance on Table S-3 Regarding Radioactive Effluents From the Uranium Fuel Cycle**

---

<sup>37</sup> In an April 1997 statement on the Nuclear Regulatory Commission’s proposed standard governing licensing termination, which set a 25 millirem per year dose limit with the potential for exposures to go up to 100 millirem per year under certain conditions, Ramona Trovato, the Director of the EPA’s Office of Radiation and Indoor Air, concluded that “a cancer risk of 1 in 250” would be “simply unacceptably high.” *Id.* at 4.

The EPA went on to conclude that:

This draft rule [from the Nuclear Regulatory Commission] would not ensure adequate protection of the public health and the environment. It would not provide the public the level of protection from residual radioactive materials from NRC licensees that they are afforded for other environmental pollutants under EPA's remediation programs, including those that involve radioactive materials.

*Id.* at \_\_pp. 11-12\_.

In Chapter 5 of the Environmental Report, TVA addresses the impacts of the uranium fuel cycle. In accordance with 10 C.F.R. § 51.51, TVA relies on Table S-3 of 10 C.F.R. Part 51, and concludes that the impacts of radioactive waste disposal are “SMALL.” Environmental Report at 5.7-1, 5.7-8. Table S-3, however, fails to make accurate assumptions or estimates about the nature of disposal methods that must be used or the types of radioactive wastes to be disposed of. If accurate information is used about disposal methods and waste types, the environmental impacts of the uranium fuel cycle to human health and the environment are “LARGE.”

This contention is supported by the expert declaration of Dr. Arjun Makhijani (attached as Exhibit B). In addition, BREDL adopts and incorporates by reference the Institute for Energy and Environmental Research’s (“IEER’s”) comments on EPA’s proposed radiation protection standards for the Yucca Mountain repository, *Comments on the U.S. Environmental Protection Agency’s Proposed Rule for the Public Health and Environmental Radiation Protection Standards for Yucca Mountain, Nevada, submitted on Behalf of the Institute for Energy and Environmental Research* (November 21, 2005), which can be found on the Web at: <http://www.ieer.org/comments/waste/yuccaepa.pdf>.

The contention and its subparts demonstrate a genuine and material dispute between BREDL and the TVA regarding the significance of the environmental impacts of the uranium fuel cycle. The impacts must be assessed with reasonable accuracy in order to ensure that the Environmental Report has an adequate basis for assessing the impacts of licensing the proposed plant and weighing the costs and benefits of alternatives to the proposed plant.

BREDL recognizes that this contention raises a challenge to the generic assumptions and conclusions in Table S-3. However, BREDL respectfully submits that the information submitted in its contention constitutes new and significant information, not considered in any previous environmental impact statement (“EIS”), that must be considered in the EIS for the Bellefonte plant because it would have a significant effect on the outcome of TVA’s and the NRC’s analyses of the environmental impacts of licensing the proposed plant. *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360 (1989).

As required by NRC regulations, BREDL intends to submit a rulemaking petition to seek revision of Table S-3. In the meantime, BREDL seeks admission of this contention in order to protect its right to ensure that any generic resolution of BREDL’s concerns is made in a timely way and “plugged in” to the licensing decision in this particular case. *Baltimore Gas and Electric Co. v. Natural Resources Defense Council, Inc.*, 462 U.S. 87, 101 (1983). *See also Commonwealth of Massachusetts v. NRC*, 522 F.3d 115 (1st Cir. 2008). In *Commonwealth of Massachusetts*, the First Circuit found that although the NRC may make generic determinations regarding the significance of environmental impacts and prohibit challenges to those generic determinations in individual proceedings, it nevertheless must “consider any new and significant information regarding environmental impacts before renewing a nuclear power plant’s operating license.” 511 F.3d at 127. Moreover, while the NRC may “channel” into a generic rulemaking the challenging party’s concerns about the effects of new and significant information on an individual licensing decision, the NRC may not refuse to

provide “at least one path by which the [challenging party] may establish a connection” between the rulemaking and the licensing proceeding, thereby ensuring that the result of the rulemaking proceeding will be applied in the individual licensing case. *Id.* at 128. In order to ensure that a “connection” is maintained between any rulemaking petition that BREDL may bring and BREDL’s right to seek application of new and significant information to this license renewal proceeding, BREDL requests that this contention be admitted and held in abeyance pending the outcome of the generic proceeding.

1. TVA concludes that the environmental impacts of high level waste disposal are “SMALL,” based on TVA’s belief that effluents from waste buried in a repository will be within the limits of EPA’s proposed standards: 15 millirem per year for 10,000 years following disposal and 350 millirem per year after 10,000 years through one million years after disposal. Environmental Report, Section 5.7.6 at 5.7-8.

As noted in Contention Seventeen (Inadequacy of Environmental Report’s Analysis of Human Health Impacts of Spent Fuel Disposal), TVA has not taken into account the fact the 350 millirem dose limit is the median dose.<sup>38</sup> This means that half of the maximally exposed population in the contaminated area will be experience doses greater than 350 millirem. Therefore they would experience doses and health risks considerably in excess of those the TVA characterizes as SMALL. These health risks are LARGE, not SMALL.

---

<sup>38</sup> The proposed standard states: “DOE will measure the *median* of the distribution of doses against the dose standard beyond 10,000 years, will calculate doses using updated scientific factors, and will incorporate specific direction on analyzing features, events, and processes that may affect performance.” Proposed Rule, Public Health and Environmental Radiation Protection Standards for Yucca Mountain, NV , 70 Fed. Reg. 49,014 (August 22, 2005) (emphasis added).

Further, as noted in Contention Seventeen, even the median dose of 350 mrem per year would produce lifetime risks that are LARGE not SMALL.

In the past, the EPA has been extremely specific about what it believes to be the level of risk from exposure to anthropogenic radiation that is acceptable today. In an April 1997 statement on the Nuclear Regulatory Commission's standard governing licensing termination which set a 25 millirem per year dose limit with the potential for exposures to go up to 100 millirem per year under certain conditions, Ramona Trovato, the Director of the EPA's Office of Radiation and Indoor Air, concluded that "a cancer risk of 1 in 250" would be "simply unacceptably high." Ramona Trovato, *Statement on the Nuclear Regulatory Commission's Rule on Radiological Criteria for License Termination* at 4 (April 21, 1997). Ms. Trovato's statement, which was presented to the NRC in a hearing on April 21, 2007. As noted in Contention Seventeen, the lifetime risk of fatal cancer at an exposure rate of 350 millirem per year is much greater than the "unacceptably high" level of 1 in 250. There is no reason to think that a human being on earth tens of thousands of years from now would need any less protection from radiation in the environment.

2. Neither the Environmental Report nor Table S-3 adequately addresses the environmental impacts of disposal of Class B, C, and Greater than Class C waste. With respect to Class B and C waste, the Environmental Report says almost nothing about these waste streams. On page 5.7-7, it just cites reference plant data and says that "the NRC notes in the reference plant data that there are to be no significant radioactive releases to the environment." On page 5.7-16, it simply states that these wastes will have

“shallow” burial. Shallow burial of low-level radioactive waste can have considerable radiological consequences in the long-term, depending on disposal sites, packaging, and the amounts of waste involved. Further, the assumption in Table S-3 that wastes other than high level wastes will be “buried on site” is not in conformity with present regulations for Class A, B, C, or Greater than Class C waste, which require licensed disposal sites.

With respect to GTCC waste, Table S-3 is severely outdated. There was no GTCC waste category when the 10 CFR § 51.51 and Table S-3 were written in the late 1970’s. Final Rule, *Licensing and Regulatory Policy and Procedures for Environmental Protection; Uranium Fuel Cycle Impacts from Spent Fuel Reprocessing and Radioactive Waste Management*, 44 Fed. Reg. 45,392 (August 12, 1979). NRC regulations regarding GTCC waste were not written until ten years later. Final Rule, *Disposal of Radioactive Wastes*, 54 Fed. Reg. 22,578 (May 25, 1989) The Part 61 low-level waste regulations require disposal of GTCC in a deep geologic repository and prohibit shallow land burial without a specific exemption. Thus, Table S-3’s assumption that GTCC waste may be disposed of on site in shallow land burial is entirely unfounded. Further, the Environmental Report’s assumption that GTCC waste can be disposed of by shallow land burial is also similarly unfounded. GTCC waste has been designated for repository disposal (unless a special license is granted to do otherwise) because much GTCC waste has high radioactivity per unit volume and is long-lived. Its impacts in the absence of repository disposal could therefore be considerable – though the amounts would be site specific. Therefore Table S-3, which was prepared prior to the understanding that led to

the creation of a GTCC category, cannot be relied upon for estimating the environmental impact of GTCC disposal.

Finally, it is premature to address the environmental impacts of GTCC disposal until the U.S. Department of Energy (“DOE”) completes the Environmental Impact Statement (“EIS”) that it is currently preparing regarding GTCC disposal. *See Notice of Intent to Prepare an Environmental Impact Statement for the Disposal of Greater-Than-Class-C Low-Level Radioactive Waste*, 72 Fed. Reg. 40,135 (July 31, 2007); *Notice of Intent to Prepare an Environmental Impact Statement for the Disposal of Greater-Than-Class-C Low-Level Radioactive Waste: Correction*,” 72 Fed. Reg. 41,819 (July 31, 2007). This EIS is being prepared because the DOE considers the development of capability to dispose of GTCC waste as a major federal action.<sup>39</sup> A full evaluation of the impacts of options of GTCC disposal has never been done. Until that is complete and until the specifics are incorporated into this license application and ER, both the LA and ER will remain incomplete.

3. Table S-3 makes no mention of the large amounts of depleted uranium that will be generated in the course of enrichment of uranium to produce fuel for the proposed nuclear reactors. Large amounts of DU from uranium enrichment plants has been declared a low-level waste by the NRC Commission, but its classification within the low-level waste scheme has yet to be decided. In fact, the NRC has asked its staff to conduct

---

<sup>39</sup> According to the GTCC EIS website set up by Argonne National Laboratory for the GTCC EIS process, “The Secretary of Energy has determined that development of disposal capability for GTCC LLW is a major Federal action that may have a significant impact upon the environment within the meaning of the National Environmental Policy Act of 1969 (NEPA). On the web at <http://www.gtceis.anl.gov/eis/why/index.cfm>

a generic proceeding to determine such a classification.<sup>40</sup> That proceeding has not yet begun.

Over the 40-year lifetime of the plant, over 10,000 metric tons of depleted uranium would be generated in the process of enriching fuel for the proposed two-unit power plant (based on 0.25 percent tails). DU has radiological characteristics similar to Greater than Class C low-level waste containing long-lived, alpha emitting transuranic radionuclides at concentrations greater than 100 nanocuries per gram. Shallow land disposal of over 10,000 metric tons of DU would cause substantial health and environmental impacts. An assessment done by IEER regarding the environmental effects of the disposal of 133,000 metric tons of DU from an enrichment plant proposed for New Mexico concluded that peak doses from the disposal would be in the hundreds of rem per year to the maximally exposed individual under a variety of shallow land disposal conditions, including disposal in dry or wet areas (Arjun Makhijani and Brice Smith, *Costs and Risks of Management and Disposal of Depleted Uranium from the National Enrichment Facility Proposed to be Built in Lea County New Mexico by LES*, IEER, Takoma Park, Maryland, November 24, 2004 Table 5 at p. 24). In contrast, the maximum allowable dose from low-level radioactive waste disposal is only 0.025 rem per year. This means that DU from enrichment plants, over the life of the plant, if

---

<sup>40</sup> "...the Commission directs the NRC staff, outside of this adjudication, to consider whether the quantities of depleted uranium at issue in the waste stream from uranium enrichment facilities warrant amending section 61.55(a)(6) or the section 61.55(a) waste classification tables." Nuclear Regulatory Commission Memorandum and Order, CLI-05-20, October 19, 2005.

disposed on in shallow land burial, would produce doses thousands of times greater than the allowable limit at the time of peak dose.

The above calculation was for the entire DU output of the enrichment plant. The impact of disposal of over 10,000 metric tons DU from one twin-reactor project would be lower than the impact of an entire enrichment plant's DU output, but it would still be very substantial. Peak doses from disposal of 10,000 metric tons of DU would be on the order of several rem per year or more. This is a hundred times or more over the maximum allowable dose (0.025 rem per year) under 10 CFR 61 Part C, which governs health impacts from low-level waste disposal. Hence the expected impact from shallow land disposal of DU from the proposed plant would be LARGE. The ER is fundamentally incomplete without specific consideration of the impacts of DU disposal.

**CONTENTION NINETEEN: Environmental Report's Improper Characterization of Health Effects from the Uranium Fuel Cycle as Small and Failure to Adequately Compare Them to Health Effects of Alternative Energy Sources**

The Environmental Report estimates that the annual population dose from routine operations at the proposed Bellefonte nuclear power plant will be 2,247 rem, including radon and Tc-99. *Id.* at 5.7-19. But the Environmental Report fails to evaluate what this means with respect to the number of cancer illnesses and deaths that are likely to be caused by the plant's operation. Instead, the Environmental Report states that:

The sum of the estimated whole body population doses from gaseous effluents, liquid effluents, Rn-222, and Tc-99 discussed above can be used to estimate the number of fatal cancers, nonfatal cancers, and severe hereditary effects that the U.S. population would incur annually. This risk is quite small compared to the number of fatal cancers, nonfatal cancers, and severe hereditary effects that are

estimated to occur in the U.S. population annually from exposure to natural sources of radiation using the same risk estimation method.

Environmental Report at 5.7-7.

In fact, the likely incidence of cancer illness and mortality is significantly in excess of cancer illness and mortality from exposure to natural sources of radiation. Applying BEIR VII risk factors of 1,135 cancers per million rem (incidence) and 570 cancer deaths per million rem to this dose estimate,<sup>41</sup> the annual expected cancers, based on the BEIR VII risk averaged for males and females are as follows:

Cancer incidence over 40 years of operation: 102

Cancer deaths over 40 years of operation: 51

Thus, the radiation doses projected by TVA would lead to a significant number of cancers from plant operation, even assuming no mishaps or major accidents.

TVA has estimated the fatal cancers from sources other than radon and Tc-99 as 0.8 cancer deaths per year of BLN operation (p. 5.7-6). Hence even TVA acknowledges that over the lifetime of the plant, it is estimated to cause 32 fatal cancers. We have used more recent risk coefficients, published by the National Academies in 2006, to estimate

---

<sup>41</sup> Committee to Assess Health Risks from Exposure to Low Levels of Ionizing Radiation, Board on Radiation Effects Research, National Research Council of the National Academies (Richard R. Monson, Chair), *Health Risks from Exposure to Low Levels of Ionizing Radiation: BEIR VII – Phase 2* (Washington, DC: National Academies Press, 2006) (on the Web at <http://darwin.nap.edu/books/030909156X/html>). The table of risk factors is on page 15. In January, the Science Advisory Board of the Environmental Protection Agency recommended to the EPA that it adopt the BEIR VII report for most cancers. *Advisory on Agency Draft White Paper entitled “Modifying EPA Radiation Risk Models based on BEIR VII”*, Science Advisory Board, EPA-SAB-08-006, January 31, 2008.

the number of cancer deaths and also the number of cancer cases (whether fatal or not). We have also added the cancer cases and deaths due to radon and Tc-99 doses estimated by TVA on Table 5.7-3 (p. 5.7-18) and reproduced on p. 5.7-19.

TVA has claimed that the radiological impact from routine operation of the nuclear fuel cycle is SMALL (p. 5.7-7) based on reference to cancers expected to occur “from exposure to natural sources of radiation using the same risk estimation method.” (p. 5.7-7). TVA also argues that an epidemiological study concluded that any risk of cancer from nuclear power plants was “too small to be detected by the methods employed.” (p. 5.7-7).

The latter argument is clearly specious. If natural lightning destroys a vast swath of forest, for instance, and if in this context someone destroying a few trees by fire or by cutting them down cannot be detected by the methods employed, it does not change the fact of the anthropogenic destruction. A tree falls in the forest when cut down, even if someone is not there to detect it.

As regards cancers caused by natural background radiation, we note that it is fundamentally improper to compare natural sources of risk to involuntarily imposed radiation. Even if the latter is small and the former large, the latter has a much larger social significance. We are not free, for instance, to punch a neighbor in the nose because the suffering that causes is much smaller than the suffering of dying from natural causes, for instance. Were appeals to the ills and sufferings inherent in life to provide a rationale for infliction of damage by human beings on one another, social order would

break down into violence by the strong on the weak – which is precisely one of the conditions that government seeks to prevent.

Dozens of cancer deaths and over one hundred cancer cases over the life of the plant cannot be regarded as a SMALL impact. We regard the impact as LARGE

The Environmental Report is also deficient because it fails to compare the health effects of operating the proposed plant with the health effects of alternative energy-producing technologies such as wind and solar energy, or with the alternative of energy conservation. The ER should include a comparison of cancer incidence and mortality expected from both the proposed Bellefonte plant and from the use of alternative energy sources.

This contention is supported by the Declaration of Dr. Arjun Makhijani, which is attached as Exhibit B. The contention demonstrates a genuine and material dispute between BREDL and TVA regarding the adequacy of the Environmental Report to address the environmental impacts of the proposed Bellefonte nuclear plant and to adequately weigh the relative costs and benefits of alternative sources of energy.

**CONCLUSION**

We believe that the foregoing contentions should be admitted because they satisfy the Commission's requirements in 10 C.F.R. § 2.309 and 10 C.F.R. § 52.103; we request that a hearing be granted.

Respectfully submitted this 6<sup>th</sup> day of June, 2008

\_\_\_\_\_/s/\_\_\_\_\_  
Louis A. Zeller  
Blue Ridge Environmental Defense League  
PO Box 88  
Glendale Springs, North Carolina 28629  
(336) 982-2691  
e-mail: BREDL@skybest.com

\_\_\_\_\_/s/\_\_\_\_\_  
Sara Barczak  
Southern Alliance for Clean Energy  
428 Bull Street  
Savannah, Georgia 31401  
(912) 201-0354  
e-mail: sara@cleanenergy.org

**UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION**

**BEFORE THE SECRETARY**

In the Matter of	)	
	)	
Tennessee Valley Authority	)	Docket Nos. 52-014, 52-015
	)	
Bellefonte Nuclear Power Plant	)	
Units 3 and 4	)	
	)	

**CERTIFICATE OF SERVICE**

I hereby certify that copies of the June 6, 2008 PETITION FOR INTERVENTION AND REQUEST FOR HEARING BY THE BELLEFONTE EFFICIENCY AND SUSTAINABILITY TEAM, THE BLUE RIDGE ENVIRONMENTAL DEFENSE LEAGUE AND THE SOUTHERN ALLIANCE FOR CLEAN ENERGY was served on the following persons via Electronic Information Exchange this 6<sup>th</sup> day of June, 2008. Further, I certify that a NOTICE OF APPEARANCE FOR SARA BARCZAK was also filed:

Office of the Secretary  
ATTN: Docketing and Service  
Mail Stop 0-16C1  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001  
(E-mail: hearingdocket@nrc.gov)

Office of Commission Appellate  
Adjudication  
US Nuclear Regulatory Commission  
Washington, DC 20555-0001  
(E-mail: ocaamail@nrc.gov)

Patrick A. Moulding, Esq.  
Ann P. Hodgdon, Esq.  
US Nuclear Regulatory Commission  
Mail Stop O-15 D21  
Washington, DC 20555-0001  
(E-mail: patrick.moulding@nrc.gov,  
ann.hodgdon@nrc.gov)

Louise Gorenflo  
Bellefonte Efficiency & Sustainability Team  
185 Hood Drive  
Crossville, TN 28555  
(E-mail: lgorenflo@gmail.com)

Steven P. Frantz, Esq.  
Stephen J. Burdick, Esq.  
Morgani, Lewis & Bockius LLP  
1111 Pennsylvania Ave., NW  
Washington, DC 20004  
(E-mail: sfrantz@morganlewis.com,  
sburdick@morganlewis.com)

Edward J. Vigluicci, Esq.  
Scott A. Vance, Esq.  
Tennessee Valley Authority  
400 West Summit Hill Dr., WT 6A-K  
Knoxville, TN 37902  
(E-mail: ejvigluicci@tva.gov,  
savance@tva.gov)