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General Comment

Comments and Recommendations on the Draft Environmental Impact Statement (DEIS) for NRC, Generic-License Renewal of Nuclear Plans Regarding Sequoyah Nuclear Plan, Units 1 and 2, TN

Attachments

Sequoyah Nuclear Plant Units 1 and 2 - ER 14-0522

United States Department of the Interior

OFFICE OF THE SECRETARY

Office of Environmental Policy and Compliance
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ER 14/0522
9043.1

September 26, 2014

Cindy Bladey
Office of Administration
Mail Stop: 3WFN-06-A44M
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Comments and Recommendations on the Draft Environmental Impact Statement (DEIS) for NRC, Generic-License Renewal of Nuclear Plans Regarding Sequoyah Nuclear Plan, Units 1 and 2, TN

Dear Ms. Bladey:

The United States Department of the Interior has reviewed the Draft Environmental Impact Statement (DEIS) and believes the DEIS is well written. We provide these comments with the hope of improving the DEIS prepared by the Nuclear Regulatory Commission (NRC) regarding a General-License Renewal for Sequoyah Nuclear Plant (SQN), Units 1 and 2.

General Comments

We find a "no effect" determination isn't well supported. The action area defined by NRC is less than what has been demonstrated by TVA in the past. The DEIS also overlooked several mussel records which may have contributed to the "no effect" determination. Additionally, the dispersal capacity of fish which regularly host mussel glochidia was understated. The DEIS also did not evaluate mortality of fish at cooling water intakes in the context of those fishes' role as important glochidial host species for listed freshwater mussels. Within the data tables provided by NRC in this DEIS, we further found evidence of impacts to the aquatic community of Chickamauga Reservoir from operations at SQN which were not identified in the DEIS or effects determination. Lastly, the DEIS does not address system-wide effects on listed species; particularly of TVA moving water through multiple dams and reservoirs within the Tennessee River system for the purpose of regulating the discharge of thermal pollution at SQN.

Specific Comments

Action Area
Specifically, the action area defined for aquatic species in the DEIS, "from the point of river water intake at the site (at Tennessee River Mile (TRM 485.1) and extending 4.1 mi (6.6 km) downstream to TRM 481.0," is smaller than the effect of heated plumes modeled by TVA. Particularly, while applying for modification of NPDES permits to allow for an increase in river temperature rise from upstream to downstream of the plant and an increase in the rate of change of river temperature downstream of the plant for 1996, TVA reported ΔT correlated with dT_d /dt, and that the latter affected a downstream river distance of 5.5 miles at the previous dT_d /dt limit of 2.0°C/hour (TVA 1996). This is greater than the 4.1 miles downstream identified as the action area in the DEIS. Since then ΔT and dT_d /dt has been raised from 3.0°C to 5.0°C and from 2.0°C/hour to 5.0°C/hour, respectively. This latter action has likely increased the downstream reach of the Tennessee River affected through discharges from SQN. We recommend NRC expand the action area to reflect full spatial extent of aquatic species response to actions at SQN.

Species Records

Table 3-20 and the text of the DEIS omits records of dromedary pearlymussel and pink mucket downstream of SQN in Nickajack Reservoir and the successful relocation of orangefoot pimpleback, pink mucket, and rough pigtoe to Nickajack Reservoir below Chickamauga Dam in 2004 and 2005. Inclusion of these records reduces the distance host fish would have to travel carrying glochidia of these species from the 133 river mi (214 river km) estimated in the DEIS to as few as 15 river mi (24 river ki) for dromedary pearlymussel and less than 1 mile (1.6 river km) for pink mucket, rough pigtoe, and orange-foot pimpleback. Additionally, the DEIS concluded fish migration of 133 mi (214 km) was unlikely, though species such as sauger (*Sander canadensis*) has been known to regularly migrate 350 km within a single season (Jaeger et al. 2005).

Host Fish Dispersal

The DEIS also does not consider the effect of operations at SQN on several fish species in the context of their role as glochidial fish hosts for listed mussels. For example, laboratory studies have confirmed that four of nineteen fish tested are suitable hosts for the pink mucket. These include the largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), smallmouth bass *(Micropterus dolomieu*), and walleye (*Stizostedion vitreum*) (Barnhart 1997). Other reported glochidial fish host species include the sauger (*Stizostedion canadense*) and the freshwater drum (*Aplodinotus grunniens*) (USFWS 1985). These include the largemouth bass (*Micropterus salmoides*), spotted bass (*Micropterus punctulatus*), smallmouth bass (*Micropterus dolomieu*), and walleye (*Stizostedion vitreum*) (Barnhart 1997). Other reported glochidial fish host species include the sauger (*S. canadense*) and the freshwater drum (*Aplodinotus grunniens*).

Recent studies have identified the fantail darter (*Etheostoma flabellare*) as a glochidial host for the dromedary pearlymussel. Laboratory studies also identified the following potential host

species: the banded darter (*Etheostoma zonale*), tangerine darter (*Percina aurantiaca*), logperch (*Percina caprodes*), and gilt darter (*Percina evides*) (Watson and Neves 1998). Jones and Neves (2001) recently confirmed the suitability of the banded darter, tangerine darter, and logperch and identified the following additional glochidial host species: black sculpin (*Cottus baileyi*), greenside darter (*Etheostoma blennioides*), snubnose darter (*Etheostoma simoterum*), blotchside logperch (*Percina burtoni*), channel darter (*Percina copelandi*), and Roanoke darter (*Percina roanoka*).

Specific glochidial hosts for orangefoot pimpleback and rough pigtoe are not known (ECOS 2014).

Broadly, the DEIS acknowledges several fish species which serve as important glochidial hosts for listed mussels avoid or are otherwise adversely affected by the thermal plume created by the discharge of heated effluents from SQN. We recommend NRC consider the impact of the thermal plume on fish species with emphasis on their role as glochidial hosts for endangered mussels.

Impingement Mortality of Host Fish

Furthermore, the DEIS estimates 40,362 fish are impinged on cooling water intakes, annually. Loss of potential glochidal host species of this magnitude could significantly endangered mussels. We recommend NRC consider the impact of glochidal host mortality via impingement when considering the effect of this action on endangered mussel species.

Community Response

Operations at SQN may have already affected aquatic communities of the Tennessee River, and if so, will likely continue to do so after re-licensing. Data from the DEIS (Table 3-14. Percent of Fish in Each Trophic Group by Season and Location in 2011) indicates Benthic Invertivores are more abundant upstream than downstream of SQN. This corresponds with an interesting pattern observed in the community structure of mussels in Chickamauga Reservoir upstream and downstream of SQN. Analysis of data provided in Table 3-9 (Average Mean Density per Square Meter of Benthic Taxa Collected at Downstream and Upstream Sites near SQN) find the density and diversity of mussels upstream versus downstream of SQN is not significantly different, but richness and community composition is.

Specifically, mussels of Order Sphaeriidae dominate the mussel community upstream of SQN (64% of mussels observed upstream). Sphaeriidae are native to the Tennessee River, and it is possibly for this reason benthic invertivores are more abundant in this part of the reservoir. Meanwhile mussels of Order Corbiculidae, introduced to the Tennessee River system in the early 20th century from Asia, dominate the mussel community downstream of SQN (68% of mussels observed downstream) where benthic invertivores are less abundant. The dominance of a non-native mussel taxa in the downstream mussel community may explain the lessor abundance of benthic invertivores in this part of the reservoir. Relatedly, Unionidae, native to the Tennessee River system, comprises 2% of the upstream community but was not detected in the community immediately downstream of SQN during recent surveys.

Unionidae includes listed endangered species dromedary pearlymussel (*Dromus dromas*), pink mucket (*Lampsilis abrupta*) orangefoot pimpleback (*Plethobasus cooperianus*), and rough pigtoe (*Pleurobema plenum*). Historically, dromedary pearlymussel has only been observed upstream of SQN. Prior to construction of SQN pink mucket was observed downstream in 1963 but all subsequent observations of this species since the construction of SQN have occurred upstream of plant. However, there are records of dromedary pearlymussel which may still be affected by this action within an expanded action area that includes the tailwater of Chickamauga Dam and Nickajack Reservoir. The presence of native mussel species, including listed endangered species, otherwise exclusively upstream of SQN, is cause for concern and indicates SQN may be partially responsible for loss of endemic mussel taxa downstream.

There is also significant reduction of Diptera Chironomidae (midges) density downstream of SQN relative to the upstream reference sites (One-Way ANOVA, $p = 0.022$, Rsq(adj) = 31.07%; data obtained from Table 3-9 (Average Mean Density per Square Meter of Benthic Taxa Collected at Downstream and Upstream Sites near SQN) of the DEIS). Diptera Chironomidae are sensitive to pollution, generally, and their lesser relative representation at sites downstream of SQN versus sites upstream of SQN is cause for additional concern. Impacts to midges and other aquatic insects and benthic macroinvertebrates could result in further impacts to listed mussels through the disruption of the food chain utilized by fish which serve as important glochidial hosts for listed mussel species.

System-Wide Effects

TVA often moves water through multiple dams and reservoirs to regulate the temperature of heated effluents in accordance with its National Pollutant Discharge Elimination System (NPDES) permits. SQN utilizes approximately 8% of the water of Chickamauga Resevoir for cooling operations. The intake temperature of this water, important to this action, is maintained by a complex, well-orchestrated movement of water through the Tennessee River system via scheduled releases from multiple dams and reservoirs. Water releases or withholdings undertaken by TVA at various dams throughout the Tennessee River system for the purpose of regulating or disbursing heated water discharged from SQN should also be considered a part of the action; especially so if those actions would not be taken "but for" the need to provide water to SQN or to dilute and distribute heated waters discharged from it. A good example of a species which could be affected by the system-wide movement of water through the Tennessee River for the purpose of regulating thermal discharges at SQN is Anthony's riversnail (*Athearnia anthonyi*), located below Nickajack Dam where the species is regularly impacted by the discharge of waters from the reservoir (USFWS, 2011).

Summary and Conclusion

In summary we recommend NRC revise the DEIS to include a more defensible reasoning for its effects determination, or to amend its effects determination of "no effect" to listed species, if appropriate, using the best scientific information available. The action area for the thermal plume needs to be revised to include all of the upstream and downstream reaches where species may still respond to it. We also believe the revision of the DEIS should address the potential loss of

glochidial host fish to impingement at the cooling water intake and/or through avoidance of heated plumes within the reservoir. Changes in aquatic community structure, composition, and functionality should be acknowledged and be used to inform the current effects determination. Lastly, we recommend NRC take a systemic view of the effect of this action and look at the full range of actions necessary to operate SQN and evaluate the impact of each on federally protected species.

Thank you for the opportunity to review this DEIS. If you have any questions or comments, please contact Kenneth McDonald on (931) 525-4990 or via email at *kenneth_mcdonald@fws.gov*. I can be reached on (404) 331-4524 or via email at joyce_stanley@ios.doi.gov.

Sincerely,

Joyce Stanley, MPA
Regional Environmental Protection Specialist

cc:
Christine Willis – FWS
Gary Lecain - USGS
Anita Barnett – NPS
Chester McGhee – BIA
Gary Taylor – BLM
OEPC – WASH

RESOURCES

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