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Re: Comments on NRC's Update of Its Generic Environmental Impact Statement (GEIS) for License Renewal of Nuclear Power Plants (NUREG-1437)

Dear Chief:

We appreciate the opportunity to comment on the U.S. Nuclear Regulatory Commission's (NRC) update of the Generic Environmental Impact Statement (GEIS) on License Renewal for Nuclear Power Plants that was issued in 1996 (NUREG-1437). We also appreciate NRC's locating in southern California one of its public meetings on this GEIS.

Our recommendations for updating and revising the list of topics in the GEIS are enclosed. If you have any questions regarding these comments, please contact Barbara Byron at 916-654-4976 or Darcie Houck at 916-654-3855.

Sincerely,

JAMES D. BOYD, Commissioner and
California State Liaison Officer to the
Nuclear Regulatory Commission

JDB/BB:lb

Enclosure

cc: Paul Lohaus, NRC
Bill Maier, NRC

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Comments on the U.S. Nuclear Regulatory Commission's (NRC's) Update of the Generic Environmental Impact Statement (GEIS) for Nuclear Power Plant License Renewal

September 17, 2003

The purpose of these comments is to augment the list of environmental issues that the NRC should address in the Generic Environmental Impact Statement (GEIS) regarding possible environmental impacts that could occur from renewing licenses of individual nuclear power plants under 10 CFR 54. The GEIS is NRC's means of establishing the bounds and significance of these potential impacts for all operating light-water nuclear reactors. The environmental review, together with the safety review and on-site plant inspections, form the basis for the NRC staff's recommendation on whether to renew or not to renew an operating license for a nuclear power plant.

NRC anticipates that it will receive applications for renewal of the operating licenses for a significant portion, if not all, of the operating nuclear power plants in the U.S. In California, nuclear power generation provides approximately 14 percent of the electricity generated within the state. Operating power plants in California are Diablo Canyon Units 1 and 2 (their operating licenses expire 2021 and 2025, respectively) and San Onofre Nuclear Generating Station Units 2 and 3 (operating licenses expire in 2022). The owners of these plants have not yet applied for license renewal.

The GEIS has three main objectives: (1) to provide an understanding of the types and severity of environmental impacts that may occur as a result of license renewal of nuclear power plants (NPP); (2) to identify and assess those impacts that are expected to be generic to license renewal; and (3) to support a rulemaking (10 CFR Part 51) to define the number and scope of issues that need to be addressed by the applicants in plant-by-plant license renewal proceedings.

We recommend that the following issues be updated or added to the issues to be evaluated in the revised GEIS and/or in individual plant license renewal applications:

1. Aging NPP issues: Plant aging issues have been addressed generically in NRC's "Generic Aging Lessons Learned (GALL) Report" (NUREG-1801), dated 2001, as well as in the ongoing NRC investigation and follow-up regarding corrosion problems in the Davis-Besse pressure vessel lid and South Texas Project Unit 1. As we enter an era of large numbers of aging and refurbished nuclear power plants, it is important that NRC begin developing proactive methods for identifying safety problems before they become significant. There is a need for a system-wide review to identify preliminary or potential "anticipatory indicators" of safety problems related to plant aging to identify any trends before a major safety problem actually occurs. NRC should look at trends, such as repeated unplanned reactor shutdowns or component or system failures that might indicate that a safety problem is developing.

In license renewal application proceedings, individual plants should be evaluated in detail for aging-issues and trends, e.g., steam generator tube cracking, vessel head corrosion, and long-term problems and/or repeated failures in safety-related

equipment including reactor coolant systems. In addition, the cumulative effects of marine salt spray corrosion should be evaluated for coastal plants, such as California's nuclear power plants.

2. Post-9/11 Terrorism Issues: Similarly, although NRC addresses nuclear power plant security issues outside of the power plant license renewal proceedings, the communities surrounding nuclear power plants are very concerned that plants may be vulnerable to multiple assaults and/or terrorist attacks by a large aircraft. The quantities of spent fuel accumulated and stored onsite with extended plant operation are far greater than originally envisioned when the plants were first licensed. With nuclear power plant license renewal, the large quantities of spent fuel accumulating onsite could pose a richer and more attractive target for potential terrorists.

The revised GEIS should recognize that environmental impact analyses and safety issues have changed significantly since Sept. 11. Although much of the information related to security issues with respect to nuclear power plants is considered "safeguarded" information, sufficient information should be provided during the license renewal process on whether all reasonable efforts are being made to minimize the risk of a potential terrorist attack. The environmental impact review for license renewal should include a meaningful analysis, excluding information that could compromise plant safety or security, of the potential risk and environmental impacts from a large-scale terrorist attack on a plant.

3. Alternative Electricity Sources: Regions of the U.S. differ in their reliance upon and availability of alternative electricity generation technologies (gas-fired plants, renewables, demand-side management, etc.). A regional or site-specific evaluation of alternative electricity sources, in comparison to nuclear power plant license renewal, should be provided in the environmental evaluation.
4. Accumulation of Spent Nuclear Fuel Onsite: The long-term risk of extended onsite storage and accumulation of spent fuel should be evaluated given the uncertainties regarding when a permanent repository or offsite interim storage facility will become available. Plant-specific estimates of the total volume of spent fuel that could be stored onsite in wet and dry storage should be provided.
5. Seismic Risks: In California, operating nuclear power plants are located in seismically active areas. Site-specific seismic safety information should be provided to update plant safety and environmental impact analyses in license renewal applications. Because geologists are learning more about earthquake faults and seismic potential on a continuing basis, that new geologic information should be included and considered on a plant-specific basis during license renewal.
6. Thermal Damage to Marine Environments: Damage to the coastal marine environment and biota from warm seawater discharges from California nuclear plants is a continuing problem. Efforts are underway to offset the damage of the

cooling system discharges, which dump large amounts of seawater into the ocean each day at much warmer temperatures. California utilities have conducted extensive studies on thermal damage to marine environments. The plant-specific environmental review during license renewal should include the findings from these and other studies. The review should evaluate the cumulative impacts to the coastal marine environment adjacent to the plant associated with plant license renewal and extended operation. These potential impacts and mitigation strategies should be reviewed on a site-specific basis during license renewal proceedings.

7. Reliability and Integration with the Transmission System: The reliability of California's aging nuclear power plants is a significant issue in terms of their integration with and impact on the reliability of the entire transmission system serving the state. The nuclear power plants in California provide significant quantities of energy and capacity to the state's electrical system and help to maintain the overall stability of the grid. The environmental review during license renewal should evaluate on a plant-specific basis the potential impact on transmission system reliability from the closure of nuclear power plants in California.
8. Transportation Impacts: The environmental review should evaluate the potential transportation impacts from the increased number of spent fuel shipments that will result from extended plant operation. Spent fuel from California nuclear power plants will be transported to a repository or offsite storage facility by truck, rail and/or barge. Although the U.S. Department of Energy's Final Environmental Impact Statement for the Yucca Mt. Repository discusses the potential impacts from transporting spent fuel to the repository, there is no route-specific evaluation of potential impacts. The environmental review should evaluate the site-specific and route-specific transportation impacts from the planned spent fuel shipments offsite.
9. Quality Assurance for Cask Manufacture: The potential radiological impacts from dry cask storage systems are a direct function of the structural integrity of the casks when subjected to stress under normal and accident conditions. Allegations have been made to the NRC regarding certain manufacturing and design code violations, Quality Assurance program violations, and reliability problems of the casks. Since safety depends on performance of the casks to design standards, the environmental review for license renewal should discuss extended spent fuel storage onsite, including dry cask storage, and describe on a plant-specific basis what assurances, for example, quality assurance programs, will be provided to help ensure that casks used for storing this fuel will be built to design specifications and will perform as designed.
10. Plant Safety Culture: A thorough site-specific review of a plant's "safety culture" among plant management should be included in any license renewal application. "Lessons Learned" from the Columbia Accident Investigation Board's report,

released August 2003¹, may be very relevant to accident prevention and safety at nuclear power plants. The report, which identifies root causes for the Columbia shuttle disaster, noted that cultural constraints and organizational practices detrimental to safety were allowed to develop. These included: (a) reliance on past success as a substitute for sound engineering practices (such as testing to understand why systems were not performing in accordance with requirements); (b) organizational barriers that prevented effective communication of critical safety information and stifled professional differences of opinion; and (c) program managers that were clearly overconfident. NRC should examine the Lessons Learned from this comprehensive safety investigation and how these lessons may be applied to safety programs for our aging nuclear power plants.

A similar investigation of the Challenger disaster identified an ineffective "silent safety" system in which budget cuts resulted in a lack of resources, personnel, independence and authority. Although subsequent NASA briefings described a risk-adverse philosophy that empowered any employee to stop an operation at the mere hint of a safety problem, the Columbia Safety Board report concluded that NASA's views of its safety culture in those briefings "did not reflect reality." The report also concluded that Shuttle Program safety personnel failed to adequately assess anomalies and frequently accepted critically important risks without analytical support, even when the tools to provide more comprehensive assessments were available.

A 1990 U.S. General Accounting Office (GAO) questioned the effectiveness of NASA's safety organization². Similarly, a GAO report in 1999 criticized NRC's programs to ensure that utilities comply with NRC's regulations, take prompt actions to correct deficiencies found, and operate their plants safely³. The GAO report concluded that NRC gives utilities considerable latitude to fix their problems—a strategy that may work well when utility managers place high priority on maintaining a strong safety culture. However, GAO found that this condition was not present in three plants that they examined and that the problems worsened when NRC did not hold the utilities accountable for fixing them. The GAO report found that NRC's safety oversight has not focused on the competency of nuclear plant management, even though the nuclear industry and NRC officials agree that such competency is perhaps the most critical factor in safe performance.

The Naval Reactor program was recognized in the Columbia Report for its high degree of engineering discipline, emphasis on total responsibility of individuals and organizations, and its redundant and rapid means of communicating problems to decision-makers. The NRC should review the findings from the Columbia disaster investigation for successful elements of the Naval Reactor

¹ Columbia Accident Investigation Board, Report Volume 1, August 2003, NASA and the Government Printing Office.
<http://www.nasa.gov/columbia/home/index.html>

² GAO Report, "Space Program Safety: Funding for NASA's Safety Organizations Should be Centralized", GAO/NSIAD-90-187, August 1990, U.S. General Accounting Office.

³ GAO Report, "Major Management Challenges and Program Risks: Nuclear Regulatory Commission", GAO/OCG-99-19, January 1999, U.S. General Accounting Office.

safety program and any lessons learned that can be applied to nuclear power plant safety management. NRC should develop criteria for use in evaluating a licensee's "safety culture" based on findings from the Columbia report regarding shortcomings in the safety culture at NASA and strengths of the Naval Reactor safety program. The license renewal process should use these criteria for conducting a thorough plant-specific review of plant management and its safety culture. Renewing a plant's operating license should be conditioned upon an effective safety culture in plant management.

11. NRC should develop criteria for evaluating the safety of plants with significant design modifications or significant long-term safety violations: NRC assumes that plants are safe if they operate as designed and meet NRC's regulations. However, changes made to a plant over time, such as replacing components with different parts and reconfiguring systems can alter the plant's design and affect how certain safety systems may work in an emergency. The GAO recommended in its 1999 report that NRC should develop a means of quantifying the safety of plants that deviate from their approved designs⁴. In the 1990's, NRC found that some utilities had not maintained current information on their plant's designs and had not examined the impact of modifications on the safety of the plant's operations. NRC identified instances in which utilities had not properly tested safety-related components and had made errors in their analyses of how emergency cooling systems would work in an accident. NRC concluded that most of the problems resulted from errors in the original design or from design modifications, inadequate testing, and discrepancies in documentation. The license renewal evaluation should include an analysis of the safety impacts of plants that deviate from their approved designs.
12. Impact of Deregulation on Plant Safety: One of the major changes that has occurred since the GEIS was issued in 1996 is deregulation of the electricity market. As the electric utility industry is deregulated, safety margins may be compromised as licensees or utilities cut costs to remain competitive. One troublesome example of cost-cutting measures is curtailing maintenance programs, thereby reducing safety margins. The pressures for cost-cutting measures can be very high. The 1999 GAO report⁵ stated that as many as 26 of the nation's nuclear sites are vulnerable to shutdown because production costs are higher than the projected market prices of electricity. As a result, electricity production schedules, plant safety objectives, and cost reduction goals may conflict with one another. Therefore, license renewal evaluations should include an evaluation of the licensee's commitment to plant safety over and above the potentially conflicting goals of plant electricity production schedules and cost reduction. NRC must clearly state the goals and performance measures for which the licensees and plant operators and safety personnel will be held accountable.

This concludes our remarks.

⁴ GAO Report, "Major Management Challenges and Program Risks: Nuclear Regulatory Commission", GAO/OCG-99-19, January 1999, U.S. General Accounting Office.

⁵ Ibid