April 6, 2009

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE SECRETARY

In the Matter of
Luminant Generation Company LLC
Combined License for Comanche Peak
Units 3 and 4 Docket Nos. 52-034, 52-035
NRC-2008-0594

DECLARATION BY GORDON THOMPSON IN SUPPORT OF CONTENTIONS SUBMITTED BY THE SUSTAINABLE ENERGY AND ECONOMIC DEVELOPMENT COALITION (SEED)

I, Gordon Thompson, declare as follows:

I. Introduction

I-1. I am the executive director of the Institute for Resource and Security Studies (IRSS), a nonprofit, tax-exempt corporation based in Massachusetts. Our office is located at 27 Ellsworth Avenue, Cambridge, MA 02139. IRSS was founded in 1984 to conduct technical and policy analysis and public education, with the objective of promoting global human security and sustainable use of natural resources. In addition to holding my position at IRSS, I am a research professor at the George Perkins Marsh Institute, Clark University, Worcester, Massachusetts. I am an expert in the technical analysis of safety, security and environmental issues related to nuclear facilities. A copy of my curriculum vitae is included as Attachment 1 to this declaration.

I-2. I received an undergraduate education in science and mechanical engineering at the University of New South Wales, in Australia. Subsequently, I pursued graduate studies at Oxford University and received from that institution a Doctorate of Philosophy in mathematics in 1973, for analyses of plasmas undergoing thermonuclear fusion. During my graduate studies I was associated with the fusion research program of the UK Atomic Energy Authority. My undergraduate and graduate work provided me with a rigorous education in the methodologies and disciplines of science, mathematics, and engineering.

I-3. Since 1977, a significant part of my work has consisted of technical analyses of safety, security and environmental issues related to nuclear power plants (NPPs) and other nuclear facilities. These analyses have been sponsored by a variety of nongovernmental organizations and local, state and national governments, predominantly in North America and Western Europe. Drawing upon these analyses, I have provided expert testimony in legal and regulatory proceedings, and have served on committees advising US government agencies. In a number of instances, the findings of my work have been accepted or adopted by relevant governmental agencies.

I-4. This declaration supports contentions by SEED regarding the management of spent nuclear fuel (SNF) from NPPs operating in the United States, including the proposed Comanche Peak Units 3 and 4. SNF could be managed by storage, disposal, or separation of its constituent parts.[1]

I-5. This declaration focuses primarily on issues directly related to the management of SNF. In pursuit of that focus, the declaration necessarily touches upon other issues related to NPPs. The declaration does not purport to provide a comprehensive analysis of any issue related to NPPs.

I-6. Two documents prepared by me are attached herewith and form part of this declaration. Attachment 2 is a report titled *Environmental Impacts of Storing Spent Nuclear Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Waste Confidence Decision and Environmental Impact Determination*, and is dated February 6, 2009. Attachment 3 is a journal article titled "The US Effort to Dispose of High-Level Radioactive Waste", which appeared in the journal *Energy and Environment*, Volume 19, Numbers 3 and 4 (2008), pages 391-412. Numerous documents are cited in Attachments 2 and 3. Other documents are cited in the footnotes of this declaration.

I-7. Section II of this declaration discusses the history and prospects of SNF management in the USA. The discussion addresses, among other matters, the series of Waste Confidence decisions issued by the US Nuclear Regulatory Commission (NRC). Section III discusses the perspective of sustainability, and its relevance to management of SNF. Section IV discusses the potential for a large, unplanned release of radioactive material from stored SNF. That release could be caused by a conventional accident or a malice-induced accident. The discussion addresses, among other matters, NRC's reliance on secrecy as a primary measure for limiting the radiological risk associated with SNF storage. Section V summarizes issues identified in this declaration that have significant implications for the environmental impacts of storing SNF generated by a new NPP. Section VI discusses the treatment of these issues in the applicant's Environmental Report for the proposed Comanche Peak Units 3 and 4. Conclusions are presented in Section VII.

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[1] Separation could be done, for example, by primarily chemical means in a reprocessing plant, or by primarily physical means in the proposed DUPIC fuel cycle.

II. History and Prospects of SNF Management in the USA

II-1. The history of commercial nuclear power in the United States could be said to begin in 1957, when the GE VBWR plant in California received an operating license.[2] In the same year, the National Academy of Sciences issued a report, finding that the most promising method for disposing of high-level radioactive waste (HLW) was to place the waste in a repository constructed in an underground salt deposit. Also, in that year the US Atomic Energy Commission first began to plan for disposal of HLW.[3]

II-2. Initially, the nuclear industry and the government generally assumed that SNF from commercial NPPs would be reprocessed. Reprocessing was banned by President Carter in 1977. Although the ban was subsequently lifted, reprocessing has not resumed. National policy for management of SNF switched to an emphasis on disposal in a mined repository. That policy was formalized in the Nuclear Waste Policy Act (NWPA) of 1982. The NWPA called for the construction of two repositories, to receive commercial SNF together with HLW from military nuclear programs and related activities. Under the NWPA, the federal government was obliged to begin receiving SNF in 1998, for placement in a repository.[4]

II-3. The repository-development program mandated by the NWPA has moved more slowly than anticipated, and has manifested a variety of technical, institutional and socio-political deficiencies and failures.[5] The program is now focused entirely on obtaining a license to open a repository at the Yucca Mountain site. Writing in late 2007, I expressed the following judgment about the program:[6]

> "On balance, a range of technical and political factors suggest that the Yucca Mountain project will lose momentum and eventually be cancelled, and that commercial spent fuel will remain at reactor sites for at least the next several decades."

II-4. Recent actions by President Obama have effectively halted the Yucca Mountain project and may lead to its cancellation. The President's February 2009 budget plan states:[7]

> "The Yucca Mountain program will be scaled back to those costs necessary to answer inquiries from the Nuclear Regulatory Commission, while the Administration devises a new strategy toward nuclear waste disposal."

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[2] NRC, *2007-2008 Information Digest*, NUREG-1350, Volume 19, August 2007, Appendix B.
[3] Attachment 3.
[4] Attachment 3.
[5] Attachment 3.
[6] Attachment 3, page 408.
[7] Office of Management and Budget, Executive Office of the President, *A New Era of Responsibility: Renewing America's Promise*, 26 February 2009, page 65.

II-5. NRC has formally expressed its view of the repository-development program through a series of Waste Confidence decisions. Those decisions have not been based on a systematic assessment of the program's feasibility, or an assessment of factors that could cause delays. Instead, NRC has simply accommodated delays in the program by successively pushing forward the date when a repository would – with "reasonable assurance" – be available. In 1984, NRC determined that a repository would be available by 2007-2009. In 1990, NRC extended that date to 2025 (within the first quarter of the 21st century), and NRC now proposes to further extend that date to 2049-2059 (50-60 years after expiration of the Dresden 1 operating license).[8] This progression invites skepticism about NRC's "reasonable assurance". NRC's estimated time horizon for repository availability has receded with each revision of its Waste Confidence decision, beginning at 23-25 years in 1984, then receding to 35 years in 1990, and now to 40-50 years.

II-6. Commercial nuclear power represents a major, long-term commitment of resources and societal attention. As mentioned above, the first operating license for a US commercial NPP was issued in 1957. A number of NPPs are now licensed to operate into the 2040s. If plants that were licensed more recently receive 20-year license extensions, which seems likely, they will be licensed into the 2050s. Watts Bar 1 would be licensed until 2055.[9] Conceivably, some of the existing NPPs will receive a second license extension, allowing their operation into the 2060s or 2070s.

II-7. As of early 2008, about 57,000 MTHM of commercial SNF was in storage across the USA.[10] This stock of SNF is growing at the rate of about 2,000 MTHM annually. The majority of this stock is stored in water-filled pools at operating NPPs. Those pools are equipped with high-density racks. The remainder of the SNF is stored under dry conditions (in helium-filled canisters) at independent spent fuel storage installations (ISFSIs).[11] There are 49 licensed ISFSIs across the USA, of which 45 are at NPP sites.[12] At some of those NPP sites, decommissioning activities have removed the NPP itself, leaving an ISFSI as the remaining major facility on the site.[13]

II-8. ISFSIs were first established in the 1980s, and the number of ISFSIs began to grow rapidly in the mid-1990s. This growth reflects the fact that spent-fuel pools are reaching their maximum capacity of SNF. When a pool approaches that point, and the licensee wishes to continue operating the NPP's reactor, older fuel in the pool is offloaded to an ISFSI to make room for fuel newly discharged from the reactor.[14] The offloading occurs

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[8] Attachment 2, Section 1.

[9] Attachment 2, Section 2.

[10] The quantity of SNF can be measured in terms of metric tons of heavy metal (MTHM), based on the fresh (pre-irradiation) form of the fuel.

[11] A small amount of SNF is wet-stored at an ISFSI in Morris, Illinois.

[12] One ISFSI license is for an away-from-reactor site in Utah. Actual establishment of that ISFSI appears unlikely.

[13] Attachment 2, Section 2.

[14] The older fuel is appropriate for transfer to an ISFSI because it produces less heat from radioactive decay than is produced by newly-discharged fuel.

on a batch basis, reflecting the use of modular storage at ISFSIs. Storage modules are filled one at a time, and then installed at the ISFSI.[15]

II-9. The 1990 version of NRC's Waste Confidence decision states, with "reasonable assurance" that SNF can be stored safely for at least 30 years beyond the licensed life of the NPP that generated the SNF. Now, NRC proposes to extend that period to at least 60 years.[16]

II-10. It appears that NRC expects to license new NPPs with no change in the requirements for managing SNF. Thus, NRC assumes that SNF from the new plants would be stored initially in pools equipped with high-density racks, and then in ISFSIs, as is done at existing NPPs. NRC's requirements regarding the safety and security of SNF storage will be the same for new plants and existing plants.

II-11. If a new NPP were to enter service in 2020 and operate for 60 years, it would shut down in 2080. NRC currently envisions that SNF generated by the plant could be stored for at least 60 years after shut-down. Thus, the entire inventory of SNF generated by the plant during its lifetime could remain in storage until at least 2140. One or more repositories might open prior to that date, potentially offering a permanent home for the stored SNF. However, SNF generated in earlier decades would have priority for placement in the repositories.[17] Note that the NWPA limits the capacity of the proposed Yucca Mountain repository to 70,000 MTHM of waste, of which 63,000 MTHM could be commercial SNF. Thus, even if the Yucca Mountain repository were to open, it could not accommodate a substantial fraction of the SNF that is expected to arise from existing NPPs. (See paragraphs II-6 and II-7, above.) The political and technical factors that led to the NWPA-mandated limit on the capacity of the Yucca Mountain repository would be likely to apply to future repositories. Accordingly, if a substantial number of new NPPs were to enter operation, it is likely that repositories could not be opened fast enough to receive all of the SNF generated by existing and new NPPs. In that event, the national inventory of stored SNF would continue to rise until the last NPP is shut down.

II-12. Half a century of experience, from 1957 to the present, shows that opening even one repository is fraught with technical and political difficulty. The Yucca Mountain project is likely to be cancelled, and at present there is no appetite in Washington for re-commencing the repository-development process. Accordingly, the most reasonable assumption about repository development during the next half-century is that no repository for HLW and SNF will open in the USA. Proponents of future (post-2009) operation of existing or new NPPs should have the burden of proof in disputing that assumption. Looking forward beyond the next half-century is a highly uncertain exercise. Major changes in energy systems, the economy, societal expectations, and environmental policies could have occurred by the latter part of the 21st century.

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[15] Attachment 2, Section 2.

[16] Attachment 2, Table 1-1.

[17] Older SNF would have contractual priority. Also, older SNF would be more readily accommodated in a repository because the heat output per MTHM of SNF declines with age.

Proponents of ongoing generation of SNF should be obliged to explain how they account for relevant, potential changes during the entire period when SNF could be stored.

II-13. The US Department of Energy (DOE) is the federal agency that is responsible for repository development. In an initiative separate from, but related to, the Yucca Mountain project, DOE has established the Global Nuclear Energy Partnership (GNEP) program. That program is pursuing the development of alternative nuclear fuel cycles that would involve the physical and chemical processing of SNF to separate its constituent parts (plutonium, uranium, fission products, etc.).[18]

II-14. Current US policy is to operate a once-through fuel cycle in which SNF is stored and eventually disposed of in a repository. One of the explicit purposes of the GNEP program is to develop fuel-cycle options that would require less repository capacity than would be required for a once-through fuel cycle producing the same amount of electrical energy. Each of the GNEP fuel cycles would involve the processing of SNF in facilities that would produce streams of HLW. The HLW waste forms would require storage prior to their placement in a repository. The storage period could be long. For example, some fuel cycles would involve the separation of cesium and strontium isotopes from the other constituents of SNF. The cesium and strontium isotopes would be incorporated into some type of liquid or solid HLW waste form that would be stored for about 300 years.[19]

II-15. Separation of cesium and strontium isotopes for extended storage would be done to reduce the need for repository capacity. Over 300 years of storage, radioactive decay would substantially reduce the inventory of these isotopes, and their heat output would decline accordingly.[20] From a purely technical perspective, the construction and operation of a repository would become easier and cheaper if that approach were adopted. However, the approach raises important questions about the risk of prolonged storage and the inter-generational equity of deferred disposal.

II-16. According to DOE, the transition to an alternative fuel cycle could begin as soon as 10-15 years in the future.[21] In my judgment, that outcome is unlikely. Any alternative fuel cycle would be costly and fraught with technical difficulties, and would have significant, adverse impacts in a variety of respects. Thus, the once-through fuel cycle is likely to remain dominant in the USA for at least the next several decades. Nevertheless, proponents of ongoing generation of SNF should be obliged to explain how they account for the GNEP program.

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[18] Attachment 2, Section 2.

[19] Attachment 2, Section 2.

[20] Cesium-137 has a half-life of 30 years. Over 300 years, the inventory of this isotope would decline by a factor of about 1,000.

[21] Attachment 2, Section 2.

III. The Sustainability Perspective

III-1. The concept of sustainability was brought to wide public attention by the World Commission on Environment and Development (WCED) in 1987. WCED discussed the concept in terms of sustainable development, to emphasize that sustainability is compatible with improvement in the conditions of life for poorer societies. Since 1987, the concept of sustainability has been widely endorsed by governments and other entities. Yet, there has been comparatively little progress in making the concept operational at the level of specific policies and plans. In an effort to address that problem, the Organization for Economic Cooperation and Development (OECD) initiated a three-year project in 1998, seeking to identify sustainability principles and indicators that can be used in policy making. One product of the effort is a report by the OECD Nuclear Energy Agency (NEA), published in 2000, that discusses commercial nuclear power in the context of sustainable development.[22]

III-2. In discussing the concept of sustainability, the NEA report takes as its starting point the WCED definition of sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". The NEA report elaborates on that definition by suggesting that sustainability involves the passing on to future generations of a stock of capital assets, which could be human-made, natural, or human and social. Human-made assets include buildings, machinery, and infrastructure. Natural assets include the environment, and the renewable and non-renewable resources that it can supply. Human and social assets include education, health, scientific and technical knowledge, cultures, institutions, and social networks.

III-3. According to NEA, "strong sustainability" involves the preservation of an asset in its present form. That approach is relevant, for example, to ecosystems that are essential and irreplaceable. Earth's atmosphere fits that category. An alternative approach is "weak sustainability", whereby the loss of one asset (e.g., an area of forested land) is offset by creation of another asset (e.g., development of a city on the formerly forested land). The weak-sustainability approach requires tradeoffs, which create the potential for conflicts within and between generations. The strong-sustainability approach is conceptually simpler, but is rarely encountered in its pure form. For example, human-induced emissions of CO_2 to the atmosphere cannot be eliminated instantly, but must be reduced over time. Even if we acted with the best of intentions, we would knowingly continue to perturb Earth's climate over the coming decades.

III-4. The NEA report contains a general discussion of nuclear power from the perspective of sustainability. That discussion addresses many of the relevant issues, including emissions of CO_2 and other greenhouse gases. The NEA report does not, however, provide an analytic framework that could be used to assess the sustainability of a proposed program of nuclear power, or to compare the sustainability of that program

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[22] Nuclear Energy Agency, OECD, *Nuclear Energy in a Sustainable Development Perspective*, Paris, 2000.

and the sustainability of other strategies to meet energy needs. No other entity has stepped into this void to supply an appropriate framework.

III-5. In the absence of a generally-accepted framework to assess the sustainability of nuclear power, competing claims and conclusions abound. For example, the World Nuclear Association (WNA), an industry group, says:[23]

> "Nuclear power is a 'sustainable development' technology because its fuel will be available for multiple centuries, its safety record is superior among major energy sources, its consumption causes virtually no pollution, its use preserves valuable fossil resources for future generations, its costs are competitive and still declining and its waste can be securely managed over the long-term."

Other entities strongly contest each of the statements in that sentence. Many analyses find that nuclear power can obstruct sustainability. For example, a recent analysis examined the contribution that nuclear power could make to climate stabilization.[24] Three questions were posed: "(1) How much more nuclear energy would be needed to have a significant impact? (2) Could that much nuclear energy be brought online in anywhere near the time required from a climate perspective? (3) Are the opportunity costs of such an expansion acceptable?" The analysis concluded: "In sum, the more urgent climate change requirements are, the less likely nuclear energy will be able to meet these challenges."

III-6. Continued generation of SNF, in the absence of a repository, raises important questions about the sustainability of nuclear power. From a sustainability perspective, the accumulation of SNF could be seen in two ways. One observer could view the plutonium in the SNF as an energy resource that will be useful to future generations. That observer must assume that future generations will rely heavily on nuclear fission power, and will possess capabilities for separation of SNF, use of plutonium, and disposal of HLW. A different observer could prioritize the passing on to future generations of a stock of natural, built and human capital that maximizes the opportunities for future generations to make their own choices about technologies and social arrangements. To the second observer, passing on a large stock of SNF could encumber future generations with hazardous material that they do not want, and would therefore be immoral.

III-7. There has been no systematic, national debate about the respective merits of the opposing positions set forth in the preceding paragraph. Proponents of ongoing generation of SNF should be obliged to explain their position on this issue, and to provide a technical and ethical basis for that position.

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[23] "Nuclear Power and Sustainable Development", accessed from the WNA website (www.world-nuclear.org) on April 1, 2009.

[24] Sharon Squassoni, *Nuclear Energy: Rebirth or Resuscitation?*, Carnegie Endowment for International Peace, Washington, DC, 2009.

IV. The Potential for a Large, Unplanned Release of Radioactive Material from Stored SNF

IV-1. The present, de facto, national strategy for managing SNF involves wet storage in a high-density pool at each NPP, followed by dry storage in an ISFSI. The pool is adjacent to the NPP's reactor, and shares some of its safety and support systems. The ISFSI is typically located at the NPP site. NRC envisions that this strategy will continue for new NPPs. Also, NRC's requirements regarding the safety and security of SNF storage will be the same for existing and new NPPs.[25]

IV-2. The strategy described in the preceding paragraph creates a substantial risk of radiological harm and, therefore, has severe, adverse impacts on the environment. The dominant component of the radiological risk arises from the potential for a fire in a spent-fuel pool following a loss of water from the pool. That event could be caused by a conventional accident or a malice-induced accident. The potential for a pool fire is exacerbated by the presence of an operating reactor in close proximity to a pool. The second-largest component of the radiological risk arises from the potential for a malice-induced accident to release radioactive material from an ISFSI.

IV-3. NRC concedes, in various documents, that a fire could occur in a spent-fuel pool following a loss of water. NRC also concedes that radioactive material released during a pool fire would have significant, adverse impacts on the environment. To offset those concessions, NRC argues that the probability of a pool fire is very low. NRC attributes the alleged low probability, in part, to unspecified, secret security measures and damage-control preparations that have been implemented at commercial NPPs. NRC further attributes the alleged low probability, in part, to unspecified, secret studies that find that a fire would not break out in certain scenarios for loss of water from a pool. None of the arguments advanced by NRC to support its claim of low probability cites or provides an analysis that could meet the standards of an environmental impact statement (EIS) prepared under the National Environmental Policy Act (NEPA).

IV-4. Options are available for reducing the radiological risk now associated with storage of SNF. Some of those options are entirely passive, and do not rely on active systems or human action. Options of that type are especially suitable for SNF storage. Notably, spent-fuel pools could be re-equipped with low-density racks, as was intended when the existing NPPs were designed, the excess fuel being moved to ISFSIs. That option would be entirely passive, and would dramatically reduce the potential for a pool fire. Also, the spent-fuel storage modules that are deployed at ISFSIs could be protected from attack by berming, underground placement, and/or stronger outer containers. Those options would be entirely passive, and would significantly reduce the risk of a malice-induced release of radioactive material from an ISFSI. Passive, robust options for risk

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[25] Supporting information for this paragraph, and all other paragraphs in Section IV of this declaration, is available in Attachment 2.

reduction, such as the options outlined here for spent-fuel pools and ISFSIs, are protective measures of the type called for in the National Infrastructure Protection Plan.

IV-5. NRC relies on secrecy as a primary measure for limiting the radiological risk associated with SNF storage. NRC's heavy reliance on secrecy, and its refusal to perform risk analyses that meet the standards of an EIS prepared under NEPA, are significant deficiencies in NRC's approach to regulating the storage of SNF. NRC's reliance on secrecy has adverse impacts on the environment in two respects. First, secrecy is likely to be counterproductive, suppressing a true understanding of risk and discouraging the use of appropriate measures of risk reduction. Second, secretive behavior by a governmental agency has adverse impacts on society and the economy. In addition, NRC's overall regulatory approach, which combines secrecy with a lack of NEPA compliance, has adverse impacts on the defense and security of the USA. NRC's approach undermines the potential to enhance protective deterrence by implementing protective measures of the type called for in the National Infrastructure Protection Plan.

IV-6. Use of passive, robust options for risk reduction, as discussed in paragraph IV-4, above, could reduce or eliminate any need for secrecy about SNF storage and its environmental impacts. Nevertheless, NRC does not require the use of such risk-reducing options for SNF storage, either in the context of existing or new NPPs. Yet, NRC envisions that the SNF generated by a new NPP entering service in 2020 could be stored until at least 2140. Thus, NRC is willing to inflict unnecessary secrecy and its adverse impacts on generations far in the future. NRC does not acknowledge that secrecy has significant, adverse impacts, and that technical measures can render secrecy unnecessary in the context of SNF storage.

V. Summary of Issues Identified Here

V-1. Preceding sections of this declaration identify a number of issues that have significant implications for the environmental impacts of storing SNF generated by a new NPP. These issues should be addressed in the licensing process for the proposed Comanche Peak Units 3 and 4. For each issue, the burden of proof should rest with parties that dispute the issue as posed here. The issues are:

<u>Issue No. 1</u>:
The US inventory of stored SNF is likely to continue rising as long as NPPs operate.
<u>Background</u>:
NRC envisions that storage of SNF could continue for at least 120 years after startup of the NPP that generated the SNF. If a substantial number of new NPPs enter service, the inventory of stored SNF could continue to rise even if one or more repositories operate. The most reasonable assumption about repository development during the next half-century is that no repository will open in the USA. Beyond that period, prediction of repository development is highly uncertain.

Issue No. 2:
The GNEP program could introduce substantial changes in management of SNF.
Background:
In my judgment, the GNEP program is unlikely to yield any significant outcome. Nevertheless, GNEP is an official US government program, and its implications for SNF management should be considered in the NPP licensing process.

Issue No. 3:
From the perspective of sustainability, continued accumulation of stored SNF could be viewed by some people as appropriate and by others as immoral; there has been no systematic debate about the merits of these opposing positions.
Background:
There is no generally-accepted framework to assess the sustainability of nuclear power. Those who endorse the continued accumulation of SNF must assume that future generations will rely heavily on nuclear fission power, and will possess capabilities for separation of SNF, use of plutonium, and disposal of HLW. The opposing view prioritizes the passing on to future generations of a stock of natural, built and human capital that maximizes the opportunities for future generations to make their own choices about technologies and social arrangements.

Issue No. 4:
The present mode of storing SNF, which NRC will continue allowing in the context of new NPPs, creates a substantial risk of radiological harm.
Background:
The dominant component of the radiological risk arises from the potential for a fire in a spent-fuel pool following a loss of water from the pool. That event could be caused by a conventional accident or a malice-induced accident. The second-largest component of the radiological risk arises from the potential for a malice-induced accident to release radioactive material from an ISFSI.

Issue No. 5:
NRC relies on secrecy as a primary measure for limiting the radiological risk associated with SNF storage; secrecy has significant, adverse impacts on the environment.
Background:
Secrecy is likely to be counterproductive, suppressing a true understanding of risk and discouraging the use of appropriate measures of risk reduction. Also, secretive behavior by a governmental agency has adverse impacts on society and the economy. Moreover, NRC's overall approach to regulating SNF storage, which combines secrecy with a lack of NEPA compliance, has adverse impacts on the defense and security of the USA.

Issue No. 6:
Options are available for reducing the radiological risk associated with storage of SNF; appropriate options could reduce or eliminate any need for secrecy about SNF storage.
Background:
Passive, robust options for SNF storage are available in the context of wet storage, for an initial period of several years after discharge from a reactor, and dry storage for the subsequent period. These options would be consistent with the National Infrastructure Protection Plan. Secrecy could be reduced or eliminated if passive, robust options were employed.

VI. Treatment of SNF Storage Issues in the Applicant's Environmental Report

VI-1. Section V, above, identifies six issues that have significant implications for the environmental impacts of storing SNF generated by a new NPP. These issues should be addressed in the licensing process for the proposed Comanche Peak Units 3 and 4. The applicant should discuss these issues in its Environmental Report.[26]

VI-2. I have reviewed the applicant's Environmental Report, and have not identified any useful discussion of any of the issues identified in Section V, above.

VII. Conclusions

VII-1. Six issues, as described in Section V, above, have significant implications for the environmental impacts of storing SNF generated by a new NPP. These issues should be addressed in the licensing process for the proposed Comanche Peak Units 3 and 4. For each issue, the burden of proof should rest with parties that dispute the issue as posed here.

VII-2. The applicant's Environmental Report contains no useful discussion of any of the six issues described in Section V, above.

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[26] "Comanche Peak Nuclear Power Plant Units 3 and 4, COL Application, Part 3, Environmental Report, Revision 0, (Non-Proprietary Version)", undated.

The facts presented in this declaration are true and correct to the best of my knowledge, and the opinions expressed in the declaration are based on my best professional judgment.

G. R. Thompson

Gordon Thompson

April 6, 2009

Attachments

Attachment 1: Curriculum Vitae for Gordon Thompson, February 2009.

Attachment 2: Report by Gordon Thompson titled *Environmental Impacts of Storing Spent Nuclear Fuel and High-Level Waste from Commercial Nuclear Reactors: A Critique of NRC's Waste Confidence Decision and Environmental Impact Determination*, February 6, 2009.

Attachment 3: Journal article by Gordon Thompson titled "The US Effort to Dispose of High-Level Radioactive Waste", *Energy and Environment*, Volume 19, Numbers 3 and 4 (2008), pages 391-412.