

**SUPPLEMENTAL SITE AUDIT TRIP REPORT SUMMARY
RELATED TO THE ENVIRONMENTAL REVIEW OF THE PROPOSED
TURKEY POINT NUCLEAR POWER PLANT UNITS 6 AND 7**

On January 27 and 29, 2016, the U.S. Nuclear Regulatory Commission (NRC) staff conducted a supplemental site audit related to the combined license (COL) application submitted by Florida Power and Light Company (FPL) for the proposed Turkey Point Nuclear Power Plant (Turkey Point) Units 6 and 7. The purpose of the supplemental site audit was to assist the staff in determining whether new required mitigation measures put in place by local regulatory agencies are significant with respect to the staff environmental analysis of the impacts of proposed Units 6 and 7, which are described in the staff's draft EIS, published in February 2015 (ADAMS Accession Nos. ML15055A103 and ML15055A109). In addition, the audit assisted the staff in responding to stakeholder comments on the draft EIS regarding the mitigation.

In July 2014, FPL notified the NRC, Office of Nuclear Reactor Regulation, that the cooling canal system (CCS), which supports the operation of Turkey Point Units 3 and 4, was experiencing an algal bloom as well as increases in water temperature and the concentration of other constituents (i.e. salinity, nitrogen, etc.). FPL then applied to the NRC for an amendment of the Units 3 and 4 licenses to allow for operation of those units with increased maximum inlet cooling water temperature, which the NRC granted. At about the same time, FPL also applied for and was granted several emergency permits issued by the Florida Department of Environmental Protection (FDEP) to support improvement of the overall water quality of the CCS.

On December 23, 2014, FDEP issued an administrative order requiring FPL to reduce and maintain the salinity of the CCS at or below an annual average salinity of 34 psu (practical salinity units). Subsequently, on October 6, 2015, FPL signed a Consent Agreement with Miami-Dade County through its Department of Regulatory and Economic Resources, Division of Environmental Resources Management (DERM) to undertake a number of activities that would address the water quality impacts associated with the CCS adjacent to the Turkey Point site. These new mitigation measures, including those intended to reduce salinity, could change the existing environment described in Section 2.3.1 of the staff's draft EIS for Units 6 and 7. Therefore, the staff considers this information to be new and potentially significant.

The supplemental audit consisted of two meetings: One on Wednesday, January 27, 2016, with FPL and its contractors, and a second meeting on Friday, January 29, 2016, with representatives of DERM. Representatives of the NRC staff along with its contractor Pacific Northwest National Laboratory, the cooperating agencies on the environmental review, the U.S. Army Corps of Engineers-Miami Field Office and the National Park Service, and the Department of Interior participated in both meetings. Enclosed is a list of the audit participants, supplemental audit information needs, and a summary of the audit discussion.

Docket Nos.: 52-040 and 52-041

Enclosures:
As stated

cc w/enclosures: see next page

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U.S. Nuclear Regulatory Commission

Turkey Point Units 6 and 7

Docket Nos. 52-040 and 52-041

Environmental Review Supplemental Site Audit Summary

List of Attendees for Meeting with FPL, Wednesday, January 27, 2016

<u>Name</u>	<u>Affiliation</u>
Ms. Alicia Williamson	NRC
Dr. Michael Masnik	NRC
Mr. Dan Barnhurst	NRC
Mr. Mohammad Haque	NRC
Mr. Robert Bryce	PNNL
Ms. Sandi McInturff	PNNL
Mr. Lance Vail	PNNL
Mr. Paul Thorne	PNNL
Ms. Megan Clouser	USACE
Ms. Sarah Bellmund	NPS (Biscayne National Park)
Mr. Bryan Faenher	NPS
Ms. Joan Lawrence	Department of Interior (DOI)
Mr. Bill Maher	FPL
Mr. Rick Orthen	FPL
Mr. Steve Scroggs	FPL
Mr. Garrett Day	Bechtel
Mr. James Ross	TetraTech
Mr. Pete Andersen	TetraTech

Enclosure

U.S. Nuclear Regulatory Commission

Turkey Point Units 6 and 7

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Information Needs for Meeting with FPL, Wednesday, January 27, 2016

1. Have a subject matter expert familiar with the development of the consent agreement available who can discuss the communication FPL has had with agencies regarding the consent agreement.
2. Have a subject matter expert available who can describe the range of possible approaches considered to achieve the outcome the county seeks through the consent agreement (pumping hypersaline plume, etc).
3. Have a subject matter expert available who can discuss any completed or ongoing modeling efforts being performed to support implementation of the consent agreement.
4. Have a subject matter expert available who can describe any adaptation plans relative to achieving the objectives of the consent agreement (will there be measures for detection of pre-determined environmental conditions that would cause FPL to revise the mitigation plans).
5. Have a subject matter expert available who can discuss the current water quality conditions in cooling canal system and ongoing salinity mitigation plans (independent of consent agreement).
6. Have a subject matter expert available who is prepared to answer questions on the content of the December RAI response related to how the recent changes in the operation of the cooling canals may change the environmental baseline of the affected environment in the vicinity of Units 6 and 7.

**U.S. Nuclear Regulatory Commission
Turkey Point Units 6 and 7
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Environmental Review Supplemental Site Audit Summary**

Wednesday, January 27, 2016

The audit meeting began with introductions of the participating staff and then FPL gave a short presentation that provided some background for the discussion of the audit information needs. The presentation provided a chronological summary of events that led to the recent changes in site conditions and the resulting Administrative Order from the Florida Department of Environmental Protection (FDEP) (issued in December 2014) requiring FPL to reduce the salinity levels in the cooling canals. FPL also summarized a Consent Agreement between FPL and Miami-Dade county (issued in October 2015), which requires the remediation of the hypersaline plume as well as measures to address other constituents (i.e. chlorides) that have migrated off the Turkey Point site to the north and west of the cooling canals.

FPL explained what actions they took to respond to the FDEP administrative order, including adding fresh water from the L-31 Canal to the CCS, for which FPL obtained all the necessary State of Florida permits, to assist with salinity and temperature reduction. FPL indicated fresh water from the L-31 canal is still available to use but is limited to times when excess fresh water is available. FPL also indicated that they added saline water to the cooling canal system from permitted wells located on the Turkey Point peninsula. These wells draw saline water from the Biscayne aquifer and indirectly draw from Biscayne Bay. One long term solution FPL said it was pursuing to mitigate the changing conditions in the canal system is to obtain a modification of the conditions of certification for the cooling canals that would allow the withdrawal of up to 14 MGD of water from the upper Floridan aquifer for use in the cooling canal system. FPL is proposing to construct up to 6 new wells into the upper Floridan aquifer to obtain the water. Next, FPL spoke about how the FDEP permit to construct additional wells into the upper Floridan aquifer had been challenged but an Administrative Law Judge recently ruled that well construction and withdrawals can go forward.

As mentioned above, FPL is developing a salinity management plan to meet the FDEP administrative orders terms and conditions, including a target of an average annual salinity in the canals of 34 PSU within 4 years. Furthermore, FPL has developed a model of the Floridan aquifer they are using to assess the impact of withdrawals from the Floridan aquifer for freshening. They stated that the withdrawal of water should not affect other users of the upper Floridan.

FPL does not anticipate any conflicts between the actions planned to address salinity in the cooling canals and the actions required to remediate the hypersaline plume in the groundwater beneath and adjacent to the site. Remediation of the plume is a specific requirement to meet the Miami-Dade County Consent Agreement. FPL explained that recent routine water quality monitoring conducted by DERM showed the chloride concentrations in groundwater samples just to the west of the Turkey Point property line were above 19,000 mg/l. FPL indicated that these readings suggested the salinity plume underneath the cooling canals is migrating off the FPL site because chloride is indicative of salinity and under normal conditions, a salt water intrusion plume from the ocean has a maximum concentration of 19,000 mg/l chloride. FPL stated that this exceedance violates the water quality standards in Section 24-42(4) for the

Code of Miami-Dade County. FPL indicated that DERM is also concerned about other contaminants in the hypersaline water (phosphorus, nitrogen, and tritium), although there is no mention of them in the consent agreement. FPL further stated they as well as DERM have been testing the wells inside and outside of the canal system for those particular constituents.

Next the discussion focused on the details of the consent agreement. The first task FPL must carry out is submit a plan to DERM on how they will comply with the objectives of the agreement. The main objectives of the agreement are to: 1) Reduce the mass of the chloride plume to the north and west; 2) Slow and arrest the movement of the hyper saline plume in the aquifer; and 3) Return the extent of the 19,000 mg/l chloride plume to within boundary of the FPL property.

FPL indicated these actions will take place through abatement and remediation.

Abatement – the plan acknowledges the activities underway to reduce the salinity in the canals. Remediation – Remediation would include: 1) Develop a recovery well system; 2) Remove hyper saline waters through a recovery well system and direct them to the UIC well open to the Boulder Zone; 3) Develop a 3D groundwater model to help design and permit the well field; and 4) Perform an aquifer performance test to better estimate aquifer properties for the well field design. The well where the test will be performed is being drilled now. FPL and DERM will review the results of operating the recovery well system after 5 years and revise the operation of the recovery well system as necessary to achieve the objectives. There will be ongoing reviews on a 5 year cycle. There will be discussion along the way about whether there will need to be maintenance activities after the goal of the recovery well system has been achieved.

FPL plans to install recovery wells once a permit is given by FDEP. FPL will have nine months to complete the wells. The consent agreement calls for operation of the system by early 2017. Also, three additional monitoring locations will be installed as part of the consent agreement.

Next, FPL discussed the new groundwater model required by the consent agreement. The model is a 13 layer unsaturated-saturated model with a domain that covers approximately 5 miles north to south by 8 miles east to west. It uses the SEAWAT and MODFLOW groundwater modeling codes. The model is set up to focus on salinity contributions to density. It includes surface canal drain systems and other users of the Biscayne aquifer. It uses rainfall records for the past 30 years as a basis for estimating precipitation inputs to the system, including the recent groundwater quality data, which reflect the summer of 2014 changes in salinity conditions. In addition, the model will include all the surrounding major hydrological features and will be calibrated using the Extended Power Uprate monitoring data. The aquifer performance test results, which are discussed above, will help establish the model's vertical hydraulic conductivity parameters. FPL's current plan is to have the model calibrated by the beginning of March, 2016. FPL will use the model to look at a number of solutions. FPL indicated the model is being established to design and evaluate the recovery well system and model runs will not include operation of the radial collector wells.

FPL indicated the model has 3 purposes: 1) Help inform and optimize the extraction program to minimize impact on fresher, shallow groundwater; 2) Evaluate the performance of the interceptor ditch, since appropriate operation of the recovery wells may mean that pumping from the interceptor ditch can be eliminated; and 3) Provide information on the hypersaline water concentration over time based on the extractions.

Finally, FPL described the current state of water quality in the cooling canal system. They indicated the turbidity and phosphorus levels had decreased from previously recorded levels but an increase in nitrogen was occurring. In addition, the cyanobacteria believed to have caused the original algal bloom in the summer of 2014 have died off. The staff requested to examine the recent monitoring data from stations located on and adjacent to the site. FPL agreed to get the staff copies of the data or a link to the data on the Miami-County website where the data is located for public observation. The staff also requested that FPL provide an electronic copy of the data in Table 2.2-3 in the recently submitted response to RAI 8380 (ADAMS Accession Number ML16028A121), and FPL agreed to provide the electronic formatted file to the staff.

In summary, the FPL staff made available to address the NRC's Information Needs were able to sufficiently address the staff's needs as well as respond to additional questions that arose during the discussions. To the extent the NRC staff decides to use the information discussed during the audit in the final EIS and that information has not already been submitted to the NRC or is not publicly available from another source, the staff will propose RAIs to confirm that information is provided on the Turkey Point COL docket.

Friday, January 29, 2016

The Environmental Project Manager for the Turkey Point Units 6 and 7 environmental review opened the meeting by thanking DERM staff for meeting with the NRC Team. She indicated the NRC was interested in Miami-Dade County's perspective on the Consent Agreement related to remediation of the hypersaline plume. After opening remarks all participants introduced themselves. Meeting attendees are listed in Table 3.

Mr. Lee Hefty, Director, DERM started off by outlining DERM-Miami-Dade County's regulatory responsibilities and said that because the hypersaline plume had moved off the FPL site, the County has jurisdiction over surface and groundwater and needed to take action and put the consent agreement into place. The action was taken at this time because the uprate monitoring data made it clear that the hypersaline plume had moved off the Turkey Point site and was migrating to the north and west. Because of this, the focus of the actions being taken in response to the consent agreement has been to the north and west of the site. Recent data has shown that the plume is also moving off the Turkey Point site to the east towards Biscayne Bay. Next the discussion focused on how FPL may have violated local water quality standards for the constituent chloride and the types of mitigation DERM would consider viable to remediate the moving plume. The main option discussed was treatment of the hyper-saline plume source via dilution, along with removal and disposal of the plume into the Boulder zone via an existing underground injection control well currently onsite. The key elements of this remediation plan included development of a groundwater model to guide the design of the pumping system to remove hypersaline water from the ground; conducting an aquifer performance test to provide local characteristics for the model; design and installation of the pumping system; and disposal of the water through the existing underground injection control well. DERM anticipates the model will be available for their review in early April 2016.

DERM indicated the water used to freshen the canal system and dilute the plume could potentially come from the upper Floridan aquifer. The number of wells needed would not be set until after the results of the aquifer performance test were reviewed. In addition, the wells required by DERM's consent agreement would be in addition to wells that might be required by an FDEP administrative order. DERM agreed this was probably the most feasible option for plume abatement but also indicated additional options were being considered such as using reclaimed water from the South District plant.

Next, the NRC staff asked about potential conflicts with other upper Floridan aquifer users. DERM responded that the currently permitted FPL wells are probably not sustainable but DERM plans to require FPL to model the potential impacts to other water users.

Another potential issue discussed was the presence of elevated levels of tritium discovered in monitoring stations adjacent to the Turkey Point site. In addition to tritium, increased levels of phosphorus and nitrogen were being observed in monitoring stations adjacent to the Turkey Point site, including a monitoring station adjacent to the Turtle Point canal in Biscayne Bay (TPBBW-7B). The concentrations observed are above the concentration of these parameters typically found in Biscayne Bay. DERM noted the increase in the concentrations of these constituents in the bay coincide with higher water levels in the cooling canals and could be resulting from increased communication between the canals and the Bay. Also, DERM indicated this new data could be provided to the NRC staff for review and they were in the process of collecting samples in the FPL barge basin.

The discussion ended with questions from the NRC staff regarding the State of Florida's underground injection program since disposal of the plume via deep well injection is being considered. A representative of the Miami-Dade Sewer and Water program indicated a significant amount of work was being conducted regarding the potential placement and location of a disposal well to support the proposed mitigation and DERM will work with FPL to make a final decision on disposal.

Since the audit, DERM's observations that the increase in the concentrations of the aforementioned constituents (tritium, phosphorus, and nitrogen) observed at monitoring stations adjacent to the Turkey Point site might be originating from the cooling canals have been confirmed. Tritium acts as a tracer of water originating from the canals because there are no other tritium sources nearby. In addition, DERM shared supporting data with the NRC staff that show elevated tritium, nitrogen, and phosphorus in samples collected adjacent to the site in the bay.