November 25, 2013

The Coalition to Decommission San Onofre
Attn: Gene Stone
1203 Via Presa
San Clemente, California, 92672

SUBJECT: RESPONSES TO THE QUESTIONS FROM THE COALITION TO DECOMMISSION SAN ONOFRE RECEIVED PRIOR TO THE SEPTEMBER 26, 2013 U.S. NUCLEAR REGULATORY COMMISISON PUBLIC MEETING REGARDING THE DECOMMISSIONING PROCESS AT THE SAN ONOFRE NUCLEAR GENERATING STATION

Dear Mr. Stone:

On September 24, 2013, the U.S. Nuclear Regulatory Commission (NRC) received several questions from the Coalition to Decommission San Onofre (Coalition). A number of your questions were addressed at a public meeting on September 26, 2013, which was held to discuss the decommissioning process at the San Onofre Nuclear Generating Station, Units 2 and 3 (SONGS) in Carlsbad, California.

At the close of the meeting, the NRC staff agreed to provide formalized written answers to the Coalition's questions, including those that were discussed during the public meeting. In accordance with this agreement, please find attached the NRC staff's responses to the Coalition's questions regarding the NRC's decommissioning process.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

It was a pleasure to meet with you to better understand your concerns about the decommissioning of SONGS Units 2 and 3. Once Southern California Edison submits its Post Shutdown Decommissioning Activities Report (PSDAR), please feel free to contact John Hickman at 301-415-3017 should you have any additional questions regarding these activities.

Sincerely,

/RA by Aby Mohseni Acting for/

Larry Camper, Director
Division of Waste Management
and Environmental Protection
Office of Federal and State Materials
and Environmental Management Programs

Enclosure:
Responses to the Questions from
the Coalition to Decommission San Onofre

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Responses to the Questions from the Coalition to Decommission San Onofre
Received During the NRC Public Meeting
Held on September 26, 2013

1. Is the U.S. Nuclear Regulatory Commission (NRC) willing to recognize *The Coalition to Decommission San Onofre* and grant us official status? Will the public have an opportunity to review and comment on significant decommissioning plans, including planned expenditures?

   Answer:

   Public involvement in the NRC's activities is a cornerstone of strong, fair regulation of the nuclear industry. The NRC recognizes the public's interest in the proper regulation of nuclear activities and provides opportunities for citizens to make their opinions known. The NRC seeks to elicit public involvement early in the regulatory process so that safety concerns that may affect a community can be resolved in a timely and practical manner. This process is considered vital to assuring the public that the NRC is making sound, balanced decisions about nuclear safety. Consistent with this policy, the NRC held a public meeting in Carlsbad last September and met with interested stakeholders, including both non-government organizations and local and state government officials.

   The NRC was created by the Congress to be an independent regulator charged with ensuring public health and safety and protecting the environment. As an independent regulator, the NRC ensures that all members of the public are given a fair and equal opportunity to comment on a licensee's decommissioning and license termination plans. Therefore, the NRC does not officially recognize or endorse any special interest group, public or private organizations, coalitions, or individuals. This approach assures that one or more organizations does not dominate the public forums and allows members of the public to provide alternative and differing viewpoints and comments to the NRC.

   However, the NRC recognizes the need and desire for community involvement in the decommissioning of a nuclear power plant. Decommissioning is a complex project and the NRC believes that decommissioning impacts need to be vetted within the local community. For many years, the NRC has strongly recommended that licensees involved in decommissioning activities form a community committee to obtain local citizen views on the decommissioning process and spent fuel storage issues. It has been the NRC view that those licensees who actively engage the community maintain better relations with the local citizens.

   As discussed at the September public meeting held in Carlsbad, the NRC has provided oversight for the decommissioning of 11 nuclear power plants. Experience gained from these decommissioning projects has been well documented by both the NRC and the nuclear industry. In 2005, the Electric Power Research Institute (EPRI) published the "Maine Yankee Decommissioning – Experience Report – Detailed Experience 1997 – 2004" (EPRI 1011734). In this lessons learned report, the industry recognized that engaging the local community and officially forming a Community Advisory Panel or Board (CAP/CAB) is a good practice.

Specifically, the EPRI report states that “the Maine Yankee Community Advisory Panel (CAP) was established in 1997 to enhance opportunities for public involvement in the decommissioning process of Maine Yankee. The CAP represents the local community. By thoroughly reviewing the decommissioning process, the CAP is in a position to advise Maine Yankee on key issues of concern to the local community.” Since the decommissioning of Maine Yankee, licensees have employed a CAP or CAB at many other sites, including Connecticut Yankee, Big Rock Point, Millstone, and others.

In your state, the NRC views the Humboldt Bay Citizens Advisory Board, which is sponsored by Pacific Gas and Electric, as an effective means to communicate with the local citizens. In our role as an independent regulator, the NRC frequently attends the Humboldt Bay CAB meetings to address concerns from the CAB members. The NRC has strongly encouraged Southern California Edison (SCE) to form a CAP/CAB for the San Onofre decommissioning effort in order to enhance communications with the local communities and stakeholders. SCE has responded that they are considering forming a community advisory group for the San Onofre decommissioning effort.

As discussed at the September public meeting held in Carlsbad, the NRC regulations currently offer the public opportunities to review and provide comments on licensee documents during the decommissioning process. Under the NRC regulations in section 50.82 of Title 10 of the *Code of Federal Regulations* (10 CFR), the NRC is required to publish a notice of the receipt of the licensee’s Post-Shutdown Decommissioning Activities Report (PSDAR), make the PSDAR available for public comment, schedule a meeting in the vicinity of the location of the licensed facility to discuss the PSDAR within 60 days of receipt, and publish a notice of the meeting in the *Federal Register* and another forum readily accessible to individuals in the vicinity of the site. An example of this *Federal Register* notice is the NRC’s Notice of Public Meeting and Availability of Report published in the *Federal Register* on April 1, 2013, for the Kewaunee Power Station (78 FR 19540).

To date, SCE has not yet submitted the PSDAR for the San Onofre Nuclear Generating Station, Units 2 and 3 (SONGS) to the NRC. This document serves as the main planning tool for the decommissioning process, including the estimated cost of the decommissioning activities By regulation, SCE has two years from the date of cessation of operations to submit the PSDAR; therefore, this document is due to the NRC by June 2015. However, SCE has stated that they expect to submit the SONGS PSDAR in 2014. In either case, a public meeting near the site within 60 days of receiving the PSDAR is required as part of this process. In addition, during the decommissioning of SONGS, Units 2 and 3, the NRC will conduct routine inspections of the SONGS decommissioning activities. Inspection reports without security-related information will be publicly available on the NRC’s website.

2. High burnup fuel has been used at San Onofre since 1996, we were told by the NRC recently. But we cannot find a public notice of that from the NRC or SCE. Even the union and other workers we have talked with were not aware of its use. Was a notice ever given to the public and workers? Were workers made aware that this high burnup fuel is more than twice as radioactive?

Answer:

New fuel designs, including high burnup fuel (HBF), undergo an NRC technical review, and are generally approved for use via a Topical Report that provides the technical evaluation of the new fuel design and lists any limitations for its use. Once the new fuel design is approved with an associated Topical Report, all NRC reactor licensees are permitted to use that fuel design within their reactor core without requesting specific NRC approval, as long as the core continues to meet all design and safety limits. In an operating nuclear reactor, burnup is one of the many parameters that are considered in designing the fuel and core for each operating cycle. Many parameters are evaluated throughout the operating cycle to verify that design specific limits are met. Data-based, predictive tools are used to evaluate these parameters over the cycle. Throughout the cycle, physics testing is also done to confirm key physics parameters are consistent with predictions. When a new fuel is designed its use is limited by the data available to support the associated predictive tools. As such, burnup is limited for a particular fuel by the supporting predictive tools, the data supporting the predictive tools, and the requirement to not exceed any design limit. In an operating reactor, the main distinction between HBF and low burnup fuel (LBF) is the amount of exposure to which the fuel is subjected. The fuel is required to meet all safety limits at all times during the operating cycle.

a. High burnup fuel is hotter and "between 2 and 158 times more radioactive," requiring the waste to be cooled on-site in spent fuel pools for at least 12-15 years (rather than 5 years). Does the NRC agree with this statement? If not, how much more radioactive would the NRC say high burnup is? Edison reported to the CPUC they must keep some of their fuel in the spent fuel pools for at least 12 more years.

   Answer:

   HBF is typically defined as fuel with a burnup (a measure of the time a fuel assembly stays in the reactor core) greater than 45,000 megawatt-days per metric ton of initial uranium. LBF means any fuel with a lower exposure than this value. Average fuel burnups have increased from around 35,000 megawatt days per metric ton uranium two decades ago, to over 45,000 megawatt days per metric ton uranium today. Higher burnup fuel is thermally hotter and more radioactive than lower burnup fuel for a given cooling time. The difference in decay heat (a function of the fuel transferring heat to decrease its temperature over time) and radioactive source term depends on the difference in the fuel burnup (i.e., how long the fuel was being used in the reactor), the initial enrichment of the fuel, and the irradiation environment that the fuel was exposed to in the reactor. Moving from 35,000 megawatt days per metric ton uranium to 45,000 and 55,000 increases the overall heat source term or level by 35% and 78%, respectively, and increases the radiation source term or level by 33% and 72%, respectively.

   HBF must be cooled longer than LBF before it can be placed into a dry storage system. How much longer depends on the difference in burnup, the specific dry storage system design, and the decay heat loading pattern of the fuel being used. As an example, for a 5.0 weight percent enriched (in Uranium-235) fuel assembly in one particular storage system, the required cooling time goes from 4.5, to 7, to 12 years, for a fuel burnup of 35,000, 45,000, and 55,000 megawatt days per metric ton uranium, respectively.

b. How does the presence of high burnup fuel affect the decommissioning process at San Onofre? What specific problems does this higher radioactive fuel present for waste storage in fuel pools and dry cask storage at San Onofre and how much longer will this radiation last? How will decommissioning be impacted by the current onsite storage of the spent fuel?

Answer:

HBF is decommissioned in accordance with the same regulatory requirements as other fuel types. The higher heat load of HBF will require the water circulation pumps in the spent fuel pool to circulate more water in order to efficiently reject the added heat from the HBF and maintain water temperatures. Once the HBF spent fuel is sufficiently cooled in the pool, it may be transferred from the fuel pool to the dry storage canisters in the Interim Spent Fuel Storage Installation (ISFSI), after which the spent fuel pool can be decommissioned consistent with the licensee's decommissioning strategy and schedule.

A dry cask storage system that is designed to handle HBF has been reviewed and approved for use at SONGS. This review included determining if the dry cask storage system provides adequate margins to safely store HBF. SCE is only able to store fuel within the fuel specifications and other limits in the associated certificate of compliance, which provides reasonable assurance of the safety of the stored fuel. The impact on the overall decommissioning schedule for SONGS will be dependent on the spent fuel management plan that the licensee will determine. To date, SCE has not provided their decommissioning and spent fuel management plans for the NRC to evaluate.

c. We understand the NRC staff is worried about short and long-term waste storage in dry casks of high burnup fuel and has initiated a new study to determine if it can safely be stored in dry casks. Is this report complete? Will it be released to the public, and when?

Answer:

It is not clear what NRC study the question is addressing. Currently HBF is licensed to be stored in approved dry cask storage systems for an initial period of 20 years, with a potential extension of one or more 40 year intervals. However, with the delay in availability of a final repository for spent nuclear fuel it was determined that the dry storage of spent fuel might have to account for a considerably longer period of time than originally planned. As such, the NRC staff is examining the regulatory framework and potential technical issues related to extended dry storage and subsequent transportation of spent nuclear fuel for periods beyond the initial licensing and single renewal period (i.e., beyond ~60 years of storage). This analysis has been undertaken in order to identify potential changes needed to the associated regulations or guidance, in accordance with direction from the Commission in Staff Requirements Memorandum COMSECY-10-0007, "Project Plan for the Regulatory Program Review to Support Extended Storage and Transportation (EST) of Spent Nuclear Fuel" (see Agencywide Documents Access and Management System (ADAMS) Accession No. ML103400287).

As a first step in the EST Program, the NRC identified the technical information needs associated with extended dry fuel storage systems (see draft issued for public comment,

at ADAMS Accession No. ML120580143) in order to understand potential degradation mechanisms, the level of knowledge about these mechanisms, and how that degradation would affect the ability of a dry storage component to fulfill its regulatory or safety function. The EST Program is expected to be complete in the next five to seven years, subject to any funding limitations that may occur. The report, once finalized, will be made available to the public.

d. One of your concerns is that there is no way to monitor what is occurring inside the dry casks. How does the NRC propose to monitor the highly radioactive material inside of the dry casks? How many casks will be required to safely store all the high burnup fuel that is on site in both the spent fuel pools and dry casks at San Onofre? How much high burnup fuel is on site in fuel pools and dry cask at San Onofre?

Answer:

The NRC collects data on the total amount of spent fuel stored at commercial facilities, like SONGS, throughout the country. This information, and much more concerning spent nuclear fuel, is available on the NRC website at http://www.nrc.gov/waste/spent-fuel-storage.html. The NRC does not independently maintain records showing how many fuel assemblies have been loaded into each cask that were specifically HBF. However, licensees and certificate holders are required to register each cask with the NRC pursuant to 10 CFR 72.212(b)(2). The cask registrations and information contained therein are subject to routine inspection by the NRC. When the last routine ISFSI inspection report was issued for SONGS on May 20, 2011, SCE had loaded 11 canisters that contained at least one HBF assembly out of the 55 canisters loaded on the ISFSI pad at SONGS (see ADAMS Accession No. ML111430612). For any given facility, more specific spent fuel information is considered security-sensitive and is therefore not disclosed to the public.

The NRC is actively monitoring the efforts of industry and the Department of Energy (DOE) to better understand fuel aging mechanisms and promote methods for monitoring the behavior of fuel inside a sealed dry cask. DOE is taking an active role in funding Nuclear Energy University Program (NEUP) projects to study this issue. In addition, DOE is sponsoring a demonstration test with a variety of HBFs to benchmark models of fuel behavior and obtain, through monitoring of the mockup test casks, the temperature and gases evolved which will indicate how the fuel is behaving. This demonstration will provide data that will allow the creation of enhanced models to predict the behavior of various types of spent fuel.

In terms of the number of dry casks that will be necessary to store the spent fuel at SONGS, it will depend on which dry cask storage system is used for the decommissioning effort and when the spent fuel is actually moved from the fuel pool to dry cask storage due to the different sizes of casks available and the actual heat being given off by the assemblies the licensee wants to load into the dry casks. This information is not yet available from SCE, but should be provided as a part of the SONGS spent fuel management plan.

e. We know that MOX fuel was used in Unit 1 and was removed from San Onofre to the GE Morris facility in Illinois. How and when was that done and under what permit was that done? If MOX fuel was transported away, can other high burnup fuel be moved from the site in the same way to the same or similar places?

Answer:

Between March 1972 and September 1980, 270 fuel assemblies were shipped from SONGS to the GE Morris facility. Mixed oxide (MOX) fuel was not included as a part of these shipments. Specifically, Appendix A of the Technical Specifications for GE Morris (see ADAMS Accession No. ML042180413) identifies that 270 stainless steel clad fuel assemblies are allowed to be stored at the GE Morris facility. Page 12 of a 2004 NRC Inspection Report (see ADAMS Accession No. ML040070255) indicates that the MOX fuel irradiated at SONGS is zircaloy-clad. Consequently, GE Morris is not allowed to store the MOX fuel from SONGS. The NRC report also indicates that the MOX fuel was stored in the SONGS Unit 1 spent fuel pool, and Page 9 of the 2004 NRC Inspection Report identifies that irradiated MOX fuel can be loaded into the Advanced NUHOMS dry cask storage system employed by SONGS. In addition, a 2011 NRC Inspection Report (see ADAMS Accession No. ML111430612) identified that eighteen of the dry storage canisters located on the SONGS ISFSI pad contain either irradiated fuel or greater than Class C radioactive waste from SONGS Unit 1.

SONGS can transfer spent fuel only to licensees/licensed facilities that are authorized to receive the spent fuel and have an agreement in place with SCE to accept the fuel. Information on SCE's plans for the spent fuel is not yet available, but should be provided as a part of the SONGS spent fuel management plan.

3. Will the NRC allow the resale of non-radioactive equipment and secondary side components (e.g., the turbines, moisture separator reheaters, heat exchangers, condensers, intake pumps, intake piping, outfall piping, all associated piping and electrical components)? Since some of these are almost new (turbines $90 million, canister $50 million, heat exchangers $20 million), will they be sold and will the proceeds go to offset the cost of decommissioning?

Answer:

The NRC regulates the safe use of radioactive materials and does not regulate commerce. As such, the NRC will ensure that the materials released from the site for unrestricted use meet radiological release requirements. If a licensee has non-radioactive assets, including plant components, equipment, and recyclable materials that can generate revenue, the use of this revenue is outside of the NRC's authority and is under the oversight of the state public utility commission. The licensee may also transfer or sell contaminated parts and equipment to other licensees for use in their nuclear facilities, within the limitations of the applicable transportation requirements.

4. Will there be public announcements when any "allowable" toxic waste is to be released into the environment. We would also like to know, in general and relative terms that everyone can understand, what the upper limits are for releasing radiation and toxic chemicals into the

environment during the decommissioning process. When were those limits established and what would trigger a process to reevaluate those limits?

Answer:

During decommissioning, both liquid and airborne radiological releases will be monitored and are required to be maintained below the same radiological limits as when the plant was in operation. The radiological effluent release criteria were established in 10 CFR Part 20 many decades ago. The licensee will continue to provide the NRC with environmental effluent reports and the NRC will conduct inspections of this area throughout the decommissioning process. The results of the NRC inspections and any associated findings will be published in inspection reports that are publicly available. The NRC does not monitor or regulate the release of toxins or other forms of non-radiological waste as that is within the purview of the Environmental Protection Agency and other similar federal and state government organizations.

5. The NRC has not approved the transport of dry storage casks nor even short-term dry cask storage (beyond 20 years) for high burnup fuel. Will the NRC continue to allow high burnup fuel use even though they do NOT have an approved safe solution to store or transport this waste - even short-term? High burnup fuel is more difficult to store and transport. In addition, there is no transport cask design approved to store high burnup fuel. The NRC currently licenses dry cask storage for high burnup for only 20 years. The current expiration date for SONGS is February 5, 2023.

   Answer:

   While HBF does possess a higher initial heat load that LBF, it can be safely stored and transported if the potential fuel degradation mechanisms are addressed and the NRC regulatory requirements are satisfied. The assertion that the NRC has not licensed any casks for transport of HBF or short term storage of HBF is incorrect. HBF is in dry cask storage at a number of reactor sites across the country. In addition, there are a limited number of transportation packages certified for the transport of spent nuclear fuel. Of those, some have HBF included in the authorized contents. For example, the Model No. UMS Universal Transport Cask package and the Model No. Hi-Star 180 transportation package have current transportation certificates of compliance which include HBF contents.

   The NRC will continue to license the storage of HBF as long as the applicants can show that it can be done safely by meeting the applicable regulatory requirements. Currently HBF is licensed to be stored in approved dry cask storage systems for an initial period of 20 years, with a potential extension of one or more 40 year intervals. The NRC is developing a path forward for licensing the storage of HBF up to 60 years and beyond based on time limiting aging analysis, aging management plans, analysis of consequences of a variety of potential fuel behaviors, and test data provided by the applicants.

   There are three types of dry cask storage systems for spent nuclear fuel: 1) storage only which have not been approved for transportation, 2) dual purpose systems that are designed for both storage and transport (most of these have been approved for storage of HBF only but some have also been approved for transport of HBF), and 3) canisterized

systems where the canister may or may not be put into a new overpack for transport. The current dry storage cask design in use at SONGS is the Transnuclear (TN) NUHOMS system, Certificate of Compliance 072-1029, Amendment 1, with a 24PT4-DSC canister. The Technical Specifications for this canister allow fuel burnup of up to 60,000 megaawatt days per metric ton uranium. Note that higher burnup fuel requires a longer required cooling time (years after discharge) in the spent fuel pool before the heat load has decreased enough to meet the Certificate's Technical Specifications for using the dry cask storage system.

The Coalition cites the Regulatory Information Conference (RIC) talk by a senior NRC staff member on the storage and transportation of HBF. Specifically, the statement on Slide 7 of the Argonne National Laboratory (ANL) results that says there is "enough data to determine there is a regulatory issue. Insufficient data to support a licensing position." In late 2012 the NRC completed an experimental program at ANL to determine at what temperature cladding goes from ductile (able to bend) to brittle condition. That program found that different types of cladding become brittle at different temperatures. Dry storage cask designers will therefore need to address the specific fuel cladding type and its temperature to show that HBF can stay intact during a transport accident.

6. What are the reasons San Onofre has the highest percentage of damaged fuel assemblies of any U.S. nuclear plant? What is the impact of this to decommissioning in terms of safety, timeline, and cost?

   Answer:

   Like many other power plants, SONGS has experienced some fuel cladding failures during its operating history, the reasons for which have been documented in various sources including NRC inspection reports and generic communications. There is no data to support that SONGS possesses the highest percentage of damaged fuel assemblies of any U.S. nuclear plant. It is not expected that the condition of the SONGS fuel will have a significant adverse impact on decommissioning safety, schedule, or costs. In addition, the licensee for SONGS has radiological safety procedures in place to address worker safety, monitor the plant, and make radiological measurements to ensure that materials released from the facility meet the radiological release criteria. Moreover, during the decommissioning of SONGS, Units 2 and 3, the NRC will conduct routine inspections of the SONGS decommissioning activities. Inspection reports without security-related information will be publicly available on the NRC's website.

7. What is the status of Southern California Edison's request to the NRC for approval to upgrade from 24 fuel assembly casks to the NUHOMS® 32PTH2 [32 fuel assembly] dry cask system, with an estimated installation date of September 2014? The higher number of fuel assemblies brings higher risk of radiation releases, especially for high burnup fuel, which is hotter and more radioactive and therefore takes more space to store. Since it's safer to reduce the number of assemblies rather than increasing the number of assemblies, why does the NRC approve 32 assembly casks?

Answer:

Transnuclear, Inc. (TN) submitted an application to the NRC to amend its Certificate of Compliance (CoC) No. 1029 for dry cask storage to add the NUHOMS® 32PTH2 System (in accordance with 10 CFR Part 72, Subparts K and L). CoC 1029 already includes the NUHOMS®-24PT1 and 24PT4, which are currently approved for use by holders of 10 CFR Part 50 licenses for nuclear reactors at reactor sites under the general license provisions in the NRC's regulations (general licenses are issued pursuant to 10 CFR 72.210, subject to the conditions specified by 10 CFR 72.212). SCE holds a 10 CFR Part 50 license, and as such may use any cask under the general license. By letter dated February 10, 2012, in support of the TN amendment request, SCE indicated that it plans to use the NUHOMS® 32PTH2 System by September 2014.

In order for the NRC to approve the TN amendment, adequate protection of public health and safety must continue to be ensured. The NRC staff's safety evaluation must conclude that the applicant provides reasonable assurance that the NUHOMS® 32PTH2 System will provide safe storage of spent nuclear fuel for the certified life of the cask system in compliance with 10 CFR Part 72. This includes a finding that the radiation protection system design and acceptance criteria have been satisfied and that the applicant's accident evaluation of the cask adequately demonstrates that it will provide for safe storage of spent nuclear fuel during credible accidents.

The NRC staff is nearing completion of its technical / safety review of the application and supplemental information provided by TN, which is being performed in accordance with the applicable NRC regulations in 10 CFR Part 72, using the guidance in NUREG-1536, Revision 1, "Standard Review Plan for Spent Fuel Dry Storage Systems at a General License Facility," dated July 2010.

The NRC approves dry storage cask designs and design changes through rulemaking, and approved casks are listed in 10 CFR 72.214. Upon completion of its technical / safety review, the NRC will issue a proposed rule for public comment, which will include a draft safety evaluation report, environmental assessment, and amended Certificate of Compliance. The staff currently expects the proposed rule for the amendment to CoC 1029 (to allow the NUHOMS® 32PTH2 System) to be published for public comment in the spring of 2014. The NRC would review and address any public comments received on the proposed rule as part of its process to decide whether to approve the design change.

8. Is removing the spent fuel pool considered part of the decommissioning process? If so, how can dry casks be transported without use of a spent fuel pool in cases where that may be needed? What vulnerabilities are there in San Onofre's spent fuel pools? What improvements could be made to improve safety? Will any of them be made? If so, when? If not, why not?

Answer:

There are two spent fuel pools at SONGS, both of which were built during construction of the plants. Both of the spent fuel pools meet all regulatory requirements for the storage of new and spent nuclear fuel. Decontamination of the spent fuel pools, which may involve

removal and disposal, is a decommissioning activity. Before starting to decommission systems and components needed for moving, unloading, and shipping the spent fuel (like the spent fuel pool), the licensee must develop a plan for removal of the spent fuel from the reactor site, and a plan for how the spent fuel will be managed until the time that DOE takes title to, and possession of, the spent fuel (these requirements are in 10 CFR 72.218). This plan is part of the licensee's program for managing and providing funding for management of spent fuel following permanent shutdown of the reactor until the time that DOE takes the fuel. The licensee is required (in 10 CFR 50.54(bb)) to submit this spent fuel management program to the NRC for review within 2 years following permanent shutdown.

The licensee's program for spent fuel management and its plan for removal of the spent fuel from the site would need to consider what equipment, systems, or facilities would be needed to place the spent fuel into an approved transportation package, before decommissioning these systems. For example, if the storage system is a canister-based system (the spent fuel is confined in a welded canister that is placed in a storage overpack that provides radiation shielding), the canister may be placed into a transportation overpack / package without the need for a spent fuel pool. If the storage system was not transportable, a spent fuel pool or dry transfer facility would be needed to repackage the spent fuel into an appropriate transportation package when necessary.

SONGS currently uses a dry canister based storage system for its spent fuel in conjunction with the spent fuel pools. Regarding transportability of this system, the 24PT1 canister is certified for transport (under CoC 9255; MP187 transportation cask), as is the 24PT4 canister (under CoC 9302; MP197 transportation cask). As discussed earlier, the NRC is currently reviewing an application for amendment to CoC 9302 (MP197 transportation cask) to allow transportation of the 32PTH2 canister.

9. What is the reason (or possible reasons) for the high damage rate of fuel assemblies at San Onofre? How many of these are high burnup?

   Answer:

   Many nuclear plants experience damage to fuel assembly cladding that can cause leakage of the gas surrounding the fuel pellets within the cladding. These fuel assemblies are commonly called "leakers," and the various causes that can lead to a fuel leaker (as well as the means for preventing them) are continually being studied. However, nuclear fuel assemblies with such defects can be repaired since it is the cladding and not the fuel itself that is damaged, and if the fuel is not completely irradiated (i.e., spent) it can be reinserted into the reactor for additional use. In addition, spent fuel that is to be placed into dry storage can be evaluated for leaks and subsequently repaired prior to placing it in the ISFSI.

   In regard to the number of damaged fuel assemblies at SONGS that are HBF, the NRC does not maintain public records showing how many fuel assemblies of a specific type or burnup have been damaged and/or repaired. The NRC and DOE operate the Nuclear Material Management and Safeguards System (NMMSS), a database that tracks special nuclear material (enriched uranium and plutonium). This database does not distinguish between fresh and irradiated material, and the information is withheld from the public for security reasons. This is also why figures on spent fuel inventory come from the industry.

10. What level of on-site staffing will NRC provide during the decommissioning process, and in which areas of technical expertise and oversight?

    Answer:

    Consistent with agency procedures, the NRC typically maintains a full time resident inspector onsite during part of the first year after permanent shutdown. The resident inspector oversees the plant transition from operation to permanent shutdown, in order to verify that the licensee complies with their license, technical specifications, and procedures. Generally, early in the first year after permanent shutdown, the Inspection Program is transferred from the Reactor Oversight Program to Inspection Manual Chapter (IMC) 2561, "Reactor Decommissioning." For SONGS, this transfer within the NRC was completed on August 29, 2013. The contents of this IMC are publicly available and outline the oversight activities that the NRC staff will be involved in throughout the decommissioning process.

    During the first year, the licensee prepares the plant for safe decommissioning. The actions taken by the licensee include the modification of systems, shipment of radioactive waste, emptying of tanks, draining of systems, and electrical isolation of components. As during plant operations, the resident inspection staff is supplemented with special inspection expertise as needed, which includes security, emergency response, health physics, environmental monitoring, and engineering. NRC inspections continue throughout decommissioning until the licensee demonstrates that the site meets the license termination requirements. The level of decommissioning inspections will be commensurate with the licensee's planned decommissioning activities, which will be outlined by SCE in its PSDAR for SONGS.

11. How do the waste confidence hearings affect the probability and timing at San Onofre for shipment of nuclear waste to remote interim or permanent storage?

    Answer:

    The proposed Waste Confidence rulemaking has no impact on the probability or timing of SONGS spent nuclear fuel being shipped to a mined geologic repository because Waste Confidence is the NRC's generic determination regarding the environmental impacts of storing spent nuclear fuel after the end of the licensed life for operations of a nuclear reactor and before final disposal in a repository. The proposed Waste Confidence rulemaking does not authorize the shipment to or disposal of spent nuclear fuel to a mined geologic repository. Similarly, Waste Confidence has no impact on SONGS spent nuclear fuel being shipped to a remote interim storage site because the proposed rulemaking does not authorize the shipment to or storage of spent nuclear fuel at an interim storage facility.