TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

November 2, 1972

RECEIVED NOV 6 1972 U.S. ATOMIC ENERGY COMMISSION Regulatory Mail Section

AIR MAIL

Mr. Daniel R. Muller
Assistant Director
Environmental Projects
Directorate of Licensing
U.S. Atomic Energy Commission
Washington, DC 20545

Dear Mr. Muller:

Please refer to my letters of August 26 and September 27 regarding the final environmental statement for the Watts Bar Nuclear Plant (Docket Nos. 50-390 and 50-391).

As agreed in discussion with your staff on October 30, we are furnishing the enclosed additional information which will be included in the final environmental statement. We believe that this information should be adequate to resolve the points raised by your staff.

If AEC does not consider that this information is adequate to allow completion of its review of the statement, please let us know as soon as possible since the Atomic Safety and Licensing Board has been informed that the final statement will be submitted to the Council on Environmental Quality by November 8. This submittal date was considered necessary to allow sufficient time prior to the evidentiary hearing on environmental issues to be held on November 29.

Very truly yours,

J E Gilleland

J. E. Gilleland
Assistant to the Manager of Power

Enclosure

6048

Insert the following on page 1.2-2 before power needs section.

Estimates of future TVA loads are prepared by extending trends of the past while taking into account changes in factors affecting use. Loads are forecast by a number of geographic and class of service categories. Redundant methods are used, where possible, to increase forecast accuracy. Forecasting is preceded by analysis and adjustment of historical data and background preparation including a review of industry conditions, a review of current appliance sales and housing trends, study of possible new loads, and other factors such as the outlook for the national and regional economy.

Residential uses are forecast by utilizing published forecasts of national household trends and historical trends for regional share of national households and number of customers per household. Average use is forecast by estimating the regional saturation of appliances and annual uses of appliances.

Peak load energy forecasts of large commercial and industrial loads served by municipalities and cooperatives are individually prepared on the basis of past history, stated plans for operating levels, type of product, contract demand, etc.

Large industrial and Federal loads which are directly served by TVA are also forecast on an individual basis. Industrial loads are grouped according to industry type and known expansion and allowance for growth are considered.

6048

Replace first paragraph of power needs, page 1.2-2, with the following:

1. Power needs - The Watts Bar Nuclear Plant is being constructed to supply 2,340 MW of dependable capacity to the TVA system for the period 1977-2012. A review of the load and supply situations of neighboring utilities as given in reliability council reports and environmental reports indicates that the required capacity could not be supplied by neighboring utilities with their existing and planned system capacity additions. Surplus capacity is, however, available on a seasonal basis from these utilities. TVA makes maximum use of this surplus seasonal capacity through seasonal exchanges of generating capacity. At the present time TVA has agreements in which a total of 2,060,000 kW of firm power is made available to TVA during the winter and returned by TVA to these utilities in the summer. The agreements include: 1,500,000 kW with Mississippi Power & Light Company; 300,000 kW with Southern Services, Inc.; and 260,000 kW with the Illinois-Missouri Group. The TVA power system is a winter and summer peaking system with the highest annual peak loads in the TVA service area usually occurring between November and March. Due to these seasonal exchange arrangements, the loads which TVA generating capacity must actually serve during the remainder of this decade will be greater in the summer than in the preceding winter; therefore, it is not feasible for TVA to further increase its interchange capacity during this period.

TVA believes that the construction of generating capacity to serve its own needs in conjunction with maximum use of surplus seasonal capacity through interchange agreements serves to optimize the capacity additions both on the TVA and the interconnected systems.

The following tabulation indicates TVA's expected power supply outlook during the 1977-79 peak load seasons based on the current capacity installation schedules:

Replace first sentence (page 1.2-3) with the following:

2. Consequences of delays - TVA's desired reserve margins are determined by utilization of the loss of load probability method which has been adopted to the characteristics of the TVA system. The planning criteria are to maintain a desired reserve margin within a reliability risk level of one day in 10 years, and any reduction below these margins increases the risk of not serving firm load. Even if the projected schedules for capacity are achieved, the margins shown in the above tabulation are deficient in each of the winter periods indicated as shown in the following tabulation:

	Margins				
	Desired		Available		Deficiency
Period	MW	%	MW	%	MW
Winter 1976-77	5,137	21.4	4,605	19.2	532
Winter 1977-78	5,290	20.9	4,425	17.5	865
Winter 1978-79	5,476	20.5	4,195	15.7	1,281

Add new paragraph at the end of page 1.2-6

The analysis shown on page 1.2-3 shows that TVA cannot carry out its statuatory obligation of providing an ample supply of electricity for the TVA region without the Watts Bar Nuclear Plant. Even with the Watts Bar plant, the reliability risk level will be below that which TVA considers desirable. Without the plant, the reliability risk level would be increased to a loss of load probability of nearly four days per year which is clearly unacceptable.

Replace last paragraph on page 4.1-2 with the following:

Two major disadvantages to planning an oil-fired power plant of the Watts Bar size are the uncertainty of a long-range fuel supply and the high cost of oil. In 1970 TVA began contacting the major oil companies in the United States to develop a dependable supply of fuel for gas turbines and for use in steam-electric generating plants. Letters of inquiry were sent to sixteen major oil companies in May 1970. Of the twelve companies that responded to the letters, eight indicated no interest at that time in supplying oil for power plants. Meetings were held with the remaining four companies and none of these was interested in a long-term contract for supplying the quantity of oil needed for a 2,600-MW oil-fired power plant. The suppliers indicated that this quantity of oil (20 to 24 million barrels per year) could not be supplied from domestic sources. Therefore, a long-term contract would be contingent upon a supplier obtaining an oil import quota each year since the TVA operating area lies in Petroleum Administration for Defense (PAD) Districts 2 and 3. As a result of these inquiries, TVA concluded that the long-term requirements of an oil-fired steam-electric generating plant could not be assured. Since 1970 we have held discussions with three other oil companies and these discussions have reaffirmed the conclusion that contracts for this quantity of oil are contingent upon a supplier obtaining an oil import quota and that the oil supply could not be assured. TVA believes that an assured fuel supply must be available before a decision is made to construct a generating plant.

Air pollution control regulations have caused low-sulfur fuel oil to be in strong demand and oil import quotas have caused a greater burden on domestic supplies. Domestic demand for fuel oil has increased at a rate of about 5 percent per year since 1968 while the domestic production has increased at a rate of about 1.5 percent per year. Also, the domestic reserves to production ratio decreased from 12.8 years in 1960 to about 9 years in 1970 when proven reserves were 29.6 billion barrels and production was 3.32 billion barrels. The increased demand and reduced domestic reserves will force more dependence on the restricted and uncertain foreign supplies. In 1970 foreign sources supplied 23 percent of the domestic oil requirements. The shortage of low-sulfur oil reserves and difficulty in securing a reliable foreign or domestic supply at this time make the selection of oil as fuel for a base load plant the size of Watts Bar an unacceptable alternative.

Even if an adequate supply of fuel oil for the life of the plant were assured, the cost of oil as fuel would make the selection unacceptable for base load capacity. On a heat content basis, low-sulfur fuel oil costs more than four times as much as nuclear fuel. The following table shows a comparison of approximate costs of nuclear and oil-fired plants of the 2,500-MW size category.

	Nuclear	Oil-Fired
Plant investment, $/kW	269	175
Levelized fuel cost, ¢/10^6 Btu	15.5	70.0
Net plant heat rate - Btu/kWh	10,355.0	9,043
Annual Production Expense, mill/kWh:		
Plant investment	3.3	2.2
Operating and maintenance	1.9	6.7
Total	5.2	8.9
Difference	Base	3.7

This difference in annual production expense is estimated to represent an annual cost difference of about $66.5 million.

On page 4.2-2 change "2. <u>Environmental Considerations</u>" to "2. <u>Physical Environment</u>" and on page 4.2-8 insert the following before "Feasibility"

3. <u>Environmental considerations</u> -

(1) <u>Aesthetics</u> - The proposed plant is similar in design to the Sequoyah Nuclear Plant. By taking advantage of similarities of design, considerable savings could be realized in the design, construction, and licensing of the plant. This approach results in marked similarities in the external appearance of the two plants with the exception of the natural draft cooling towers to be used at Watts Bar and the number of transmission lines emanating from the plant. For this reason the appearance of the proposed plant would be essentially the same at any site where auxiliary cooling facilities are required and visual impacts would not vary significantly.

None of the sites considered is in a heavily populated location and none is at a location frequented by large numbers of visitors.

All sites have been examined for potential visual impacts considering such factors as plant elevations relative to reservoirs and surrounding terrain, distances from well-travelled highways, and distances from waterways. None of the sites is highly elevated with respect to the reservoirs or surrounding terrain. Plant grade elevations vary from about 25 feet above the normal reservoir elevation at sites A and B to about 45 feet at site F, the site selected. The distance from the reservoir to the powerhouse would vary from about 1,300 feet at site E to about 6,000 feet at site D. The site selected situates the powerhouse about 2,400 feet from the reservoir. Due to the hilly nature of the terrain in the eastern portion of the Tennessee River valley, considerable natural screening is provided for installation at lower elevations. At any of the sites considered the plant would be visible from a state or U.S. highway with the exception of site G which lies on a small peninsula in a sharp bend of the river.

Plant construction plans are coordinated with architectural personnel who route access roads, recommend leaving trees standing in strategic areas as visual screens, and otherwise reduce visual impacts. These practices would be followed at any site and visual impacts would not be expected to be significant except for the large natural draft cooling towers and their visible vapor plumes. The towers would be visible in the near vicinity of the plant site and their plumes could be visible for as much as 10 miles. The plumes, therefore, could be seen on some occasions from some small towns regardless of the site chosen. The towers themselves are considered to be visually acceptable despite their size.

Examination of the alternative sites to determine the visual impacts resulting from transmission line connections indicates that some differences exist. Where the lines leave the plant overland, they can be screened by strategic routing, but where reservoir crossings are required the lines cause greater visual impacts. Therefore, the number of reservoir crossings required is considered as an indicator of the degree of impact. Of the sites considered when utilizing single-circuit 500-kV transmission lines, each would probably require a total of five reservoir crossings except for site A with four crossings and site E with three crossings. Impacts of crossings can be minimized by use of double circuit towers and strategic location of crossings. The extent to which these procedures would be employed at the various sites is not known.

Regardless of the location selected, the design of the plant would have as an objective the creation of harmony between the plant and its setting. The architectural design and site development should provide an aesthetically pleasing appearance and mitigate the transition in land use.

It is concluded that through careful planning and coordination of plant design, the plant's visual impacts would be made acceptable at any of the sites considered.

(2) Recreation - The alternative sites were considered for the impacts on recreation potential which might occur due to the construction and operation of a nuclear plant.

Guntersville, Chickamauga, and Watts Bar Lakes are very similar in terms of suitability for recreation. Each has good sport fishing, clean clear waters, water contact sports, and the beautiful backdrop provided by the wooded Appalachian foothills. These reservoirs combined attract almost 11,500,000 visits annually--5,358,000 at Guntersville, 3,636,000 at Chickamauga, and 2,506,000 at Watts Bar. These visits occur at boat docks and resorts, state and local parks, wildlife areas, public access areas, and private residences located along the shoreline.

The sites considered on Guntersville Reservoir at TRM 369L (site A) and TRM 392R (site C) and on Watts Bar Reservoir TRM 559R (site G) are in areas which have high capability for development for family boating activities and recreational lodging. Selection of one of these sites would reduce these potential recreation uses.

The four other sites investigated--two on Guntersville Reservoir at TRM 386.5R (site D) and TRM 398.5 (site D) and two on Chickamauga Reservoir at TRM 499L (site E) and TRM 528R (the site selected for this plant)--are less suited for recreation but could be used for limited development of facilities for boating and water contact sports. Selection of one of these sites would have no appreciable effect on recreation uses in these local areas.

(3) Land use compatibility - Assessments of land use compatibility involved in constructing and operating a nuclear plant on each of the sites considered have been made. Present and projected uses of the areas surrounding the sites have been determined to identify potential conflicts. The following tabulation briefly describes some of the features considered in the assessments of sites A through G.

(a) Site A - Most of the land on and around the site is very sparsely developed. Upstream, about 1.5 miles, some second home development is occurring on the shoreline, and downstream about 5 miles, a major industry has located a plant. Development of the site for generating purposes would be generally compatible with projected land uses.

(b) Site B - Downstream from the site is part of the town of Scottsboro's permanent residential development. Future development plans anticipate further urbanization of this area to the extent that use of the designated site for a nuclear plant would probably be incompatible.

(c) Site C - This site contains and is adjacent to farmland with high potential for industrial development. Thus, use of this site for a nuclear plant would be compatible with present and projected land uses in the vicinity.

(d) Site D - An important wildlife management area virtually surrounds the site and would probably be encroached upon were the site to be utilized. Although this land has also been identified as having significant industrial potential, use of the site for a nuclear plant would be incompatible with the present and probable future use of adjoining land.

(e) Site E - No intensive development is located near this site. However, it is just downstream and adjacent to the Hiwassee Island Game Management and Waterfowl Refuge Area which is of major importance to East Tennessee. The compatibility of the site with the continued existence of the wildlife refuge has not been determined. It is judged, however, that impacts of constructing a plant on this site would affect the refuge only during the construction period and no permanent damage to the refuge would result.

(f) Site F - Adjacent to a conventional steam plant and bounded by agricultural and forestry land uses, this site is an appropriate location for a nuclear plant and has been selected for location of the proposed plant. The site and its surroundings are discussed in detail in section 1.1.

(g) Site G - Present and projected land use on and around this site is agriculture and openland. Use of the site for a nuclear plant would be compatible with these uses.

While some incompatibility has been identified, construction of a nuclear plant at any of the sites would not result in any significant impacts on long-term productivity of land of the areas involved. The largest amount of land involved are the transmission line rights of way. Where the transmission lines cross open fields or farmland, only minor restrictions are imposed. Where wooded areas are crossed, some benefits are realized by providing wildlife food and cover although some short-term forest products production may be adversely affected.

All sites are examined for archaeological and historical significance prior to any significant alteration of the site. This procedure may result in exploration of sites with archaeological and historical significance to an area and add to the knowledge of the history of the area. Site F, the site selected, is such a case. TVA financed an archaeological survey and exploration which might never have been made if the area had been left to private development.

(4) Impacts on fisheries and wildlife - Studies of fish and other aquatic life inhabiting Guntersville, Chickamauga, and Watts Bar Reservoirs indicate that none of these reservoirs is unique with regard to species population.

A 1970 Chickamauga Reservoir fish population survey indicated on the basis of numbers 12 percent game fish, 55 percent rough fish, and 33 percent forage fish. Bluegill and other sunfish, largemouth bass, spotted bass, white crappie, and white bass dominated the game fish. Gizzard and threadfin shad were the dominant forage fish. Two species of buffalo and freshwater drum dominated the rough fish. The survey indicated that the upper end of Chickamauga Reservoir plays a significant role in production of the fisheries resource of the reservoir. Fish populations of Watts Bar Reservoir are not expected to vary significantly from that in Chickamauga Reservoir.

Guntersville Reservoir supports a variety of game, rough, and forage fish. A recent fish population survey on Mud and Town Creeks and at TRM 392 indicated that by number there were about 48 percent game, 22 percent rough, and 30 percent forage fish. By weight there were 21 percent game, 57 percent rough, and 22 percent forage fish. Predominant fish species by numbers were gizzard shad, 25 percent; bluegill, 23 percent; redear, 10 percent; drum, 10 percent; black bullhead, 9 percent; and largemouth bass, 8 percent. However, species composition varied considerably from point to point. No significant variation of fish populations are expected from site to site on the reservoir, with the exception of sites which have shallow water embayments nearby which are more productive for larval fish. Such embayments exist at sites C and D.

It is assumed that observance of applicable water quality standards will adequately protect aquatic biota of these reservoirs. Consequently, releases from a nuclear plant at any site considered would not be expected to significantly affect aquatic resources of the area regardless of species population or distribution.

All of the sites considered are in the vicinity of wildlife management area or waterfowl refuge, the most significant one being site E which adjoins the Hiwassee Island Game Management and Waterfowl Refuge. This refuge supports the largest concentration of geese in the valley region east of Wheeler Wildlife Refuge and is responsible for an annual hunter harvest of an estimated 2,000 to 5,000 geese per year. Sites D and G are also considered to pose an interference to migratory waterfowl if used for a nuclear plant but are not considered as important as site E in this regard. Some disturbance of wildlife inhabiting the nearby refuges or waterfowl using the areas seasonally would result during the plant construction period. The degree of this disruption cannot be predicted. However, after the major construction activities have ceased, the uses of the areas are expected to return to normal and the operation of a nuclear plant is not expected to significantly affect the wildlife of the areas.