North Carolina Department of Environment and Natural Resources
Division of Energy, Mineral and Land Resources
Land Quality Section

Tracy E. Davis, PE, CPM
Director

Pat McCrory, Governor
John E. Skvarla, III, Secretary

NOTICE OF INSPECTION

Date: March 11, 2014

Duke Energy Corporation
Attention: Sean DeNeale
526 South Church Street, ECI-013
Charlotte, North Carolina 28202

RE: Buck Steam Station Main Dam
ROWAN-047 – High Hazard Potential
Rowan County

Dear Mr. DeNeale:

The "Dam Safety Law of 1967," as amended, provides for the certification and inspection of dams in the interest of public health, safety, and welfare, in order to reduce the risk of failure of such dams; to prevent injuries to persons, damage to property; and to insure the maintenance of stream flows.

Our record indicates that you are the owner and/or responsible for the referenced dam, which is located off Dukeville Road and was inspected on February 26, 2014 by personnel of the Land Quality Section. This inspection revealed the conditions outlined below. Please note that references to "right" and "left" in descriptions of the dam structure are referenced while looking in the downstream direction.

1. The last section of the concrete chute spillway outlet channel has separated from the channel and settled. It is recommended that you monitor this situation and notify this office if the condition worsens.

2. Please continue to perform internal inspections of the discharge pipe at least annually. As previously stated in correspondence issued by Mr. Steve McEvoy, PE, and State Dam Safety Engineer on March 25, 2011, we request the annual inspection video be reviewed by a registered professional engineer experienced in pipe condition assessment and that this engineer render a professional opinion as to the integrity of the pipe pursuant to such review. Please continue to provide this Division with a copy of the inspection report, and include copies of pictures and/or videos taken during the inspection.

3. Wetness with clear flow was observed at the dam center toe. You should inspect this area periodically and notify this office if there is an increase in the amount of wetness, discoloration of water, or if embankment sliding occurs.

4. An area of saturated soils was observed approximately three-fourths height distance from the top of dam adjacent to the right abutment, potentially due to heavy, recent rain. Please monitor this area and notify this office if there is a sudden change in the area.

5. Trees and bushes are growing on the dam in the dam extension area. This type of growth can cause problems and even failure of the dam by creating holes when trees are uprooted due to wind or ice; by leaving possible seepage holes when trees die and their roots decay; or by causing erosion of the dam around this growth should the dam overtop during heavy rains. This woody growth can also hinder inspection and provide habitat for burrowing animals. Therefore, we recommend that this type of growth be removed and a good grass cover be established on the dam.

   Though it is not our policy to allow any trees to grow on a dam, it is recommended that all trees greater than six inches in diameter be left on the dam. Trees larger than six inches that are in poor shape or pose a threat to the structural integrity of the dam and need removal require the supervision of a registered professional engineer competent in the area of dam safety. Also, prior approval must be obtained from the Division of Energy, Mineral and Land Resources for the removal of trees greater than six inches in diameter. All trees less than six inches should be removed.

6. Areas of surface damage possibly due to mower activity and areas of stressed vegetation due to recent rains were observed on the downstream slope of the dam. It is recommended that the areas be monitored and vegetation reestablished as needed to prevent surface erosion.

Additionally, the following general maintenance procedures are recommended:

1. Periodically check the operation of all drain valve facilities. This will ensure satisfactory operation of the drains should an emergency situation arise.

2. Periodically monitor the subject dam and appurtenant works with respect to elements affecting its safety. This is in light of the legal duties, obligations, and liabilities arising from the ownership and/or operation of a dam.

During this inspection we also investigated the potential for property damage and loss of life in the event that your dam fails. This investigation determined that failure of your dam could result in significant environmental damage to the Yadkin River and possible interruption of utility service. Therefore, we are listing your dam in the "High Hazard Potential" Note that all hazard classifications are subject to change due to downstream conditions.

Please be advised that the Division of Energy, Mineral and Land Resources must approve any excavation, modification, or major repair work to this dam before the work commences. Also, note that this dam may not be

breached, meaning the dam may not be drained by cutting a notch in the dam, without prior engineered breach plans being submitted to and approved by the Division of Energy, Mineral and Land Resources.

The "Dam Operation Maintenance and Inspection Manual" published by this Division provides inspection guidelines and recommended routine dam maintenance activities for the owner as well as emergency procedures in the event of possible dam failure. This document may be viewed online at http://portal.ncdenr.org/web/lr/dams.

Although every reasonable effort is made to determine the safety of each dam, our resources generally limit us to a surficial inspection of the dam and its appurtenant structures. This letter carries no implication regarding the internal stability of the dam. Dams, and especially their spillways and conduits, deteriorate with age. You are therefore advised to keep a close watch on the dam and notify us if you detect any changes, especially cracks, ground movements, or changes in seepage rate or color.

Please notify this office in writing if you wish to assert that you have no ownership or otherwise are not responsible for maintenance or repairs to the subject dam. If you have an emergency situation during non-office hours, you should notify 911 and the State Emergency Operations Center at 1 (800) 858-0368. They will notify the appropriate personnel in this Office of the situation.

Your cooperation and consideration in maintaining a safe dam is appreciated. Should you have any questions concerning our inspection, please contact me at (704) 663-1699.

Sincerely,

Zahid S. K

Zahid S. Khan, CPM, CPESC, CPSWQ
Regional Engineer
Land Quality Section

THE/cys

cc: Steven M. McEvoy, PE, State Dam Safety Engineer

DAM SAFETY INSPECTION REPORT

BW-GHAZALE

NAME	COUNTY	NO.	INSPECTED BY	DATE
BUCK STEAM STATION MAIN DAM	ROWAN	047	BRODWAY, EPLIN, KORMANIK	2/26/2014

OWNER	ADDRESS	PHONE
DUKE ENERGY	See file	

TYPE DAM: ☐ Concrete gravity ☐ Concrete arch ☐ Other ☐ Embankment ☐ Concrete buttress ☐ Stone masonary

TYPE INSPECTION: ☐ Initial ☐ Followup ☒ Periodic ☐ Other

SITE CONDITIONS: ☐ Dry ☐ Snowcover ☒ Wet ☐ Other

HAZARD DESCRIPTION: See file

HAZARD CLASS: ☐ Low (A) ☐ Intermediate (B) ☒ High (C)

REMARKS: Alex Papp, Sean DeNeal, Opie Wooten, Scott Nordgren, Tom Bailey, Mike Miller, Max Gardner, Henry Bottkins, Record heavy rains

ACTION: ☐ None ☒ Maintenance ☐ Monitoring ☐ Minor repair ☐ Engineering

RECOMMENDATIONS: ☐ Inspection letter ☐ Deficiency letter ☐ RE notice ☐ Engineering study ☐ Inspection by RE ☐ Inspection by DSE ☐ Dam safety order ☐ Enforcement ☒ Periodic reinspection ☐ Other reinspection

UPSTREAM SLOPE / FACE

PROBLEMS: ☐ 1.None ☐ 2.Trees ☐ 3.High bushes ☐ 4.Burrows ☐ 5.Wave erosion ☐ 6.Livestock damage ☐ 7.Slides ☐ 8.Depressions ☐ 9.Bulges ☐ 10.Sparse rip rap ☐ 11.Displaced rip rap ☐ 12.Cracks ☐ 13.Undermining ☐ 14.Holes ☐ 15.Spalling ☐ 16.Displaced joints ☐ 17.Deteriorated joints ☐ 18.Exposed reinforcement ☐ 19.Other

COVER: ☒ Vegetation ☐ Rip rap ☐ Concrete ☐ Asphalt ☐ Other

SOME WOODY GROWTH ON DAM EXTENSION AREA

TOP OF DAM

PROBLEMS: ☒ 1.None ☐ 2.Trees ☐ 3.High bushes ☐ 4.Burrows ☐ 5.Ruts ☐ 6.Livestock damage ☐ 7.Depressions ☐ 8.Unlevel ☐ 9.Misalignment ☐ 10.Has overtopped ☐ 11.Cracks ☐ 12.Spalling ☐ 13.Deteriorated joints ☐ 14.Displaced joints ☐ 15.Exposed reinforcement ☐ 16.Other

COVER: ☒ Vegetation ☒ Gravel ☐ Concrete ☐ Asphalt ☐ Other

DOWNSTREAM SLOPE / FACE

PROBLEMS: ☐ 1.None ☐ 2.Trees ☐ 3.High bushes ☐ 4.Burrows ☐ 5.Erosion ☐ 6.Livestock damage ☐ 7.Slides ☐ 8.Depressions ☐ 9.Bulges ☐ 10.Wetness ☐ 11.Seepage ☐ 12.Boils ☐ 13.Cracks ☐ 14.Holes ☐ 15.Spalling ☐ 16.Displaced joints ☐ 17.Deteriorated joints ☐ 18.Exposed reinforcement ☐ 19.Other

COVER: ☒ Vegetation ☐ Rip rap ☐ Concrete ☐ Other

Soft area 3/4 down slope below aspy net visually estimated

Slope levels out, no flow/wetness observed

TOE CONTACT

PROBLEMS: ☐ 1.None ☐ 2.Trees ☐ 3.High bushes ☐ 4.Burrows ☐ 5.Erosion ☐ 6.Livestock damage ☐ 7.Slides ☐ 8.Depressions ☐ 9.Bulges ☐ 10.Wetness ☐ 11.Seepage ☐ 12.Boils ☐ 13.Cracks ☐ 14.Holes ☐ 15.Spalling ☐ 16.Displaced joints ☐ 17.Deteriorated joints ☐ 18.Exposed reinforcement ☐ 19.Undermining ☐ 20.Other

COVER: ☒ Vegetation ☒ Rip rap ☐ Concrete ☐ Other

WETNESS AT TOE, HISTORICAL CONDITION
SOME SURFACE EROSION IN AREA ~15FT LONG
~ 20 FT UPSLOPE OF CHEMICAL STORAGE BUILDING
REPAIR/ESTABLISH VEGETATION RECOMMENDED

TOTAL FLOW AT TOE IS CLEAR, VISUALLY ESTIMATED AT < 1 GPM INCLUDING SURFACE FLOW FROM ENTIRE DAM

AREA	PROBLEMS		COMMENTS
ABUTMENT CONTACTS	■ 1.None ☐ 2.Trees ☐ 3.High bushes ☐ 4.Burrows ☐ 5.Erosion ☐ 6.Livestock damage ☐ 7.Slides ☐ 8.Depressions ☐ 9.Bulges ☐ 10.Wetness	☐ 11.Seepage ☐ 12.Boils ☐ 13.Cracks ☐ 14.Holes ☐ 15.Spalling ☐ 16.Displaced joints ☐ 17.Deteriorated joints ☐ 18.Exposed reinforcement ☐ 19.Undermining ☐ 20.Other	COVER: ☐ Vegetation ■ Rip rap ☐ Concrete ☐ Other
PRINCIPAL SPILLWAY	☐ 1.None ☐ 2.No trashguard ☐ 3.Obstructed ☐ 4.Plugged ☐ 5.Rusted ☐ 6.Damaged ☐ 7.Gates leaking ☐ 8.Joints leaking ☐ 9.Cracks ☐ 10.Joint deterioration	■ 11.Joint displacement ☐ 12.Undermined ☐ 13.Voids ☐ 14.Erosion ☐ 15.Holes ☐ 16.Conduit collasped ☐ 17.Spalling ☐ 18.Outlet undercutting ☐ 19.Misalignment ■ 20.Other	TYPE/SIZE: 10'x10' CONCRETE RISER w/ 36" CMP BARREL 20) LAST INTERNAL INSPECTION OF 36" CMP BARREL WAS 10/11/2013 - See file 11) LAST SECTION OF CONCRETE CHUTE SEPARATED - HISTORICAL CONDITION, UNDERMINING OF CONCRETE CHUTE 2ND SECTION, AT LEAST 1.5-2FT ON LEFT SIDE, VISUALLY ESTIMATED AT RIVER'S EDGE
EMERGENCY SPILLWAY	■ 1.None ☐ 2.No ES ☐ 3.Same as PS ☐ 4.Obstructed ☐ 5.Erosion ☐ 6.Displaced rip rap ☐ 7.Sparse rip rap ☐ 8.Joints leaking ☐ 9.Cracks ☐ 10.Joint deterioration	☐ 11.Joint displacement ☐ 12.Undermining ☐ 13.Voids ☐ 14.Holes ☐ 15.Exposed reinforcement ☐ 16.Spalling ☐ 17.Outlet erosion ☐ 18.Misalignment ☐ 19.Inadequate capacity ☐ 20.Other	TYPE/SIZE: Earthen channel
DRAINS / OTHER OUTLETS	■ 1.None ☐ 2.No bottom drain ☐ 3.Bottom drain inoperable ☐ 4.Subsurface drain dry ☐ 5.Subsurface drain muddy flow ☐ 6.Subsurface drain obstructed ☐ 7.No animal guard ☐ 8.Other		TYPE: N/A

SKETCHES/COMMENTS

MONTHLY PIEZOMETER READINGS REVIEWED FOR THE PAST YEAR. OPIE HAS NOTED CORRELATION OF LEVELS WITH RAINS, FOR THOSE W/ CHANGING ELEVATIONS.