STATE OF NORTH CAROLINA
DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES
DIVISION OF WATER QUALITY

PERMIT

TO DISCHARGE WASTEWATER UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provision of North Carolina General Statute 143-215.1, other lawful standards and regulations promulgated and adopted by the North Carolina Environmental Management Commission, and the Federal Water Pollution Control Act, as amended,

Duke Energy Corporation

is hereby authorized to discharge wastewater from a facility located at the

Belews Creek Steam Station
3195 Pine Hall Road (NCSR 1908)
Belews Creek
Stokes County

to receiving waters designated as the West Belews Creek/Belews Lake (outfall 001) and the Dan River (outfall 003) in the Roanoke River Basin

in accordance with effluent limitations, monitoring requirements, and other conditions set forth in Parts I, II, III and IV hereof.

This permit shall become effective November 1, 2012.

This permit and authorization to discharge shall expire at midnight on **February 28, 2017.**

Signed this day October 12, 2012.

Original signed by Tom Belnick

Charles Wakild P.E., Director
Division of Water Quality
By Authority of the Environmental Management Commission

SUPPLEMENT TO PERMIT COVER SHEET

All previous NPDES Permits issued to this facility, whether for operation or discharge are hereby revoked. As of this permit issuance, any previously issued permit bearing this number is no longer effective. Therefore, the exclusive authority to operate and discharge from this facility arises under the permit conditions, requirements, terms, and provisions included herein.

Duke Energy Corporation is hereby authorized to:

1. Continue to discharge:
   - Once through cooling water (outfall 001) consisting of intake screen backwash, recirculating cooling water, station equipment cooling water and once-through cooling water
   - Ash basin discharge (outfall 003) consisting of wastestreams from the power house and yard holding sumps, ash sluice lines, chemical holding pond, coal yard sumps, stormwater and remediated groundwater, and treated FGD wastewater from internal outfall 002 (Outfall 002 discharges to the ash pond)

   From a facility located at Belews Creek Station, 3195 Pine Hall Road (NCSR 1908), Belews Creek in Stokes County, and

2. Discharge wastewater from said treatment works at the location specified on the attached map into West Belews Creek/Belews Lake (outfall 001) and the Dan River (outfall 003), which are classified C and WS-IV waters, respectively, in the Roanoke River Basin.

A. (1) EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 001)

During the period beginning on the effective date of this permit and lasting until expiration, the Permittee is authorized to discharge once-through cooling water and intake screen backwash from outfall 001. Such discharges shall be limited and monitored by the Permittee as specified below:

PARAMETER	LIMITS		MONITORING REQUIREMENTS		
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Location[1]
Flow			Continuous	Pump Logs	Effluent
Temperature °C			Daily	Recorder/Grab	Upstream
Temperature °C [2]	32°C		Daily	Recorder/Grab	Downstream
Temperature °C			Daily	Recorder/Grab	Effluent

Notes:
1. Sampling locations: Upstream - Upstream at Southern Railroad crossing of Belews Creek OR East Belews Creek (site 405 or site 419), Downstream - Downstream at the discharge from the Dam, approximately 5.3 miles from the outfall. Upstream temperature samples are to be measured one foot below the surface.
2. **In no case shall the ambient temperature exceed 32°C as a result of Belews Creek Steam Station operations.** The ambient temperature shall be defined as the daily average downstream discharge water temperature. In cases where the Permittee experiences equipment problems and is unable to obtain daily temperatures from the existing temperature monitoring system, monitoring must be reestablished within five working days.

Chlorination of the once through condenser cooling water and/or auxiliary cooling water, discharged through outfall 001, is not allowed under this permit. Should Duke Energy wish to chlorinate its condenser cooling water, a permit modification must be requested and received prior to commencing chlorination.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

A. (2) EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Internal Outfall 002)

During the period beginning on the effective date of this permit and lasting until expiration, the Permittee is authorized to discharge from **Internal Outfall 002** (treated FGD wet scrubber wastewater to ash settling basin). Such discharges shall be limited and monitored by the Permittee as specified below:

PARAMETER	LIMITS		MONITORING REQUIREMENTS		
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Location[1]
Flow	Monitor and Report		Monthly	Pump Logs or similar readings	Effluent
Total Suspended solids	Monitor and Report		Quarterly	Grab	Effluent
Total Arsenic	Monitor and Report		Quarterly	Grab	Effluent
Chlorides	Monitor and Report		Quarterly	Grab	Effluent
Total Mercury	Monitor and Report		Quarterly	Grab	Effluent
Total Selenium	Monitor and Report		Quarterly	Grab	Effluent

Notes:
1. Effluent shall be defined as the discharge from the FGD wastewater treatment prior to discharge to the ash settling basin.

All flows shall be reported on monthly DMRs, should no flow occur during a given month, the words "No Flow" shall be clearly written on the front of the DMR. All samples shall be of a representative discharge.

Sampling is only required when this outfall is discharging.

A. (3) EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS (Outfall 003)

During the period beginning on the effective date of this permit and lasting until expiration, the Permittee is authorized to discharge from outfall 003 (ash settling pond) to the Dan River. Such discharges shall be limited and monitored by the Permittee as specified below:

PARAMETER	LIMITS		MONITORING REQUIREMENTS		
	Monthly Average	Daily Maximum	Measurement Frequency	Sample Type	Sample Location
Flow			Weekly	Pump logs or estimate	Effluent
Oil and Grease[1]	15.0 mg/L	20.0 mg/L	Quarterly[1]	Grab	Effluent
Total Suspended Solids[1]	30.0 mg/L	50.0 mg/L	Quarterly[1]	Grab	Effluent
Total Arsenic			Quarterly	Grab	Effluent
Chlorides			Quarterly	Grab	Effluent
Total Iron		1.0 mg/L	Quarterly	Grab	Effluent
Total Copper		1.0 mg/L	Quarterly	Grab	Effluent
Total Selenium			Quarterly	Grab	Effluent
Total Silver			Quarterly	Grab	Effluent
Fluoride			Quarterly	Grab	Effluent
Total Phosphorus			Quarterly	Grab	Effluent
Total Nitrogen (NO_2 + NO_3 + TKN)			Quarterly	Grab	Effluent
Sulfates[5]	1,502.4 mg/L	1,502.4 mg/L	Monthly	Grab	Effluent
Chronic Toxicity[2]			Quarterly	Grab	Effluent
pH[3]			2/Month	Grab	Effluent
Bromides			Monthly	Grab	Effluent
Total Mercury[4]			Quarterly	Grab	Effluent

Notes:

1. Quarterly monitoring for TSS, oil and grease and all toxicants shall be performed concurrently with the Chronic Toxicity test.
2. Whole Effluent Toxicity shall be monitored by chronic toxicity (Ceriodaphnia) P/F at 19%. Tests shall be conducted in February, May, August and November (see Part A. (7.) for details).
3. The pH shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be monitored 2/month upstream of the confluence of the discharge and the receiving waters by grab sample.
4. The facility shall employ method 1631E.
5. After 12 months of monitoring, the facility can submit a request for a minor modification to remove the limit if the Reasonable Potential to exceed the water quality standard does not exist.

The coal pile runoff and low volume wastes shall be discharged into the ash settling pond.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

A. (4) SPECIAL CONDITIONS

The following special conditions are applicable to Belews Creek Steam Station under NC0024406:

- There shall be no discharge of polychlorinated biphenyl compounds such as those commonly used for transformer fluid.
- **Outfall 006 -** The monitoring requirements for this internal discharge have been relocated to the actual discharge location (outfall 003) as of the February 1, 1998 NPDES permit. This discharge must remain internal and discharge to the ash pond. If discharge to the ash pond is relocated to surface waters of the state, then the monitoring requirements for this discharge will need to be reinstated via permit modification request.
- Continued intake screen backwash and non-contact cooling water are permitted without limitations or monitoring requirements.
- Nothing contained in this permit shall be construed as a waiver by the Permittee or any right to a hearing it may have pursuant to State or Federal laws or regulations.
- The term "low volume waste sources" means, taken collectively as if from one source, wastewater from all sources except those for which specific limitations are otherwise established in this part. Low volume wastewater sources include, but are not limited to: wastewater from wet scrubber air pollution control systems, ion exchange water treatment system, water treatment evaporator blowdown, laboratory and sampling streams, boiler blowdown, floor drains, cooling tower basin cleaning wastes, and recirculating service water systems. Sanitary and air conditioning wastes are not included.
- The term "chemical metal cleaning waste" means any wastewater resulting from cleaning any metal process equipment with chemical compounds, including, but not limited to, boiler tube cleaning.
- It has been determined from information submitted that the plans and procedures in place at Belews Creek Steam Station are equivalent to that of a BMP.
- Discharge of any product registered under the Federal Insecticide, Fungicide, and Rodenticide Act to any waste stream which may ultimately be released to lakes, rivers, streams or other wasters of the United States is prohibited unless specifically authorized elsewhere in this permit. Discharge of chlorine from the use of chlorine gas, sodium hypochlorite, or other similar chlorination compounds for disinfection in the plant potable and service water systems and in sewage treatment is authorized. Use of restricted use pesticides for lake management purposes by applicators licensed by the N.C. Pesticide Board is allowed.
- The Permittee shall report all visible discharges of floating materials, such as an oil sheen, to the Director when submitting DMRs
- If the Permittee, after monitoring for at least six months, determines that the facility is consistently meeting the effluent limits contained herein, the Permittee may request of the Director that the monitoring requirements be reduced to a lesser frequency.
- The Dan River Monitoring Plan, Phase III, as referred in the Engineering Report dated June 10, 1983 and submitted to DWQ, shall continue to be conducted.

A. (5) BOILER CLEANING WASTES

It has been demonstrated that under certain conditions it is possible to reduce the concentration of metals in boiler cleaning wastes in the range of 92-99+ percent by treatment in ash ponds. Because of dilution problems and the existence of boundary interface layers at the extremities of the plume, it is difficult to prove beyond doubt that the quantity of iron and copper discharge will always be less than one milligram per liter times the flow of metal cleaning when treated in this manner.

The application of physical/chemical methods of treating wastewater has also been demonstrated to be effective in the treatment of metal cleaning wastes. However, the effectiveness of ash pond treatment should be considered in relation to the small differences in effluent quality realized between the two methods.

It has been demonstrated that the presence of ions of copper, iron, nickel and zinc in the ash pond waters was not measurably increased during the ash pond equivalency demonstration at the Duke Power Company's Belews Creek Steam Station. Therefore, when the following conditions are implemented during metal cleaning procedures, effective treatment for metals can be obtained at this facility:

1. Large ash basin providing potential reaction volumes in the ratio of 100 to 1.
2. Well-defined shallow ash delta near the ash basin influent.
3. Ash pond pHs of no less than 6.5 prior to metal cleaning waste addition.
4. Four days retention time in ash pond with effluent stopped.
5. Boiler volume less than 86,000 gallons.
6. Chemicals for cleaning to include only one or more of the following:
    a. Copper removal step- sodium bromate ($NaBrO_2$), ammonium carbonate ($(NH_4)_2CO_3$-H_2O, and ammonium hydroxide (NH_4OH).
    b. Iron removal step – hydrochloric acid (HCl), ammonium bifluoride ($(NH_4)HF_2$ and proprietary inhibitors.
7. Maximum dilution of wastewater before entering ash pond: 6 to 1.
8. If monitoring of basin effluents (as required by the permit) after treatment of metal cleaning wastes reveals discharges exceed the limits of the permit, Permittee will:
    1) re-close the basin discharge,
    2) conduct such in-basin sampling as necessary to determine the cause of nonconformance,
    3) take appropriate corrective actions, and
    4) file a report with EPA including all pertinent data.

A. (6) SPECIAL CONDITION FOR ASH POND DISCHARGE

Beginning on the effective date of this permit and lasting until expiration, there shall be no discharge of plant wastewater to the ash pond unless the Permittee provides and maintains at all times a minimum free water volume (between the top of the sediment level and the minimum discharge elevation) equivalent to the sum of the maximum 24-hour plant discharges plus all direct rainfall and all runoff flows to the pond resulting from a 10-year, 24-hour rainfall event, when using a runoff coefficient of 1.0. During the term of the permit, the Permittee shall remove settled material from the ponds or otherwise enlarge the available storage capacities in order to maintain the required minimum volumes at all times. The Permittee shall determine and report to the permit issuing authority the following on an annual basis:

1) the actual free water volume of the ash pond,
2) physical measurements of the dimensions of the free water volume in sufficient detail to allow validation of the calculated volume, and
3) a certification that the required volume is available with adequate safety factor to include all solids expected to be deposited in the pond for the following year.

Present information indicates a needed volume of 86.2 acre-feet in addition to solids that will be deposited to the ash pond; any change to plant operations affecting such certification shall be reported to the Director within five days.

NOTE: In the event that adequate volume has been certified to exist for the term of the permit, periodic certification is not needed.

A. (7) CHRONIC TOXICITY PASS/FAIL PERMIT LIMIT (QUARTERLY)

The effluent discharge shall at no time exhibit observable inhibition of reproduction or significant mortality to *Ceriodaphnia dubia* at an effluent concentration of **19.0%.**

The permit holder shall perform at a minimum, *quarterly* monitoring using test procedures outlined in the "North Carolina *Ceriodaphnia* Chronic Effluent Bioassay Procedure," Revised February 1998, or subsequent versions or "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised-February 1998) or subsequent versions**. The tests will be performed *during the months of* February, May, August and November.** Effluent sampling for this testing shall be performed at the NPDES permitted final effluent discharge below all treatment processes.

If the test procedure performed as the first test of any single quarter results in a failure or ChV below the permit limit, then multiple-concentration testing shall be performed at a minimum, in each of the two following months as described in "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised-February 1998) or subsequent versions.

The chronic value for multiple concentration tests will be determined using the geometric mean of the highest concentration having no detectable impairment of reproduction or survival and the lowest concentration that does have a detectable impairment of reproduction or survival. The definition of "detectable impairment," collection methods, exposure regimes, and further statistical methods are specified in the "North Carolina Phase II Chronic Whole Effluent Toxicity Test Procedure" (Revised-February 1998) or subsequent versions.

All toxicity testing results required as part of this permit condition will be entered on the Effluent Discharge Monitoring Form (MR-1) for the months in which tests were performed, using the parameter code TGP3B for the pass/fail results and THP3B for the Chronic Value. Additionally, DWQ Form AT-3 (original) is to be sent to the following address:

Attention: NC DENR / DWQ / Environmental Sciences Section
1621 Mail Service Center
Raleigh, North Carolina 27699-1621

Completed Aquatic Toxicity Test Forms shall be filed with the Environmental Sciences Section no later than 30 days after the end of the reporting period for which the report is made.

Test data shall be complete, accurate, include all supporting chemical/physical measurements and all concentration/response data, and be certified by laboratory supervisor and ORC or approved designate signature. Total residual chlorine of the effluent toxicity sample must be measured and reported if chlorine is employed for disinfection of the waste stream.

Should there be no discharge of flow from the facility during a month in which toxicity monitoring is required, the permittee will complete the information located at the top of the aquatic toxicity (AT) test form indicating the facility name, permit number, pipe number, county, and the month/year of the report with the notation of "No Flow" in the comment area of the form. The report shall be submitted to the Environmental Sciences Section at the address cited above.

Should the permittee fail to monitor during a month in which toxicity monitoring is required, monitoring will be required during the following month. Should any test data from this monitoring requirement or tests performed by the North Carolina Division of Water Quality indicate potential impacts to the receiving stream, this permit may be re-opened and modified to include alternate monitoring requirements or limits.

If the Permittee monitors any pollutant more frequently then required by this permit, the results of such monitoring shall be included in the calculation & reporting of the data submitted on the DMR & all AT Forms submitted.

NOTE: Failure to achieve test conditions as specified in the cited document, such as minimum control organism survival, minimum control organism reproduction, and appropriate environmental controls, shall constitute an invalid test and will require immediate follow-up testing to be completed no later than the last day of the month following the month of the initial monitoring.

A. (8) BIOCIDE CONDITION

The Permittee shall not use any biocides except those approved in conjunction with the permit application. The Permittee shall notify the Director in writing not later than ninety (90) days prior to instituting use of any additional biocide used in cooling systems which may be toxic to aquatic life other than those previously reported to the Division of Water Quality. Such notification shall include completion of Biocide Worksheet Form 101 and a map locating the discharge point and receiving stream. Completion of Biocide Worksheet Form 101 is not necessary for those outfalls containing toxicity testing. Division approval is not necessary for the introduction of a new biocide into an outfall currently being tested for toxicity.

A. (9) SECTION 316(b) REQUIREMENTS / Cooling Water Intake Structure (CWIS)

The facility shall continue to properly operate and maintain the CWIS.

A. (10) GROUNDWATER MONITORING WELL CONSTRUCTION AND SAMPLING

The permittee shall conduct groundwater monitoring to determine the compliance of this NPDES permitted facility with the current groundwater Standards found under 15A NCAC 2L .0200. The monitoring shall be conducted in accordance with the Sampling Plan approved by the Division.

A. (11) STRUCTURAL INTEGRITY INSPECTIONS OF ASH POND DAMS

The facility shall meet the dam design and dam safety requirements per 15A NCAC 2K.

A. (12) FISH TISSUE MONITORING NEAR ASH POND DISCHARGE (Outfall 003)

The facility shall conduct fish tissue monitoring once during the permit term and submit the results with the NPDES permit renewal application. The objective of the monitoring is to evaluate potential uptake of pollutants by fish tissue near the Ash Pond discharge. The parameters analyzed in fish tissue shall be arsenic, selenium, and mercury. The monitoring shall be conducted in accordance with the Sampling Plan approved by the Division.

A. (13) PUMPING FROM DAN RIVER INTO BELEWS LAKE

The Division recognizes the additional cooling water demand on Belews Lake associated with new scrubbers. The operation of a permanent pump station and cooling water intake structure, receiving water pumped from the Dan River to Belews Lake, is hereby authorized under the following conditions:

- Pumping must not lower the flow in Dan River below 110 cfs, which is the Division of Water Resources target flow recommendation for this site. River flow at the pumping location must be checked at a newly installed USGS gauge station near the old USGS Pine Hall gauge station prior to each daily pumping event.
- The Dan River pumps intake will be positioned above the river bottom and have an approach velocity less than or equal to 0.5 feet/second at the inlet of the velocity caps and at the 2mm fine mesh traveling screens to minimize fish entrainment and impingement.
- The withdrawal location will be near the confluence of the spillway channel below Belews Lake Dam and the Dan River. This is a scoured bottom area that does not provide suitable aquatic habitat.
- The facility will perform routine semi-annual lake monitoring to assess limnological conditions in Belews Lake.
- Pumping may occur to a maximum water level in Belews Lake of 724.5 feet msl.
- Pumping must not occur from April 1 through June 30 of any year, in order to avoid the fish spawning period.

- At least 80% of ambient flow as recorded at the new Pine Hall USGS gauge must be bypassed (i.e., withdraw no more than 20% of flow).

This approval allows the operation of two 50 cfs velocity caps, a permanent settling pond with approximately 6000 square feet of surface area, a 4-pump pumping station with a capacity not to exceed 100 cfs, force main, an electrical substation with an access road, and a diffuser in Belews Lake.

Please note that this authorization does not affect the legal requirements to obtain other permits or approvals which may be required for this activity by the Division of Water Quality or other agencies, including the Division of Land Resources, the Division of Water Resources, or the US Army Corps of Engineers. The Division reserves the right to reopen this permit in the event of unforeseen negative environmental impacts due to this pumping operation.

A. (14) BROMIDE REDUCTION EVALUATION

Duke Energy shall investigate technical solutions to reduce bromide in the discharge from Outfall 003. Duke Energy shall submit semi-annual reports on the efforts it undertakes to reduce bromide at the source as well as efforts at downstream water treatment plants to reduce formation of total trihalomethanes (TTHM). Duke Energy shall continue to work with the downstream public water supply systems to find a solution to the issue of the TTHM formation in the distribution system of the downstream water systems. The semi-annual status reports (3 copies) shall be submitted to the Division of Water Quality, Complex NPDES Permitting Unit.

In the event of a Maximum Contaminant Level (MCL) violation for Total Trihalomethanes (THMs) at the Town of Madison, the City of Eden or any wholesale customers of those systems, Duke Energy will within 14 days of the request provide the latest available bromide monitoring data that can be incorporated into required Public Notices issued by the public water system(s).

A. (15) SECTION 316 (A) THERMAL VARIANCE

The thermal variance granted under Section 316(a) terminates on expiration of the NPDES permit. Should the permittee wish a continuation of its 316(a) thermal variance beyond the term of this permit, reapplication for such continuation shall be submitted in accordance with 40 CFR Part 125, Subpart H and Section 122.21(1)(6) not later than 180 days prior to permit expiration. Reapplication shall include a basis for continuation such as a) plant operating conditions and load factors are unchanged and are expected to remain so for the term of the reissued permit; b) there are no changes to plant discharges or other discharges in the plant site area which could interact with the thermal discharges; and c) there are no changes to the biotic community of the receiving waterbody which would impact the previous variance determination.

The next 316 (a) studies shall be performed in accordance with the Division of Water Quality approved plan. The temperature analysis and the balanced and indigenous study plan shall conform to the specifications outlined in 40 CFR 125 Subpart H and the EPA's Draft 316a Guidance Manual, dated 1977. The EPA shall be provided an opportunity to review the plan prior to the commencement of the study.

A. (16) DOMESTIC WASTEWATER TREATMENT PLANT

The domestic wastewater treatment plant shall be properly operated and maintained to ensure treatment of domestic wastewater to secondary levels.