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DESCRIPTION: Ltr re our 9-11-72 ltr.....furnishing comments on Draft Enviro Statement for the Crystal River Unit 3	ENCLOSURES:  <b>Do Not Remove</b> <b>ACKNOWLEDGED</b>
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PLANT NAMES: Crystal River Unit 3

FOR ACTION/INFORMATION			11-29-72	AB
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SKOVHOLT-L	STELLO	ENVIRO	MASON L		
P. COLLINS	MOORE	MULLER	WILSON L	PLANS	
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1-ASLB-YORE/SAYRE	1-R. CATLIN, E-256-GT	BROOKHAVEN NAT. LAB D
WOODWARD/H. ST.	1-CONSULTANT'S	1-AGMED(WALTER KOESTER, Rm C-427, GT)
16-CYS ACRS HOLDING	NEWMARK/BLUME/AGABIAN	1-RD...MULLER...F-309GT



# United States Department of the Interior

50-302

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

ER-72/1091

NOV 23 1972



Dear Mr. Muller:

This is in response to your letter of September 11, 1972, requesting our comments on the Atomic Energy Commission's draft statement, dated September 1972, on environmental considerations for Crystal River Nuclear Generating Plant, Unit 3, Citrus County, Florida.

## General

During the last two calendar years the Bureau of Sport Fisheries and Wildlife and the Geological Survey, both of this Department, have participated in discussions with AEC and the applicant and have made suggestions and comments within the limits of their jurisdiction and expertise. Concerns for probable adverse environmental impacts resulting from the operation of Unit 3 and adequacy of the environmental studies were expressed several times during this period. The draft environmental statement does not adequately reflect improvement in the studies or in the plant design as a result of these discussions. It appears to us that the plant is poorly sited from an environmental standpoint, the impacts resulting from the use of once-through cooling are intolerable, and the construction and maintenance of the navigation canal and its unbroken spoil dike is a further adverse impact on the natural environment of the area.

The major aquatic environmental problems could be solved by the use of a closed-cycle cooling system. This would eliminate the need for most of the withdrawals and discharges of water and waste heat to aquatic environment. This would also permit a breaching of the navigation channel spoil dikes at several points to permit water circulation and free passage of aquatic organisms.

The statement should provide the chronology of the physical development of Units 1, 2, and 3 at the site in order for

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the baseline environmental assessments to have value. The assessments of the existing conditions at Crystal River are inadequate in that the construction and operation impacts of Units 1 and 2 and the accessory facilities, such as the navigation and intake channel, are not clearly defined. Units 1 and 2 created major impacts on the environment of the Crystal River area when the navigation channel was constructed with its extensive dike system. The construction of a diked channel several miles into the Gulf undoubtedly had a significant impact on the hydrology of the area. The ecological system has probably been in a state of change for several years as a result of the physical and ecological changes and therefore an adequate recognition of this changing baseline situation is necessary to properly evaluate the impacts of Unit 3. We think that an effective evaluation of the impacts of Unit 3 can be made only when they are superimposed upon the effects of Units 1 and 2. Therefore, we are in agreement with the operating license stipulation given on page iv requiring the applicant to establish adequate baseline ecological data.

In our view, the assessment of the entrainment impact of Crystal River Units 1, 2, and 3 has been grossly under-investigated. Observations made at the Crystal River site by staff members of the Bureau of Sport Fisheries and Wildlife and the National Marine Fisheries Service in early May of 1972 showed clearly that thousands of fish fry were gathered in the slack water eddies at the intake structure of Crystal River Units 1 and 2 and fish larvae were taken in plankton tows. Large numbers of predatory fish were feeding heavily upon smaller organisms being brought by the intake channel to the intakes of the plant. The victims apparently included fish fry and juveniles entrained in the plant's intake flow. This type of entrainment with the probable billions of fish fry and larvae entrained there have not been adequately investigated according to any of the data made available to our reviewers thus far.

In view of the apparent inadequacies in the physical descriptions of the impact of the project, an immediate question is raised as to the adequacy of any assessments of biological impacts, since biological impacts largely result from the physical changes created by the project. The obvious lack of sufficient sampling information and insufficient evaluation of the impacts of the existing

Units 1 and 2 leaves little room to conclude other than that the Crystal River plant is already having a tremendous adverse impact on the estuarine values of this site even though the extent of damage has not been quantified by the detailed studies which should have been performed. The addition of Unit 3 to this operation will unquestionably escalate the damages from entrainment, from impingement of large organisms, and from various adverse impacts on the physical oceanography and the biology of the site. The potential for entrainment of large numbers of juvenile fish and the larval and juvenile forms of other important sport and commercial species is inadequately assessed in this report and undoubtedly cannot be fully assessed based on the limited data available in the impact statement.

Our specific comments are given according to the format of the statement or according to specific subjects.

#### Historical Significance

The final environmental statement should include evidence that the State Liaison Officer for Historic Preservation was contacted concerning possible effects of the proposed action on historic properties which are under consideration for nomination to the National Register of Historic Places.

The statement discusses several areas and sites of archeological and paleontological importance in the general area of the plant but it does not show that the site was surveyed by professional archeologists prior to the initiation of construction. Since construction of the plant is well underway, most of the impacts of site preparation and construction have already occurred; therefore, these impacts remain unknown.

#### Geology

As a result of procedures previously established between the Geological Survey of this Department and the AEC, a comprehensive review of the geologic and hydrologic aspects of the site as presented in the applicant's Preliminary Safety Analysis Report to the AEC was performed. The results of this review was transmitted to the AEC on April 2, 1968. We think that the inclusion of some of the

data presented in this report should be included in the final environmental statement. The brief description of the geology of the site presented in the draft statement is inadequate for an independent assessment of the geologic environment relevant to the construction of the plant.

#### Hydrology

One of the most important aquifers in the Country is located beneath this plant. As stated on page 2-19, the limestone aquifer is highly porous and surface waters located above the water table will filter into the ground-water table very rapidly. The effects of leakage or spillage of radioactive wastes on this aquifer should be addressed in the final environmental statement.

#### Terrestrial Ecology

The faunal lists given on page 2-22 and page 2-23 are incomplete. We suggest that important upland game birds such as turkey and mourning dove, various waterfowl species including shore and wading birds, raptore, reptiles, and amphibians be added to that list. More complete lists are referred to on page 2-24; but we think that these lists should be included in the environmental statement.

The list of fishes appears to be reasonably complete.

#### Planktonic Organisms

Page 2-46 of the impact statement refers to plankton sampling conducted in April and June and July of 1971 at the Crystal River intake and discharge canals. We have referred to the Crystal River Environmental Status Report for July through December 1971 issued by the company. We assume that the plankton studies referred to on page 2-47 in the statement are those discussed under chlorination studies by Dr. Lackey in section 6 of the Environmental Status Report. The sampling conducted there appears to consist of dipping 200 liters of water from the canal with a bucket and pouring it through a hand-held plankton net. This type of sampling would sample no more than an extremely minimal volume of surface water, and would frighten away free-swimming organisms such as fish fry which frequently appear in zooplankton samples. Certainly, this type of

sampling would not provide a valid representation of all the planktonic life occurring in the canals at all the various depths, at all the various times of the day or night, or different seasons or phases of the moon and tide cycles. However, these samples do reveal a substantial zooplankton population.

#### Effluent System

It is indicated in the first paragraph on page 3-7 that the velocity in the intake canal of 1.3 fps at ebb tide may be sufficiently low to prevent serious entrapment of fish. This might be true for larger individuals of the more rapid swimming species which do not have tendencies to follow currents at the time and which are not seeking dark hiding places. However, for virtually all larval and juvenile fish which are incapable of even swimming at speeds of 1.3 fps, there is no possibility of their escape when they have entered the intake canal. They are doomed to entrainment unless they can exist in the intake canal, an unlikely circumstance for more than a tiny fraction of these fish and an impossibility for most of them. Practically all fish smaller than 1.5 inches have difficulty swimming at a sustained rate of 1.3 fps for more than about 2 seconds.

#### Heat Dissipation System

This section or the section on Effects of the Intake Structure should indicate the manner of disposal for dead fish, trash, and debris collected on the racks and screens. We suggest that this information be included in the final statement.

#### Solid Waste

It is indicated on page 3-16 that solid wastes are to be packaged in drums and shipped to an AEC-licensed burial site. Also, it is indicated on page V-46 of the applicant's environmental report that low-level radioactive solid wastes include such materials as paper, rags, clothing, plastics, and particulate and charcoal filters. We recommend that the final environmental statement contain the details on emergency procedures which will be used for

maximum containment of these waste and for minimum contamination of personnel under conditions where a severe accident might result in the spill of low-level wastes.

#### Site Preparation and Plant Construction

The impacts resulting from the erection of transmission towers and stringing of lines on 2,140 acres of existing rights-of-way should be assessed in this section.

#### Effects of the Intake Structure

The AEC staff estimate of 200,000 finfish presently being destroyed at the intakes appears to be largely based on 24-hour samples taken 1 day per month. Sampling only 1 day per month could miss any peak impingement brought on by seasonal abundance of fish or particular seasonal or climatic conditions. Evidence at other plants and statements made at the Crystal River briefings, held twice each year by the company, suggest that major portions of the annual losses for some species may occur on a relatively small number of days. The baseline ecological study which the applicant will perform as a condition to the operating license should provide more accurate data.

A doubling of the estimated present losses is predicted when Unit 3 goes on line, an assumption based on the doubled volume of cooling water. Since the velocity in the intake canal will nearly double, the assumption that fish losses will only double is undoubtedly conservative. The impact is considerably greater than simple function of the volume of water being strained through the plant. It is one of swimming speed of fish. Fish which might escape from a fraction of a foot per second current drawing them into the intake canal may not escape when that rate is doubled. There is considerable possibility that many species not now taken at the plant will appear on the screens when the velocities are doubled. The number of individuals of the species now taken may very well double, but additional species may cause the total number of fish taken to escalate significantly.

### Aquatic Ecology

The applicant's estimate of the thermal plume size is given on page 5-17 for Units 1, 2, and 3. We agree with the AEC staff that the affected areas will be much larger than projected by the applicant.

We also concur with the AEC staff that other cooling alternatives or modifications to the present method should be considered. We suggest that consideration be given to the discharge of the cooling water from Unit 3 through a submerged pipeline crossing the existing intake canal in a southerly direction. Dual discharge points could serve to physically disperse the two heat loads, that for Units 1 and 2 to the northwest and that for Unit 3 to the south.

### Effects on Aquatic Life

The discussion of impact of waste heat discharges on aquatic life does not include recognition of the possible effect of increased predation on organisms subjected to significant increases in temperature in the warmed area nor does it consider possible increases in disease or parasite infestation of organisms spending prolonged periods in the warmed area. Also, it does not consider the possibility of failure of sex products to develop normally in adults spending prolonged periods in the heated plume area. While little is known about the probability of this in the warm climates of Florida, there are distinct possibilities that critical effects could take place.

### Eutrophication

Discussions given by the company's study technicians at Crystal River in the past have indicated increased growth of certain benthic diatoms occurring in the discharge zone. The enlargement of the zone of discharge and the increase in temperature coupled with a probable additional supply of nutrients from entrained organisms killed by the plant certainly suggest that the periphyton may very definitely be increased by additional heat discharges from Unit 3. Destruction of beds of seagrass by the excessive temperatures will cause biological loss far beyond that expected from exceeding exclusion temperatures for some mobile organisms.

### Biological Impact

The impacts on aquatic life resulting from pumping cooling water from the embayment area south of the intake canal dike and discharging it into the embayment area to the north of the dike should be analyzed. The area south of the dike includes the mouth of Crystal River and is somewhat enclosed by the many oyster reefs. The area enclosed by a line drawn from Long Point which is about 6 miles south of the dike to a point on the dike approximately 3 miles from shore would include a semienclosed bay area approximately 4 miles wide and 6 miles long. The volume of water involved would be approximately 21 billion gallons. When the three units are operating at full load, a volume of water equal to this semienclosed bay would be pumped through the plant in 11 days. It is understood that much of the water will come from offshore; however, the effects on aquatic life resulting from the transfer of this large amount of water from the south side of the dike to the north side are expected to be significant and should be assessed.

### Plant Accidents

This section contains an adequate evaluation of impacts resulting from plant accidents through Class 8 for air-bourne emissions. However, the environmental effects of releases to water is lacking. Many of these postulated accidents listed in tables 6-1 and 6-2 could result in releases to Gulf of Mexico and should be evaluated in detail.

We also think that Class 9 accidents resulting in both air and water releases should be described and the impacts on human life and the remaining environment discussed as long as there is any possibility of occurrence. The consequences of an accident of this severity could have far-reaching effects on land and in the Gulf, which could persist for centuries and affect millions of people and other life species. We think that consideration of the possible impacts of Class 9 accidents should have a bearing on alternatives to the proposal.

of Units 1, 2, and 3 if the cooling system were applied to all three units. It would essentially eliminate the intake problems with the entrainment and impingement now occurring and likely to increase at the site; the destruction of the natural balances of salinity and temperature which are much affected by the huge volumes of water circulating in the area, and reduce the impact of the plume on the discharge area since the plume would be essentially eliminated. Additionally, the use of a closed-cycle system would permit a breaching of the long dikes extending into the Gulf permitting once again a natural circulation of water and aquatic organisms through the area.

We conclude that the natural resources involved are so significant that they must receive first consideration in the licensing of the operation of Unit 3. It further appears unreasonable to permit the existing damages of Units 1 and 2 to be continued if it is technically feasible to correct the serious environmental problems with these units simultaneously with measures adopted to correct the environmental problems expected from Crystal River, Unit 3.

We consider the discussed alternative of dilution unacceptable since it accentuates the already identified major problem of entraining aquatic organisms and of destroying the physical composition of an irreplaceable unit of aquatic habitat.

The alternative of a holdup pond is undesirable because of the further usurpation of the publicly owned bottom of the bay by the proposed circulation system. Further, this does not eliminate the entrainment and physical habitat destruction problems involved in once-through cooling.

A closed-cycle spray module system deserves additional investigation and more comment than is given in section 11 of this statement. A spray module unit on a once-through cooling basis in the existing canal will not eliminate the problems of entrainment of organisms nor the physical displacement and destruction of the habitat.

The discussed modification of the discharge canal as set forth on page 11-16 is highly undesirable. The construction of such a canal extension merely compounds the already serious existing problem of a prolonged dike which interferes with current and organism movements in the coastal area at Crystal River. If this canal were constructed as proposed, it would completely foreclose any opportunity

### Irreversible and Irretrievable Commitment of Resources

This section ignores the unique and high value of the Crystal River aquatic environment and its complicated, yet delicately balanced, ecological associations. Many of these damages are irretrievable. Although the statement refers to living forms killed as irretrievable, it does not consider loss or change of habitat and possible loss of aquatic productivity.

### Alternative Cooling Methods

Technology for salt water cooling towers and other closed cycle cooling systems is advancing at a rapid rate.

The recently released draft environmental statement for the Forked River Nuclear Station, Unit 1, in New Jersey, includes a salt water cooling tower for the 1,093 megawatt nuclear unit. Salinities in that area are similar to those at Crystal River and salt drift predictions for the Forked River Unit is at a sufficiently low level to suggest that such a tower might be considered for the Crystal River Units.

Studies in connection with the Forked River plant appear to show that the drift factor and the salt deposition from this drift may be much less severe than has previously been thought, especially in coastal areas where there is already a normally high salt deposition rate with which the ecological system is in balance.

It is our understanding that a cooling tower is now under construction at Chalk Point Plant on the Patuxent River in Maryland and the manufacturer guarantees a drift factor no greater than 0.002 percent of the total cooling flow.

In view of the availability of this technology, it appears that a more thorough discussion and evaluation of closed-cycle cooling techniques is fully warranted in the environmental impact statement. In addition to the salt water towers, there should be a discussion of fresh water towers or other closed-cycle devices using makeup water from the Withlacoochee and Crystal Rivers.

In our view, the use of a closed-cycle cooling system would eliminate the majority of the problems related to operation

for correcting the existing problem. The use of this canal would merely move the area of impact of the plume and would not eliminate the entrainment and physical environment damage which are so serious at Crystal River already.

The use of a cooling pond as discussed on page 11-5 appears to have questionable advantages since it would involve several adverse impacts discussed there. More acreage of wetland might be destroyed in addition to the 330 acres already lost.

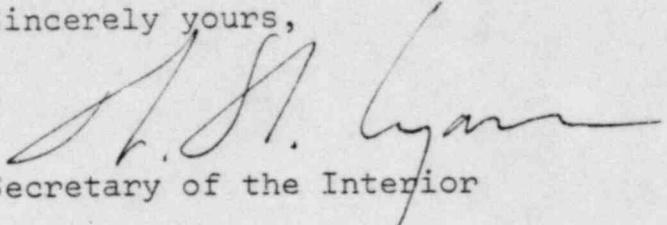
#### Recommendations

Based on our concerns for the environmental impacts of the proposed project, we recommend that the operating license for Crystal River No. 3 contain the following stipulations in addition to, or in lieu of when appropriate, those given in the Summary and Conclusions of the statement.

1. Within 6 months after issuance of the operating license, the applicant shall present to the AEC completed plans for an alternate cooling system which will significantly reduce the entrainment and other damage to aquatic life.
2. After AEC approval, the applicant shall construct and place in operation at the earliest possible time, and in no case later than 3 years, after issuance of the operating license the cooling system required in stipulation No. 1 above.
3. Full operation of Unit 3 shall not be permitted until the alternate cooling system is functional.
4. The applicant should be required to adopt and employ all practical measures which may be developed in order to minimize any adverse impacts of the plant operation on the biota during the interim period.

We hope these comments will be helpful in the preparation  
of the final environmental statement.

Sincerely yours,

  
H.H. Lamm  
Deputy Assistant Secretary of the Interior

Mr. Daniel R. Muller  
Assistant Director for  
Environmental Projects  
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