

Pacific Northwest National Laboratory

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December 12, 2006

Ms. Elinor Cunningham
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
11555 Rockville Pike, Mail Stop 12 E5
Rockville, MD 20852

Dear Ms. Cunningham:

Subject: Vogtle Early Site Permit Alternative Sites Trip Report (JCN J-3329)

PNNL has completed a summary of the trip conducted November 6 through 9 to examine the three proposed alternative sites in Southern Nuclear Operating Company's application for an Early Site Permit (ESP) at the Vogtle Site. The purposes of this trip included: 1) discussions with the applicant concerning alternative sites as described in the ESP application, 2) tour the sites and surrounding areas, 3) collect initial information that may be useful in determining if any of the alternative sites is environmentally preferable or obviously superior to the proposed ESP site at Vogtle..

Please see the enclosed hard copy of this report. An electronic copy has been transmitted directly to the Environmental Program Manager, Mr. Mark Notich.

Please contact me at 509-376-2554 (email: michael.sackschewsky@pnl.gov) or Mr. Van Ramsdell (509-372-6313, van.ramsdell@pnl.gov) if you have any questions or comments.

Sincerely,



Michael R. Sackschewsky
Ecology Group
Pacific Northwest National Laboratory
P.O. Box 999 MSIN K6-85
Richland, WA 99352

cc: Van Ramsdell, PNNL, K3-55
Mark Notich, NRC O11 F1

902 Battelle Boulevard • P.O. Box 999 • Richland, WA 99352

**Vogtle ESP Alternative Sites Review
Trip Report
November 6-9, 2006**

Hatch Nuclear Plant – November 6, 2006

Appling County, Georgia

Attendance

NRC: Mark Notich (EPM)
Richard Raione (hydrology)
Nancy Kuntzleman (ecology)

PNNL: Mike Sackschewsky (lab team lead)
Chris Cook (hydrology)
Darby Stapp (cultural)
Paul Hendrickson (land use/alternatives)
Becky Krieg (aquatic)

Southern Nuclear Operating Company (SNC):
Tom Moorer - (Vogtle ESP Environmental Manager)-
Mike Nichols – GA Power, Ecology Lab - Smyrna, GA
Violet Coleman – Chemistry supervisor
Byron Feimster – site environmental specialist from Hatch area
Anne Lovell – Tetra Tech – socioeconomics – Alternate site analysis

Initial discussions focused on the overall site selection process used to identify potential sites, and why Plant Vogtle was selected as the site to move forward with.

Process for alternate site selection

The region of interest for SNC was Georgia, Alabama, Mississippi, and the panhandle of Florida, but they also looked at South Carolina, Tennessee, and parts of Kentucky because this is their new marketing area.

There was a site selection process – but SNC did not provide any written procedures they used. No special studies were performed for the alternative sites. Tom Moorer said they spent time with Tetra Tech and Bechtel looking at representative sites. He also made a matrix with each of the items in NUREG-1555 and ranked the sites.

Other criteria - SNC screened out areas they didn't own because SNC already owns a number of sites suitable for energy development and they wanted a regulated plant not a merchant plant so that limited the area they could be in. These criteria precluded them from the Savannah River site because SRS is outside their service area. They did not include existing fossil sites because none had adequate space available for a nuclear plant. However, they looked at Cherokee (SC)- (Duke and SNC partnership option) and Bellefonte – TVA owned.

SNC is involved in partnerships for these sites.

The process initially identified 14 potential new reactor sites within SNC's domain.

They chose existing nuclear sites - Plant Hatch and Plant Farley, and included the Barton greenfield site ("because they didn't have a 3rd existing site"). Alabama Power purchased the Barton site in the '60s with the intent of developing it as a 4 Unit nuclear site, they wrote a PSAR and started an Environmental Report, but the plans were dropped in the 1970's.

SNC determined that all four of the sites are suitable for new units, but when all things were considered, Plant Vogtle was the clear favorite because of the amount of land available at the site, water availability, access to the transmission grid, proximity to the area with the most anticipated growth (Atlanta), navigation, and overall infrastructure.

Plant Hatch - concern was water availability – influenced by drought more than Vogtle site. The Altamaha River is rather shallow – also land, seismic, and transmission line concerns.

Plant Farley – is water challenged because of an inter-state water rights issues. It has transmission line issues and there are limited options onsite for placement of the new units.

Barton Site – would require the greatest amount of site preparation and infrastructure development.

Upon completion of the discussion of the general site selection process the group toured Plant Hatch, with stops near the existing intake and discharge structures, the recreation area, the old Dean's Landing site, the existing cooling towers, and the wetland / swamp area on the eastern edge of the site. The tour ended at approximately 4 pm.

Plant Hatch Site Considerations

The Plant Hatch site covers approximately 2240 acres, of which 900 acres are maintained as wildlife habitat on the north side of the Altamaha River in Toombs, County, GA. All site structures and facilities are on the south side of the river in Appling County, GA. There are currently two GE Mark 1 BWR's on site with a combined output of 1848 MWe. The reactors are cooled via mechanical draft towers with make up water from the Altamaha River. Units 1 and 2 started operation in 1974 and 1978 respectively.

Cultural Resources

There is a small family cemetery near the recreation complex, known as the Bell Cemetery. There are several monuments, one large, within a fenced area. J. A. Bell was born in 1857 and died in 1911. Mrs. J. A. Bell was born in 1855 and died in 1910. There should be home sites near by, but no one seemed to know about them. There are no known major issues concerning cultural resources at the Hatch Site, but surveys would need to be done.

The review team also visited an uninhabited structure at Dean's Landing off old Highway 1 (probably 1950s era). There are reportedly old house foundations along the ridge from here.

Transmission lines

SNC would try to use existing corridors at the alternate sites – but they did not determine the details for the new lines at Hatch or the other alternate sites. SNC assumed that a new line would head toward the major future load center of Atlanta. SNC estimated the number of transmission lines that would be needed by determining what would be needed at Vogtle and then applying that assumption to the other two existing sites. Plant Vogtle needed one more 500 kV line. So it was a reasonable assumption that one additional 500-kV line was needed for Plant Hatch or Plant Farley.

Plant Hatch currently has four 500-kV lines and two 230-kV lines, and Farley has two 500- kV lines and four 230-kV lines.

The Barton Site is weak on existing transmission capability. There is a hydro-plant within about 12 miles north with a small substation, but the 110 kV lines couldn't handle the load.

Hydrology

The Altamaha River was navigable to the Hatch Site in the early 1970's – but the USACE hasn't maintained the river. SNC has a maintenance dredging permit. SNC also had a permit to build the weir to raise the level of water near the plant. They started this in the 1980s but did not complete it; it has since expired. Savannah River Army Corps office contact is David Crosby.

SNC indicated that "It would be a pretty heroic effort to get barges up here" It would be a problem – probably the most difficult thing about the Hatch site, although there is a barge slip at the site. In order to construct the new reactors, the barge slip and heavy haul road would need to be repaired and/or replaced. Otherwise large components would be brought in by rail.

The ultimate heat sink for the existing units is the Altamaha River. Cooling water is cycled through mechanical draft cooling towers. The intake at Hatch is on the shoreline, with velocities higher than at Plant Vogtle or Plant Farley. Average intake velocities are 0.7 to 1.0 ft/s.

Groundwater is used at the site to provide potable, make-up demineralized water, and fire protection. The Altamaha River is not used because of the high silt load in the river water.

Ecology

Altamaha spiny mussel – Federal candidate, lives in sand bars – was added to the list of federal candidate species after the Plant Hatch license renewal actions were completed. DNR has done some recent surveys. SNC suggested that NRC talk to Brett Albanese. 770 918-6411. brett_albanese@dnr.dstate.ga.us.

Plant Hatch is a Wildlife Habitat Council certified wildlife site. Coordinated with GA Southern University. Wildlife Habitat Council is a non-profit group of corporations and environmental groups that helps large land owners manage their land in an ecologically sensitive manner. Timber is harvested on site, but they are trying to preserve the hardwoods. The site is included in the same red-cockaded woodpecker safe harbor agreement as the Vogtle Site.

The Site recently started alligator hunts by permit. The biggest so far was 13 feet.

Socioeconomics

Impressions - The entire area is very rural. Some apparent lower income pockets located next to really nice houses. Lots of farming (sorghum, cotton, hay). SNC indicated that all of the alternate sites presented similar overall EJ profiles and issues.

Seventy percent of the current workers come from Toombs and Appling Counties (mainly in Vadaia and Lyons to the north and Baxley to the south). Access to the site is very good. Highway US 1 passes along the western side of the Site.

General Impressions

Could be problems with obtaining river water, especially during dry periods.
Available land area is limited, could have problems finding a location on site for the two new units without interfering with current operations.
Railroad access – Hatch would require a significant amount of work to upgrade existing rail connections.

November 7, 2006

Travel day from Vadaia, GA to Dothan, AL for the NRC/PNNL team.

Farley Site - November 8, 2006

Dothan, Alabama

Attendance

NRC: Mark Notich (EPM)

Richard Raione (hydrology)

Nancy Kuntzleman (ecology)

PNNL: Mike Sackschewsky (lab team lead)

Chris Cook (hydrology)

Darby Stapp (cultural)

Paul Hendrickson (land use/alternatives)

Becky Krieg (aquatic)

SNC: Becky Badham – Alabama Power

Ken Darby – Environmental Specialist

Steve Krotzer – Biologist – Alabama Power

Anne Lovell – Tetra Tech

Rodney Robinson – Chem supervisor

Tom Moorner – SNC (Environmental Project Manager)

After an introductory meeting, the group spent much of the rest of the day touring the the Plant Farley site. Locations examined included the intake and discharge structure locations, the existing barge slip, solid waste landfill, Wilson's Creek, the water storage pond, and the area

that would need to be filled to construct the new cooling towers. The tour ended at approximately 2 pm.

General Description

The 1800 acre site has 2 existing Westinghouse PWR units that started up in 1977 and 1981. The main condensers are cooled via mechanical draft cooling towers but all other cooling is once through. Water is stored in a 108 acre service water pond. The pond is a safety related structure because it also serves as the ultimate heat sink.

There is an ISFSI located between the existing units and the proposed site for new units.

There are plans (not by SNC) for a new 1200 MW coal fired plant about 3 miles downstream, it would use effluent from the existing Georgia-Pacific paper plant as its cooling water source. This would not change the total amount of water withdrawn from the Chatahoochee River, but would change the total consumptive water use in the region.

Cultural Resources

The site is fairly rich in cultural resources. A recent license renewal captured most of the information. Tom Moorer, was not able to locate a map of the historic or archeological site locations. The team did not observe any cultural sites during the tour, archeological surveys would need to be performed in areas disturbed by new construction.

Hydrology

Outfall – a significant amount of modeling and field data collection has occurred in order to obtain the current 316(a) permit. The key parameter from the modeling effort was the outflow velocity, and river stage was found to be insignificant. Data and results were presented to Alabama Department of Environmental Management (ADEM).

There was a discussion of the water issues between FL, GA and AL. The states have been in a legal battle about water usage in the Chattahoochee River. See the ER for more information on the compact and issues between the three states. The dividing line between Alabama and Georgia is the west bank of the Chattahoochee River at high water (based on a Jeffersonian era survey). Except at very high water levels, the Chattahoochee River is wholly within the state of Georgia. The intake is located at the end of a short canal, so it is wholly within Alabama.

New cooling towers were recently (~2000) installed for the existing plant. The towers are of a newer design and generate a smaller plume than the older towers..

The Chattahoochee River Keeper is located in Columbus, GA

Biggest hydrology issue (from the applicant's perspective) is related to the quantity of flow in the river. There are many concerns about the water needs of Atlanta (upstream), and there is much concern about the quantity of water needed downstream.

There are significant fluctuations of outflow from the upstream dams as hydroelectric operations are timed to follow the need for power. The typical peak discharge is 7 to 10 kcfs, however flows during off-peak hours can fall to 1.5 kcfs. The shoreline water surface elevation can drop

10 to 12 feet between peak and trough periods.

The USACE-Mobile District analysis of low-river discharge periods was reported to assume that four plants were operating at the Farley Site. The historical reason why 4 units are assumed to be operating stems from the original Farley Site plan, which called for four units. The minimum discharge analyzed by USACE-Mobile District is 800 cfs.

Groundwater is used at the site for drinking and fire protection. Groundwater is used because it is much cheaper to use groundwater than river water as a potable water supply.

An annual bathymetry survey of the pond is performed since the pond is safety related. The service water intake is also dredged.

The consumptive water use is lower than would be expected because a large portion of the plant heat is dissipated through once-through cooling. Farley is not closed-cycle cooling, but "operates" as closed-cycle because the discharge is less than 80%, as stated under the updated 316(b) regulations.

Navigation/Transportation Issues

The Chattahoochee River is navigable to Columbus, Georgia. SNC recently brought up new reactor heads, steam generators and cooling tower components by barge. The USACE has a 9' by 100' authorized channel – but haven't done maintenance since 2000. There is also an issue of no navigation below the Woodruff dam (in FL) so this is a problem.

They would need to enlarge the barge slip by about 40-50% in order to have it be useable to support construction. The current design would be relatively easy to modify, but in it's site evaluation study Bechtel assumed the construction of a new barge slip.

There is an existing rail spur that goes to the SFX line by Columbus. This rail line would require modifications, including several bridges in order to handle steam generators and reactor vessels. This would be very expensive.

Transmission Lines

SNC would need to add one new 500 kV line to Webb. SNC is not certain, but they probably would need to widen the corridor and put in more towers for the 500 kV line.

T&E species

Terrestrial T&E species potentially occurring in the area include the indigo snake, bald eagle American alligator, flatwood salamander (not documented in county - but there is suitable habitat). There is bat habitat along transmission lines (particularly the Sinai line) and the relic trillium is also known to occur in SW Georgia / SE Alabama.

There are no known aquatic T&Es. The gulf sturgeon can not make it past the first dam. There has been talk about a fish passage structure on this dam, but it hasn't happened yet. If it did the gulf sturgeon could make it up. There are several rare mussel species in the area, including 6 that are federally listed. Most of these rare mussel species have been extirpated from the mainstem of the Chattahoochee River but a few are still found in the tributaries. None

of the listed mussel species are thought to exist in the Chattahoochee river in the vicinity of Plant Farley.

General Ecology

The Farley site is a Wildlife Habitat Council Certified Wildlife Habitat – 1992. First one that SNC certified (before Plant Hatch or Plant Vogtle).

There is a hunting program and bow-hunting is allowed on site. There used to be a lot of deer on the site. The site started to manage some of the habitats differently and to allow bow hunting to reduce the population. They do not have a current population estimate.

Recreational fishing on the Chattahoochee only. No commercial fishing. The striped bass can't make it past the first dam so they have hybrid striped bass and white bass.

The sites is starting to get a considerable amount of climbing fern (invasive, non-native). An attractive, ornamental species, but can take over in a kudzu-type fashion.

The new water intake would need to put it on undisturbed land. Cooling towers would be in floodplain, and they probably would have to mitigate for wetland losses resulting from cooling tower construction. They would have to build up the area using fill acquired from off-site.

Corbicula have flourished in the water storage pond by the intake. SNC uses a clamshell to take out 3-4 dump trucks of *Corbicula* per year. They put catfish in the pond, hoping they would eat the *Corbicula*.

Socioeconomics

The surrounding area is very rural. There is a Georgia-Pacific paper mill south of the site that has a much greater aesthetic impact than the Farley site. There were no obvious low income areas in the immediate vicinity of the site, nor were there any obvious upscale areas. Area is primarily agricultural, with hay, cotton, and timber the primary crops. The primary road used to access the site (Alabama 95) is relatively narrow, and likely would require upgrades to support construction.

Barton Site - November 9, 2006

Clanton, Alabama

Attendance

NRC: Mark Notich (EPM)
Richard Raione (hydrology)
Nancy Kuntzleman (ecology)

PNNL: Mike Sackschewsky (lab team lead)
Chris Cook (hydrology)
Darby Stapp (cultural)
Paul Hendrickson (land use/alternatives)
Becky Krieg (aquatic)

SNC: Tom Moorer – SNC, Environmental PM
Steve Krotzer – Biologist – Alabama Power
Anne Lovell – Tetra Tech
Brian Seal – Forester – AL Power
Matthew Martz – SNC, Env. Specialist
Brian Robinson – Plant project developer

The group briefly met at the Alabama Power office in Clanton, AL, then spent the balance of the morning touring the Barton Site. Areas visited included a man-made pond, the site of an abandoned meteorological tower that was used to collect information during the 1970's, the general vicinity of where the reactor units and towers would be located, and a real estate development adjacent to the site. The tour was completed by noon.

Background

The site is on the Coosa River in the corners of Chilton and Elmore Counties, directly across the river from Coosa County. The nearest town is Verbena, Clanton is approximately 15 miles WNW, Montgomery is approximately 30 miles south. Alabama Power acquired the site in the 1960's with the intention of developing it as a 4-Unit nuclear site. The applicant developed a PSAR for this site and started a draft ER. However, the project was cancelled and the applications were withdrawn in the mid 1970's.

Alabama Power currently manages the site for timber, and leases hunting rights to a local hunting club.

Coosa River and Hydrology

Mitchell Dam is upstream of the site and was constructed in the 1920s. Jordan and Bouldin Dams are both downstream of the site. Bouldin Dam was initially constructed in the 1960s, however it was rebuilt in the 1980s after it failed. The FERC license for several of the dams along the river are about to be renewed.

Downstream of the Barton site, the main Coosa River flows to Jordan Dam. However, a portion of the flow is diverted via a man-made canal to Bouldin Dam; the flows merge again approximately 10 miles below Jordan Dam. The Wetumpka USGS gage (the nearest gage to the Barton Site) is on the Coosa River below Jordan Dam but does not include the outflow from Bouldin Dam. The Coosa River merges with the Tallapoosa River downstream of Jordan Dam to form the Alabama River.

There is no USGS gage between Mitchell Dam and the Barton Site, however there are few water withdrawals in that reach. Tom Moorer committed to sending at least two years of outflow data from the Mitchell Dam to the NRC. Outflow data from Mitchell Dam is not publicly available.

The aquifers below the Barton Site have very low yields. If this site is developed, no groundwater use is anticipated. All water needs will be satisfied at the new facility by withdrawing water from the Coosa River.

Discharge would be upstream of residents in the Ferry Oaks sub-division.

Cultural Resources

No surveys for cultural resources have been performed at the site. There are several areas on site that have a relatively high potential for cultural resources.

Land Use and Infrastructure

There is a 20-acre parcel in the middle of the site that has not been acquired by SNC.

Topography is steep so there will be quite a bit of construction needed for the intake and outfall, and cut and fill work for the reactor and cooling tower locations. Probably mechanical draft cooling towers, but there is a possibility they could use natural draft cooling towers.

Large components would need to come in by rail – there is no possibility of barging. SNC would need to construct about 6-miles of railroad.

The access roads would require upgrades, and all of the onsite transportation, utilities, and support infrastructure would have to be installed.

There is a 115 kV transmission line on site, a 230 kV line about 0.5 mile west, and a 500 kV line about 19 miles west of the site in Chilton County. The site would require significant transmission capacity upgrades. There is a natural gas line located about 2-miles north of the site.

Socioeconomics

The site is in a fairly rural area. Nearby towns include Marbury, Verbena, and Clanton. There is an upscale subdivision (Ferry Oaks Development) that went in 8 years ago in the corner of the site. The NRC team saw about 8 homes with several more under construction. The access road to the development traverses the Barton site. The SNC representatives indicated that there is an understanding that this road may need to be moved if the site is ever developed for power production.

Land use on the other side of the river is primarily timber production, although several upscale properties were apparent on the river shoreline. SNC would not need to acquire land across from site for the exclusion area.

The Alabama Confederate Memorial Park is located near where traffic would turn from US Highway 31 to access the Barton Site. There are two cemeteries at the site. The team was told that the SHPO's office has information on it on their website.

Access to within a couple of miles of the Barton Site is good via US Highway 31, the local roads between US 31 and the Barton Site likely would require upgrades to support site construction.

Ecology

Red Cockaded Woodpecker habitat in area, but not on site. The site was clear cut in the first half of the 20th century so the trees are not yet old enough to support red-cockaded woodpeckers. Bald eagle nests are located up Chestnut creek (north end of site) but they haven't been seen on site. There is possible bald eagle nest south of site as well.

No rare mussels and snails have been found in either the Coosa river or in Chestnut Creek. There have been a number of surveys done of the area. A large study covering all of the mussels in Alabama is about to be published by University of Florida Press. The names of the authors are: Jim Williams – retired Florida Museum, Art Bolgin – Alabama State Museum, Jeff Garner - AL State Dept Natural Resources.

People to contact: Jeff Garner (Mussels and snails), Jody Thompson/Greg Lein State Dept of Conservation and Natural Resources (ADCNR) for non-game species.