



Ron Benham  
Director Nuclear and Regulatory Affairs

April 28, 2022  
RA 22-0042

U. S. Nuclear Regulatory Commission  
ATTN: Document Control Desk  
Washington, DC 20555

Subject: Docket No. 50-482: Annual Environmental Operating Report 2021

Commissioners and Staff:

The purpose of this letter is to submit the enclosed Annual Environmental Operating Report. The Annual Environmental Operating Report is being submitted pursuant to Wolf Creek Generating Station (WCGS) Renewed Facility Operating License NPF-42, Appendix B, "Environmental Protection Plan." This report covers the operation of WCGS for the period of January 1, 2021, through December 31, 2021.

This letter contains no commitments. If you have any questions concerning this matter, please contact me at (620) 364-4204.

Sincerely,

A handwritten signature in black ink that reads "Ron Benham".

Ron Benham

RDB/

Enclosure: Wolf Creek Generating Station Annual Environmental Operating Report 2021

cc: S. S. Lee (NRC), w/e  
S. A. Morris (NRC), w/e  
G. E. Werner (NRC), w/e  
Senior Resident Inspector (NRC), w/e

Enclosure to RA 22-0042

**Wolf Creek Generating Station  
Annual Environmental Operating Report 2021  
(8 pages)**

WOLF CREEK GENERATING STATION  
ANNUAL ENVIRONMENTAL OPERATING REPORT  
2021

ENVIRONMENTAL MANAGEMENT ORGANIZATION  
WOLF CREEK NUCLEAR OPERATING CORPORATION  
P.O. BOX 411  
BURLINGTON, KANSAS 66839

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## 1.0 INTRODUCTION

The 2021 Annual Environmental Operating Report is being submitted in accordance with the objectives of the Environmental Protection Plan (EPP), Appendix B to the Facility Operating License NPF-42. The purpose of this report is to demonstrate that the Wolf Creek Generating Station (WCGS) operated during 2021 in a manner protective of the environment.

## 2.0 ENVIRONMENTAL MONITORING

### 2.1 AQUATIC [EPP Section 2.1]

#### 2.1.1 Impacts of Water Withdrawal on the Neosho River

There were no adverse impacts to the Neosho River due to water-use conflicts because river flows downstream of the makeup pumps were maintained during 2021. Additionally, minimum streamflow at Parsons, Kansas, set by the operations agreement for the Cottonwood Neosho Water Assurance District number three, was exceeded throughout 2021.

The WCGS Final Environmental Statement/Operating License Stage (FES/OLS, Section 5.6), NUREG-0878, postulated that makeup water withdrawal of 41 cubic feet per second (cfs) during drought conditions would extend the duration and severity of low-flow conditions below John Redmond Reservoir (JRR). This, in turn, was expected to reduce riffle habitat that would adversely affect the Neosho Madtom, a federally listed threatened species.

Actual makeup water withdrawals during 2021 are summarized as follows:

Source	2021 Period	Duration (days)	Average Pump Rate (cfs)	<sup>(1)</sup> River Flow (cfs)		
				Avg	Min	Max
John Redmond Storage	9/01-10/28	31	93	84	50	230
<sup>(2)</sup> Neosho River	9/04-11/10	40	71	1760	252	4810

(1) Flow measured at United States Geological Survey Gauging Station in Burlington, Kansas.

(2) Before natural flows from the Neosho River are permitted by the Kansas Department of Agriculture, Division of Water Resources to be pumped, a 250 cfs minimum must be maintained downstream of the pumps. Otherwise makeup water is from JRR storage.

As shown above, average pump rates were more than average river flows measured at the United States Geological Survey Gauging Station in Burlington, Kansas, downstream of the pumps at the Makeup Water Screenhouse (MUSH). The minimum river flow was 50 cfs below the pumps while pumping. This

demonstrates that downstream flows were maintained. In addition, makeup pumps were operated under permitted water 71 of the 164 days.

For comparison purposes, the 41 cfs assessed in the FES/OLS refers to a continuous annual average from JRR storage. The actual 2021 pumping from JRR storage averaged 93 cfs for 31 days, which was equivalent to 6.60 cfs, when calculated on a similar, annual basis. This flow rate was lower than the 41 cfs evaluated as impacting the Neosho River during drought conditions.

Auxiliary makeup pumps were operated at flows ranging from 1-2 cfs from 9/01 through 9/02.

Consequently, makeup pumping activities did not impact flows intended to maintain minimum stream flows in the Neosho River, and no adverse impacts due to water-use conflicts occurred during 2021.

### **2.1.2 Oxidizing Biocide Discharges to Coffey County Lake (CCL)**

Circulating Water System (CWS) Discharge:

There were no adverse impacts observed due to biocides during 2021. Biocide use at WCGS was predicted to cause periodic, appreciable mortality in a conservatively estimated 40 acres of the discharge area to CCL. However, these impacts were not expected to meaningfully affect the overall biological productivity of the lake (FES/OLS, Section 5.5.2.2). The postulated biocide levels expected to cause the impacts were from 0.68 to 1.08 mg/l of total residual chlorine at the CWS discharge (FES/OLS, Section 4.2.6.1).

Actual maximum biocide concentration measured was 0.13 mg/l and averaged 0.09 mg/l total residual oxidant (TRO) during 2021. This level was much lower than those evaluated in the FES/OLS, thus impacts were correspondingly less. The Kansas Department of Health and Environment (KDHE) also requires, through the WCGS National Pollutant Discharge Elimination System (NPDES) permit, that biocide discharges for the CWS be less than 0.2 mg/l TRO, for a maximum of two hours per day. Consequently, biocide impacts to CCL have been less than initially evaluated in the FES/OLS, and NPDES compliance assures that this will continue.

Essential Service Water System (ESWS) Discharge:

Flow from the WCGS Service Water System (SWS) diverted through the Essential Service Water System (ESWS) was completed to provide microbiologically induced corrosion protection and sedimentation control. The KDHE established a 1.0 mg/l TRO limit for the SWS diversion through the ESWS. Actual maximum TRO was 0.33 mg/l and averaged 0.19 mg/l during 2021. Based on this information, permitted biocide discharges did not have appreciable effects on the cooling lake environment.

### **2.1.3 Cold Shock**

In the event of a rapid decline in plant power level during winter, fish attracted to the WCGS heated discharge could experience mortality due to a quick reduction in body temperature (cold shock). In reference to licensing document evaluations, the WCGS EPP Section 2.1 (c) states, “Cold shock effects on fish due to reactor shutdowns could cause significant mortality to aquatic species in the cooling lake.”

Fish mortality due to cold shock was not observed in CCL following declines in plant power level.

Fish mortality was not observed following the plant power changes. Consequently, significant impact to the fishery in CCL due to cold shock events did not occur during 2021.

#### **2.1.4 Impingement and Entrainment**

Impacts of entrainment and impingement of fish and aquatic organisms due to WCGS cooling water pumping were projected to be significant, as indicated in the WCGS EPP, Section 2.1 (d). EPP Section 2.1 states that the NRC relies on the State of Kansas for determination of the need for monitoring entrainment and impingement impacts. The KDHE requested WCGS to monitor impingement impacts for the Clean Water Act (CWA) 316 (b), Phase II regulations. This monitoring has been completed, and results were submitted to the KDHE in 2008. Entrainment monitoring has not been required. No significant adverse impacts to the CCL fishery were identified because of impingement (RA-00433). Fishery management at WCGS has succeeded in controlling impingement and minimized potential impacts of impingement to the fishery.

#### **2.1.5 Impacts of Coffey County Lake Discharges to the Neosho River**

The WCGS NPDES permit requires that CCL discharges be sampled on the first day of each discharge and weekly thereafter until the end of each respective discharge. A discharge limit was set for pH (NPDES Outfall 004). Lake discharges can occur at the Blowdown Spillway and Service Spillway. During 2021, no discharges occurred at the Blowdown Spillway. There were no NPDES violations from discharges from the Service Spillway, and no detrimental effects were expected to the Neosho River water quality.

## **2.2 TERRESTRIAL [EPP Section 2.2]**

### **2.2.1 Control of Vegetation in the Exclusion Zone**

The composition and structure of vegetation in the 453 hectare (1120 acre) exclusion zone were selectively controlled to be compatible with the function and security of station facilities. Most areas in the immediate vicinity of the power block typically have been planted and maintained in a lawn-type condition. Other areas within the exclusion area have been mowed for security and aesthetic purposes. Tree and brush control occurred in some areas.

Various maintenance and construction activities during 2021 have caused temporary impacts to the vegetation in many areas surrounding WCGS. As projects are completed, restoration of the areas involved is expected to return the vegetation in the exclusion zone like previous conditions.

### **2.2.2 Vegetation Buffer Zone Surrounding Coffey County Lake**

To create a buffer zone of at least 500 acres around CCL, as specified in EPP Section 2.2 (b), agricultural production activities were curtailed in 1980 within a border ranging from approximately 200-400 feet adjacent to the lake shoreline. This area is approximately 1440 acres. Previously grazed or hayed native grass areas were left undisturbed. Previously cultivated lands were allowed to advance through natural succession stages, or native grasses were established in these areas. Land management activities included controlled burning to enhance and/or maintain the designated buffer zone with a naturally occurring biotic community.

### **2.2.3 Herbicide Use for Maintenance of WCGS Structures**

Herbicides were used on transmission corridors, gravel areas, railroad easements, and various land areas associated with WCGS. Only herbicides approved by Environmental Protection Agency and the state of Kansas were used. Application rates followed label instructions. No adverse environmental impacts from herbicide treatment of WCGS facilities were identified.

The transmission lines associated with WCGS include the Wolf Creek-Rose Hill and a small portion of the Wolf Creek-Benton and Wolf Creek/Waverly/La Cygne lines. Herbicides for bare ground control were used on various gravel areas, including the switchyard, protected area boundary, meteorological tower, storage tank berms, railroad beds, and storage yards. Noxious weed and nuisance tree/brush growth were controlled on the dam, and selected grassland areas around the cooling lake.

### **2.2.4 Waterfowl Disease Contingency Plan and Monitoring**

A waterfowl disease contingency plan was maintained to provide guidance for station biologists in the event of suspected or actual disease outbreaks. The contingency plan lists appropriate federal and state wildlife agency contacts to be made by Wolf Creek Generating Station (WCGS) in the event of such problems.



The waterfowl disease contingency plan is in section 5.3.2 of the Avian Protection Plan. During routine environmental monitoring and surveillance activities taking place over this reporting period, no waterfowl mortality attributable to disease pathogens was identified.

#### **2.2.5 Fog Monitoring Program [EPP Subsection 4.2.1]**

Fog monitoring concluded that operation of WCGS did not appreciably increase fogging incidents from that measured before operation. Visibility monitoring was initiated in December 1983, and continued through 1987. The purpose of this study was to evaluate the impact of waste heat dissipation from CCL on fog occurrence along U.S. Highway 75 near New Strawn, Kansas. The program was required through one year of commercial operation that started in September 1985. Upon conclusion of 1987 data collection, sufficient information was available to evaluate cooling lake fogging, and all commitments relevant to fog monitoring have been satisfied.

During 2021, there were no reports of fogging incidents in the vicinity of, nearby U.S. Highway 75 from individuals or local agencies responsible for traffic safety. Periodic fogging likely caused by the cooling lake did occur during the winter months of 2021 but was restricted to the plant site and immediate vicinity of the lake. No mitigation actions or further monitoring were warranted.

#### **2.2.6 Wildlife Monitoring Program [EPP Subsection 4.2.2]**

A wildlife monitoring program was initiated in 1982 to monitor and assess waterfowl, waterbird, and bald eagle usage of CCL. This program included transmission line collision surveys to assess collision mortality and determine potential mitigation needs. This wildlife monitoring program was to continue for at least two years following WCGS start-up (FES-OLS Section 5.5.1.2), which occurred in September 1985.

Transmission line surveys were conducted from 1983 through 1988. Monitoring of lake use by waterfowl, waterbirds, and bald eagles continued through 1996. By then, sufficient data had been collected to determine waterfowl, waterbird, and bald eagle usage of CCL. Consequently, the scope of the wildlife monitoring program was reduced. The current program consists of reviewing CCL waterfowl and bald eagle survey data collected by the Kansas Department of Wildlife and Parks (KDWP). If review of the KDWP's data indicates that usage has increased from that previously documented, then additional monitoring may be initiated, if warranted.

Review of waterfowl and bald eagle monitoring data for 2021 collected by the KDWP indicate that waterfowl and waterbird usage was relatively consistent with past years. Some species-specific changes were observed most likely due to a change in sampling route. Additionally, Canada Goose numbers increased similar to other low disturbance areas. Increased transmission line collision potential was not indicated. No disease outbreaks or widespread crop depredation attributable

to waterfowl use of CCL were observed. No changes to the wildlife monitoring program were warranted.

### **2.2.7 Land Management Program [EPP Subsection 4.2.3]**

Land management activities on all company-owned lands except within the 453 hectare (1120 acre) WCGS exclusion area were designed to achieve balances between agricultural production and conservation values. A periodic management plan addressed needs and accepted techniques for land maintenance, soil conservation, and wildlife management. These included the repair or construction of soil conservation structures, wetland areas, and permanent vegetative covers. In 2014, all cropland was converted to no-till agriculture and cover crops were incorporated into the crop rotation. An environmental education area was improved and maintained as part of the land management program. The land management program continues to balance agriculture production and conservation values.

## **3.0 ENVIRONMENTAL PROTECTION PLAN REPORTING REQUIREMENTS**

### **3.1 PLANT DESIGN OR OPERATION CHANGES [EPP Section 3.1]**

In 2021, WCGS did not have any plant design or operational changes that could cause potential significant effects to the environment.

### **3.2 NON-ROUTINE ENVIRONMENTAL REPORTS [EPP Section 5.4.2]**

#### **3.2.1 Submitted Non-routine Reports**

There were no environmental reports involving significant non-routine impacts submitted to the NRC during 2021.

#### **3.2.2 Unusual or Important Environmental Event Evaluations [EPP Section 4.1]**

No unusual or important environmental events that indicated or resulted in a significant environmental impact related to plant operations occurred during 2021.