Progress Energy

APR 30 2012

SERIAL: HNP-12-055

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/RENEWED LICENSE NO. NPF-63
NPDES PERMIT APPLICATION AMENDMENT

Ladies and Gentlemen:

In accordance with Section 3.2 of the Environmental Protection Plan (Nonradiological) issued as Appendix B to Renewed Facility Operating License No. NPF-63 for the Harris Nuclear Plant, Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc., is providing a copy of the request for an amendment to the application for renewal of the facility's National Pollutant Discharge Elimination System (NPDES) Permit # NC0039586 as forwarded to the North Carolina Department of Environment and Natural Resources dated April 25, 2012. A copy of the initial permit renewal application was transmitted to the NRC by letter dated January 31, 2011.

If you have any questions regarding this submittal please contact me at (919) 362-3137.

Sincerely,

David H. Corlett
Supervisor, Licensing/Regulatory Programs
Harris Nuclear Plant

DHC/mgw

Enclosure

c: Mr. J. D. Austin (NRC Senior Resident Inspector, HNP)
Ms. A. T. Billoch Colón (NRC Project Manager, HNP)
Mr. V. M. McCree (NRC Regional Administrator, Region II)

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P. O. Box 165
New Hill, NC 27562

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NRR

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Enclosure

NPDES PERMIT APPLICATION AMENDMENT

(11 Pages)

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SERIAL: HNP-12-053

Mr. Jeffrey O. Poupart
North Carolina Department of Environment and Natural Resources
Division of Water Quality
1617 Mail Service Center
Raleigh, NC 27699-1617

Subject: Carolina Power & Light Company, doing business as Progress Energy Carolinas, Inc.
Harris Nuclear Plant NPDES Permit No. NC0039586
Permit Application Amendment

Dear Mr. Poupart:

The current NPDES permit for the Harris Nuclear Plant (HNP) located in Wake County expired on July 31, 2011, and a renewal application is now under review by your staff. HNP would like to amend the current expired NPDES permit application as well as the NPDES permit application under review by your staff to reflect a change occurring at the plant.

As part of HNP's re-fueling outage (RFO-17), the plant will experience a power uprate. There will be an increase in electrical power from 900 megawatts to 979 megawatts when the plant returns to service. Enclosed is an amended Attachment 4 – Form 2C – Item II-B Flows, Sources of Pollution and Treatment Technologies reflecting this power change. The amendment is provided for your information. We do not expect the change will necessitate a permit modification.

If you have any questions regarding the enclosed information, please feel free to contact Steve Cahoon at (919) 546-7457 or steve.cahoon@pgnmail.com.

I certify, under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.

Sincerely,

Ernest J. Kapopoulos, Jr.
Plant General Manager
Harris Nuclear Plant

EJK/mgw

Enclosure

Progress Energy Carolinas, Inc.
Harris Nuclear Plant
P. O. Box 165
New Hill, NC 27562

Division of Water Quality
SERIAL: HNP-12-053

Enclosure

Attachment 4 - Form 2C

Attachment 4
Form 2C – Item II-B Flows, Sources of Pollution, and Treatment Technologies

HARRIS NUCLEAR PLANT

The Harris Nuclear Plant (HNP) consists of a 979 MW generating unit and associated facilities. The HNP systems include a Westinghouse pressurized water reactor, three re-circulating steam generators, a turbine generator, a one-pass condenser, an open re-circulating (cooling tower) cooling water system, and a lake to makeup water lost by evaporation. In a pressurized water reactor design, steam is produced in the secondary system steam generators using hot water from the reactor core. The primary system does not normally come into contact with any other part of the generating system, such as the steam cycle which includes the turbine and the condenser.

Outfall 006 – Combined Outfall to Harris Lake

The HNP operates on an open re-circulating cooling system using a natural draft cooling tower and 4100 acre makeup water storage reservoir. All five major wastewater discharges at the HNP are combined in a 36-inch diameter common pipe which discharges to the Harris Lake 500 feet offshore at 40 feet below the surface (Discharge Serial No. 006 in this application.) The individual waste streams contributing to the common outfall pipe are: cooling tower blowdown, sanitary waste treatment plant effluent, metal cleaning wastes, low-volume wastes, and radwaste system. (These waste streams are enumerated in the present permit as Discharge Serial Numbers 001, 002, 003, 004, and 005, respectively.) Toxicity testing has been conducted on the combined outfall line since February 1990. Each of the waste streams, as well as miscellaneous discharge points, are described in this narrative. Also included is a list of chemicals which are expected to be in waste streams from the HNP (Attachment 5).

Outfall 001 - HNP Cooling Tower Blowdown discharge to Outfall 006

The cooling tower provides the condenser with a supply of water for removing the heat rejected by the condensation of steam. (The circulating water temperature rise across the condenser is 25°F.) This heat is dissipated primarily by evaporation as the water falls through the tower. This evaporation is essentially pure water vapor, with the dissolved and suspended solids remaining to concentrate.

To prevent the solids from causing scale and corrosion problems, some of the concentrated cooling water is discharged from the cooling tower basin, i.e., blowdown. During plant operation, the cooling tower basin continuously discharges for optimum performance. Blowdown currently averages approximately 6 MGD. Makeup water for cooling tower evaporative losses and cooling tower blowdown is provided from the main reservoir. The cooling tower also serves as a partial source of service water, which is used for non-contact cooling of auxiliary equipment throughout the plant. The cooling tower is infrequently drained

for maintenance. The normal operating procedure includes draining the residual water to the lake via Discharge Serial No. 006.

Occasionally, the condensers are drained for maintenance and repairs. When the condensers are drained, it is necessary to route the residual water (approximately 60,000 gallons per condenser per event) to area storm drains which discharge to the lake. This water is monitored prior to discharge for appropriate parameters required for cooling tower blowdown in accordance with the NPDES permit. Presently, condenser draining events are reported with relevant monitoring data to DWQ on attachments to monthly Discharge Monitoring Reports.

Outfall 002 - HNP Sewage Treatment Facility discharge to Outfall 006

A 0.025 MGD extended aeration sewage treatment facility serves the HNP. The facility consists of an equalization basin, aeration basin, sludge holding tanks, raw sewage holding tank, clarifiers, and chlorine contact tanks. Disinfected effluent is pumped through a newly installed sand filter (added to help with TSS issues) to common outfall pipe. Currently, sludge is land applied off site by a contract disposal firm (Granville Farms, Inc., Permit No. WQ0000838). Because the HNP sewage treatment facility receives industrial type waste as well as domestic type waste, the land application of the mixed sludge meets the exemption conditions stipulated in 40 CFR Part 503.6.

In addition to sanitary waste, HVAC condensate is discharged to the sewage treatment facility.

Outfall 003 - HNP Metal Cleaning Wastes discharge to Outfall 006

Infrequently, cleaning of heat exchanger equipment by chemical solutions may be necessary. Cleaning solutions would be routed to the waste neutralization basin for pH adjustment (or other chemical neutralization) prior to discharge to the settling basin where further treatment by sedimentation occurs. To date, the only metal cleaning which has been conducted was a preoperational flush. If a new system is added in the future or if an existing system is changed out, flushing could be necessary again. Also, metal cleaning may be needed in the future for plant systems (e.g., steam generators, auxiliary boilers, piping, etc.). Chemical solutions used may include phosphates, organic cleaners, citric acid, or oxalic acid.

Outfall 004 - HNP Low-Volume Wastes discharge to Outfall 006

In the operation of the HNP, there are many processes which result in intermittent low volumes of various waste streams. Low-volume waste is treated by neutralization (for pH adjustment), sedimentation, and separation. These wastes may be treated in the oily waste separator and/or neutralization basin as needed prior to routing to the sedimentation basin, which ultimately discharges to the common outfall line. Annually as a maintenance practice this basin may be

physically cleaned using chlorine, a bisulfate is added after cleaning to remove the chlorine before discharge. Chemicals present in these systems may include corrosion products (such as copper and iron) corrosion inhibitors (such as nitrites, molybdates, ammonia, hydrazine, carbohydrazide, and ethanolamine), acids and bases from water treatment processes, and wastewater from ion exchange processes and ammonium bisulfite from dechlorination. Low-volume waste flow from the settling basin averages approximately 0.2 MGD. The various low-volume waste sources are described below:

a) Water treatment system wastes from processing of demineralized water and potable water.

(The water treatment system includes coagulation, filtration, disinfection, and ion exchange. Wastes from treatment include filter backwash and demineralizer regeneration wastes.)

b) Non-radioactive oily waste, floor drains, and chemical tank containment drains.

(Turbine building wastes which could contain oil are routed to the oily waste separator for treatment prior to routing to the neutralization basin. Used oil is collected by a contractor for reclamation.)

c) Steam generator and auxiliary boiler draining following wet layup

d) Non-radioactive secondary waste from condensate polishers

e) Miscellaneous drains/leaks from condenser, steam generator, and secondary components

f) Auxiliary boiler system blowdown

g) Miscellaneous waste streams not otherwise identified elsewhere in this application.

Outfall 005 - HNP Radwaste Treatment System discharge to Outfall 006

The radwaste system is designed to collect, store, process, and release any radioactive or potentially radioactive liquids associated with operation of the nuclear power plant. The waste streams are collected in tanks and sampled for conventional pollutants and radioactivity. The specific batch treatment is selected based on these analytical results. This allows for selection of the proper treatment processes for each individual batch. Most radwaste streams are treated by the Modular Fluidized Transfer Demineralization System (MFTDS) that uses filtration and ion exchange in a manner that minimizes the production of solid wastes. Boric acid is recycled. The secondary waste system (SWS) is for treating radioactively-contaminated water from the secondary steam cycle system; however, since that system is not normally contaminated, those flows are routed to the normal low-volume waste treatment system after radiological monitoring.

After treatment, the radwaste flows are stored in one of four tanks: the secondary waste sample tank, the treated laundry and hot shower tank, the waste monitor tank, or the waste evaporator condensate tank. After monitoring to verify adequate treatment, the tanks are discharged to the common outfall line.

The cooling tower bypass line provides a flow of lake water for radwaste releases, as regulated by the NRC.

Other HNP Discharges

1. Storm Drains

Runoff from parking lots, outside storage areas, roof drains, and other areas on the plant site are collected in storm drains and ultimately routed to release points which discharge to Harris Lake. Flow contributed from those areas is estimated at 8.8 million gallons per month, based on average rainfall of 43 inches per year and a runoff assumption factor of 0.7.

In addition to stormwater, a few miscellaneous sources of water are also intermittently routed to the storm drains. These sources that have a minor contribution to overall storm drain flows are as follows:

a. Upflow filter clear well drains

The upflow filter clearwell stores filtered lake water which is used in the potable water treatment system. Periodically, some of the water from this tank is drained to the storm drains that discharge to Harris Lake. This water may contain low concentrations of chlorine because sodium hypochlorite is added to control biological growth in the tank prior to treatment through the upflow filter.

b. Heat exchanger on the demineralizer feedwater

It is necessary to heat the source water to the demineralized water treatment system to achieve optimum degassification. To accomplish this, steam is used to heat the feedwater. The condensed steam is discharged to the storm drains that flow to Harris Lake at approximately 5 - 10 gallons per minute. This steam could contain trace amounts of hydrazine and ammonia used for chemistry control in the auxiliary boiler steam system. Due to the low flow rate and the long retention time, the temperature of the condensed steam should be at ambient temperature upon reaching the lake.

c. Condenser water box drains

Prior to condenser maintenance or repairs it is sometimes (approximately twice/year) necessary to drain circulating water to the storm drains (approximately 60,000 gallons per condenser per event) that discharge to Harris Lake. This water is monitored for selected cooling tower blowdown parameters.

d. Filtered water storage tank

Water from the upflow filter clearwell is treated using a micro-filtration unit for turbidity control and then stored in a tank prior to subsequent filtration (nano-filtration unit) and disinfection. Occasionally, some water from this tank may be drained to the storm drains that discharge to Harris Lake. This water may contain trace amounts of chlorine.

e. Fire protection system

Approximately 5000 gallons of lake water used for annual testing of the fire protection system is routed to most of the storm drains that discharge to Harris Lake. In the event of a fire, additional water could be discharged to storm drains.

f. Condenser hotwell

During outages (approximately once per 18 months) it is necessary to drain the condenser hotwell for condenser maintenance and inspection. Approxmiately 70,000 gallons of this water resulting from condensed steam is drained to storm drains that discharge to Harris Lake. It may contain trace amounts of ethanolamine, 100 ppb or less of boron, and 100 ppb or less ammonia.

g. Condensate storage tank

Infrequently it is necessary to drain the condensate storage tank for maintenance. Approximately 400,000 gallons per event is drained to storm drains that discharge to Harris Lake. It may contain 200 ppb or less boron, 1000 ppb or less ammonia, and trace hydrazine.

h. Air conditioning system condensate

The condensate from various building air conditioning systems flows to various storm drains to Harris Lake. The volume is generally low and is greatest in the humid summer months.

i. Service water system strainers

Infrequently, when service water strainers located at the makeup pumps from the

cooling tower basin are backwashed to remove biofouling organisms or debris, a small volume of service water overflows the basin and runs to the adjacent storm drain that discharge to Harris Lake.

j. Maintenance Activities

During maintenance activities at the facility it may become necessary to drain all or some portion thereof of the following plant systems; normal service water, emergency service water, circulating water, potable water, and demineralized water. Maintenance activities at the facility may also require the hydrostatic flushing of system piping with discharge to the storm drain system. In addition, the facility may find it necessary to wash equipment with demineralized water with the discharge to storm drains

2. Emergency Service Water System

This system primarily provides non-contact cooling water for nuclear safety-related equipment systems and during emergency conditions. The emergency service water system discharges to the auxiliary reservoir which is used as the plant's heat sink during emergency conditions, a feature required by Nuclear Regulatory Commission regulations to provide a reliable supply of cooling water. Under normal operating conditions, the auxiliary and the main reservoirs are isolated from each other; however, the reservoirs may be connected as necessary. In addition to emergency situations, this system is used periodically for testing purposes or for containment cooling as needed. This water may contain traces of chemicals identified for the cooling tower blowdown.

HARRIS ENERGY & ENVIRONMENTAL CENTER

The Harris Energy & Environmental Center (HE&EC) includes facilities that provide support services (laboratories and training classrooms) for the HNP and other CP&L operations. The sources of wastewater at the HE&EC are domestic waste, conventional laboratory waste, cooling tower blowdown, and potentially radioactive liquid waste from the radiochemistry and metallurgy laboratories. Additionally, floor drains from several shops and storage buildings are routed to the wastewater treatment facility. All waste streams, with the exception of the radiological wastewater, receive treatment in the 0.020 MGD wastewater facility.

Components of the treatment facility include a bar screen, submersible pump station as an influent pump station, three treatment ponds, sand filtration, chlorination and dechlorination, as well as the various lift stations for the HE&EC's various buildings. The pond portion of the treatment facility consists of an aerated pond with a minimum retention time of 10 days followed by a stabilization pond, also with a minimum retention time of 10 days. The third pond is a polishing pond with a minimum 2-day retention time. Effluent from the treatment facility is discharged via the effluent discharge pipe into Harris Lake.

If necessary sludge from the treatment facility will be removed and land applied by a contractor (a contractor for sludge disposal will be chosen when needed). Because the treatment facility receives industrial type waste as well as domestic type waste, the land application of the mixed sludge meets the exemption conditions stipulated in 40 CFR 503.6

Domestic Waste

The maximum domestic waste flow from the HE&EC sanitary facilities is approximately 0.014 MGD. In addition to the approximately 235 permanent employees on the site, the HE&EC, serving as a company training facility and as a visitors' center for the nearby Harris Nuclear Plant, accommodates a fluctuating population (ranging from 0 to 450 additional people per day).

Laboratory Waste

Laboratory waste flow, consisting primarily of rinse water from the chemical, metallurgical, and biological laboratories, is approximately 0.001 MGD. HE&EC personnel are educated in the proper disposal of laboratory wastes and are encouraged to minimize the use of laboratory drains for chemical disposal. Most laboratory chemical wastes and virtually all oily wastes are drummed for off-site disposal. Laboratory wastes that are not drummed may go to one of two 5,000 gallon holding/neutralization tanks for visual inspection and testing before being discharged to the influent pump station.

Cooling Tower Blowdown

Cooling tower blowdown from the HE&EC air conditioning system averages approximately 0.002 MGD. Chemical additives include an algicide (aqueous glutaraldehyde solution) and a

suspension agent. The treatment and extended retention time in the ponds should ensure no algicide is discharged to Harris Lake.

Radiological Wastewater

The majority of the radiological wastewater results from the cleaning of laboratory glassware. In addition, small quantities of liquid radiochemistry laboratory samples, radioactive metallurgy laboratory wastewater (which is prefiltered with a paper cartridge to remove particulates before disposal), liquids generated from analyses of plant 10 CFR Part 61 samples, and reagents are disposed via the HE&EC radiochemistry laboratory drains to a holding tank. Approximately 5,000 gallons are discharged annually from the holding tank, as allowed by the radioactive materials License No. 092-0218-4, issued by the N.C. Division of Radiation Protection. The effluent from the radiological holding tank combines with the effluent from the sewage treatment plant and discharges into Harris Lake.

Radiochemical analyses are performed prior to release to calculate the total activity in the waste. These analyses include gamma spectrum analysis using intrinsic germanium gamma spectrometry systems, as well as direct analysis for Tritium, Iron-55, Nickel-63 and Strontium-89/90. Individual radionuclides have different release limits, however, the total Tritium activity discharged per calendar year shall not exceed 20 millicuries, and the total activity excluding Tritium discharge per calendar year shall not exceed 5 millicuries.

Additionally, the pH of the wastewater is determined before release. The pH must be between six and nine and is adjusted, if necessary, using 50% sodium hydroxide. The tank is agitated after addition of the sodium hydroxide, and an additional sample is analyzed to verify that the appropriate pH adjustment is achieved.

Stormwater

Stormwater runoff from the HE&EC is composed of parking lot, roof, and lawn drainage. This non-industrial stormwater is not subject to the Phase I stormwater regulations of 40 CFR Part 122.