

# **Blue Ribbon Commission on America's Nuclear Future Environmental Perspectives Panel**

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January 7, 2011

**Blue Ridge Environmental Defense League**

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*Wisdom, justice and moderation*

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## Overview

### Blue Ribbon Commission on America's Nuclear Future

Full Meeting: January 7, 2011

Augusta, Georgia

#### Panel One—Environmental Perspectives

Established by President Obama's Memorandum for the Secretary of Energy dated January 20, 2010, the Blue Ribbon Commission on America's Nuclear Future is to conduct a comprehensive review of the so-called back end of the nuclear fuel cycle.

The Commission's responsibilities include seeking input on a variety of commercial and military nuclear waste issues including but not limited to storage of irradiated nuclear fuel, long-term nuclear waste disposition including deep geological disposal, altering or amending existing laws including the Nuclear Waste Policy Act, and nuclear waste fund questions. Moreover, the Commission's deliberations are to be conducted in an open and transparent manner, with broad participation.

This paper will address the a variety of issues related to the Savannah River Site and nuclear power including plutonium fuel manufacturing and site remediation, possible plutonium fuel use at nuclear power plants in Tennessee and Alabama, the impacts of pollution from SRS on surrounding communities, and the ongoing cleanup of radioactive waste from a half-century of nuclear weapons development and manufacture.

Within this context, we cannot overlook important issue of environmental justice with a special emphasis on President Clinton's Executive Order No. 12898: "Federal Actions to Address Environmental Justice in Minority Populations and Low-income populations."

Finally, we address the renaissance of nuclear power and the issues of nuclear waste storage and disposition, nuclear fuel manufacturing, economic risks, energy policy impacts, pollution and public health in the Southeast.

We are grateful to the Commission for allowing us to present these issues at the Augusta meeting. Special thanks go to Commission staff Mary Woollen and members of the Commission who extended the invitation to be on this panel.

## **Principal Recommendation: A Non-nuclear American Future**

When the President established the Blue Ribbon Commission on America's Nuclear Future, he stated:

In performing its functions, the Commission should consider a broad range of technological and policy alternatives, and should analyze the scientific, environmental, budgetary, economic, financial, and management issues, among others, surrounding each alternative it considers. Where appropriate, the Commission may also identify potential statutory changes.

We believe that the broad range of alternatives must include the cessation of commercial nuclear power in the United States. This alternative would include a moratorium on all new construction and operating licenses now being considered by the Nuclear Regulatory Commission under 10 CFR Part 52, the cessation of renewal or extension of existing operating licenses under 10 CFR Part 50, and the replacement of these units with forms of electric power which create no back end nuclear waste problems. Under this alternative, an orderly transition to nuclear free commercial electric power generation would take place over a period of years without disruption to industry, commerce or public safety. Further, the transition, if done properly, would provide ample opportunities for economic growth and job development with beneficial impacts on environmental quality and public health. Thus, America's Non-nuclear Future would have the smallest possible requirement for storage and disposal of high-level nuclear waste of all the alternatives under consideration by the Commission.

Further Recommendations:

- Additional exposure to the Central Savannah River Area region must be limited to be as low as reasonably achievable, not what is merely legal. This means no additional radioactive waste disposition.
- Licensing of construction at Plant Vogtle be suspended pending the results of the NAS cancer study.
- Loan guarantees and other nuclear subsidies be rescinded and the redirection of resources in favor of wind energy and other truly clean and economical sources of electric power.
- Enjoin the NRC from issuing new licenses or renew existing licenses for nuclear power plants.
- NRC cannot conduct an independent licensing process. We recommend that the Blue Ribbon Commission seek an independent project audit from a special *ad hoc* commission.

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<sup>1</sup> January 29, 2010 Memorandum, [http://www.energy.gov/news/documents/2010nuclearfuture\\_memo.pdf](http://www.energy.gov/news/documents/2010nuclearfuture_memo.pdf)  
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## Health Impacts on Residents Associated with Nuclear Exposure

### South Carolina: Savannah River Site

Annual health statistics compiled by South Carolina for 2008 reveal that the highest cancer mortality rate in the state is in Region 5, an area encompassing Aiken, Barnwell, Allendale, Orangeburg, Bamberg and Calhoun counties and the Department of Energy's Savannah River Site. Cancer is leading cause of death in Aiken and Orangeburg counties, and second leading cause in the other four.<sup>2</sup> Ten years ago, Aiken County's death rate was 9.2 per thousand and Barnwell County's was 10.9 per thousand; both were higher than the overall statewide death rate in 1998 was 9.1 per 1000 population.<sup>3</sup> Then as now, the two highest mortality rates by a large margin in each county were for heart disease and cancer, both associated with exposure to ionizing radiation.<sup>4</sup>

The legacy of a half century of radioactive contamination from SRS is certainly a risk factor in the devastating public health problems in this region. Since operations began in 1951, SRS has generated over 140 million gallons of liquid radioactive waste. Through the use of tank farm evaporators, 104 million gallons of this liquid waste has been emitted into the air, leaving 36.4 million gallons of liquid and solid wastes in the SRS tank farm. Within this remaining volume are 490 million curies of liquid, solid and salt wastes. Of this total, 45% of the radioactivity, 223 million curies, and 93% of the volume, 33.8 million gallons, is in the form of salt waste containing a mixture of Cesium-137 and Strontium-90 and other dangerous radionuclides. Contamination of the tributaries and aquifers near the Savannah River Site is fairly well documented. Less well understood is the role of airborne radioactive pollution on surrounding communities. As already noted, SRS has intentionally dumped 104 million gallons of liquid waste into the air via evaporation processes. To this the Department of Energy would now add 32.2 million gallons to be evaporated by 2020.<sup>5</sup>

According to the Centers for Disease Control SRS Health Effect Subcommittee, the radionuclides of concern during air releases are Iodine-131, Hydrogen-3 (tritium) and Argon-141; the most important pathways of ingestion for airborne contamination are through the eating of milk and beef.<sup>6</sup> The airborne emission of dangerous radionuclides has had and will continue have a negative impact on the health of people living in the Central Savannah River Area, especially children and the unborn who are particularly vulnerable to radiation. Additional exposure to the region must be limited to be as low as

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<sup>2</sup> Data Source: SCDHEC SCAN; Generated by Chronic Disease Epidemiology and Evaluation (2008)  
<http://www.scdhec.gov/health/epidata/calhoun.htm>

<sup>3</sup> *South Carolina Vital And Morbidity Statistics 1998*, Volume I, Division of Biostatistics, SC Department of Health and Environmental Control, December 1998

<sup>4</sup> "Radiation from Medical Procedures in the Pathogenesis of Cancer and Ischemic Heart Disease," John W. Gofman, MD, PhD, First Edition, Committee for Nuclear Responsibility, Inc. San Francisco (1999)

<sup>5</sup> Draft Basis for Section 3116 Determination for Closure of F-Tank Farm at the Savannah River Site, September 30, 2010, [http://sro.srs.gov/DOE-SRS-WD-2010-001\\_R0.pdf](http://sro.srs.gov/DOE-SRS-WD-2010-001_R0.pdf)

<sup>6</sup> *Executive Summary*, SRS Health Effects Subcommittee, Centers for Disease Control and Prevention, Dept of Health and Human Services, 25 August 2004

reasonably achievable, not merely to meet state or federal standards.<sup>7</sup>

### Georgia: Plant Vogtle

In 2010 residents living near Plant Vogtle formed Shell Bluff Concerned Citizens, a chapter of the multi-state Blue Ridge Environmental Defense League. People who live and work in Burke County and for decades have witnessed the operation of two nuclear reactors at Plant Vogtle. Now Southern Company wants to build two more. We oppose the expansion of Plant Vogtle.

There are routine releases of airborne radioactive pollution from plant Vogtle, and large increases in radioactivity downstream from the plant. Even without an accident, Vogtle emits radioactive pollution during normal operation.

Every year, radioactive water in the form of Tritium is emitted by Plant Vogtle into the river. In 2003, Vogtle's pollution was 1,900 curies; in 2004, 1,200 curies and in 2005, 1860 curies.<sup>8</sup> The discharge of Tritium (Hydrogen-3) in the form of radioactive water pollutes the Savannah River all the way to the ocean. Downstream drinking water wells are also contaminated. Residents of Beaufort, SC (112 miles downriver) and Port Wentworth, SC (122 miles downriver) have had their public drinking water supplies contaminated with radiation.<sup>9</sup> Other radioactive pollutants, including Cesium-137 and Cobalt-60, have also increased downstream from the Vogtle reactors since they began operation.

The two existing reactors at Plant Vogtle discharge 10,000 gallons of liquid waste per minute into the Savannah River. The everyday discharge of hot water includes nuclear fission products and tritium at over 1,400 curies/year. The addition of two new reactors would increase this radioactive pollution by an additional 2,020 curies per year.<sup>10</sup>

These air and water emissions have negative impacts on public health. There is no safe level of radiation. And merely meeting federal regulations does not make a nuclear plant safe. Chronic exposure to fairly low-levels of beta radiation can cause cancer. Cesium-137 and Cobalt-60 emit both beta and gamma radiation. Exposure to beta radiation via inhalation or ingestion can cause tissue damage and increase the risk of cancer. Gamma rays travel great distances and can penetrate most barriers. It is considered the primary hazard to the general population during most radiological emergencies.

Local residents depend on the Savannah River for fish to feed their families. Radiological monitoring reveals that Savanna River fish are contaminated with Cesium-

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<sup>7</sup> *Long-Term Institutional Management of US DOE Legacy Waste Sites*, National Research Council of the National Academy of Science, August 2000

<sup>8</sup> Westinghouse Savannah River Company Environmental Reports: 2003, 2004, 2005, WSRC-TR-2004-00015, WSRC-TR-2005-00005, WSRC-TR-2006-00007

<sup>9</sup> Beaufort/Jasper County Water Treatment Plant and Cherokee Hill Water Treatment Plant recorded 17% increase in beta radiation in finished drinking water and 37% increase in beta radiation in raw water supply.

<sup>10</sup> Sources: SNOG Vogtle ESP ER Table 2.9-1; Table 3.0-1; Table 3.5-1

137.<sup>11</sup> Tests in the vicinity of Plant Vogtle routinely find Cesium-137 in the edible parts of fish. Radioactive Cesium-137 is of particular concern because levels actually increase when fish is cooked.<sup>12</sup> One study found that cesium levels increase by 32% when fish are fried with breading, and by 62% when fried without breading.<sup>13</sup>

A study conducted by the University of South Carolina has shown that there is a higher than average instance of cervical cancer in black women, and a higher rate of esophageal cancer in black men, within a fifty mile radius of Plant Vogtle.<sup>14</sup> Some people blame the old atomic bomb plant at Savannah River Site, which lies just across the River from Burke County, but Georgia EPD monitoring indicates much of the radioactive pollution comes from the two nuclear reactors at Plant Vogtle. Studies of public health data<sup>15</sup> indicate that the death rate per 100,000 population from all cancers in Burke County increased by 24.2% and that infant deaths increased by 70.1% in Burke County after the Plant Vogtle reactors went online.<sup>16</sup>

Irradiated fuel is a waste product of all nuclear reactors. This high-level radioactive waste would have to be stored at the Vogtle site for decades even after the reactors cease to operate, and perhaps indefinitely. There is no place for this radioactive waste to go.

As a federal agency the Department of Energy must comply with environmental justice requirements by avoiding disproportionate adverse environmental impacts on low income populations and minority communities. The relevant federal regulation is Executive Order 12898 which states:

To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The NRC must avoid disproportionate, adverse environmental impacts on low income and minority populations and impacts on important religious, subsistence, or social practices.<sup>17</sup>

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<sup>11</sup> *Vogtle Electric Generating Plant, Annual Radiological Operating Report for 2005*, Southern Company (2006).

<sup>12</sup> Joanna Burger, et al., *Effects of Cooking on Radiocesium in Fish from the Savannah River: Exposure Differences for the Public*, Arch. Environ. Contam. Toxicol. 46, p. 231, 2004. (Exhibit 2.6).

<sup>13</sup> *Id.* The weight loss during cooking of a breaded fish was 25% and the weight loss of an un-breaded fish was 39%.

<sup>14</sup> 1997 FEB 3, Cancer Weekly via NewsRx.com & NewsRx.net (Exhibit 2.7).

<sup>15</sup> U.S. Centers for Disease Control and Prevention ICD-9 codes 000.1-799.9 (<http://wonder.cdc.gov>)

<sup>16</sup> "Health Risks of Adding New Reactors to the Vogtle Nuclear Plant: Radioactive contamination from Vogtle reactors 1 and 2 and changes in health status within a 40 mile radius" by Joseph J. Mangano, MPH MBA. Mangano is Director, Secretary, and the National Coordinator of the Radiation and Public Health Project. Report available at: <http://www.bredl.org/pdf/HealthRisksofNewReactorsatVogtle-June2007.pdf>

<sup>17</sup> Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, February 11, 1994

Whether the plague in Shell Bluff is caused by pollution from the old SRS bomb plant, which closed its reactors years ago, or from Vogtle's reactors which continue to operate, it is imperative that before any additional nuclear power plants are constructed, state and federal agencies must determine the cause in order to eliminate and prevent disproportionately high and adverse human health or environmental effects. Presently, the National Academy of Sciences is doing an assessment of cancer risks in people living near nuclear facilities. The scoping phase of the study began in September 2010 and is to continue through 2011. When it is complete, an epidemiological study of cancer risks will be undertaken.<sup>18</sup> We hereby recommend to the Blue Ribbon Commission that licensing of construction at Plant Vogtle be suspended pending the results of the NAS cancer study.

In addition to the above Executive Order, there are critical Constitutional due process and equal protection considerations. Specifically, 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." However, these rights are violated because of inequitable standards of protection which treat people differently and deprive them of Constitutional guarantees. Federal regulations do not prevent radiation exposure, they sanction it. 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 (5.0xE-05) and a lifetime risk of 3.5 in 1,000 (3.5-E03). 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 lifetime.<sup>19</sup> 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.<sup>20</sup>

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

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<sup>18</sup> *Analysis of Cancer Risks in Populations Near Nuclear Facilities: Phase 1*, available at <http://dels.nas.edu/global/nrsb/CancerRisk>, accessed 6 January 2010, This page contains the most current information on this project

<sup>19</sup> "Table of Fatal Cancer Risk from Ionizing Radiation," NRC Below Regulatory Concern Policy, 22 June 1990

<sup>20</sup> 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



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.<sup>21</sup>

The difference in lifetime cancer risk between one person per million ( $1 \times 10^{-6}$ ) and 3 or 4 persons per 1000 ( $3.5 \times 10^{-3}$ ) is three orders of magnitude, or one thousand times greater for radioactive pollution. This is not equal protection. And the disproportionate adverse impacts are borne primarily by the residents of Shell Bluff.

### **Clean Alternatives to Nuclear Power Are Available**

Wind energy is a clean, safe and abundant source of electric power. The Department of Energy's Pacific Northwest Laboratory estimates the energy potential of the U.S. wind resource at 10.8 trillion kilowatt-hours per year; three times total U.S. electricity consumption.

Wind turbines are extremely effective at reducing emissions of carbon dioxide. A single 750-kilowatt wind turbine operating at a typical 30% efficiency produces about 2 million kilowatt-hours of electricity annually. Based on the U.S. average fuel mix, approximately a pound and a half of carbon dioxide is emitted for every kilowatt-hour of electric power generated. Therefore, an average sized utility scale wind turbine prevents the emission of 1,500 tons of carbon dioxide per year.

$$2 \text{ million kWh} \times 1.5 \text{ pounds CO}_2/\text{kWh} = 1500 \text{ tons of CO}_2$$

In 2009 over 10,000 MW of new wind power capacity was installed in the United States, up from 8,800 in 2008. This new electric generating capacity provided as much power as three large nuclear power plants, enough for 2.4 million homes.<sup>22</sup>

We recommend that the United States phase out nuclear power. Other leading industrial nations are doing so. Sweden will phase out nuclear power by 2030. Belgium requires the shut-down of its nuclear power plants after 40 years of operation. In 2002 Germany passed a nuclear phase out law requiring that nuclear power plants be shut down after an average operating life of about 32 years. Two have already been shut down. In 2004 Spain's government pledged to abandon nuclear energy and increase support for renewable energy; the first unit was shut down in 2006. Four years ago the United Kingdom's Sustainable Development Commission concluded:

The majority of members of the Commission believe that, given sufficient drive and support, a nonnuclear strategy could and should be sufficient to deliver all

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<sup>21</sup> *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

<sup>22</sup> "Wind Power sinks back to 2007 levels with only 700 MW installed in second quarter," AWEA Press Release July 27, 2010, [http://www.awea.org/rn\\_release\\_07-27-10b.cfm](http://www.awea.org/rn_release_07-27-10b.cfm)

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the carbon savings we shall need up to 2050 and beyond, and to ensure secure access to reliable sources of energy. The relatively small contribution that a new nuclear power programme would make to addressing these challenges (even if we were to double our existing nuclear capacity, this would give an 8% cut on total emissions from 1990 levels by 2035, and would contribute next to nothing before 2020) simple doesn't justify the substantial disbenefits and costs that would be entailed in such a programme.<sup>23</sup>

We are pleased that the Administration has put renewed emphasis on large-scale wind power development. However, we are disappointed with the continued support for polluting, expensive and risky nuclear power plants; the \$8.3 billion loan guarantee should never have been awarded to Southern Nuclear Operating Company. We recommend that these loan guarantees and other nuclear subsidies be rescinded and the redirection of resources in favor of wind energy and other truly clean and economical sources of electric power.

### **Risks of Plutonium Fuel Production at SRS**

Plutonium is flammable, toxic and radioactive. It's unstable, unpredictable and difficult to handle, store, or transport. During the Cold War, about 39 tons of plutonium was produced at the Savannah River Site weapons complex in South Carolina. Today, plutonium from scrapped nuclear missiles is a waste product with no good use. For over a decade, the US Department of Energy has promoted its use as fuel in commercial nuclear power plants, and plans to manufacture it at SRS. And for about as long, the Blue Ridge Environmental Defense League has opposed this plan. Plutonium must be kept out of the air, water, soil, and out of the hands of people who would use it to do harm.

Massive amounts of liquid radioactive waste would be generated during "plutonium polishing" operations at the plutonium fuel factory now under construction at the Savannah River Site. "Plutonium oxide polishing" is the public relations term for the chemical purification of plutonium powder, using silver nitrate and nitric and oxalic acids, in order to strip away unwanted impurities like gallium, highly enriched uranium, and highly radioactive americium. Duke-Cogema-Stone and Webster, estimate the factory would produce 89,000 gallons of high activity liquid alpha radioactive waste and 214,000 gallons of low-level waste per year. Much of the high alpha activity waste would be laced with dangerous amounts of intensely radioactive Americium.

Less than 100 micrograms of plutonium oxide in the lungs can cause lung cancer within a few decades, and the acute lethal doses are only 500 milligrams for ingestion and 20 milligrams for inhalation. Plutonium is a fissile material, so there is always a risk of an uncontrolled nuclear chain reaction, referred to as criticality, when there is one or more kilograms of plutonium in one place. Since there will be nearly 60 kilograms of

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<sup>23</sup> "Sustainable Development Commission, Is Nuclear the Answer?" London, March 2006, <http://www.greens-efa.org/cms/topics/dokbin/206/206749.pdf>, from *World Nuclear Industry Status Report 2007*, Mycle Schneider with Antony Froggatt, p. 31

plutonium within plutonium fuel assemblies, the greatest consequence of a severe accident is probably a major uncontrolled nuclear chain reaction that releases intensely radioactive fission products.

However, the use of plutonium oxide fuel in commercial power reactors will not significantly reduce the amount of plutonium. Nuclear reactors produce plutonium where none existed before. A typical commercial reactor produces 500 pounds of plutonium a year. Government contractors have estimated that using plutonium oxide in commercial reactors would reduce the total plutonium by only 1%.

Furthermore, plutonium oxide fuel would be a valuable target. The secrecy and defense measures which the military uses to transport plutonium would have to be duplicated by every domestic utility company using plutonium fuel. Also, the transport of the plutonium fuel to reactor sites would add to the risk of accidental release of radiation.

A report prepared by a special commission of International Physicians for the Prevention of Nuclear War and the Institute for Energy and Environmental Research states:

Using plutonium as fuel on a large scale would be difficult to safeguard and would involve a high risk of diversion. In the case of plutonium from weapons, there would be a regular traffic of plutonium oxide from dismantlement and storage sites to fabrication facilities and reactors, with the risk of attack along transportation routes.<sup>24</sup>

Plutonium fuel in commercial reactors would make civilian and military nuclear technologies indistinguishable from one another.

Our opposition to plutonium fuel is comprehensive. We have published detailed studies, done our own testing, held public meetings, and spoken at public hearings. We mounted grassroots legal campaigns which helped expose the negative aspects of the program. We've worked with activists in France, Britain, Russia, and Japan who believe as we do that plutonium should be relegated to the dustbin of history.

In the 21<sup>st</sup> Century we face a complex international security picture. What the United States decides both to do and not to do with dismantled warheads will affect international stability for decades. Plutonium fueled reactors and other technologies which combine military and domestic uses of fissionable materials would create an impossibly complicated proliferation puzzle.

### **Potential Consequences of Accident and Terrorist Attack**

Malevolent acts against nuclear fuel and high-level waste shipments are a major threat, made clear by the September 11, 2001 terrorist attacks on the United States. The Nuclear

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<sup>24</sup> International Physicians for the Prevention of Nuclear War and The Institute for Energy and Environmental Research, *Plutonium: Deadly Gold of the Nuclear Age*, International Physicians Press, Cambridge Massachusetts, 1992, p.133-134

and Radiation Studies Board, unable to perform an in-depth technical examination of transportation security because of classified information constraints nevertheless made the following recommendation:

An independent examination of the security of spent fuel and high-level waste transportation should be carried out prior to the commencement of large-quantity shipments to a federal repository or to interim storage. This examination should provide an integrated evaluation of the threat environment, the response of packages to credible malevolent acts, and operational security requirements for protecting spent fuel and high-level waste while in transport. This examination should be carried out by a technically knowledgeable group that is independent of the government and free from institutional and financial conflicts of interest. This group should be given full access to the necessary classified documents and Safeguards Information to carry out this task. The findings and recommendations from this examination should be made available to the public to the fullest extent possible.<sup>25</sup>

A comprehensive review of nuclear fuel and high-level waste transportation security should have unrestricted access to the information necessary to do this analysis.

### **Future Generations and Radioactive Waste Liability**

As of 2007, the United States had accumulated more than 50,000 metric tons of spent nuclear fuel from nuclear reactors. A typical 1000-MWe nuclear reactor produces approximately 20 cubic meters (about 27 tonnes) of spent nuclear fuel each year.<sup>26</sup>

Nuclear power plants have created an unsolvable waste problem. The nature of this troublesome situation is in the nature of the waste and in the failure to find an acceptable solution before the first refueling of the first nuclear power plants.

In addition to the fission products, uranium, and plutonium, spent fuel contains long-lived radioactive elements called "transuranic actinides" -- elements of atomic number 93 (neptunium) and greater. It is these and other long-lived radioactive materials that require the HLW disposal site to be able to isolate and contain the waste for very long times, such as 10,000 years.<sup>27</sup>

We are at the brink of a national problem becoming an international one. Last month Westinghouse Electric Company announced the production of its first four fuel assemblies at its facility in Columbia, South Carolina. This fuel will be used at the

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<sup>25</sup> *Going the Distance? The Safe Transport of Spent Nuclear Fuel and High-Level Radioactive Waste in the United States* (2006) Nuclear and Radiation Studies Board, <http://dels.nas.edu/nrsb>

<sup>26</sup> "Safely Managing Used Nuclear Fuel". Nuclear Energy Institute. Archived from [the original](#) on October 25, 2007. <http://www.nei.org/keyissues/nuclearwastedisposal/factsheets/safelymanagingusednuclearfuel/>. Retrieved December 5, 2011

<sup>27</sup> Executive Summary, *Yucca Mountain Science and Engineering Report: Technical Information Supporting Site Recommendation Consideration*, US Department of Energy, Office of Civilian Radioactive Waste Management, May, 2001

Westinghouse-designed AP1000 reactor, Sanmen Unit 1, in Zhejiang Province, China.<sup>28</sup>

We have no confidence that irradiated fuel from nuclear power reactors can or will be safely disposed of in the future. The Nuclear Regulatory Commission's high-level nuclear waste standard is that "it would not continue to license reactors if it did not have reasonable confidence that the wastes can and will in due course be disposed of safely."<sup>29</sup> Therefore, we recommend that the Blue Ribbon Commission enjoin the NRC from issuing new licenses or renew existing licenses for nuclear power plants.

The Nuclear Waste Policy Act should be completely reexamined and hardened on-site storage coupled with precautionary principles brought to consideration of every level of radioactive waste throughout the nuclear fuel cycle and the nuclear weapons complex. Final disposition concepts must be developed, vetted with the public, and implemented across the board for such disparate radiation problems as uranium mining wastes and mill tailings, uranium enrichment and fuel processing wastes, nuclear facility decommissioning, vast stocks of nuclear weapons waste, and tons of sensitive fissile materials.

### **No Confidence in the Licensing Process**

The entire history of the Nuclear Regulatory Commission demonstrates their close ties with nuclear utilities, its regulated community. Former Chairman Richard Meserve's February 2001 letter to then-Vice President Cheney carved out an expanded role for NRC in the promotion of new nuclear power plants. The Meserve letter revealed the plans for NRC activism in limiting nuclear industry liability and eliminating regulatory obstacles.

In proceedings regarding the Yucca Mountain waste dump project, one judge pointed out the unreasonableness and unfairness of the present license intervention process:

It is not responsible conduct, however, to interpose objections that are devoid of substance on an apparent invocation of the old adage, nothing ventured, nothing gained. Insofar as concerns the NRC staff, unlike DOE, it is the regulator, not the promoter of the proposal. That being the case, it would be even more unseemly for it to interpose to the admission of contentions objections that are plainly without...Indeed, in such circumstances, the staff would, to its detriment, create the impression that it is not a disinterested participant in the licensing process but rather a spear carrier for DOE. Once such impression has been garnered, there would remain little reason to credit anything that the staff might have to offer.<sup>30</sup>

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<sup>28</sup> Westinghouse news release, December 20, 2010,

<http://westinghousenuclear.mediaroom.com/index.php?s=43&item=256>

<sup>29</sup> 73 Fed. Reg. at 59,552 (citing 42 Fed. Reg. 34,391, 34,393 (July 5, 1977); *Natural Resources Defense Council v. NRC*, 582 F.2d 166 (2d Cir. 1978))

<sup>30</sup> Judge Alan Rosenthal, ASLBP BOARD 09-878-HLW-CAB03, In the Matter of U.S. Department of Energy High-Level Waste Repository, Docket No. 63-001-HLW, April 1, 2009

By itself, the NRC cannot conduct an independent licensing process. We recommend that the Blue Ribbon Commission seek an independent project audit from a special *ad hoc* commission. This independent review should follow the pattern outlined by the National Resource Council in its March 1998 report advocating independent review of the Department of Energy's plutonium fuel project. This independent project audit is a prerequisite for scoping and the independent commission should have a continuing role.

### **The Economic Impacts**

High-level nuclear waste makes for high finance. Consumers who use nuclear-generated electricity pay a tenth-of-one-cent per kilowatt hour to cover waste management costs. The fund accumulates \$0.75 billion each year.<sup>31</sup> The cost of the Department of Energy's program to vitrify 90 million gallons of high-level waste grew from \$2.5 billion to over \$17 billion.<sup>32</sup>

Yet it's not high enough for some utilities. In 2002 accounting firm Grant Thornton revealed that Duke Energy had transferred \$123 million to its unregulated business sections in order to hide part of its profits and thereby avoid the legally mandated rate decreases these high profits would have triggered.<sup>33</sup>

In 2007 Rep. David L. Hobson criticized funding of the Savannah River Site's plutonium fuel factory which would use weapons-grade plutonium to make mixed-oxide fuel for commercial nuclear electric power plants. He said, "I firmly believe that this is a pork barrel project that is a waste of money."<sup>34</sup>

In 2007 Rep. Pete Visclosky opposed the Department of Energy's push for a "Reliable Replacement Warhead" program and the notion of a new arsenal. He said, "It is incumbent before we start down the road to know where we want to be."<sup>35</sup>

### **Conclusion**

The public funding and taxpayer dollars directed to the nuclear industry undermine less costly, cleaner forms of electric power generation. The current nuclear revival is an industry-led, taxpayer-financed attempt to revive a nuclear dinosaur.

Nuclear power is expensive. Without federal subsidies, it would not survive. The Congressional Budget Office estimated the historical default rate on nuclear loans amounted to 30% to 50% of capital costs. Because Wall Street considers nukes a risky investment, the nuclear industry has convinced Congress to approve billions of taxpayer

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<sup>31</sup> Executive Summary, *Yucca Mountain Science and Engineering Report: Technical Information Supporting Site Recommendation Consideration*, US Department of Energy, Office of Civilian Radioactive Waste Management, May, 2001

<sup>32</sup> Greg Williams, *truth-out* | Solution, 05 January 2011, <http://www.truth-out.org/solution>

<sup>33</sup> *Information courtesy of US Public Interest Research Group*

<sup>34</sup> "House Subcommittee Approves Energy-Water Bill," *CQ TODAY*, by Jeff Tollefson, May 23, 2007

<sup>35</sup> "House Subcommittee Approves Energy-Water Bill," *CQ TODAY*, by Jeff Tollefson, May 23, 2007

dollars for loan guarantees.

Commercial nuclear electric *systems* emit about one-third as much greenhouse gas as natural gas-fired power plants. The problem centers on fuel production. Making uranium fuel requires large amounts of fossil-fueled energy, creating carbon dioxide and an energy debt equivalent to the power needed to make the fuel. Depending on the grade of the uranium ore, it can take over a decade for the nuclear plant to repay this energy debt.

The nuclear industry has used its clout to make it easier to get licenses to construct and operate new nuclear plants. As a result, the health, safety and well-being of our communities take second place to so-called regulatory efficiency. In a world of computer crashes, product recalls, and financial failures, there can be no such thing as accident-free nuclear power.

The nuclear industry hopes to take advantage of diminished regulatory reviews, taxpayer-financed incentives and altered plant designs to do what it hasn't been able to do for decades: build new commercial nuclear power plants. Playing on legitimate public concerns about air pollution, electric brownouts and climate change, the utilities are waging a pro-nuclear public relations campaign. But nuclear physics is not altered by press releases, and removing a few valves and pipes will not eliminate the inherent dangers of atomic reactors.

Advocates of nuclear power claim it is an answer to global warming and a means of achieving energy independence. These are empty promises. We know full well the danger of nuclear reactor technology and the radioactive waste it produces. There is no such thing as safe nuclear power.

Twenty-four years after the nuclear power catastrophe at Chernobyl, we witness the ravaging impacts on the people of Ukraine and Belarus. Exposure to radiation cripples the human immune system, causing illness and death. The plague of Chernobyl persists as the half-lived radioactive legacy of nuclear power.

Therefore, we are exposing the inherent dangers of nuclear reactor technology and the radioactive waste it produces.

Further, we call on political and business leaders to steer clear of an energy path littered with accidents and near-misses. A safe energy future means supporting energy technologies which will carry us forward, not backward.

Louis A. Zeller, Science Director