

# WOLF CREEK

NUCLEAR OPERATING CORPORATION

Robert C. Hagan  
Vice President Nuclear Assurance

April 20, 1994

NA 94-0069

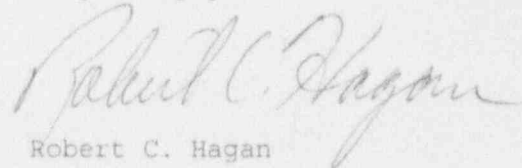
U. S. Nuclear Regulatory Commission  
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Subject: Docket No. 50-482: Annual Environmental Operating Report

Gentlemen:

Enclosed is the Annual Environmental Operating Report which is being submitted pursuant to Wolf Creek Generating Station (WCGS) Facility Operating License NPF-42, Appendix B. This report covers the operation of WCGS for the period of January 1, 1993 to December 31, 1993.

Very truly yours,



Robert C. Hagan

RCH/jad

Enclosure

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Enclosure to WCNOG  
Letter NA 94-0069  
Dated April 20, 1994

WOLF CREEK GENERATING STATION  
ANNUAL ENVIRONMENTAL OPERATING REPORT

1993

ENVIRONMENTAL MANAGEMENT SECTION  
WOLF CREEK NUCLEAR OPERATING CORPORATION

P.O. BOX 411

BURLINGTON, KANSAS 66839

APRIL 1994

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## 1.0 INTRODUCTION

Wolf Creek Nuclear Operating Corporation (WCNOC) has committed to minimizing the impact of Wolf Creek Generating Station (WCGS) operation on the environment. The 1993 Annual Environmental Operating Report is being submitted in accordance with the objectives of the Environmental Protection Plan (EPP) as required by Facility Operating License NPF-42. The purpose of this report is to demonstrate that the plant operated during 1993 in an environmentally acceptable manner.

## 2.0 ENVIRONMENTAL MONITORING

### 2.1 AQUATIC [EPP SECTION 2.1]

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

The owners of WCGS have contracted with the Kansas Water Resources Board to pump 9.672 billion gallons per calendar year from the tailwaters of the John Redmond Reservoir (JRR) to Wolf Creek Cooling Lake (WCCL). During 1993, 0.487 billion gallons or 5 percent of the contracted allotment were pumped. This water was for auxiliary raw water pumped similar to past years at approximately 1.2 million gallons per day. The larger makeup pumps were not operated during 1993.

The Final Environmental Statement/Operating License Stage (FES/OLS) postulated that makeup water withdrawal of 41 cfs (average annual predicted makeup requirements) during drought conditions would extend the duration and severity of low-flow conditions below JRR. This, in turn, was expected to reduce riffle habitat which would adversely affect Neosho madtom populations, now federally listed as a threatened species. This combination of circumstances - makeup water withdrawal during very low river flows - did not occur during 1993.

#### 2.1.2 Chlorine Discharges to Wolf Creek Cooling Lake

##### Circulating Water System Discharge:

Total residual chlorine (TRC) was postulated in Section 4.2.6.1 of the FES/OLS to range between 0.68 and 1.08 mg/l at the Circulating Water System (CWS) discharge. Three 30-minute doses per day at 411 pounds of chlorine per dose were projected to produce these concentrations. These chlorine doses were expected to cause periodic, appreciable mortality among aquatic organisms in a conservatively estimated 40 acres of the discharge area of WCCL (FES/OLS, Section 5.5.2.2).

Administered by the Kansas Department of Health and Environment (KDHE), the WCGS National Pollutant Discharge Elimination System (NPDES) permit allows TRC to be a maximum of 0.2 mg/l in the circulating water effluent. Chlorine dose duration is limited to two hours per day. In practice, WCGS has kept TRC well below the NPDES allowable limits. During 1993, actual chlorine dosages to the CWS averaged approximately 65 pounds per day. Monitoring detected a daily average TRC concentration of 0.1 mg/l. Compliance with the permit for daily maximum TRC and dose duration was 100 percent.

In Section 5.5.2.2 of the FES/OLS, the proposed chlorination treatments were not expected to meaningfully affect the overall biological productivity of WCCL. Because the actual values during CWS chlorination were well below the evaluated levels and no fish mortalities attributable to chlorination were observed, permitted chlorine discharges during 1993 were not considered to have had appreciable effects on the cooling lake environment.

#### Essential Service Water System Discharge:

During 1993, a continuous diversion of approximately 16,000 gpm of Service Water System (SWS) flow to 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 TRC limit for the SWS flow diversion through the ESWS. Measurements of TRC averaged 0.4 mg/l and, compliance with the NPDES limit in 1993 was 100 percent. No fish mortalities or water quality changes attributable to ESWS chlorine discharges were observed.

#### 2.1.3 Cold Shock

In the event of a rapid decline in plant power level during winter, fishes 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". There were no cold shock mortality events observed during 1993.

#### 2.1.4 Impingement and Entrainment

Impacts of entrainment and impingement were projected to be significant in the WCGS EPP. Condenser mortality for entrained organisms was expected to approach 100 percent. Because of this, sampling efforts to monitor entrainment impacts were not required by the NRC and have not been implemented at WCGS. Through casual observations, fish impingement at the WCCL circulating water intake was considered minimal during 1993, thus no sampling efforts to monitor impingement impacts have been initiated.

#### 2.1.5 Impacts of Wolf Creek Cooling Lake Discharges to the Neosho River

Cooling lake discharges into the Neosho River were regulated by NPDES permit limitations. Since discharges were sporadic, chiefly from stormwater runoff and short infrequent blowdowns, water was sampled on the first day of each discharge and weekly thereafter until the end of each respective discharge. Effluent parameters measured include a flow rate estimate, temperature, pH, total dissolved solids, sulfate, and chloride concentration. Discharges of these parameters were regulated to maintain a zone of passage in the Neosho River for aquatic organisms at the Wolf Creek confluence. Consequently, the flows allowed from WCCL may range from zero to unrestricted,

depending upon water quality and temperature similarities with the Neosho River. In 1993, no NPDES violations at the WCCL discharge were observed and at no time did water quality criteria restrict WCCL discharge to the Neosho River. Based on monitoring studies completed, there have been no apparent deleterious effects to Neosho River water quality or productivity due to WCCL discharges.

## 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 ha (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 have been planted and maintained in a lawn-type condition. Other areas within the exclusion area have been mowed for security and aesthetic purposes.

### 2.2.2 Vegetation Buffer Zone Surrounding Wolf Creek Cooling Lake

To create a 500 acre buffer zone around WCCL, agricultural production activities were curtailed in 1980 below an approximate elevation of 1095' MSL, eight feet above WCCL normal operating surface water elevation (1087' MSL). This border ranges from approximately 200 to 400 feet adjacent to the lake shoreline. Previously grazed or hayed native tallgrass areas were left undisturbed. Previously cultivated lands were allowed to advance through natural successional stages or native grasses were reestablished. Land management activities specified in an annual land management plan 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

A soil sterilant was applied on selected gravel areas of WCGS. These include the protected area boundary, various lay-down storage yards, meteorological tower, support building borders, storage tank berms, switchyard, hazardous waste and waste oil storage areas, and on-site railroad beds. The herbicides applied consisted of 8 pounds of Karmex (EPA Reg. No. 352-247) and 4 to 6 pounds of Oust (EPA Reg. No. 352-401) per 100 gallons of water. Application rates ranged from 20-50 gallons per acre. These herbicides are registered by the Kansas Department of Agriculture. No environmental impacts from herbicide treatment of WCGS facilities were identified.

The transmission line right-of-ways associated with the power plant were not sprayed during 1993.

### 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 WCNO in the



event of such problems. During routine wildlife 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]**

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 WCCL on fog occurrence along U.S. 75 near New Strawn, Kansas. Upon conclusion of 1987 data collection, it was determined that sufficient information was available to evaluate cooling lake fogging and that all commitments relevant to fog monitoring had been satisfied. Because no problems were identified by these data, no formal fog monitoring program has been conducted since 1987. Through casual observations, Environmental Management personnel did not observe any incidents of man-made fog along U.S. 75 during 1993. In addition, there were no reports of such incidents from individuals or local agencies responsible for traffic safety. Implementation of mitigative actions or further monitoring was not warranted.

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

A wildlife monitoring program was initiated to monitor and assess wildlife populations or parameters most likely to be impacted by the operation of WCGS. As outlined in the 1992/1993 annual wildlife study plan, specific objectives of the wildlife monitoring program were to assess waterfowl, waterbird, and bald eagle usage of WCCL. Because these annual monitoring programs target each migration season (autumn through early spring), this EPP reporting period overlaps with part of the 1993/1994 monitoring program. The objectives of this program were the same as for the 1992/1993 season. An abstract of the wildlife monitoring results is presented in the attachment to this report.

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

Land management activities on all company-owned lands except within the 453 ha (1120 acre) WCGS exclusion area were designed to achieve balances between agricultural production and conservation values. An annual management plan was formulated to address needs and propose accepted techniques for land maintenance, soil conservation, and wildlife management. These included the construction or establishment of fences, terraces, waterways, and permanent vegetative covers. A summary of the 1993 land management activity report appears in the attachment to this report.

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

#### **3.1 PLANT DESIGN OR OPERATING CHANGES [EPP SECTION 3.1]**

Proposed plant design and operational changes which have the potential to affect the environment must receive an environmental evaluation prior to implementation. A summary of each modification or operating change which required an environmental evaluation in 1993 is

presented. There were no changes in station design or operation nor were there tests or experiments that involved an unreviewed environmental question during 1993.

**Evaluation: Reroute of Sodium Hydroxide Discharge from Hydrazine Analyzer**

This evaluation addressed the potential environmental impact of changing the discharge path of 10% sodium hydroxide from the hydrazine analyzer to the steam generator blowdown sample recovery tank. The chemical was to be ultimately discharged to the lime sludge pond or oil water separator (NPDES outfalls 005 or 002, respectively). The sodium hydroxide reagent was diluted and neutralized within NPDES permit limits before being discharged. No adverse environmental impacts were expected to occur.

**Evaluation: Construction of New Office Building**

This evaluation covered the construction of a new office building on site property. The building was to be located within an area previously disturbed by plant construction within the protected area boundary. All applicable KDHE potable water and sanitary sewer design requirements were met. No adverse environmental impacts would result from constructing the building.

**Evaluation: Sump Pump Change in the Warming Line Valve Pit**

This evaluation addressed replacement of a sump pump in the warming line valve pit with another pump of a different make. The difference in volume pumped would not greatly increase plant effluents. No unreviewed environmental question existed. No adverse environmental impacts would result.

**Evaluation: Lime Sludge Pond Discharge Valve Throttling**

This evaluation addressed procedural revisions which would allow the discharge valve at the lime sludge pond (NPDES outfall 005) to be throttled. This would allow greater flexibility to control the discharge rate making flow measurements easier and controlling erosion. The character of the regulated discharge would not change. No environmental impacts would result.

### **3.2 NONROUTINE ENVIRONMENTAL REPORTS**

#### **3.2.1 Submitted Nonroutine Reports**

There were no nonroutine environmental reports involving significant impacts submitted to the NRC during 1993.

#### **3.2.2 Unusual or Important Environmental Event Evaluations**

No unusual or important environmental events reportable under specifications in the EPP were identified during 1993.



### 3.3 ENVIRONMENTAL NONCOMPLIANCES [EPP SUBSECTION 5.4.1]

At WCGS in 1993, nonradiological environmental noncompliances or noteworthy events were recorded along with the details surrounding them. The vehicle for documenting and assessing these events was WCNOC's Performance Improvement Request program. Events evaluated included such things as high treatment chemical concentrations, and monitoring plan deviations. All events were evaluated and determined not to be reportable pursuant to EPP criteria.

ATTACHMENT

SUMMARY OF

ENVIRONMENTAL INVESTIGATIONS

AT WOLF CREEK GENERATING STATION, 1993

Wolf Creek Nuclear Operating Corporation

Environmental Management

Burlington, Kansas

**Contents**

1. 1993 Land Management Activities
2. 1993 Water Quality Monitoring Activities
3. 1993 Asiatic Clam Monitoring Activities
4. 1993 Fishery Monitoring Activities
5. Wildlife Monitoring Activities

## 1. 1993 LAND MANAGEMENT ACTIVITIES

This document presents the 1993 activities for Wolf Creek Generating Station's (WCGS) land management program. It satisfies requirements specified in Environmental Management Procedure KP-LE2206. The goals that the program was designed to and did achieve were:

- a. to maximize rent income from agricultural lands,
- b. to preserve or improve both agricultural and natural resources,
- c. to foster good relations with local agricultural and natural resource communities, and
- d. to satisfy licensing requirements.

This report focuses on how the first two goals were accomplished. The latter two were integrated into the first two and were achieved to a large degree, as by-products of them. This program satisfied sections 2.2(b) and 4.2.3 of the Environmental Protection Plan (EPP), Appendix B to the Facility Operating License.

The lands at WCGS included in this program were primarily grasslands, croplands, and woodlands which were used for various purposes depending on the location and capability of each area. The improved properties around the power block area, switchyard and plant support buildings were not included. Most were leased for grazing, haying, and crop production. A strip around the Wolf Creek Cooling Lake (WCCL) shoreline was maintained in a naturally occurring biotic community to satisfy the EPP. Others were unsuitable for agricultural production, left unused to preserve lake shoreline stability, or reserved for their wildlife value.

Resource management activities on WCGS grasslands included regulation of grazing pressure, seeding of native tallgrass species, fence construction, and range evaluations. Associated management of croplands included implementation of soil conservation practices including terrace construction and farming practice requirements in respective lease contracts. Edge crops were also left for wildlife use and control of noxious weeds was accomplished on all WCGS lands.

## 2. 1993 WATER QUALITY MONITORING ACTIVITIES

Water quality monitoring of the Neosho River and Wolf Creek Cooling Lake was conducted bimonthly during 1993 similar to past years. The program was designed to maintain comparability with baseline studies to detect potential impacts due to WCGS. No such impacts were evident in the Neosho River. As expected, however, changes attributable to the power plant were detected in the lake. Increased forced evaporation likely caused higher levels of dissolved salts, solids, and parameters affected by them. Temperature and dissolved oxygen profiles revealed similar results as past years. Stratification occurred but at no time was it considered detrimental to the lake's fishery. The primary productivity of the lake remained consistent with levels found since lake filling, with the exception of slightly higher productivity in the thermally influenced area. None of the operational impacts observed were considered detrimental nor were any greater than expected in initial environmental impact evaluations. Because the data gathered to date have demonstrated the lack of plant impacts to the Neosho River and have characterized the plants influence on the cooling lake, water quality monitoring will be reduced in the future.

### 3. 1993 ASIATIC CLAM MONITORING ACTIVITIES

#### (Corbicula fluminea)

Distribution and densities of the Asiatic clam (Corbicula fluminea) were monitored in the Neosho River and WCCL. The densities and sizes in the river were typical of invading populations in marginal habitat. Corbicula were still present in the makeup water screenhouse which appeared to provide good habitat supporting more and larger individuals than the river itself. Upstream expansion above John Redmond Reservoir was not evident, but Corbicula occupied all other monitoring sites. Due to the presence in the makeup water screenhouse and the expansion in WCCL, future Corbicula monitoring in the Neosho River is no longer necessary and will be discontinued.

Monitoring in WCCL revealed that the clams continued to occupy new areas. They were found in the cooling water discharge area, spillway area, but most importantly in the cooling water intake. Two specimens were also found in the circulating water intake bays. Due to this, treatment of in-plant systems was investigated and planned in the future. Juvenile clam monitoring could not determine spawning characteristics which would help in timing in-plant chemical treatments. Changes to the 1994 juvenile monitoring will more effectively determine the spawning characteristics.

#### 4. 1993 FISHERY MONITORING ACTIVITIES

Fishery monitoring surveys were conducted on WCCL from April through October 1993. Collection methods used to target species of concern were fyke netting, seining, electrofishing, and gill netting. Data collected were used to describe the fishery which was subsequently evaluated based on the goal of increased plant reliability through reduced gizzard shad impingement.

Monitoring of WCCL in 1993 revealed that the annual gizzard shad production continued to be cropped, preventing impingement problems at the plant's cooling water intake structure. The predator populations showed signs of being prey limited, which included low recruitment, below normal body condition, and slow growth. However, some predator species improved and have appeared to develop stable populations capable of long term sustainability. The wiper hybrid, a nonreproducing predator, continued to age and may require a support stocking in 1995 to maintain them. In summary, the fishery in WCCL has consumed the annual gizzard shad production, greatly reducing impingement potential and should continue to do so in the future.



## 5. WILDLIFE MONITORING ACTIVITIES

The wildlife monitoring activities targeted possible impacts from station operation to migratory and wintering waterbirds in the vicinity of WCGS. The results presented here cover the 1992/1993 winter monitoring season and the first half of the 1993/1994 season. The general objectives of the program were to document and assess any trends or impacts to migrating or wintering populations of waterbirds, waterfowl, and threatened or endangered species that may be caused by station operation. Use of WCCL may expose birds to transmission line collision mortality or to disease outbreaks. Damage to local agricultural crops by large waterfowl concentrations using WCCL was also a concern. To document and assess such occurrences or increased potential for such, specific objectives of the program were to monitor how many and where waterbirds, waterfowl, and threatened and endangered species used WCCL during the winter migration season and compare these to the norm observed since station operation began.

During the 1992/1993 season thirty species of waterbirds and waterfowl were observed with snow goose and Franklin's gull being most abundant. Mallard usage continued to decline. During the fall of 1993, this decline in usage continued. During operational winters, the heated effluent provided previously unavailable open water habitat on WCCL. This, in combination with a lack of hunting pressure and close, abundant food supplies, has usually kept wintering birds on WCCL longer than during preoperational seasons. Mallard and Canada goose usage has indicated preferences for areas of WCCL providing these factors, although these preferences are not usually significant ( $p \leq 0.05$ ). No disease or crop depredation problems were observed during the 1992/1993 season or the first half of the 1993/1994 season. No significant transmission line collision events nor the increased potential for such were observed.

The bald eagle was the only threatened or endangered species that was consistently observed using WCCL. Its usage on WCCL declined during the first two years after plant operation began while remaining constant on John Redmond Reservoir (JRR). A large increase in usage was observed during the next two winters (1987/1988 and 1988/1989). Since then, eagle usage of WCCL has been very low. Initial operational usage on WCCL declined primarily because of the two mild winters which caused gizzard shad, a vulnerable and preferred food resource, to be more readily available on JRR than WCCL. Colder winters in 1987/1988 and 1988/1989 and station operation resulted in WCCL having some of the only available open water for much of the winter. This made WCCL more attractive to bald eagles during those times. One other factor affecting eagle usage of WCCL was availability of dead gizzard shad or other fish. Plant trips (shutdowns) during the winter can cause fish kills by cold-shock when the

plant effluent is suddenly no longer heated. This readily available food source may be a more important factor than simply available open water when it comes to eagle usage of WCCL. No incidence of bald eagle collisions with WCGS transmission lines have been found as a result of the usage patterns observed.