December 4, 2003

Mr. Richard C. Nelson
Supervisor
U.S. Fish and Wildlife Service
4469 48th Avenue Court
Rock Island, Illinois 61201

Subject: REQUEST FOR CONCURRENCE - BIOLOGICAL ASSESSMENT FOR QUAD CITIES NUCLEAR POWER STATION, UNITS 1 AND 2 LICENSE RENEWAL

Dear Mr. Nelson:

The Nuclear Regulatory Commission (NRC) staff has prepared the enclosed Biological Assessment (BA) to evaluate whether the proposed renewal of the operating licenses of the Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities), for an additional 20-year period would have adverse effects on listed species, and request concurrence by your office.

Quad Cities is located on the east bank of Pool 14 of the Mississippi River between Lock and Dams 13 and 14, and 815.1-km (506.5 mi) upstream from its confluence with the Ohio River. This BA evaluates the potential impacts of the proposed license renewal on Federally listed threatened or endangered species. Seven species, afforded protection under the Endangered Species Act of 1973, could potentially inhabit the Quad Cities site or transmission line rights-of-way (ROWs). For five of the species, the renewal of the licenses for an additional 20 years will have "no effect." For the bald eagle *(Haliaeetus leucocephalus*) and the Higgins' eye pearlymussel (*Lampsilis higginsii*), known to occur near or occasionally use the site or ROWs, license renewal may affect, but is not likely to adversely affect these two species.

In reaching our conclusion, we relied on information provided by Exelon Generation Company, LLC (the licensee), on research performed by the NRC staff, and on current listings of species provided by the Rock Island Field Office of the U.S. Fish and Wildlife Service.

If you have any questions regarding this BA or our request for concurrence, please contact, Mr. Duke Wheeler, NRC Senior Environmental Project Manager, at (301) 415-1444.

Sincerely,

/RA/

Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation

Docket Nos.: 50-254 and 50-265

Enclosure: As stated
cc w/encl: See next page

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cc w/encl: See next page
DISTRIBUTION:

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Biological Assessment

Quad Cities Nuclear Power Station, Units 1 and 2
License Renewal Review

Rock Island County, Illinois

December 2003

Docket Nos. 50-254 and 50-265

U.S. Nuclear Regulatory Commission
Rockville, Maryland

Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

Enclosure

Biological Assessment of the Effects of License Renewal for the Quad Cities Nuclear Power Station, Units 1 and 2 on Threatened or Endangered Species

Executive Summary

This Biological Assessment (BA) evaluates the potential impacts of the proposed license renewal for the Quad Cities Nuclear Power Station, Units 1 and 2 (Quad Cities) on Federally listed threatened or endangered species. There will be no major construction, refurbishment, or replacement activities associated with this action. A total of seven species, afforded protection under the Endangered Species Act of 1973, could potentially inhabit the Quad Cities site or transmission line rights-of-way (ROWs). The U.S. Nuclear Regulatory Commission (NRC) staff has conducted a BA of these seven species and has determined that five of the species, the western prairie fringed orchid (*Platanthera praeclara*), the eastern prairie fringed orchid (*Platanthera leucophaea)*, the prairie bush-clover (*Lespedeza leptostachya*), the Indiana bat (*Myotis sodalis*), and the Iowa Pleistocene snail (*Discus macclintocki*) are not known from the site or transmission ROWs. For these five species the NRC staff has concluded that the renewal of the Quad Cities license for an additional 20 years will have "no effect." For the bald eagle *(Haliaeetus leucocephalus*) and the Higgins' eye pearlymussel (*Lampsilis higginsii*), known to occur near or occasionally use the site or ROWs, the staff has determined that license renewal for Quad Cities may affect, but is not likely to adversely affect these two species.

Introduction

The NRC licenses the operation of domestic nuclear power plants in accordance with the Atomic Energy Act of 1954, as amended, and NRC implementing regulations. Exelon Generation Company, LLC (Exelon) operates Quad Cities pursuant to NRC Operating License Numbers DRP-29 and DRP-30, both of which expire on December 14, 2012.

Exelon has prepared an environmental report in conjunction with its application for renewal of the Quad Cities operating licenses, as provided for by the following NRC regulations:

- Title 10, Energy, Code of Federal Regulations (CFR), Part 54, Requirements for Renewal of Operating Licenses for Nuclear Power Plants, Section 54.23, Contents of Application - Environmental Information (10 CFR 54.23)

- Title 10, Energy, CFR, Part 51, Environmental Protection Regulations for Domestic Licensing and Related Regulatory Functions, Section 51.53, Postconstruction Environmental Reports, Subsection 51.53(c), Operating License Renewal Stage [10 CFR 51.53(c)]

The renewed operating licenses would allow up to 20 additional years of plant operation beyond the current licensed operating period of 40 years.

No major refurbishment or replacement of important systems, structures, or components are expected during the Quad Cities license renewal period. In addition, no construction activities are expected to be associated with license renewal.

The purpose of this BA is to provide the NRC staff's assessment to the U.S. Fish and Wildlife Service (FWS) concerning the potential impacts of continued operation of Quad Cities on threatened or endangered species and designated critical habitat pursuant to Section 7(a)(2) of the Endangered Species Act. This consultation is between the NRC staff and the FWS.

This BA examines the effects of the Quad Cities operation on Federally listed species that occur in the counties where the Quad Cities site and associated transmission lines are located. The seven Federally listed species that could occur within the Quad Cities site or along its associated transmission lines are listed in Table 1. No designated critical habitat exists for any of the listed species on or in the vicinity of the Quad Cities site or transmission ROWs. No species known from the site or ROWs are proposed for listing or are candidate species.

Table 1. Species Listed as Endangered or Threatened or Candidates for Listing by the FWS that Occur or Potentially Occur within Rock Island, Whiteside and Lee Counties, Illinois, and Clinton and Scott Counties, Iowa

Scientific Name	Common Name	Federal Status[1]	County	Habitat[2]
	Plants			
Platanthera praeclara	western prairie fringed orchid	T	All	mesic to wet tallgrass prairies and meadows; old fields; roadside ditches
Platanthera leucophaea	eastern prairie fringed orchid	T	All	wet grassland habitats
Lespedeza leptostachya	prairie bush-clover	T	All	dry to mesic prairies
	Birds			
Haliaeetus leucocephalus	bald eagle	T	Rock Island, Whiteside, Scott, Clinton	Wintering, breeding (Clinton County) Open water, riparian, bottomlands

Table 2 (continued)

Scientific Name	Common Name	Federal Status[1]	County	Habitat[2]
		Mollusks		
Discus macclintocki	Iowa Pleistocene snail	E	Clinton	algific talus slopes
Lampsilis higginsii	Higgins' eye pearlymussel	E	Rock Island, Scott, Clinton	sand/gravel substrates; swift flowing currents
		Mammals		
Myotis sodalis	Indiana bat	E	South of Interstate 80 in Iowa and All Counties in Illinois	caves, mines; small stream corridors with well-developed riparian woods; upland and bottomland forests

1. T = Threatened; E = Endangered
2. No designated critical habitat occurs in the counties of concern

Source: FWS 2003a and FWS 2003c

This BA summarizes pertinent project information and existing data, and discusses the potential consequences of the proposed 20-year license renewal on the seven species listed in Table 1 with emphasis on the Higgins' eye pearlymussel and the bald eagle.

Project Description

The proposed action is the renewal of the operating licenses for Quad Cities. The Quad Cities site is located on the banks of the Mississippi River at river-km 815.1 (river-mi 506.5) and about 32 km (20 mi) northeast of the Quad Cities Metropolitan Area of Davenport and Bettendorf, Iowa; and Rock Island, Moline, and East Moline, Illinois (Figures 1 and 2). The current operating licenses for both Units 1 and 2 expire on December 14, 2012. By letter dated January 3, 2003, Exelon submitted an application to the NRC (Exelon 2003a) to renew these operating licenses for an additional 20 years of operation (i.e., until December 14, 2032).

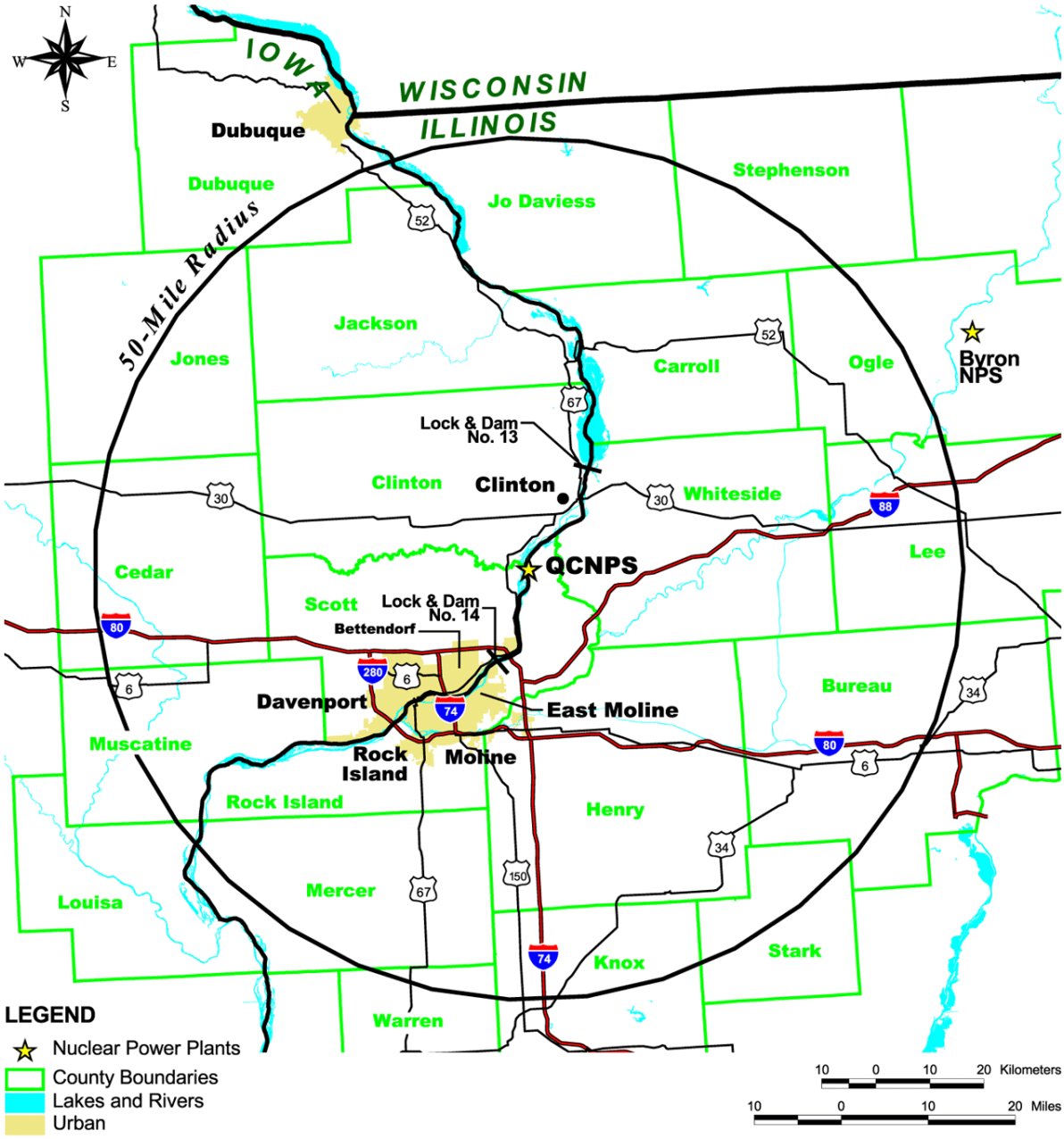

Figure 1. Quad Cities Nuclear Power Station 80-km (50-mi) Region

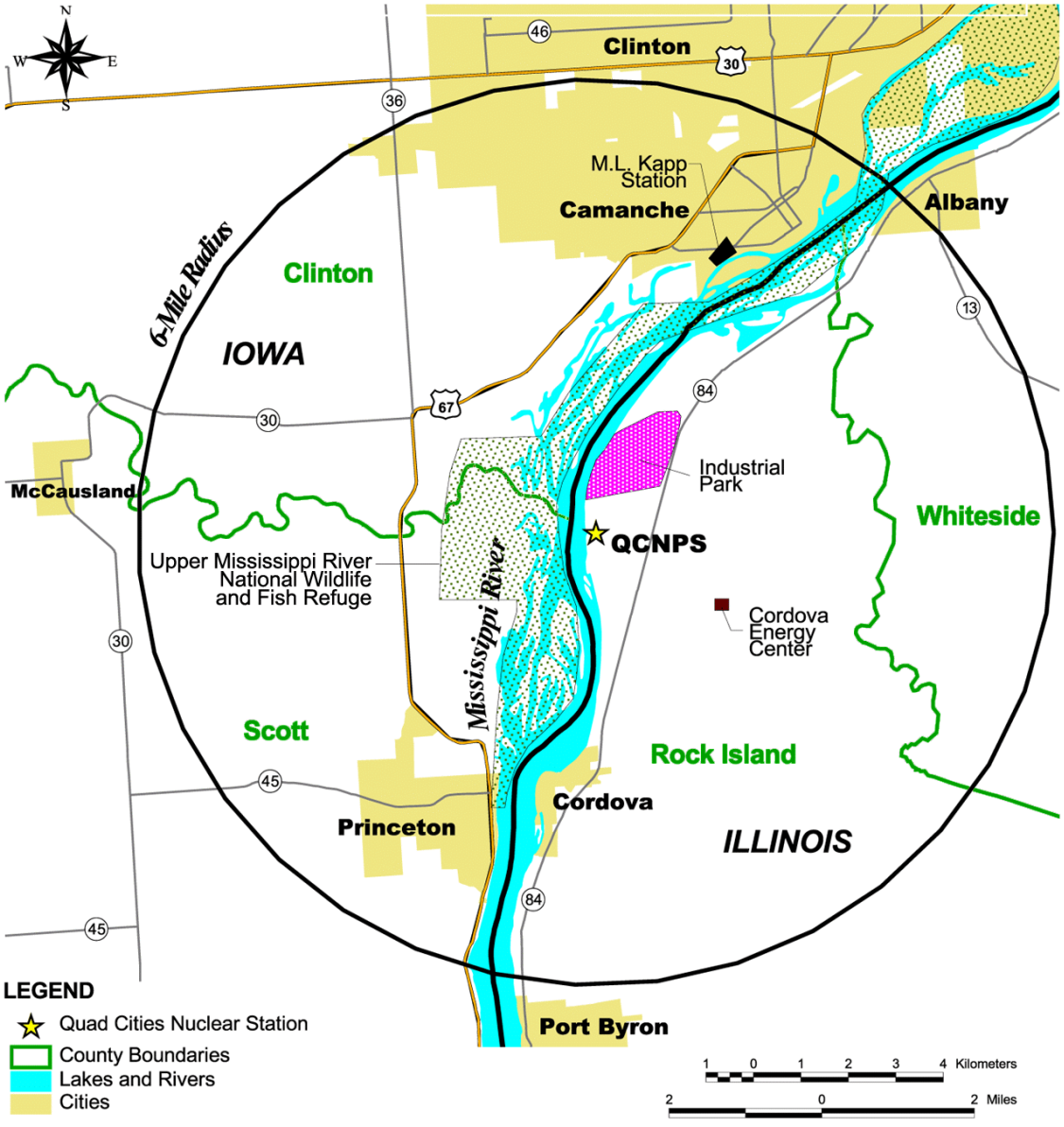

Figure 2. Quad Cities Nuclear Power Station, 10-km (6-mi) Region

In a letter dated March 12, 2003, the NRC staff requested comments from the FWS on the operating license renewal application for Quad Cities. Specifically, the NRC requested a list of species and information on protected, proposed, and candidate species, and any critical habitat, that may be in the vicinity of the Quad Cities plant and its associated transmission lines (NRC 2003a). In response, on June 6, 2003, the FWS provided information regarding

Federally listed species that have been observed or that may occur in the vicinity of the Quad Cities site and its associated transmission lines (FWS 2003a). On August 12, 2003, the NRC staff requested additional information from the FWS for an expanded scope of the transmission lines under review for license renewal (NRC 2003b). The FWS responded on September 15, 2003, with this requested information (FWS 2003c). This information has been reviewed by the NRC staff and is included in this BA.

Exelon also has corresponded with the FWS regarding potential impacts of license renewal on threatened or endangered species (Jury 2002). The FWS indicated that it had no objection to the license renewal action (Millar 2002). Quad Cities is not located near the designated critical habitat of any of the threatened or endangered species discussed in this assessment.

Exelon has no plans to conduct major refurbishment or construction activities at Quad Cities as part of continued operations during the license renewal period; therefore, the proposed project is not a major construction activity (Exelon 2003b).

Description of Project Area

1. General Plant and Ecological Resources Information

Quad Cities is owned and operated by Exelon (2003b). It is located in the Upper Mississippi Basin on the Illinois side of the Mississippi River approximately 80-kilometers (50 mi) south of the northern boundary of the State of Illinois and 815.1 river-km (506.5 river-mi) upstream from its confluence with the Ohio River. It is located on the east bank of Pool 14 of the Mississippi River between Lock and Dams 13 and 14 (Figures 1 and 2).

The Quad Cities site is located on moderately high bluffs between 6 m (20 ft) and 12-m (40 ft) above the surface of the river. The site is flat with a grade level of approximately 2.7-m (9 ft) above maximum flood stage. The Quad Cities site features two boiling water reactor units, intake and discharge canals, auxiliary buildings, switchyards, and a spent fuel pool. The site occupies approximately 331 ha (817 ac) of both developed and undeveloped areas. The site also contains a 4.8-km (3-mi) retired spray canal that is now used to raise fish (Exelon 2003b). The developed areas mostly occupy the western half of the site. Undeveloped areas are located generally on the eastern half of the site and support habitats that include open fields and planted pines. Approximately 22 ha (55 ac) are leased for farming (i.e., hay). The surrounding area is rural farmland and woods with an industrial park located 1.6-km (1 mi) north of the site, and the Cordova Energy Center, a gas-fired power plant, located approximately 1.6-km (1 mi) to the southeast. Prior to plant operations, the primary use of the site was agricultural and residential (AEC 1972).

The Quad Cities site is located in an area of sandy soil with little bushy or wooded habitat. The agricultural lands in the vicinity are used for grain and cattle forage crops (AEC 1972). Some of the species (i.e., especially terrestrial mammals) that inhabit areas adjacent to the Quad Cities site probably also use the limited natural areas within the site boundaries. Other important local habitats are nearby river islands and areas adjacent to the river in Scott and Clinton counties in Iowa. These areas, which are generally encompassed by the Upper Mississippi River National Wildlife and Fish Refuge (NWFR) and the Princeton Wildlife Management Area (PWMA),

provide upland and bottomland habitats, including hardwood forests, grasslands, agricultural fields, islands, wetlands, sloughs, lakes, and shoreline (FWS 2003c). Birds (e.g., migratory passerines, raptors, waterfowl, and shorebirds) use the area extensively. The wetlands, forests, and prairies are used by more than 50 species of mammals that include deer, raccoon, muskrat, red and gray fox, coyote, weasel, mink, badger, skunk, river otter, and many other small mammals (FWS 2000c; AEC 1972).

The PWMA, a 482-ha (1190-ac) habitat management unit within the Upper Mississippi River NWFR, was constructed to provide optimum habitat conditions for fish and wildlife species. The water levels within these units are managed to provide emergent vegetation and mud/sand flats to maintain diverse habitat types for many wetland-dependent species (FWS 2000c). Floodplain forest habitats dominate this management area and include such plant species as silver maples, green ash, and cottonwoods. Large numbers of bald eagles live this area during the winter months as well as waterfowl and migratory passerines (Iowa Bird and Birding 2002).

The principal aquatic resources in the vicinity of the Quad Cities site are associated with the Mississippi River. The transmission lines associated with Quad Cities cross a number of streams, ranging in size from small intermittent streams to the Rock River. The major changes and modifications within the Upper Mississippi River that have had the greatest effect on aquatic resources include: (1) loss of floodplain connectivity due to extensive levee construction, (2) impoundment of the river from construction of locks and dams, (3) river channelization related to navigation, (4) water quality degradation in tributary streams, and (5) invasion of exotic species through man-made navigation projects (Upper Mississippi River Conservation Committee 1993). The main channel of the Upper Mississippi River is periodically dredged in some reaches to maintain the 3-m (9-ft) navigation channel (Fremling and Drazkowski 2000). The impacts of contaminants from agricultural, industrial, municipal, and residential sources on river biota are largely unknown (Fremling and Drazkowski 2000).

Ninety-two fish species have been collected in Pool 14 of the Mississippi River (Bowzer and Lippincott 2000). The most abundant species include the gizzard shad, common carp, emerald shiner, river shiner, bluegill, and freshwater drum. The most common game species include channel catfish, white bass, pumpkinseed, largemouth bass, white crappie, black crappie, walleye, and sauger (Bowzer and Lippincott 2000). Commercial fisheries also exist for species such as the bigmouth buffalo, common carp, catfish and bullheads, and freshwater drum (FWS 1991). Walleye and hybrid striped bass have increased in Pool 14 due to stocking of these fish by Exelon (Bowzer and Lippincott 2000; LaJeone and Monzingo 2000).

The Upper Mississippi River contains a rich assortment of freshwater mussels. Historically, as many as 50 species have been documented from the Upper Mississippi River, but only about 30 species have been reported in recent surveys (U.S. Geological Survey [USGS] 1999). Mussels are often found in dense aggregations called mussel beds. While these beds may be miles apart, an individual bed can be up to several miles long (USGS 1999). Populations of fingernail clams have declined in certain reaches of the Upper Mississippi River during recent decades. These declines have occurred chiefly during low-flow periods associated with droughts (Fremling and Drazkowski 2000). An introduced species, the zebra mussel, became established in the Upper Mississippi River by 1992. The increase in the numbers of this species has caused a decline among many native mussels because zebra mussels can

out-compete native species for oxygen and food and are so prolific that native mussel beds are smothered (FWS 2001). The zebra mussel has also increasingly displaced other macroinvertebrates, such as hydropsychid caddis flies, that live on submerged hard surfaces (Fremling and Drazkowski 2000).

2. Heat Dissipation System

Quad Cities has two General Electric boiling water reactors, with a design rating for net electrical power output of 930 megawatts electric per unit. Plant cooling and auxiliary water systems are provided by a once-through condenser cooling system that withdraws and returns water from and into the Mississippi River. The plant withdraws water from a canal intake structure located along the east side of the river. Quad Cities utilizes a two-pipe diffuser system to return the cooling water to the river. The two pipes are 4.9 m (16 ft) in diameter and lie on the bottom of the river across the main river flow. The combined cooling and service water, with an increase of as much as 15.6°C (28°F) above intake temperature, is discharged into the deepest part of the river through regularly spaced jet nozzles in the diffuser pipes. The total flow of Mississippi River water through Quad Cities for condenser circulating water and service water is approximately 61,000 L/s (970,000 gpm or 2,160 cfs). The temperature increase at the edge of the discharge mixing zone is required to be less than 2.8°C (5°F) above ambient temperature (Illinois Environmental Protection Agency 2000). At Camanche, Iowa, approximately 10 km (6 mi) upstream of the Quad Cities site, the Mississippi River has an annual mean flow of 1,380,000 L/s (48,750 cfs) (USGS 2000). The Wapsipinicon River flows into the Mississippi River from the west immediately upstream of the Quad Cities site, contributing an additional 48,000 L/s (1700 cfs) (USGS 2000), bringing the average river flow at the Quad Cities site to 1,430,000 L/s (50,500 cfs).

3. Transmission System

Quad Cities is connected to the transmission system via five transmission lines, totaling approximately 185 km (115 mi) and with ROWs covering approximately 880 ha (2200 ac). These lines traverse mainly agricultural land along with some natural terrestrial habitats (Exelon 2003b; AEC 1972). Approximately 90 to 95 percent of the transmission corridor can be classified as agricultural. The transmission lines are the Davenport line (Line 0401), the Barstow line (Line 0402), the south Nelson line (Line 0403), the north Nelson line (Line 0404), and the Rock Creek line (Line 0405) (Table 2).

Table 2. Quad Cities Transmission Line Corridors

Substation (line)	Number of Lines	kV	Approximate Corridor Length		Corridor (Right-of-Way) Width		Estimated Corridor Area	
			km	(mi)	m	(ft)	ha	ac
Davenport (0401)	1	345	20.6	12.8	55	180	110	280
Barstow (0402)	1	345	28.1[a]	17.5[a]	158, 44[b]	520, 145[b]	160[c]	400[c]
Nelson (South line 0403)	1	345	67.4[a]	41.9[a]	158, 44[b]	520, 145[b]	330[c]	830[c]
Nelson (North line 0404)	1	345	63.9	39.7	44	145	280	700
Rock Creek (0405)	1	345	8.0	5.0	52	170	40	100
Total	5		185.0[a]	115.0[a]			880[c]	2200[c]

a. The initial 3.2-km (2 mi) of corridor is shared by Barstow and Nelson South lines. The initial 3.2-km (2 mi) is counted once in the total.
b. The initial 3.2-km (2 mi) of the corridor is 158 m (520 ft) wide.
c. The area includes the area of the shared corridor. The area of the shared corridor is only included once in the total.
Source: Exelon 2003b.

Except for the Upper Mississippi River NWFR and the PWMA, the Quad Cities transmission lines traverse land cultivated for row crops and pasture typical of eastern Iowa and northwestern Illinois.

The Davenport and the Rock Creek transmission corridors are maintained by mowing (Exelon 2003c), trimming, tree removal, and use of approved herbicides (Exelon 2003c; Exelon 2003d). Unless otherwise noted, vegetation management follows a three-year cycle within the Davenport corridor (Exelon 2003c) and a six-year cycle within the Rock Creek corridor (Exelon 2003d). Herbicide application is performed according to label specifications by certified applicators. Pre-activity surveys are not routinely performed for the Davenport and the Rock Creek transmission lines (Exelon 2003c; Exelon 2003d). Line maintenance staff receives training in identifying Federally and State listed species and their habitats that may occur in the vicinity of the Rock Creek line and in procedures to follow if one of these species is encountered during maintenance activities (Exelon 2003d). Line maintenance staff working within the Davenport corridor does not receive similar training (Exelon 2003c).

Description of Federally Protected Species Potentially Occurring in the Project Area

1. Indiana Bat (*Myotis sodalis*)

The Indiana bat was originally listed in 1967 as Federally endangered. Its decline is largely attributed to cave destruction and disturbance (FWS 1991b). The Indiana bat is very small, with a wingspan of 23 to 28 cm (9 to 11 in.) and weighing approximately 9 g (0.3 ounces) (FWS 2003c). In winter, the Indiana bat uses limestone caves or abandoned mines for hibernation, although some hibernate under bridges, in old buildings, or under loose bark and in hollows of trees (FWS 2003c; FWS 1991b). This species forages for insects along stream corridors, within the canopy of floodplain and upland forests, over clearings with early successional vegetation (old fields), along the borders of croplands, along wooded fencerows, and over farm ponds and in pastures. It has been shown that the foraging range for the bats varies by season, age, and sex and ranges up to 33 ha (81 ac) (FWS 2003c). Roosting and rearing of young usually occurs in caves, although it may occur in the loose bark of trees (FWS 1991b). Exelon has not noted any Indiana bats in the vicinity of the Quad Cities site or its associated transmission lines. Undeveloped portions of the Quad Cities site have not been surveyed for the Indiana bat.(1) The FWS notes that the bat may occur in all counties in Iowa south of Interstate 80 (FWS 2003c). Interstate 80 is a major east-west highway in Illinois and Iowa approximately 5 miles south of the Quad Cities site. The Iowa Department of Natural Resources did not note any occurrences of threatened or endangered species in the vicinity of the transmission lines associated with Quad Cities (Brandrup 2002). The NRC staff has concluded that the Indiana bat is unlikely to utilize the site or the transmission ROWs on a regular basis, and that license renewal for an additional 20 years will have “no effect” on the listed speceis.

2. Iowa Pleistocene Snail (*Discus macclintocki*)

The Federally endangered Iowa Pleistocene snail was originally listed in July 1978 (43 FR 28932 [FWS 1978]). This small land snail inhabits algific (i.e., cold producing) talus slopes, within the leaf litter of cool and moist hillsides (FWS 2003c). It breeds from late March to August by laying two-to-six eggs in this leaf litter, with the eggs hatching approximately 28 days later. The snail feeds on fallen leaves of birch and maple trees or dogwood shrubs. Climate change is attributed as the primary cause of long-term decline of this snail although the most immediate threats are from habitat degradation and destruction, human disturbance, and livestock grazing, as well as misapplication of pesticides (FWS 1997; FWS 2002b). The snail has been found in approximately 30 sites in Iowa and Illinois (FWS 2003c) with none noted by Exelon at Quad Cities (Exelon 2003a). Suitable habitat is unlikely to occur at the site or in the immediate vicinity of Quad Cities transmission lines and their corridors, with the majority of traversed land characterized as flat and agricultural (Exelon 2003a). The NRC has determined that license renewal for an additional 20 years will have “no effect” on the listed species.

3. Western Prairie Fringed Orchid (*Platanthera praeclara*)

The Federally threatened western prairie fringed orchid was listed as threatened in 1989, along with the eastern prairie fringed orchid (54 FR 39857 [FWS 1989]). It occurs in mesic to wet

(1) Personal communication with Ed Cunningham during Quad Cities site audit, March 12, 2003.

tallgrass prairies and meadows, but is also found in old fields or roadside ditches (FWS 1996; FWS 2003c). The western prairie fringed orchid is restricted to areas west of the Mississippi River and is known to occur in about 75 sites in 8 states (FWS 2003a). The prairie fringed orchids are mostly threatened by conversion of its habitats to cropland and other habitat loss activities. Other threats include invasive species competition, wetland destruction, intensive hay mowing, fire suppression, and overgrazing (FWS 2003c; Herkert 2002). Based on the known distribution of the species, it is unlikely to be found at the Quad Cities site or along the transmission ROWs. The NRC has determined that license renewal for an additional 20 years will have "no effect" on the listed species.

4. Eastern Prairie Fringed Orchid (*Platanthera leucophaea*)

The eastern prairie fringed orchid, listed as threatened in 1989 (54 FR 39857 [FWS 1989]), also occupies mesic to wet tallgrass prairie or grassland habitats (Herkert 2002; FWS 2003c). However, it can also occupy bogs, fens, and sedge meadows (FWS 2003c). This species formerly occurred throughout Illinois yet has been nearly eliminated from all but northeastern Illinois. There are 30 known Illinois populations; no known populations occur in Whiteside County, although it could occur in Rock Island or Lee counties (records for these counties are no longer extant [Herkert 2002]). No occurrences of either species (eastern or western prairie fringed orchid) have been documented for the Quad Cities site or in areas along its associated transmission lines (Exelon 2003a). The NRC has determined that license renewal for an additional 20 years will have "no effect" on the listed species.

5. Prairie Bush-clover (*Lespedeza leptostachya*)

The Federally-listed threatened prairie bush clover (52 FR 781 [FWS 1987]) occurs on dry gravel and sand prairies (Herkert 2002). It is found only in the tallgrass prairie region of four Midwestern states and is currently found at fewer than 40 sites in 23 counties of Iowa, Illinois, Minnesota, and Wisconsin (FWS 2003c), although it could occur throughout Illinois (FWS 2003c). Fourteen known populations occur in Illinois at present with five of these populations protected on public land; none of these known populations occur in Rock Island or Whiteside counties, although a recent record of a population is known for Lee County (Herkert 2002). The decline of the prairie bush clover is primarily due to the historic loss of tallgrass prairie habitat from conversion to agricultural land, and this species tends to only occur presently in areas that escaped plowing due to being too rocky or steep (FWS 2003c). The lack of suitable habitat leads the NRC staff to conclude that this species is not likely to be present at the site or along the transmission ROWs. The NRC has determined that license renewal for an additional 20 years will have "no effect" on the listed species.

6. Higgins' Eye Pearlymussel (*Lampsilis higginsii*)

The Federally-listed endangered Higgins' eye pearlymussel is only found in the Mississippi River, St. Croix River in Wisconsin, the Wisconsin River, and the Rock River in Illinois. The Higgins' eye pearlymussel spawns in late summer, but larvae are retained in the marsupia until they are released during the following spring or summer (FWS 2003c). Fish hosts for the glochidia (larvae) include freshwater drum, largemouth bass, black crappie, sauger, and walleye (FWS 2003). The Higgins' eye pearlymussel most frequently occurs in medium to large rivers with current velocities of about 0.15 to 0.46 m/sec (0.49 to 1.51 ft/sec) and in depths of 1.0 to 6.0 m (3.3 to 19.7 ft) with firm, coarse sand or mud-gravel substrates

(FWS 2000a, 2001). This species is common to abundant within Pool 14 of the Mississippi River (Bowzer and Lippincott 2000).

No critical habitat has been designated for the Higgins' eye pearlymussel. However, ten Essential Habitat Areas for the Higgins' eye pearlymussel occur within the Upper Mississippi River watershed. Essential Habitat Areas are locations known to contain reproducing populations of the Higgins' eye pearlymussel in association with a healthy and diverse unionid community (e.g., mussel beds) (FWS 1998). An Essential Habitat Area begins approximately 1.6 km (1.0 mi) downstream of Quad Cities, Units 1 and 2 at river-km 813.3 (river-mi 505.5) and continues downstream to river-km 809.3 (river-mi 503.0) at Cordova, Illinois (FWS 2003b).

The only other Essential Habitat Area located downstream of the Quad Cities site (river-km 815.1 or river-mi 506.5) occurs in Pool 15 in the Sylvan Slough at River Miles 485.5 through 486.0. The other Essential Habitat Areas are in upstream Pools 9 and 10 of the Mississippi River, the St. Croix River, and the Wisconsin River (FWS 2003b). Nearly all of the remaining habitat for the Higgins' eye pearlymussel within the Mississippi River occurs within the navigation channel.

Suitable host species for the glochidia (mussel larvae) of the Higgins' eye pearlymussel include sauger, freshwater drum, largemouth bass, smallmouth bass, walleye, yellow perch (*Perca flavescens*), and black crappie; while marginal host species include bluegill, northern pike (*Esox lucius*), and green sunfish (FWS 2003b). Most of these fish species are common to abundant and widespread; thus, it is doubtful that the presence of fish hosts is a limiting factor affecting the Higgins' eye pearlymussel (Rasmussen 1979).

7. Bald Eagle (*Haliaeetus leucocephalus*)

The bald eagle was originally listed as endangered by the FWS in 1978, but population increases prompted downlisting to threatened status in 1995. Recovery goals for the species have generally been met or exceeded within the species' range. In addition, population trends indicate that the bald eagle has recovered and is neither in danger of extinction nor likely to become in danger of extinction within the foreseeable future throughout all or a significant portion of its range. As a consequence, the bald eagle was proposed for delisting in 1999 (64 FR 36453 [FWS 1999]).

Bald eagles usually occur near large bodies of water, especially rivers, lakes and reservoirs that provide a reliable food source and isolation from human disturbance. Large trees and snags along shorelines are used as perches and nest sites. Bald eagles primarily feed on fish and waterfowl. These habitats and site components are available in the vicinity of the Quad Cities site and along riparian areas traversed by the Davenport and Rock Creek transmission lines.

The bald eagle is a common visitor to the Upper Mississippi River Valley, including the PWMA and the Savanna District of the Upper Mississippi River NWFR. The bald eagle uses the area as a winter migration corridor and for nesting habitat during the summer. From October to March, hundreds of bald eagles congregate in the area to feed on fish, typically near locks and dams or in ice-free backwater areas (FWS 2000b). These attractive winter feeding grounds include open water areas created by the warm water effluents from the Quad Cities plant (FWS 2003a).

The bald eagle also nests at the Savanna District of the Upper Mississippi River NWFR, usually on islands or along backwater shorelines (FWS 2000b). Bald eagles build their nests in large trees near rivers or lakes and often use the same nest year after year. Within the Savanna District, there are seven active (i.e., known) bald eagle nesting territories, and some of these nests have successfully produced young (FWS 2000b). The nearest known bald eagle nest to the Quad Cities site is located at river mile 514.3 on Beaver Island and has been established for over a decade with observed success in producing young. This nest is approximately 11.3-km (7 mi) or 8 river miles north of the Quad Cities site and 7.2-km (4.5 mi) or 5 river miles north of the Rock Creek transmission line. No other known bald eagle nests occur in the vicinity of the Quad Cities site or its associated transmission lines (Dee 2003). Bald eagles are easily observed in the vicinity of the Quad Cities site (Britton 2003) and are known to regularly occur there (Britton 2003). At this time, Exelon and the owners of the transmission lines (and their line maintenance contractors) have not needed to implement the Northern States Bald Eagle Recovery Plan and Management Guidelines (FWS 1983). This recovery plan provides guidance on the management of bald eagle nesting areas (e.g., providing disturbance buffer zones for nest trees, management of habitat and key components, etc.). The NRC staff expects that the owner of the transmission lines, and the line maintenance contractors, will become familiar with this plan and will implement the guidance within this plan if a need arises in the future.

Effects of the Proposed Action on Listed Species Occurring in the Project Area

This section presents the anticipated effects of the proposed action on listed species in the vicinity of Quad Cities and its associated transmission lines. As previously discussed, the western fringed orchid, the eastern fringed orchid, the prairie bush-clover, the Indiana bat and the Iowa Pleistocene snail are not known from the site or transmission ROWs and therefore will not be impacted by the continued operation of the facility during the proposed license renewal period. Only the Higgins' eye pearlymussel and bald eagle potentially occur in the vicinity of the site and therefore have the potential for adverse impact during the license renewal period. No designated critical habitat exists in the area and, therefore, no impacts to such habitat are anticipated.

1. Higgins' Eye Pearlymussel (*Lampsilis higginsii*)

Past actions that have adversely affected the freshwater mussels (including the Higgins' eye pearlymussel) within the Upper Mississippi River have included the pearl button and cultivated pearl industries, siltation, chemicals, establishment and maintenance of the 3-m (9-ft) deep navigation channel, commercial and recreational navigation, and introduced species particularly the zebra mussel (*Dreissena polymorpha*) (USG 1999). The FWS (2000a) has determined that the continuation of the current operation and maintenance activities of the 2.7-m (9-ft) navigation channel in the Mississippi River for another 50 years would jeopardize the continued existence of the Higgins' eye pearlymussel. Two of the Essential Habitat Areas for the Higgins' eye pearlymussel, both located in Wisconsin, are located within the navigation channel (FWS 2000a). However, the major adverse effect would be associated with continuing upstream transport of zebra mussels by barge traffic. Currently, there are no effective ways to control established populations of zebra mussels at the scale required to eliminate their threat to the Higgins' eye pearlymussel (FWS 2003c). Reintroductions of the Higgins' eye

pearlymussel into rivers from which it has been extirpated have been conducted since 2000, but it is too early to determine the success of these reintroductions (FWS 2003c).

The presence of the Higgins' eye pearlymussel in the Essential Habitat Area downstream from the Quad Cities site suggests that the operation of Quad Cities has not adversely affected the species. Relocations of unionids (including Higgins' eye pearlymussels) were required as a condition of a FWS Biological Opinion (Ecological Specialists, Inc. 2002). The mussels were relocated from river mile 504 to approximately river mile 505, which is closer to the Quad Cities site. Walleye are annually released as part of the fish production operation at the Quad Cities site (Bowzer and Lippincott 2000). As previously mentioned, it is one of several suitable host fishes for the glochidia of the Higgins' eye pearlymussel (FWS 2003c). Thus, release of walleye may provide a small benefit to the mussels that occur downstream from the Quad Cities site. However, the Essential Habitat Area at Cordova, Illinois, and the two in Wisconsin that occur within the navigation channel have become severely infested with zebra mussels (FWS 2003c).

The Quad Cities cooling-water intake and discharge are closely monitored under the National Pollutant Discharge Elimination System (NPDES) program. NPDES permit limits are reviewed on a regular basis by state regulatory agencies to ensure the protection of aquatic biota. The heated condenser water is completely mixed with river water and meets the 2.8°C (5°F) criterion within 152-m (500 ft) downstream of the diffuser pipes (LaJeone and Monzingo 2000). Thus, thermal discharges related to the operation of Quad Cities affect a relatively small area of the Mississippi River. The required thermal mixing zone does not exceed 10.5-ha (26 ac). This is only about 0.25 percent of the area of Pool 14. Furthermore, it extends no more than 152 m (500 ft) downstream of the point of discharge. The Cordova (Illinois) Essential Habitat Area for the Higgins' eye pearlymussel is over 1.6-km (1.0 mi) downstream of the Quad Cities site and thermal mixing zone. Therefore, this mussel bed is not affected by thermal discharges from Quad Cities. Also, there are no plans to conduct refurbishment or construction at Quad Cities (Exelon 2003b).

On the basis of the minimal anticipated impacts of cooling water intake and discharge on the Higgins' eye pearlymussel or its habitat, the NRC staff concludes that continued operation of Quad Cities over the 20-year license renewal period is not likely to adversely affect the Higgins' eye pearlymussel.

2. Bald Eagle

Bald eagles visit the open water and riparian habitats on or near Quad Cities as well as the Davenport and Rock Creek transmission line corridors during winter migration, and they nest in this area in the summer. Continued operation of Quad Cities could affect bald eagles if plant operations resulted in changes to conditions in the Mississippi River that affected food availability (i.e., the availability of fish or waterfowl), or if the Rock Creek or the Davenport transmission lines presented a hazard to the eagles, or if transmission line vegetation management activities disturbed the eagles or degraded their habitats.

Discharges of heated water to the Mississippi River during plant operations result in warmer water in the outfall area. During the winter, the resulting open water may attract eagles that

would otherwise migrate further south. This additional open water increases food availability for bald eagles during the winter and represents a benefit to eagles.

On the basis of their design, location, and surrounding habitats, the Rock Creek and Davenport transmission lines are unlikely to affect the bald eagle adversely. The Rock Creek transmission line is an 8-km (5-mi) long, 345-kV line. This line runs through the industrial park just north of Quad Cities and then crosses the river into Iowa. Its corridor crosses the Mississippi River and the Savanna District of the Upper Mississippi River NWFR approximately 3-km (2 mi) north of the site (Exelon 2003b). The Rock Creek transmission line crosses only open water and riparian habitats within the Upper Mississippi River NWFR. The NRC staff expects that the owners of the transmission line, and the line maintenance contractors, will ensure all ROW maintenance activities for this transmission line that occur in the refuge will be reviewed and approved by the FWS through the Savanna District Office of the Upper Mississippi River NWFR. The remainder of this line traverses lands cultivated for row crops and pasture typical of eastern Iowa.

The Davenport transmission line is a 20.6-km (12.8-mi) long, 345-kV line. This line crosses the Mississippi River and the Upper Mississippi River NWFR immediately south of the Quad Cities site as it enters Iowa from Illinois. The portion of the Upper Mississippi River NWFR traversed by the Davenport corridor is within the PWMA. The Iowa Department of Natural Resources manages this area under a cooperative agreement with the Savanna District of the Upper Mississippi River NWFR. The portion of the Davenport corridor crossing this area is slightly more than 1.6-km (1 mi) in length. The NRC staff expects that the owners of the transmission line, and the line maintenance contractors, will ensure all ROW maintenance activities for this transmission line that occur in the refuge will be reviewed and approved by the FWS through the Savanna District Office of the Upper Mississippi River NWFR. The transmission line then crosses predominantly agricultural land with the exception of a short passage (less than 0.8-km [0.5 mi]) through dense timber and a shorter crossing through sparse timber.

In addition, many habitats along these transmission lines are not likely to be used by bald eagles because of the level of disturbance and human activities normally associated with these relatively developed and agricultural areas. These conditions substantially reduce or eliminate the probability that bald eagles would accidentally strike the transmission line and be killed or injured. The protected open water and riparian areas associated with the Upper Mississippi River NWFR and the PWMA are likely to be used by bald eagles yet represent a small percentage of the transmission line corridors.

The impacts of transmission lines on birds were analyzed in the Generic Environmental Impact Statement (GEIS) on the effects of nuclear power plant license renewal (NRC 1996). In the GEIS, the NRC concluded that mortality resulting from bird collisions with transmission lines associated with license renewal and an additional 20 years of operation would be of small significance. This conclusion was based on (1) the fact that existing literature does not indicate that collision mortality is high enough to result in population-level effects, and (2) the lack of known instances where nuclear power plant lines affect large numbers of individuals in local areas. Neither Exelon nor the NRC staff is aware of any new or significant information that would change the above evaluation of effects on the bald eagle. Exelon and its contractors are not aware of any bald eagle injuries or mortalities as a result of collisions with the lines.

No management actions for bald eagle nesting and breeding areas (e.g., those actions recommended by the Management Guidelines and Breeding Areas of the Northern States Bald Eagle Recovery Plan) have been needed along the Quad Cities transmission lines. However, it is expected that the owners of the transmission line, and the line maintenance contractors, would implement such actions upon identification of a nest. Vegetation management staff would coordinate and work closely with the FWS, the Upper Mississippi NWFR's Savanna District, the Illinois Department of Natural Resources, and the Iowa Department of Natural Resources to identify needed management actions and would implement actions needed to protect the bald eagle and its habitat. Additionally, it is expected that the transmission line owner, and its vegetation management contractors, would report any incidences of bald eagle injury or mortality along these transmission lines. No incidents have been reported because neither Exelon nor its contractors have observed any injuries or mortalities to bald eagles in the area of Quad Cities and its transmission lines (MidAmerica 2003; Exelon 2003d; Cunningham 2003; Exelon 2003b).

The NRC staff expects that the transmission line owner, and its contractors, will implement Best Management Practices for protecting the bald eagle and its habitats during vegetation management activities. The transmission line owner, and its vegetation management contractors, are expected to work with the FWS and state agencies to ensure that any maintenance operations for the transmission lines minimize any potential for adverse impacts on the bald eagle. Based on this review, the staff concludes that the continued operation of Quad Cities may affect, but is unlikely to adversely affect, the bald eagle.

Conclusion

Exelon has no plans to conduct major refurbishment or construction activities at Quad Cities for continued operations during the license renewal period. The proposed project is not a major construction activity. The proposed project is not located near designated critical habitat of any of the threatened and endangered species discussed in this assessment. Based on information concerning life history and the habitat present at the site and long the transmission ROWs, the continued operation of Quad Cities during the proposed 20-year license renewal period will have "no effect" on the western prairie fringed orchid, the eastern prairie fringed orchid, the prairie bush-clover, the Iowa Pleistocene snail, and the Indiana bat. Additionally the NRC staff has determined that continued operation during the proposed renewal period "may affect", but is "not likely to adversely affect", the Higgins' eye pearlymussel or the bald eagle.

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