

Responses to Questions from the Prairie Island Indian Community Concerning Issues Related to Prairie Island Nuclear Generating Plant

May 26, 2010

Question No. 1

1. In Minnesota there are two nuclear power plants—Monticello Nuclear Generating Plant and the Prairie Island Nuclear Generating Plant. Both of these plants have on-site spent fuel storage. One site—the Prairie Island site—is immediately adjacent to the residents of the Prairie Island Indian Community. In both cases, the public and the Minnesota legislature supported on-site storage as a necessary, short-term solution to keep the two plants operational and over 2,000 permanent and contract workers employed. The storage sites were billed as a needed “temporary” measure until the repository at Yucca Mountain was operational (when the “temporary” sites were first approved, the target date for removal of the spent nuclear fuel to Yucca Mountain was 1998). In light of recent events, these “temporary” sites are now essentially *de facto* permanent sites.
- Do current NRC regulations for dry cask storage consider long-term storage?

NRC Response

Yes. NRC regulations for dry cask storage contained in 10 CFR Part 72 allow for the possibility of longer-term storage through renewals of the dry cask licenses. Currently, dry cask licenses and subsequent renewals are established for 20 year time intervals. As part of license renewal, applicants are required to demonstrate that the casks will still meet safety standards for the additional time period requested. An integral part of this assessment is development of an Aging Management Plan (AMP) to identify and address potential aging effects of the cask components. The AMP is a highly structured process that requires systematic scoping and identification of important cask components, time-limited aging analyses to predict effects of aging, and an active aging management program. The aging management program specifies inspections, monitoring, maintenance, and corrective actions that should be taken for the cask system during the license renewal period.

Based on available test data and analyses, the NRC has confidence that the aging behavior of casks for at least 60 years can be reasonably predicted and that corresponding AMPs are adequate means to ensure continued safety, security, and environmental protection. However, the ultimate burden of proof is on each applicant when requesting a renewed license for dry cask storage. Data and engineering judgment also suggests that casks can have a service life up to 100 years and beyond. However, additional information is needed to confirm this judgment, and provide confidence in regulating potential casks for license renewal periods that exceed 100 years. NRC Research is developing the technical basis to ensure the continued safe performance of long-term dry storage systems for spent nuclear fuel and high-level radioactive waste under extended service

conditions (20 to 100 years) and the structural integrity of spent fuel transport casks during severe accidents.

- Have the health, safety, and environmental consequences of long-term storage been considered?

NRC Response

Yes. The health and safety consequences of dry storage have been characterized through evaluating annual radiological doses and considering the effects of potential severe accidents. The ability of the cask to maintain its confinement function is addressed through dry cask storage license renewal analyses and AMP (see response above) and, as such, NRC expects the health and safety consequences to remain the same, or decline over time as the stored fuel itself becomes less hazardous through long-term radioactive decay.

For each licensing action requiring renewal of storage licenses, the NRC is required by National Environmental Policy Act (NEPA) to perform environmental analyses (i.e. impacts) of the licensing action.

- How long can these casks be used? Were these casks (the TN-40 at the PINGP) designed for long-term storage (i.e., greater than 100 years)?

NRC Response

NRC licensing reviews focus on assuring that each design is safe for the time period of storage requested (e.g. 20 years). NRC does not require submission of information regarding design life other than that necessary to justify operation for the 20-year license term. Therefore, NRC does not have details regarding PINGP's original intent for design life beyond 20 years. Some cask vendors may have originally designed the cask with a limited service life in mind (assuming the availability of a repository). However, it may be possible to demonstrate the actual as-built TN-40 designs are capable of longer service lives with an appropriate AMP. The AMP would require them to perform time-limited aging analyses and develop an active management program to monitor performance of the cask.

NRC notes it has experience in renewing storage licenses for longer terms with an AMP, such as at Surry, which uses the TN-32 cask design. However, PINGP has not submitted any such requests for storage license renewal, or associated AMPs to the NRC at this time. PINGP's current storage license will expire in October of 2013.

- Since it will take decades to implement any new storage or waste management plan (that will be recommended by the Blue Ribbon Commission on America's Nuclear Future), will the DOE or the NRC be evaluating the long-term use of dry casks?

NRC Response

Yes. NRC is actively evaluating the long-term use of dry casks for greater than 100 years. The Commission recently directed the staff to perform a thorough evaluation of its regulatory programs and to undertake research to bolster the technical basis for extended periods of storage. NRC is initiating efforts to perform its own research to provide data and insights for regulating storage beyond 100 years. The NRC is an independent regulator, but is also coordinating with DOE on plans for evaluating and demonstrating long-term use of dry casks. Data and insights from future DOE evaluations will likely be considered in any future licensing decisions for long-term cask uses.

- What assurances can the NRC or the DOE give host communities that long-term use of dry casks will not present problems?

NRC Response

The NRC will continue to have licensing, inspection, and enforcement oversight of dry cask storage facilities as authorized by law. As described above, the licensing process for renewing casks for long-term use will require a thorough demonstration to ensure the cask structures are robust and safe for the requested license periods. The NRC will also continue to implement an inspection program to periodically monitor activities of the owner, to assure casks are safely maintained as committed to in the license application, and to take enforcement action if requirements are not met.

Additionally, if significant technical issues were identified for casks on longer time horizons, the staff believes the basic technology exists today to repackage fuel from older casks into new storage or transportation casks. Such operations would be similar to how fuel is currently handled and packaged into new casks. The ability to handle and retrieve spent nuclear fuel is an issue actively addressed by NRC.

Question No. 2

2. The Prairie Island Indian Community has on-going concerns about the security of the power plant and the spent fuel storage installation. Although the PINGP site is annexed into the City of Red Wing, the Community is in reality the closest jurisdiction for emergency response, and the PIPD (staffed by both federal and state-licensed peace officers) would be the closest first responder for an incident or event at the PINGP.
- Does the NRC have any plans to acknowledge the status and role of PIIC as a “host community”?
 - Would the NRC support efforts to better equip the PIPD to improve and enhance its ability to respond to a security or terrorist threat at the site?

NRC Response

The criteria used by NRC to evaluate power reactor emergency plans are found in Part 50 of Title 10 of the *Code of Federal Regulations* (10 CFR). In accordance with 10 CFR 50.47, the NRC evaluates the effectiveness of the power reactor’s onsite response organization, and the Federal Emergency Management Agency (FEMA) evaluates the effectiveness of offsite response organizations.

The meeting that PIIC hosted in February 2010, at the Prairie Island Indian Community, provided the State of Minnesota, FEMA Region V, NRC Region III, Goodhue County, and the City of Red Wing, a forum to discuss emergency response for the Prairie Island Nuclear Generating Plant.

The NRC Region III Government Liaison Officer will maintain communication with the State of Minnesota, through the Governor-appointed State Liaison Officer and other State officials, to facilitate communications with the Prairie Island Indian Community applicable to emergency response.

Question No. 3

3. Recently the NRC asked the National Academy of Sciences' Nuclear Radiation Studies Board (NAS NRSB) to perform a state-of-the-art study on cancer risk for populations around nuclear power facilities. The announcement stated that the NRC is "interested in having the NAS evaluate cancer diagnosis [rates], as well as exploring how to divide the study areas around facilities into geographical units smaller than [the] counties used in the National Cancer Institute report" (which was completed in 1990).
- How did this study request come about?

NRC Response

NRC initiated this work to have the most current scientific information available to respond to stakeholder concerns related to cancer mortality and incidence rates for populations that live near past, present, and proposed nuclear power facilities.

The NRC staff uses a 1990 study conducted by the National Cancer Institute (NCI), "Cancer in Populations Living Near Nuclear Facilities," as a valuable risk communication tool for addressing stakeholder concerns about cancer mortality attributable to the operation of nuclear power facilities. However, the NCI report is almost 20 years old and a new study needs to be performed to reflect the current populations living near nuclear power facilities.

In addition, the analyses in the NCI report focused on cancer deaths, and the general public is often also interested in cancer incidence (i.e., being diagnosed with cancer, but not necessarily dying from the disease). Therefore, the NAS project is expected to assess cancer incidence study in addition to the mortality study.

- How will the study areas be determined? Will all facilities be evaluated or just a representative group?

NRC Response

The new study is to include facilities in the following life-cycle phases: facilities in the process of being decommissioned or that have been decommissioned and facilities that are currently in operation. In addition, studies will be performed at potential future facilities to establish a baseline cancer risk for the site. When selecting the facilities to study, the NAS is expected to consider a variety of factors in order to minimize uncertainty in the study results, including the quality of the cancer mortality and incidence data in the regions surrounding the facilities.

- Evaluating cancer rates at the county level would tend to dilute the cancer incidence rates immediately around nuclear power plants. For instance, the Prairie Island Indian Community is the closest population to the PINGP; the City of Red Wing is 10 miles away from the PINGP. We recommend that census tracts be used for a more accurate assessment of cancer rates.

NRC Response

The NRC has requested that the NAS determine the feasibility of reducing the study geographical areas from the county size—as used in the 1990 National Cancer Institute study—to smaller areas closer to the facility (e.g., zip codes, census tracts, or annular rings developed around the facility using geographic information systems at 3-mile, 10-mile, 30-mile, and 50-miles)

- The Prairie Island Community raised health concerns (i.e., cancer rates) in their scoping comments for the Supplemental Environmental Impact Statement (SEIS) that the NRC was preparing for the PINGP’s license renewal application. The tribe cited studies conducted by the German and Swiss governments around nuclear power plants. The tribe was told that these were “Category 1” (i.e., generic to all nuclear power plants) and would therefore not be addressed in the final SEIS. Health impacts are not discussed in the draft SEIS. How will the NRC account for this new cancer study, in pending license renewal applications?

NRC Response

At this point, it would be premature to predict what the results of the NAS cancer study will be and therefore we cannot determine at this time how the results may affect the license renewal process.

Upon the completion of the NAS cancer study, the NRC will thoroughly review and evaluate the report to determine whether changes are needed to our radiation protection regulations. If changes are warranted based on the report, the NRC will initiate the rulemaking process conducted in an open and transparent process that will consider input from all interested parties.

Typically, for significant changes to our radiation protection standards, the NRC invites other Federal regulatory agencies, such as the Environmental Protection Agency (EPA) and the Department of Energy to participate in the process to maximize the contribution from radiological and human health experts. When changes to the radiation protection standards are finalized, the license renewal evaluation process will change to conform to the regulations.

Question No. 4

4. The Prairie Island Community is also very concerned about the potential health effects from exposure to electromagnetic fields from the high voltage power lines coming from the PINGP. According to the NRC, biological and physical studies of electromagnetic fields have not found consistent evidence linking harmful effects with field exposure. The draft SEIS (for license renewal) notes that scientific research is continuing in this area and that the potential for chronic effects is not known at this time. According to a National Institute of Environmental Health Sciences (NIEHS) report, extremely low frequency-electromagnetic field (ELF-EMF) exposure “cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard.” The draft SEIS adopts the NRC’s 1996 Generic EIS finding of “uncertain” for electromagnetic fields—chronic exposure. Since there is no scientific consensus on whether human health is compromised, the Tribe believes that is NO assurance that there are NO adverse health effects (i.e., chronic health effects, increased risks to cancer). Many community Members reside within 100 to 400 meters of the 345-kV transmission lines. The Community is very concerned about this potential hazard and we urge the NRC to continue evaluating the latest studies and reports.
- Will the NAS NRSB cancer study also look at combined/cumulative health effects from the high-voltage power lines?

NRC Response:

The NAS cancer study is expected to focus on the risks from ionizing radiation exposure from radioactive releases from nuclear facilities licensed by NRC. The high voltage transmission lines are under the jurisdiction of the states and will not be evaluated in the study.

However, the NRC is continuing to follow the research done on the effects of electromagnetic fields (EMF) by the National Institute of Environmental Health Sciences (NIEHS), through the U.S. Department of Energy.

The NRC performs a reevaluation of the technical basis for the areas associated with license renewal approximately every 10 years. The issue of EMF will be reexamined for each subsequent revision to the Generic Environmental Impact Statement (GEIS). Changes to the GEIS will be made when valid scientific information is available to support a definitive assessment of the impact.

Question No. 5

5. The Prairie Island Indian Community is concerned about cumulative health and environmental impacts from all aspects of the PINGP's operation—the reactors (radiological releases and effluent, thermal effluent, tritium contamination), the spent fuel storage installation, and the high-voltage power lines (EMF)—and has raised them in various venues with the NRC.
- How has the NRC addressed these concerns?

NRC Response

Nuclear power plants are authorized to release radioactive effluents within Federal limits and as low as reasonably achievable (ALARA) controls, which are described in the Commission's regulations in 10 CFR Part 50.36a. PINGP's effluent and environmental reports are publicly available on the NRC's web site.

The NRC establishes public dose limits based on international/national recommendations and EPA federal guidelines. The limits consider potential cumulative effects. The annual dose limits were developed to protect against adverse health effects from long-term chronic exposure.

As part of the Reactor Oversight Process (ROP), NRC inspectors routinely review the public radiation safety and occupational radiation safety programs. In addition, inspectors are reviewing the actions by PINGP to implement the industry initiative on groundwater protection. Spent fuel storage is also reviewed and monitored by an inspection program and meets regulatory requirements.

The NRC reviewed the licensee's tritium monitoring program and determined that the site is complying with applicable federal regulations for their radioactive effluent program, their radiological environmental monitoring program, and the industry's voluntary initiative for groundwater protection.

We have concluded the Prairie Island Indian Community (PIIC) drinking water is safe with regards to radiological discharges from the Prairie Island facility. In addition, our inspection and oversight provides no indication that any underground pipes are currently leaking contaminated water.

Through our inspections we have concluded that the site effluents are as low as reasonably achievable, within regulatory limits and contribute a small fraction of the dose that arises from natural radiation exposure. No adverse health effects have been discerned from doses at these low levels.

For the period of extended operation, the NRC staff evaluated potential cumulative impacts from the operation of PINGP during the license renewal term in Chapter 4 of the Draft Supplemental Environmental Impact Statement (SEIS). The following is a summary of the NRC staff's conclusions for the various issues:

- **Aquatic and water resources -- moderate to large impact**
- **Terrestrial resources -- small impact**
- **Human health (radiation exposure and EMF) -- small impact**
- **Socioeconomics (including environmental justice) -- moderate impact.**

Chapter 6 of the Draft SEIS evaluated the impacts from spent nuclear fuel storage and concluded that the impacts are small.

Question No. 6

6. Last September the NRC has identified a substantive cross-cutting issue (SCCI) in the area of human performance at the PINGP. The NRC has 3 SCCI's—human performance; problem identification and resolution; and safety conscious work environment. In the case of PINGP, the NRC identified themes related to the human performance SCCI:

systematic process (4 findings)
conservative assumptions (6 findings)
procedural adequacy (5 findings)
procedural compliance (4 findings)

Additional performance problems in the last six (6) months include:

- The loss of radioactive tools and equipment at the plant. While the loss was noticed by plant staff on 12-18-09, the NRC wasn't notified until 01-19-10;
- A fire in a non-safeguard diesel generator in January 2010 following Emergency Preparedness inspection;
- NRC Preliminary White Finding issued on 4-9-10. PINGP's emergency plan Alert emergency action levels (EALs) RA1.1 and RA1.2 specified instrument threshold values that were beyond the indicated ranges of the effluent radiation monitors;
- Fish Kill in Discharge Canal on 4-14-10;
- Unexpected turbine trip 4-16-10 during Re-Fueling Outage of Unit 2; Emergency Operating Procedures implemented and Unit 2 shutdown. Cause of turbine trip still unknown; and
- Equipment malfunction and release of sponge rubber balls on 4-18-10 when a flap designed to catch the balls and direct them for reuse failed to automatically reposition. As many as 1,500 of the balls released into the external circulating water system and could float into the Mississippi River.

The NRC also identified a SCCI for Monticello (also operated by NSP) in the area of human performance.

- Are these related?
- Is this an issue of proper management and oversight?
- Has the PINGP improved in the area of human performance?
- Is the NRC satisfied that the management is doing all it can to ensure that the plant is being operated safely?

NRC Response

The additional issues identified above will be, or have been, evaluated as part of the NRC's baseline Reactor Oversight Process inspections. The first bulleted finding was identified as a licensee identified violation in the first quarter report for 2010. The basis of the Reactor Oversight Process is contained in Inspection Manual Chapter 0308 and includes a description of the cross-cutting issues facet of the program. The NRC's process for assessing substantive cross-cutting issues (SCCIs) is defined in Inspection Manual Chapter 0305 with the specific parts (Areas, Components and Aspects) recently relocated to Inspection Manual Chapter 0310. The NRC has developed criteria for notifying the licensee when a substantive cross-cutting issue exists at a particular site.

The purpose of identifying a SCCI at the mid-cycle and end-of-cycle review meetings is to inform the licensee on the docket that the NRC has a significant level of concern with the licensee's performance in the cross-cutting area. The process does not attempt to assess issue commonality between plants such as Monticello and Prairie Island, but at each plant identifies SCCIs, monitors actions taken to improve performance, and increases the NRC's regulatory response if performance declines, or fails to improve.

The SCCIs have continued at Prairie Island and the NRC has increased interactions with the licensee. There is currently no SCCI open for the Monticello Nuclear Generating Plant.

The NRC reassessed human performance for the year 2009 in the annual end-of-cycle review. The conclusions from that assessment were sent to the licensee in a letter dated March 3, 2010. The letter stated:

Overall, Prairie Island Nuclear Generating Plant, Units 1 and 2 operated in a manner that preserved public health and safety and fully met all cornerstone objectives.

With regards to human performance the letter also summarized and stated:

In the 2009 mid-cycle assessment letter, dated September 1, 2009 (ADAMS Ref. ML092440367), we advised you of a substantive cross-cutting issue (SCCI) in the area of human performance (HP) with cross-cutting themes in the aspects of systematic process (H.1(a)), conservative assumptions (H.1(b)), procedural adequacy (H.2(c)), and procedural compliance (H.4(b)). During this assessment period, there were 26 findings documented with cross-cutting aspects in the HP area. Of these 26 findings, four shared a common cross-cutting aspect of systematic process, four findings with conservative assumptions, six findings with procedural adequacy, and seven findings with procedural compliance. The number of findings in the SCCI themes increased during this assessment period in two out of the four themes. You discussed your actions to address the ongoing HP SCCI during a December 1, 2009, public meeting and

some improvement has been observed. However, these actions have not yet proven effective in mitigating the cross-cutting themes. Therefore, the NRC has a concern with your progress in addressing this cross-cutting area and has concluded that the SCCI will remain open until all cross-cutting themes have been cleared in the area of HP. To clear each of the themes, we will assess whether your corrective actions have resulted in a positive sustainable improvement in the area and will consider the number of findings in the theme.

In addition, because you have a substantive cross-cutting issue in the area of HP for two consecutive assessment cycles, we are requesting you provide a written response to the issue to include discussion of your actions undertaken, those actions planned to address the concern, and a current assessment of performance. This response should be sent to the NRC within 30 days of receipt of this letter. Also, we will discuss the substantive cross-cutting issue during the upcoming end-of-cycle meeting.

The end-of-cycle meeting was a public meeting held on May 20, 2010. The NRC continues to review and assess human performance at Prairie Island. The recent events cited in the question have either not yet been finally assessed by the NRC or do not represent a finding with a human performance cross-cutting aspect in accordance with the Reactor Oversight Process.

Question No. 7

7. The Prairie Island Indian Community has raised concerns about the adequacy of monitoring at the PINGP (equipment, sample locations, sample frequency), particularly given the Tribe's concerns related to radiological releases and effluent and tritium contamination. The Tribe wants to make sure the best available monitoring technology is used, and would also like observation wells installed closer to PINGP-PIIC boundary and samples to be collected monthly (instead of annually). In addition, the Tribe would like to see "plain English" monitoring reports (instead of the difficult to understand Radiological Environmental Monitoring Program (REMP) report submitted to the NRC).
- Will the NRC provide assistance to the Tribe as part of its ongoing government-to-government consultation efforts?
 - Will the NRC support efforts to identify and implement the best available monitoring technology?

NRC Response

The NRC Region III Government Liaison Officer has communicated with Minnesota Department of Health representatives in an effort to more fully understand the State Environmental Monitoring program that is being implemented. The assistance requested is understood to be applicable to environmental monitoring. The NRC Region III Government Liaison Officer will maintain communication with the State of Minnesota, through the Governor-appointed State Liaison Officer and other State officials, to facilitate communications with the Prairie Island Indian Community applicable to environmental monitoring.

The PINGP is required by regulation (10 CFR Part 20, 10 CFR 50.34a, and 10 CFR 50.36a) to have radioactive effluent management systems which monitor and control radioactive effluents released into the environment. In addition, the plant has Technical Specifications and operating procedures to ensure that the radiation dose to members of the public from radioactive effluents meet the as low as is reasonably achievable (ALARA) design objectives contained in Appendix I to 10 CFR Part 50.

The design and monitoring requirements for the radioactive effluent systems used at commercial nuclear power reactors are based on NRC guidance. The NRC guidance is designed to ensure that radioactive effluents are appropriately controlled and monitored to limit the radiation dose to a member of the public to the ALARA design objective in Appendix I to 10 CFR Part 50. The guidance for the design and operation of radioactive effluent and environmental monitoring has been shown, through over thirty years of experience, to provide adequate protection for public health and safety and the environment. However, as directed by the Commission, the NRC staff is currently reevaluating these programs to

determine if changes are needed. A report with conclusions and recommendations is scheduled to be sent to the Commission later this year.

The format used for the annual REMP report submitted by PINGP is consistent with NRC's guidance on reporting the REMP data. The report contains numerous charts that trend the environmental data and summary sections that compare the monitoring results with regulatory standards. The detailed data tables that list individual sample analysis values are included in the report to support the environmental impact conclusions and allow NRC inspectors, who are trained specialists in the subject, to verify the accuracy of the report.

The NRC staff's evaluation of PINGP's radiation protection program showed that it is consistent with NRC guidance and standards. In addition, the NRC believes that existing monitoring equipment is suitable for providing low level environmental measurements. Although best available technology may be able to measure lower or smaller concentrations, the existing equipment has good capability to readily detect low concentrations of radioactivity. The concentrations that are being measured are already a very small fraction of limits established to protect public health and safety.

For tritium monitoring, the Prairie Island monitoring program is using best available technology to analyze for tritium in groundwater samples. The tritium detection capabilities are 19 picocuries per liter using offsite analyses. This is best available technology for tritium.

The NRC performs inspections for effluents and environmental monitoring, which verify that equipment is adequate and is being properly maintained and calibrated. The NRC inspection program is in place to verify the licensee's compliance with the regulations. If the licensee is found to not be in compliance with NRC's standards, then the NRC's enforcement program office will determine the appropriate regulatory response to ensure the licensee corrects the problem. Inspection reports, enforcement actions, and status reports for operating reactors are available on the NRC public web site here: <http://www.nrc.gov/info-finder/reactor/prai1.html>