Attachment F –Dillsboro Dam Removal EA Executive Summary

EXECUTIVE SUMMARY

Duke Power, division of Duke Energy Corporation (Duke), has prepared this combined draft Environmental Assessment (EA) and Biological Assessment (BA) in accordance with the procedures for implementation of the National Environmental Policy Act (NEPA) through the U.S. Fish and Wildlife Service (USFWS) as stated by the Council of Environmental Quality (USFWS undated). The purpose of this EA is to disclose, identify, evaluate, and determine the actions that may be taken by Duke, the supporting federal and state agencies, and other stakeholders in determining the future of the existing Dillsboro Dam. The assessment describes and evaluates alternatives to the proposed course of action. Duke will use the results of this assessment as an objective decision-making tool in addressing the future of the Dillsboro Dam and Powerhouse.

In association with this EA is a companion Biological Assessment (BA) to determine what effect the above mentioned actions may have on the federally listed Appalachian elktoe mussel (*Alasmidonta raveneliana*). This biological assessment is prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (16 U.S.C 1536 (c), and follows the procedures established through the USFWS's NEPA guidance and ESA guidance.

The Dillsboro Project is located on the Tuckasegee River near the Town of Dillsboro in Jackson County, North Carolina. Duke operates this hydroelectric project under a license from the Federal Energy Regulatory Commission (FERC) (FERC Project No. 2602). This existing license expires in 2006, and the process of obtaining a subsequent license officially began in 2000 with Duke's release of the First Stage Consultation Document.

The Tuckasegee Cooperative Stakeholder Teams (TCST) Settlement Agreement (Agreement), which will be signed by the authorized members in late October 2003, includes a Multi-Project Resource Enhancement measure of the potential removal of Dillsboro Dam and Powerhouse. As stated in the Agreement "…the Parties acknowledge that Duke Power worked with the USFWS, North Carolina Division of Water Resources (NCDWR), North Carolina Division of Water Quality (NCDWQ), North Carolina Wildlife Resources Commission (NCWRC), the North Carolina State Historic Preservation Office (NCSHPO) and the Eastern Band of Cherokee Indians (EBCI) and complete(d) the necessary environmental, cultural resource, and engineering assessments regarding the removal of Dillsboro Dam and potentially the Dillsboro Powerhouse. These assessments evaluate(d) the potential effects of dam removal on aquatic species;

determined the extent of any cultural resources impacts, and considered the options of removing the powerhouse." Therefore the need for taking action on this Project is directed towards providing and satisfying the important resource enhancement initiative that will mitigate for the various impacts of the Duke Power hydro projects, as described in the Agreement. The removal of Dillsboro Dam would provide mitigation for fish passage and instream flow relief on the other Nantahala projects.

Based on progress in association with the above-mentioned Settlement Agreement, an initial scoping meeting was conducted in which the preliminary details and proposed outline of the EA/BA were described to the TCST stakeholders. Representatives attending this initial scoping meeting included:

- USFWS;
- Natural Resources Conservation Service (NRCS);
- U.S. Forest Service;
- EBCI;
- NCWRC;
- NCDWR;
- NCDWQ;
- Duke Power

In addition to this and several other issue update meetings, consultation letters (request for information) were sent to the above stakeholders and several local governments (e.g., Town of Dillsboro). Responses from these stakeholders, as well as the verbal comments from the scoping and update meetings were used to develop this document and address the major issues.

Based on both internal discussions and stakeholder discussions and the nature of the Project, several issues were identified that will require detailed evaluation and are important in the decision-making analysis in comparison of the alternatives. These issues are as follows:

Sediment Quantity and Quality

The stakeholders have identified that sediment accumulation in the Dillsboro Project is an area of concern. Discussions and analysis concerning this issue focus on the estimated quantity of existing sediment affected by the alternatives; quality (i.e., contamination) and

mobilization/transport of any existing contaminated sediments; potential downstream sediment transport and distribution associated with the alternatives and any impacts; and any sediment management techniques to be employed with the alternatives.

Aquatic Life

The stakeholders also identified that the alternatives may affect the abundance, types, and movement/passage of aquatic life both upstream and downstream of the existing dam. EA discussion and analysis addresses the existing conditions associated with the fishery and macroinvertebrate resources and the potential effects to them from each of the alternatives.

Rare, Threatened, and Endangered (RTE) Species

The scoping process for this Project and subsequent field studies has identified two RTE mussel species and their critical habitat immediately downstream of the Dillsboro Dam. These species include the Appalachian elktoe (federal and state endangered) and the wavy-rayed lampmussel (*Lampsilis fasciola*) (NC Species of Concern). Two fish species, the wounded darter (*Etheostoma vulneratum*) and the olive darter (*Percina squamata*), both NC Species of Concern, are found immediately downstream of the Project. The only other RTE species found within the Project is the aquatic Eastern hellbender (federal and NC Species of Concern). This EA is required to address the effects of the alternatives on these species and also discuss the protection measures to be potentially implemented. The companion BA addresses the impacts to the federally listed Appalachian elktoe.

Wildlife

Several hundred little brown bats (*Myotis lucifugus*) are known to exist in the Dillsboro Powerhouse. The USFWS recommended that protection measures (e.g., bat box installation) might potentially be needed if the powerhouse removal or refurbishment alternative is selected. This EA will address the effects of the alternatives on these species and also discuss the protection measures to be potentially implemented.

Cultural Resources

The EBCI identified that the Project alternatives and any subsequent drawdown exposure may affect previously unknown cultural resources. Moreover, the NCSHPO is currently reviewing the status of the Dillsboro Powerhouse in relation to the National Register of Historic Places. This

assessment will address the effects of the alternatives on these cultural resources and also discuss the protection measures to be potentially implemented.

Other Resource Issues

Several other issues are also included in the discussion and analysis of this assessment (e.g., recreation and aesthetics). Although they do not require extensive discussions in this section, they have been factored into the cost/benefit analysis associated with this Project.

Alternatives Associated with the Dillsboro Dam

The alternatives considered in this EA/BA for the Dillsboro Dam are limited to No Action, Partial Removal, and Full Removal. In association with the future of the Dillsboro Powerhouse, the alternatives include No Action, Closure, and Full Removal.

Alternative A (No Action) has been established as a benchmark against which the proposed action of the Dillsboro Dam may be compared and evaluated from a current baseline.

Alternative A is associated with No Action or continued operation of the Project. This alternative would essentially keep the Project and the dam in the present state of operation. This Project generates a relatively small amount of electricity (918,000 kWh per year) and will continue to do so under this alternative. The dam, as described below, will remain intact and in place and will continue forming the Dillsboro Reservoir.

The Dillsboro Dam is a concrete masonry structure (cyclopean dam) that is approximately 310 feet in length and 12 feet high. Duke will continue to serve the same loads and service areas that they now serve. They will continue to retain the benefits of low-cost hydroelectric generation for the customers in the Nantahala service area.

With this No Action alternative, there would be no new major construction activities and the current operations would continue through the existing and any future license articles and conditions. Selection of this alternative would result in no change in the current environmental conditions associated with the Project. As stated in the Final FERC license application associated with the Project, the Project has no discernable effects on temperature or dissolved oxygen and is in compliance and in support of all other applicable water quality standards and designated uses.

The Dillsboro Project has acted as a sediment sink since completion of the dam, although it is now in a steady state since the reservoir has filled with sediment. Currently, an estimated 100,000 cubic yards of sediment is located upstream of the dam and consists of particles that are generally less than 10 mm in size. Thickness of the deposits is estimated to be up to 12 feet near the dam and decreases to zero at the upstream end (i.e., 0.8 miles upstream of the dam). If the No Action alternative is pursued, existing sediment conditions of storage and transport will continue. The storage and transport of sediment within and below the reservoir is assumed to be in equilibrium with current conditions and will likely not change.

Based on recent fish sampling surveys (Duke 2003), there is some indication that the presence of the dam may be a factor in the limited distribution or missing components of the fish fauna upstream of the Project (e.g., darters). Although some of these species may be reduced due to geographic, gradient or other habitat parameters, the most obvious change in species composition may be due to the restrictions of upstream movements due to the dam. There is a population of listed Appalachian elktoe mussels immediately downstream and upstream of the Project. This mussel population would continue to exist in its current state.

The NCSHPO has stated that there are no known archaeological sites located within the floodpool or shoreline of the Project or likely to be found there. The adoption of this alternative would result in no change in the floodpool elevations and shoreline areas within the Project boundaries.

There are currently no developed recreation facilities such as boat launches or campsites within the Project boundaries. Although the Town of Dillsboro maintains two primary access areas on either side of the Tuckasegee River downstream of the Project, use of the Project impoundment and immediate tailrace for recreation is limited (i.e., fishing and boating). Although the existing Project does provide very limited reservoir recreation such as fishing and boating, it will continue to provide a barrier to free-flowing river types of recreation. There are no ongoing effects of current Project operation on land use, aesthetics or socioeconomic resources.

Alternative B (Partial Removal) is associated with the partial removal or breeching of the existing Dillsboro Dam. With this alternative, the Project would cease to operate and no longer generate electricity for Duke Power. For this alternative, the dam is to be removed to the riverbed over a 120 ft. width at the center to right side of the dam, to pass the low to normal river flow

(looking downstream). The remainder of dam is removed to approximately 4 to 5 ft. height, and is left in place. High river flows will pass over this section.

The river will be restored to its assumed pre-dam depth over the 120 ft. width. Removal will be accomplished by use of hydraulic equipment to remove the dam in accordance with a staged demolition plan. An excavator with a hoe-ram attachment will demolish the dam, with an excavator and track loader used to relocate sediment and remove rubble. During the demolition process, river flow will be, at various times and sometimes in combination, diverted through the powerhouse, passed through a notch in the dam, and/or passed over the partially demolished crest. The partial removal plan can be implemented at an estimated cost of $260,000. Work will be completed by late March to early April to avoid the primary fishing and boating periods.

At each stage of the demolition plan, sediment will be mobilized and transported to the river below the dam. River flow will spread out and slow down after passing through the dam. As this occurs, sediment will be deposited in the riverbed just below the dam and will be transported downstream with the generated flows. A high flow event of approximately 850 cfs or greater is required in order to flush this sediment downstream. Therefore, it will be necessary for upstream dam operators (Duke Power Hydro Central) to release these flows at each stage of demolition to accomplish this flushing of sediment below the dam.

The river will flow through a relatively narrow channel within the existing sediment deposits during the dam demolition process and shortly thereafter. It is anticipated that within a year or less after completion of dam demolition, the river will return to its pre-dam bank-to-bank width and depth.

This action would provide the benefit of resource enhancement and would at least partially mitigate for the various impacts of the Dillsboro Dam and other Duke Power Tuckasegee River hydro projects. Although the Project currently has little effect on water quality parameters and is in compliance with the state standards, certain parameters such as dissolved oxygen and temperature may slightly improve due to the reduction in impounded waters. Total suspended solids (TSS) would, during the relatively short-term demolition period, increase. Furthermore, with this alternative the Project will change from a sediment sink to a partial downstream sediment source. A large portion of the existing accumulations of sediment would now be transported downstream in pulses based on the generated flows.

Partial removal would also at least enhance the current aquatic resource distribution and species richness of the upstream areas through limited upstream and downstream passage. The partial removal of the dam would allow partial access to aquatic resources to an additional 9.5 miles of river. The existing downstream endangered mussel population will be adversely affected by increased sediment accumulation, subsequent changes in preferred substrate, and changes in flow dynamics and will require mitigative measures (i.e., removal and relocation).

The adoption of this alternative may result in the exposure of archaeological resources due to the lowering of the floodpool elevation and the subsequent exposure of littoral areas. The partial removal of the dam could also provide almost a mile of additional riverine angling opportunity for native fish and the delayed harvest managed trout fishery. The already limited reservoir boating will be diminished; however, there would be increased opportunity for whitewater boating and canoeing without the need of a portage around the dam.

There will be no changes in the existing land use although additional shoreline exposure would benefit the riparian corridor through the formation of new wetlands and terrestrial buffers. Aesthetic values of the Project would remain (i.e., water falling over the dam), however, it will be diminished by the view of the partially removed dam structure remaining in the river. It is assumed that socioeconomic values could increase slightly in association with the increased opportunity for whitewater boating and riverine angling.

Alternative C (Full Removal) is associated with the full removal to grade of the existing Dillsboro Dam. With this alternative, the Project would cease to operate and no longer generate electricity for Duke Power. For this option, the dam is to be removed to the original riverbed over its full width. The river will be returned to its assumed pre-dam bank-to-bank width and depth. Removal will be accomplished by use of hydraulic equipment to remove the dam in accordance with a staged demolition plan. An excavator with a hoe-ram attachment will demolish the dam, with an excavator and track loader used to relocate sediment, and if necessary, remove rubble. During the demolition process, river flow will be, at various times and sometimes in combination, diverted through the powerhouse, passed through a notch in the dam, and/or passed over the partially demolished crest.

The dam demolition project should commence in late January in order to perform the work during the lower flow period. Work will be completed by late March to early April to avoid the primary fishing and boating periods. The full removal plan can be implemented at an estimated cost of $290,000.

At each stage of the demolition plan, sediment will be mobilized and transported to the river below the dam. River flow will spread out and slow down after passing through the dam. As this occurs, sediment will be deposited in the riverbed just below the dam and will be transported downstream with the generated flows. A high flow event of approximately 850 cfs or greater is required in order to flush this sediment downstream. Therefore, it will be necessary for upstream dam operators (Duke Power Hydro Central) to release these flows at each stage of demolition to accomplish this flushing of sediment below the dam.

This action would provide the full benefit of resource enhancement and would mitigate for the various impacts of the Dillsboro Dam and other Duke Power hydro projects. Although the Project currently has little effect on water quality parameters and is in compliance with the state standards, certain parameters such as dissolved oxygen and temperature may slightly improve due to the reduction in impounded waters. Total suspended solids (TSS) would, during the relatively short-term demolition period, increase. Furthermore, with this alternative the Project will change from a sediment sink to a downstream sediment source. Through staged or phased removal over a specific period, all or most of the existing accumulations of sediment would be transported downstream.

Full removal would enhance the current aquatic resource distribution and species richness of the upstream areas through complete upstream and downstream passage. The removal of the dam would allow full access to aquatic resources of 9.5 miles of additional river. The existing downstream endangered mussel population will be adversely affected by increased sediment accumulation, subsequent changes in preferred substrate, and changes in flow dynamics and will require mitigative measures (i.e., removal and relocation).

The adoption of this alternative may result in the exposure of archaeological resources due to the lowering of the floodpool elevation and the subsequent exposure of littoral areas. The removal of the dam could also provide almost a mile of additional riverine angling opportunity for native fish and the delayed harvest managed trout fishery. The riverine stretch will now be unsuitable for

reservoir boating, however, there would be increased opportunity for whitewater boating and canoeing without the need of a portage around the dam.

Natural aesthetic values of the Project would be enhanced by the view of the free flowing stretch of river. It is assumed that socioeconomic values would increase slightly in association with the increased opportunity for whitewater boating and riverine angling.

There will be no changes in the existing land use although additional shoreline exposure would benefit the riparian corridor through the formation of new wetlands and terrestrial buffers.

Alternatives Associated with the Dillsboro Powerhouse

Alternative A (No Action) has been established as a benchmark against which the proposed action of the Dillsboro Powerhouse may be compared and evaluated from a current baseline. This alternative is associated with No Action or continued operation of the Project. This alternative would essentially keep the Project and the associated powerhouse in the present state of operation. This project generates a relatively small amount of electricity (918,000 kWh per year) and will continue to do so under this alternative. The powerhouse, as described below, will remain intact and in place and will continue generating energy through use of the Dillsboro Reservoir.

With this No Action alternative, there would be no new major construction activities and the current operations and maintenance would continue through the existing and any future license articles and conditions.

Based on an environmental site assessment of the powerhouse in 2002, no major potential sources of environmental contamination were identified. There are minor concerns associated with lead-based paint on the structure and asbestos on the generator/turbine wiring. Although a minor concern, the level of potential risk was deemed low with no action recommended during continued operation.

Based on cultural resource surveys conducted by Duke Power, the Project lacks sufficient integrity to meet National Register of Historic Places (NRHP) criteria. Although the original powerhouse and dam were built in 1913, both were extensively modified in 1958. Due to extent of these

alterations, Duke believes that neither the powerhouse nor dam meets NRHP requirements. However, the NCSHPO is currently reviewing the status of the Dillsboro Powerhouse in relation to the NRHP. Preliminary information from the NCSHPO suggests that the powerhouse may be important in the context of the history of electric power development in the Nantahala area.

With **Alternative B (Closure),** the powerhouse is to be left in place with the most likely option of very limited public access. The entrance of the structure would be locked and a kiosk would be established that describes the history of the Project and powerhouse and its past importance to the Nantahala area. With this alternative, the Project would cease to operate and no longer generate electricity for Duke Power.

Potentially hazardous items (e.g., lead paint, asbestos) and oil and lubricants are to be removed prior to closure. NCSHPO suggests that the powerhouse may be important in the context of the history of electric power development in the Nantahala area. Duke will conduct further discussions with the NCSHPO to resolve this issue.

The estimated 500 little brown bats would still use the powerhouse as roosting habitat. No other principal environmental effects are associated with closure of the powerhouse.

The powerhouse closure plan can be implemented at an estimated cost of $3,000.

With **Alternative C (Demolition)**, the powerhouse is to be completely demolished down to the foundation. With this alternative, the Project would cease to operate and no longer generate electricity for Duke Power. Potentially hazardous items (e.g., lead paint, asbestos) and oil and lubricants are to be removed prior to commencing the demolition work. Equipment is assumed to have no salvage value to the Owner. The superstructure is to be demolished and removed from site. The concrete substructure walls and floors are to be demolished and removed from site. Concrete that has been placed against the rock foundation will be left in place. At completion of demolition, the pits and holes will be filled to a degree that there will be no safety hazards left on site. It is assumed that rubble from the dam removal and sediment will be used as fill material. The final surface will be armored and/or vegetated to remain stable during high water events. The powerhouse demolition plan can be implemented at an estimated cost of $200,000.

The NCSHPO is currently reviewing the status of the Dillsboro Powerhouse in relation to the NRHP. NCSHPO suggests that the powerhouse may be important in the context of the history of electric power development in the Nantahala area. Duke will conduct further discussions with the NCSHPO to resolve this issue.

With the demolition of the powerhouse, the estimated 500 little brown bats would lose there roosting habitat. A mitigation plan will be developed that incorporates measures to benefit the bat population. No other principal environmental effects are associated with removal of the powerhouse.

Decision Analysis

A risk analysis was used in association with the Dillsboro Dam to objectively quantify and analyze the factors and opinions that influence the importance, consequences, degree of uncertainty and the cost/benefit outcome of the project.

In association with the cost analysis, the normalization of all the criteria including both the total cost factors and intrinsic values showed that the partial removal alternative is the most costly (value of 0.747) followed by the full dam removal alternative (value of 0.585).

In association with the benefit analysis, the normalization of all the criteria including both the total benefit factors and intrinsic values (e.g. restored fisheries, additional whitewater boating opportunities), showed that the full dam removal alternative is the most beneficial alternative (value of 0.676) followed by the partial dam removal alternative (value of 0.559).

Thus in review of the project decision results below, the Full Dam Removal alternative has the best overall benefit/cost ratio (i.e., highest ratio) and is the Preferred Alternative for future action. The overall Preferred Alternative package would be to pursue the Full Dam Removal. Due to the cost factors associated with the demolition of the powerhouse, the Closure of the Powerhouse is the most cost effective alternative at this time.

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	COST	BENEFIT	BENEFIT/COST
NO ACTION	0.491	0.433	0.882
PARTIAL DAM REMOVAL	0.747	0.559	0.748
FULL DAM REMOVAL	0.585	0.676	**1.155**