

2.206 PETITION BY NEW JERSEY ENVIRONMENTAL FEDERATION (ET. AL.)

FOR OYSTER CREEK NUCLEAR GENERATING STATION

EXELON GENERATION COMPANY, LLC

DOCKET NO. 50-219

INTRODUCTION

In the petition submitted November 19, 2012 (Agencywide Documents and Access Management System (ADAMS) Accession No. ML12326A361), Richard Webster representing the New Jersey Environmental Federation (NJEF), the grassroots group Grandmothers, Mothers, and More for Energy Safety (GRAMMES), and Beyond Nuclear, Inc. (collectively Petitioners) urged the Nuclear Regulatory Commission (NRC) to keep Oyster Creek Nuclear Generating Station (Oyster Creek) from restarting until the following conditions are met:

- (1) The evacuation plan is updated to reflect the new reality post-Sandy - including evacuation shelters, blocked roads, emergency responders farther away and more distracted, etc.; and the sirens are repaired;
- (2) The design storm for flood defense purposes is updated to reflect the recent spate of storms and climate change and, additional flood protection is put in place as appropriate;
- (3) The "indications" (cracks or their precursors) are investigated[] and the public is assured through release of additional data[] and analysis[] they pose no additional risk of a nuclear catastrophe;
- (4) Exelon reviews whether the indications were predicted by its modeling and whether it can predict that no problematic indications will develop before the next inspection cycle and proof of ability to predict fatigue[] accurately is released to the public; and
- (5) To ensure transparency, a public meeting with NRC is held at which staff can satisfactorily answer the public's concerns, including those above.

On November 30, 2012 (ADAMS Accession No. ML12338A246), the Petitioners provided a supplement to the petition and requested that the public Petition Review Board (PRB) meeting be held close to Oyster Creek. The following is a summary of the issues that the Petitioners are concerned about:

- The root cause of the control rod drive return nozzle safe end to pipe weld indications and the implications on the license renewal aging management program (AMP),
- That Sandy illustrates that beyond design-basis storms are now more probable than NRC has been assuming since 1969, when the plant was first licensed,

- Emergency Preparedness and the situation on the ground, and
- The root cause of the leak on the reactor spray system and the implications on the license renewal AMP.

The NRC communicated to the Petitioners on November 30, 2012, and December 6, 2012, regarding arrangements for the meeting. The NRC informed the Petitioners that the public meeting would be held at the NRC Headquarters in Rockville, Maryland. The NRC also informed the Petitioners that the purpose of the public meeting was to give them an opportunity to provide any additional explanation or support for the petition before the PRB's initial consideration and recommendation. The NRC also indicated that the meeting was not a hearing, nor is it an opportunity for the Petitioners to question or examine the PRB on the merits or the issues presented in the petition request. No decisions regarding the merits of the petition were made at the meeting.

On January 3, 2013 (ADAMS Accession No. ML13015A144), the Petitioners addressed the PRB in a public meeting held in the Commissioners' Hearing Room in Rockville, Maryland. The public PRB meeting was scheduled from 11:00 AM - 1:00 PM (Eastern Time). The public PRB meeting was recorded by the NRC Operations Center and was transcribed by a court reporter. The transcript became a supplement to the petition. The transcript was also made publicly available. There was telephone line for members of the public to listen to the public PRB meeting. In addition, the public PRB meeting was webcasted through the NRC webpage. As the basis for this request, the Petitioner states that the Petitioners have serious concerns about the ongoing safety at Oyster Creek. The Petitioners believe that the NRC appears to be failing to enforce its regulations, and that lack of enforcement is leading to a lack of adequate protection at the power plant. The Petitioners have three points and one procedural issue. The Petitioners points are: (1) that Exelon discovered unacceptable indications near the control rod drive return level on the reactor pressure vessel, and the Petitioners have some concerns about how this was dealt with; (2) that during Hurricane Sandy, the Petitioners understand that the plant came within 6 inches of losing the service water pumps; and (3) the Petitioners believe Exelon failed to report a major loss of offsite emergency response capability in violation of 10 CFR 50.72(b)(3)(viii). The Petitioners' procedural issue is that the Petitioners believe that there is a major problem with transparency, and despite the Petitioners' repeated requests, the NRC has provided the Petitioners with no documents whatsoever beyond a few emails which provided cursory information. The Petitioners expressed concerns:

- Water levels reached to 7.4 feet at the plant's water intake structure on the morning of October 30, 2012, and portends risks in future storms.
- Because of power outages during the storm, 36 out of 43 warning sirens were inoperable so that an alert system in the surrounding community might have failed if it had been needed. Oyster Creek should have back-up power for sirens.
- Also because of the power outages, the Petitioners have concerns about the capacity of the generators at the plant. What is their capacity to operate when power outages are long-lasting and if the cooling pumps were close to failure; and, if they did fail, are there other sources of cooling water for the generators?

- Residents have voiced concerns about electrical corrosion that might have been caused by the storm. Can the NRC verify if seawater reached any critical electrical infrastructure at the plant and whether there was corrosion?
- Residents have also raised concerns about the dry cask storage area. Was the dry cask storage of radioactive waste area compromised and could it be vulnerable to a future storm?
- In light of dramatic changes to flood risks as evidenced by Federal Emergency Management Agency (FEMA's) new flood maps and damage from Sandy, the Petitioners asked that a revised flood management plan would be considered and an overall assessment made on how close we came to a disaster and whether projections indicate the site would be able to withstand damage from future hurricanes.
- The Petitioners asked that the NRC request the release of Exelon data on the analysis of the cracks, precursors to cracks and pinhole leaks that were observed in the reactor nozzle and cooling system.

BACKGROUND

On November 23, 2012, the petition manager contacted the Petitioners to discuss the 10 CFR 2.206 process and to offer the Petitioners an opportunity to address the PRB by phone or in person. The Petitioners requested to address the PRB prior to its internal meeting to make the initial recommendation to accept or reject the petition for review.

Because the petition requested immediate action, the PRB met internally on November 26, 2012, to review the request. The PRB denied the Petitioners request for immediate action on the basis that there was no immediate safety concern to Oyster Creek, or to the health and safety of the public for the following reasons:

- (1) On November 13, 2012 (ADAMS Accession No. ML12319A627), FEMA concluded that offsite radiological emergency preparedness is adequate to provide "Reasonable Assurance" and that appropriate measures can be taken to protect the health and safety of the public, in the event of a radiological emergency at Oyster Creek in Ocean County, New Jersey.
- (2) At the time, there were 3 emergency notification sirens inoperable out of a total of 42 emergency notification sirens, which does not exceed Exelon's reporting threshold of 25 percent or more sirens out of service. At the time, Exelon was working to restore the 3 inoperable sirens. FEMA's assessment determined that, in the areas where the sirens were determined to be inoperable, the FEMA-approved backup notification method of route alerting could be conducted, if needed.
- (3) Hurricane Sandy did not exceed Oyster Creek's maximum flood level due to probable maximum hurricane (PMH). As reported in the Oyster Creek Final Safety Analysis Report (FSAR), Subsection 2.4.5, the maximum flood level due to PMH will be at elevation 22 feet (ft) mean sea level (MSL). The plant grade, elevation 23 ft MSL, is one foot above the PMH flood level. Therefore, the flood will not find its way into the plant buildings, the floor levels of which are generally 6 inches above grade at elevation 23 ft

and 6 inches. The circulating water intake structure, with its deck at elevation 6 ft, will be under water. This deck supports, apart from the other equipment, the circulating water pumps and the emergency service water pumps. During a PMH flood, the circulating water and service water pumps will become inoperable and, thus, emergency plant procedures have been instituted which require the plant to be shutdown when flood waters reach a pre-determined level, as to ensure the capability for safe shutdown under either normal or abnormal conditions.

- (4) During a planned, routine inspection program, Exelon discovered control rod drive return nozzle safe end to pipe weld indications. These indications were determined to be surface in nature and did not result in any leakage. Exelon completed a structural weld overlay in accordance with the American Society of Mechanical Engineers (ASME) Code.

The Petitioners were informed on November 26, 2012 (ADAMS Accession No. ML12331A345), via email of the PRB's decision to deny the Petitioners' request for immediate action to not allow Oyster Creek to restart from its refueling outage.

On November 28, 2012 (ADAMS Accession No. ML12338A234), the Petitioners requested to have a public meeting to address the PRB.

On November 30, 2012 (ADAMS Accession No. ML12338A240), the Petitioners requested information related to the reactor spray flange leak.

The NRC communicated with the Petitioners on November 30, 2012 (ADAMS Accession No. ML12338A234), and December 6, 2012 (ADAMS Accession No. ML12341A299), regarding arrangements for the public PRB meeting. The NRC informed the Petitioners that the public meeting would be held at the NRC Headquarters in Rockville, Maryland. The NRC also informed the Petitioners that the purpose of the public PRB meeting was to give the Petitioners an opportunity to provide any additional explanation or support for the petition before the PRB's initial consideration and recommendation. The public PRB meeting was not a hearing, nor was it an opportunity for the Petitioners to question or examine the PRB on the merits or the issues presented in the petition request. The NRC informed the Petitioners that no decisions regarding the merits of the petition will be made at the public PRB meeting.

On December 12, 2012 (ADAMS Accession No. ML12340A493), the NRC issued a public meeting notice for this meeting and placed it on the NRC public webpage.

On December 31, 2012 (ADAMS Accession No. ML13002A150), the Petitioners made a request for the NRC to provide all the documents that the NRC staff reviewed in its decision-making.

On January 2, 2013 (ADAMS Accession No. ML13002A159), the NRC informed the Petitioners that the public meeting would be held at the NRC Headquarters in Rockville, Maryland. The NRC also outlined information on the purpose and format of the public PRB meeting as had been done in the November 30, and December 6, 2012, communications.

On January 3, 2013 (ADAMS Accession No. ML13007A084), the Petitioners asked further technical questions regarding the Oyster Creek service water system.

On January 10, 2013 (ADAMS Accession No. ML13010A470), the NRC issued the Special Inspection Team (SIT) report regarding the emergency preparedness program performance and organizational decision-making associated with Oyster Creek's response to Hurricane Sandy on October 29 and 30, 2012.

On January 11, 2013 (ADAMS Accession No. ML13015A626), the NRC informed the Petitioners that the NRC SIT report was issued and available to the public.

On January 15, 2013 (ADAMS Accession No. ML13015A635), the NRC informed the Petitioners that the transcript of the public PRB meeting, held on January 3, 2013, was available to the public.

On January 15, 2013 (ADAMS Accession No. ML13015A626), the Petitioners acknowledged reading the SIT report but the Petitioners had a question regarding service water cooling to the Oyster Creek emergency diesel generators (EDGs).

On January 15, 2013 (ADAMS Accession No. ML13015A676), the NRC responded to the Petitioners' questions regarding service water cooling to the Oyster Creek EDGs.

RESPONSES

Sirens

Oyster Creek has 42 emergency notification sirens. Event Report 48450 incorrectly stated that there are 43 emergency notification sirens and that 36 sirens out of 43 were out of service. At the height of the storm, 39 sirens were out of service. Event Report 48495 stated that 11 emergency notification sirens were inoperable out of a total of 42 emergency notification sirens, which exceeded Exelon's reporting threshold of 25 percent or more sirens out of service. Therefore, Exelon made an 8-hour report, as required under 10 CFR 50.72(b)(3)(xiii) due to the "Loss of Emergency Preparedness Capabilities." Currently, one emergency notification siren is inoperable out of a total of 42 emergency notification sirens, which does not exceed Exelon's reporting threshold of 25 percent or more sirens out of service. Exelon is working to restore the one inoperable siren. FEMA's assessment determined that, in the areas where the sirens were determined to be inoperable, the FEMA-approved backup notification method of route alerting could be conducted, if needed. With regard to back-up power for the sirens, Exelon is planning to install 42 new sirens with battery back-up at Oyster Creek starting in March 2013, and Exelon has committed to the State of New Jersey to install new sirens with battery backup capability by June 1, 2013. Following testing and acceptance by FEMA, the sirens will be placed in service and the old sirens will be removed; this expected by the end of December 2013.

This issue was addressed in the following documents: an email dated November 13, 2013 (ADAMS Accession No. ML12319A627), SIT report dated January 10, 2013 (ADAMS Accession No. ML13010A470), Quarterly Inspection Report dated January 31, 2013 (ADAMS Accession No. ML13031A540), and letter dated February 22, 2013 (ADAMS Accession No. ML12035A261).

Emergency Preparedness

On November 13, 2012 (ADAMS Accession No. ML12319A627), FEMA concluded that offsite radiological emergency preparedness is adequate to provide "Reasonable Assurance" and that appropriate measures can be taken to protect the health and safety of the public, in the event of a radiological emergency at Oyster Creek in Ocean County, New Jersey.

The New Jersey Office of Emergency Management personnel have personally inspected all emergency response-related facilities within, and support the 10-mile Emergency Planning Zone (EPZ). FEMA Region II accompanied some of the inspections to verify that the emergency response facilities and infrastructure are intact and/or have been returned to service. FEMA is continuing to work with New Jersey and the EPZ county to make sure that they are able to maintain reasonable assurance and institute any necessary compensatory measures, as they also deal with the needs of real world disaster response (44 CFR 350.13) in the aftermath of Hurricane Sandy and the subsequent Nor'easter.

The NRC staff held several discussions with the State of New Jersey and FEMA regarding offsite radiological emergency preparedness. Based on the discussions and the NRC staff observations during Hurricane Sandy and during the aftermath, the FEMA and State of New Jersey conclusions that offsite radiological emergency preparedness is adequate appeared reasonable to the NRC staff.

This issue was addressed in the following documents: an email dated November 13, 2013 (ADAMS Accession No. ML12319A627), SIT report dated January 10, 2013 (ADAMS Accession No. ML13010A470), Quarterly Inspection Report dated January 31, 2013 (ADAMS Accession No. ML13031A540), and letter dated February 22, 2013 (ADAMS Accession No. ML12035A261).

Flooding

Oyster Creek remained within its licensing basis during Hurricane Sandy. Hurricane Sandy did not exceed Oyster Creek's maximum flood level due to PMH. As reported in the Oyster Creek FSAR, Subsection 2.4.5, the maximum flood level due to PMH will be at elevation 22 feet (ft) MSL. The plant grade, elevation 23 ft MSL, is one foot above the PMH flood level. Therefore, the flood will not find its way into the plant buildings, the floor levels of which are generally 6 inches above grade at elevation 23 ft and 6 inches. The circulating water intake structure, with its deck at elevation 6 ft, will be under water. This deck supports, apart from the other equipment, the circulating water pumps and the emergency service water pumps. During a PMH flood, the circulating water and service water pumps will become inoperable and, thus, emergency plant procedures have been instituted which require the plant to be shutdown when flood waters reach a pre-determined level, as to ensure the capability for safe shutdown under either normal or abnormal conditions.

The NRC updated part of its March 12, 2012, request for information from all U.S. nuclear power plants, setting out a schedule for completing flooding hazard re-evaluations recommended by the NRC's Near-Term Task Force, which examined lessons learned from the Fukushima Dai-ichi nuclear accident.

"The information in front of us today shows U.S. plants are capable of safely handling the most likely floods at their sites. These re-evaluations will help us better understand the very unlikely flooding that could occur in the future," said Eric Leeds, director of the NRC's Office of Nuclear Reactor Regulation. "We've publicly discussed the prioritization process several times since we issued the information request, and this schedule provides a solid path towards getting the work done correctly and efficiently."

The prioritization schedule, outlined in a letter to every plant owner, gives plants 1, 2, or 3 years to complete the hazard evaluations. Oyster Creek has until March 12, 2015, to complete the flooding re-evaluation.

The design basis flood height at Oyster Creek is 22 feet. On page 5 of the NRC Special Inspection Team Report, dated January 10, 2013, it states the following:

At approximately 12:18 a.m. on October 30, 2012, the maximum intake level of 7.4 feet was reached as determined by water level measurements above the base of the service water pumps. Water levels remained below the service water pump motors and well below the design basis flood height of greater than 22 feet that is documented in [Updated Final Safety Analysis Report] UFSAR section 2.4.5.4.

The Emergency Diesel Generators (EDGs) at Oyster Creek are not dependent on service water for cooling. The EDGs use a fan/radiator assembly for cooling, exactly like a car does. At Oyster Creek, if the service water pumps are unavailable, this has no effect on the EDGs. On October 29, 2012, offsite power to Oyster Creek was lost at 8:18 p.m., and operators entered procedure ABN-36, "Loss of Offsite Power." EDGs automatically started on the loss of offsite power. The EDGs were automatically aligned to restore power to the emergency busses. Oyster Creek has two EDGs. The EDGs are independent of each other, with the exception of a common bulk fuel storage supply, and are provided with auxiliary systems to ensure reliable starting and continuous operation with no operator attention. Power to start the units is self-contained and is not dependent on the availability of any other source of normal plant power at the moment of starting. The two EDGs are located in the Diesel Generator Building, which is a separate reinforced concrete structure, and it is located at the 23 feet elevation. Each unit and its auxiliaries is located in a separate room within the Diesel Generator Building. A 15,150 gallon Diesel Generator Fuel Storage Tank was sized to provide 3 days of fuel supply. The tank is maintained above a level corresponding to a capacity of 14,000 gallons by manually transferring fuel from a 75,000 gallon fuel oil tank, located directly east of the boiler house located at the 23 feet elevation.

The water levels reached 7.4 feet at the plant's water intake structure, so some electrical cabling was flooded. Exelon performed an inspection and surveillance tests to ensure operability of the electrical components. No safety-related electrical infrastructure was wetted. Motors were above the flood level. Cabling is enclosed in conduits. In addition to being enclosed in conduit, 3 of the 4 safety-related power cables have been replaced with Okonite cables that are rated for submergence. The fourth cable is slated for replacement in March. This is a project that Exelon has been working over the past couple of years and is not related to the effects of Sandy. Cables used at Oyster Creek are not like Romex wiring used in homes. Oyster Creek cables are tested periodically, meggered and thermography is performed looking for hot spots which would indicate increased resistance due to corrosion. Exelon cleaned and

meggared a motor control center that has controls/breakers for low pressure and high pressure screen wash pumps and the traveling screens.

This issue was addressed in the following documents: SIT report dated January 10, 2013 (ADAMS Accession No. ML13010A470), Quarterly Inspection Report dated January 31, 2013 (ADAMS Accession No. ML13031A540), and letter dated February 22, 2013 (ADAMS Accession No. ML12035A261).

Dry Cask Storage

The base of the dry cask storage is located at 23 feet elevation and the water levels reached 7.4 feet during Superstorm Sandy. Therefore, the dry cask storage was never compromised at any point during Superstorm Sandy.

This issue was addressed in the following documents: Quarterly Inspection Report dated January 31, 2013 (ADAMS Accession No. ML13031A540), and letter dated February 22, 2013 (ADAMS Accession No. ML12035A261).

Event Reports 48491 and 48537

On November 7, 2012, during a planned, routine inspection program, General Electric notified the Oyster Creek management of surface indications that were detected by dye penetrant testing. The indications were in the adjacent base material area of the system pressure boundary weld. The indications were located top dead center of the 3 inch pipe. Indication No. 1 was upstream 0.7 inches away from the weld toe; the indication is 1.5 inches long. Indication No. 2 was downstream 0.2 inches away from the weld toe; the indication is 2.5 inches long. The indications were determined to be surface in nature and did not result in any leakage. Exelon completed a structural weld overlay in accordance with the ASME Code. On January 7, 2013 (ADAMS Accession No. ML13025A082), Exelon submitted a Licensee Event Report (LER) 2012-003-00, "Indications Identified in the Control Rod Drive Return Nozzle (N9)." Exelon stated that "[t]he most probable cause of the surface indications was determined to be outside diameter stress corrosion cracking." The licensee concluded that the N9 nozzle weld overlay can safely operate for one operating cycle of 24 months and subsequent analysis will be performed to support safe operation for continued operating cycles.

On November 26, 2012, the licensee discovered a pinhole leak on a Reactor Head Spray line flange during the Nuclear Steam Supply System Leak Test. Water was found to be weeping from the pinhole leak (approximately 2 to 3 drops per minute). The licensee performed an ASME code repair. The licensee also revised the Oyster Creek Reactor Pressure Vessel Disassembly procedure to improve guidance and appropriate cautions for the Reactor Head Cooling (RHC) flange. On January 25, 2013, Exelon submitted LER 2012-005-00, "Flange Leakage Found During NSSS [Nuclear Steam Supply System] Leak Test." Exelon stated, "[t]he most probable cause of the leak is due to the flange weld-base metal being subject to additional mechanical and thermal stress of the design of the flange." The licensee states that mechanical and thermal stresses outside of the design of the flange, initiated by a 2008 event, were likely to have resulted in the pinhole leakage. LER 2012-005-00 states:

In 2008, during reactor disassembly (mirror insulation removal), an incorrect flange was disconnected from the reactor head instead of the 2 inch RHC flange, which should have been disconnected. Due to the RHC flange still being connected, the flange was stressed and the RHC piping was bent when an attempt was made to remove the RHC piping and mirror insulation from the reactor head using the overhead crane. There was no indication of damage to the RHC flange at the time of this event. A large portion of the piping up to the N-7B nozzle was replaced. Based on finding no indication of damage, the RHC flange was not replaced....It is highly likely that the additional mechanical stress introduced an undetectable indication. Thermal cycling resulted in the base metal microstructure expanding and contracting, promoting propagation and growth of the metal indications. Based on the source of the leakage being identified as through-wall indication in the base metal, the most probable cause of the flange leakage was due to an undetectable indication initiated in 2008, which propagated over time into a through-wall leak by thermal cycling and additional mechanical stresses.

The NRC staff performed inspections and reviewed both ASME code repair packages.

The NRC provides ongoing oversight of the safety of Oyster Creek. One of the programs the NRC employs to provide that oversight is the Reactor Oversight Process (ROP). The ROP uses a variety of tools and inspection techniques to monitor and evaluate the licensee performance. The process focuses on those plant activities that are most important to safety. The NRC Inspectors onsite at Oyster Creek look at thousands of pages of documents in the course of their duties. NRC Inspectors review procedures, emergency response organization records, issue reports, corrective action packages, work packages, surveillance testing, control room operators' narrative logs, interview station personnel, and various technical documents. The documents related to: (1) the control rod drive return nozzle safe end to pipe weld indications; and (2) the reactor head spray line flange, have not been submitted to the NRC. As such, the documents are not in the NRC possession, but they are available for inspection. The NRC Inspectors have reviewed the documents. The State of New Jersey Department of Environmental Protection personnel have access to Oyster Creek and can review Exelon's documents.

This issue was addressed in the following documents: SIT report dated January 10, 2013 (ADAMS Accession No. ML13010A470), Quarterly Inspection Report dated January 31, 2013 (ADAMS Accession No. ML13031A540), and letter dated February 22, 2013 (ADAMS Accession No. ML12035A261).