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July 1, 1982

The Honorable Nunzio Palladino
U.S. Nuclear Regulatory Commission
Washington, DC 20555

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Dear Commissioners:

We are writing on behalf of the Natural Resources Defense Council, Inc. (NRDC) and the Sierra Club to express our views regarding the NRC's legal and ethical responsibility under the National Environmental Policy Act, 42 U.S.C. §4321 et seq. (1976) (NEPA), to supplement the 1977 Clinch River Breeder Reactor Plant (CRBR) Final Environmental Statement (FES) to address significant new information, changes in circumstances, and changes in the project which have arisen since the CRBR was deferred in 1977. We also wish to remind you that this supplemental EIS must be circulated for comment by agencies and

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the interested public as required by NEPA, the Council on Environmental Quality regulations, and the NRC's own requirements.

This letter is a follow-up to recent informal discussions with Dr. Harold Denton, members of the Office of Executive Legal Director, and NRDC representatives. Our continued concern arises from the fact that some members of the NRC Staff apparently believe the Staff can exempt itself from Council on Environmental Quality (CEQ) regulations governing environmental impact statement preparation despite the existence of substantial changes and new information bearing on the Clinch River project. As the attached memorandum of law shows, however, this interpretation of the applicable law is self-serving and clearly incorrect. See Attachment A.

NRDC is at a loss to understand why these members of your staff are showing an almost reflexive resistance to our request that the FES be supplemented before it is introduced as evidence in the upcoming LWA-I proceeding. Several factors demonstrate why such resistance is not in the best interest of the public. First, the agency owes it to the public to evaluate the environmental, health and safety risks posed by the CRBR using the most recent and reliable information. Its role is not to promote the development of breeder reactors, but to regulate and license them to protect the public from a headlong rush into an inadequately evaluated technology.

Second, more than five years have passed since President Carter, expressing concern over the proliferation risks of plutonium production and recycle technology, indefinitely deferred domestic programs, including the licensing of the CRBR, which presented unacceptable dangers to public health and national security. The current administration has chosen to ignore these risks and has resumed CRBR licensing activities. However, no reasonable argument can be made that the changed circumstances and new information gained during the five year hiatus, as well as substantial changes made in the project since 1977, do not warrant careful reevaluation by both the NRC and the public before any decision to license the CRBR can responsibly be made.

The following sections discuss a few of the numerous changes and new information affecting the environmental impact of the CRBR project. This list is not all-inclusive, and NRDC does not expect the NRC to limit its evaluation to this list. It is the NRC's continuing responsibility to gather and evaluate information relevant to the environmental impact of proposed federal actions.^{1/}

^{1/} Warm Springs Dam Task Force v. Gribble, (621 F. 2d 1017, 1023 (9th Cir. 1980)).

A. Substantial Changes in the CRBR Project

Although licensing of the CRBR Project was deferred in 1977, design work has continued unabated during the last five years. As a result, the Department of Energy, TVA, and the Project Management Corporation ("Applicants") have made substantial changes in the Clinch River reactor design and other aspects of the project which are nowhere reflected in the 1977 FES. These changes directly affect the environmental impact of the proposed project, particularly the effects of CRBR accidents, and must therefore be analyzed in a supplemental EIS.

In response to NRC's request, the Applicants have submitted a 30-page table listing all the changes to the project since 1977 that have potential environmental impacts. (See Appendix B.) Applicants have discussed each of these changes in amendments to their 4-volume Environmental Report, which forms the basis for the NRC's environmental impact statement. In this 30-page table, even the Applicants, not the most objective of participants, have been forced to admit that several of these project changes would have adverse environmental effects. And in reviewing this list of changes and impacts, independent NRC consultants at Los Alamos National Laboratory have concluded:

We believe the possible number of design changes could be greater than given by the DOE in Attachment 2. The list of design

changes given by the DOE should not be assumed to be complete and the DOE conclusion of "positive effect or no impact" of the design changes should not be assumed correct.

Letter from E. W. Barts, Los Alamos National Laboratory, to Mr. B. Morris, CRBR Project Office, NRC, dated December 18, 1981 (re: Engineering Analysis, WX-8-4544 (R644) (emphasis added)).

This list alone should compel the conclusion that the project as it is proposed today bears very little relationship to the one analyzed by the NRC in the 1977 FES. One example should suffice, however, to demonstrate the enormous potential environmental impact of these changes.

1. Change in the CRBR Core Design.

One substantial change which DOE and the other Applicants admit would have an adverse environmental impact is the change in the CRBR core design from a homogeneous to a heterogeneous core. The Applicants note that the new core design would necessitate a revised refueling schedule and an increase in shipments of spent fuel by 50%. (See Appendix B, p. 12.) Similarly 50% more shipments of fresh CRBR fuel, which is directly nuclear weapons usable, will presumably be required. Applicants admit that this increase would be environmentally adverse, and indeed, no reasonable argument can be made that the potential effect of transporting and handling such highly radioactive wastes would not be significantly adverse. Yet this is not the only potential environmental impact of the heterogeneous core design.

As the NRC staff has recently explained to the Advisory Committee on Reactor Safety, CRBR Subcommittee, the probability and consequences of core disruptive accidents, or explosions, is one of the most hotly debated subjects in the reactor technical community, and the issue has not yet been resolved by the NRC Staff. (See Transcript of ACRS CRBR Subcommittee Meeting, May 5, 1982.) A core disruptive accident ("CDA") constitutes one of the most severe potential environmental impacts caused by the Clinch River breeder reactor, and as such must be discussed in the NRC impact statement. Yet, the potential for a core disruptive accident is directly dependent on the core design. (See Transcript, supra and attached vignographs.) And, as shown below, Applicants' changes to that core design have severely affected the NRC's analysis of core disruptive accidents, and significantly increases the uncertainty surrounding the environmental impacts associated with potential CRBR accidents.

For example, NRC consultants at Argonne National Laboratory performed a comparative analysis in May 1977 of the CRBR homogeneous core and the so-called "parfait" or heterogeneous core. Henninger, et al., An Analysis of Selected Transient Undercooling Accidents Without Scram For the Clinch River Breeder With a Parfait Core, Argonne National Laboratory, Reactor Analysis and Safety Division, May 1977 (ANL/RAS 77-16). This report concluded that "several aspects of these design differences have the potential for causing the behavior

of the two cores to differ significantly under TUC [transient undercooling] HCDA conditions." Id. p. 4. A Brookhaven National Laboratory report agreed that:

This change [in CRBR core design] causes substantial variation in key reactivity feedback parameters. Computations of these parameters are more complex and subject to larger variation/uncertainties than for their counterparts in homogenous core design.

Bari, et al., Review of the Status of CRBR Licensing Technical Issues Related to Heat Removal System and Severe Accident Analysis, Brookhaven National Laboratory, Dept. of Nuclear Energy, November 1981, Section 2.1(a). See also Reactor and Structural Systems Analysis for CRBR Licensing, [Final Report for Task 1 and Task 2], Los Alamos National Laboratory, Jan. 1982.

According to these reports, three national laboratories agree that the change in CRBR core design is not only substantial but also introduces large uncertainties into NRC's ability to predict the accident potential (i.e., environmental effects) of the CRBR project. Furthermore, the NRC staff has repeatedly stated that its own analysis of the CRBR design and its accident potential will not be completed until June 1983. In a recent deposition taken by NRDC of the NRC Staff, the Staff admitted that they have not even reached any preliminary or tentative conclusions in their CRBR accident analysis (Transcript of Deposition of NRC Staff, May 6, 1982).

Because the Staff has not concluded its safety review, it cannot predict with confidence that the substantial changes in

CRBR's design will not have adverse environmental effects. It must therefore supplement its impact statement to take these changes into account, and in particular, must discuss the uncertainties brought about by the new design. See Natural Resources Defense Council, Inc. v. NRC, ___ F.2d ___, No. 74-1586 (D.C. Cir. Apr. 27, 1982).

B. Significant New Information and Changes
In Circumstances Bearing on the CRBR Project

In addition to the 30-page list of changes in the CRBR project itself, a veritable avalanche of significant new information and changes in circumstances relevant to the Clinch River project or its environmental impact have arisen since the FES was published. Each new circumstance or piece of information alone is sufficient to warrant a FES supplement, but together they absolutely preclude any other course of action.

1. Environmental Impacts of CRBR Waste
Disposal -- The Table S-3 Decision.

The most important change of circumstances is the D.C. Circuit Court of Appeals' recent decision in NRDC v. NRC, ___ F.2d ___, No. 74-1586 (D.C. Cir. Apr. 27, 1982). In that case the court invalidated NRC's so-called "Table S-3 rule," which, inter alia, purported to list the environmental effects of reprocessing and disposal of high level nuclear waste. NRC had

developed the generic Table S-3 for inclusion in environmental impact statements on individual nuclear plants and for use by Licensing Boards in their NEPA cost/benefit analyses.

The D.C. Court of Appeals invalidated the Table S-3 rule as arbitrary and capricious, and "a blatant violation of NEPA" (slip op. at 46). The court held that the rule must explicitly deal with the uncertainties inherent in the assumption that no radiological effluents will be released into the environment once wastes are sealed in a permanent repository.

It is abundantly clear that the CRBR impact statement must be supplemented as a result of the decision in NRDC v. NRC. The radioactive wastes produced by CRBR plutonium fuel would be at least as toxic, if not more so, as those produced in light-water reactors, (see, e.g., slip op. at 3-46 (Edwards, J., concurring)). Realizing that waste disposal effects must be considered in the CRBR FES, NRC included Appendix D, Tables 2 and 3, which are scaled-down versions of Table S-3. Tables 2 and 3 rely upon the same background documents as Table S-3, (see FES Appendix D, Section 2.a) characterize the impacts of long-term waste disposal as "insignificant," and fail to discuss the uncertainties in the estimates of radiological impacts. These tables therefore suffer from the same infirmities as the Table S-3 rule, and must be revised in a supplemental statement.

2. Three Mile Island Accident

The second area of significant new information and changes in circumstances relevant to the environmental effects of the Clinch River Breeder Reactor is the implications of the 1979 accident at Three Mile Island Unit 2. Based on the lessons learned from that accident, the NRC has issued the NRC Action Plan Developed as a Result of the TMI-2 Accident (NUREG-0660) (Aug. 1980); the Identification of New Unresolved Safety Issues Relating to Nuclear Power Plants (NUREG-0705) (March 1981); and Licensing Requirements for Pending Applications for Construction Permits and Manufacturing License (NUREG-0718, Rev. 1) (June 1981). Several reports on the TMI-2 accident have also been issued, most notably the Report of the President's Commission on the Accident at Three Mile Island (Oct. 1979). These analyses of new information gained from TMI-2 regarding the probability and causes of reactor accidents must be factored into all future reactor licensing proceedings, including the Clinch River project. In particular, an analysis of the ways in which human error can initiate, exacerbate, or interfere with the mitigation of accidents is of crucial importance to any discussion of the environmental impacts of an accident at Clinch River.^{2/} The NRC must use this information, not only to supplement its discussion of core disruptive accidents (CDAs) as Class 9 accidents,

^{2/} The Report of the Reactor Safety Research Review Group (Sept. 1981) states that most studies of the likely causes of serious accidents conclude through probabilistic risk analysis that over 50% of the risk is associated with human failure to perform as indicated.

but also to reevaluate whether CDAs are sufficiently probable as to be considered in the FES as Class 8 accidents. To ignore the substantial body of TMI-2 information or to argue that such information is not significant would make a mockery of the NEPA process.

3. Critiques of the Reactor Safety Study Report (WASH-1400)

The CRBR FES safety analysis must also be reviewed and modified because of its reliance on the draft of the Reactor Safety Study Report, commonly called WASH-1400. This study, published in draft in August 1974 and in final form in October 1975, has been harshly critiqued and portions of it have been discredited. A Risk Assessment Review Group Report pointed to numerous shortcomings in the WASH-1400 report, in particular the Executive Summary, and found that the report "may have been used prematurely as an estimate of the absolute risk of reactor accidents without full realization of the wide band of uncertainties involved. Such use should be discouraged." Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission, NUREG/CR-0400, p. x.

As a result of this report the Commission expressly withdrew "any explicit or implicit past endorsement of the Executive Summary" and further concluded that "in light of the Review Group conclusions on accident probabilities, the Commission does not regard as reliable the Reactor Safety Study's numerical estimate of the overall risk of reactor accident." NRC Statement of Risk Assessment and the Reactor Safety Study Report (WASH-1400) in Light of the Risk Assessment Review Group Report, January 18, 1979.

If the WASH-1400 study is now considered unreliable, even in part, then clearly an impact statement analysis which expressly relies upon it must itself be considered unreliable. The discussion in the CRBR FES of accidents beyond the design basis expressly relies upon WASH-1400 for its conclusions that most LWR core melt accidents do not lead to early containment failure (FES Section 7.13). Based on this conclusion, the Staff required that the CRBR containment system must maintain integrity for 24 hours following a CDA in order to ensure CRBR safety at a level comparable to LWRs. Id. This Staff requirement, and the entire discussion of Class 9 accidents, must now be reevaluated in light of the defects in WASH-1400, since the probability of early containment failure may be much greater than previously estimated. Without such a reevaluation, there is no guarantee whatsoever that the CRBR will be made as safe as a light water reactor, or that the environmental impacts will be comparable.^{3/}

4. Alternative Sites

It is well established that the discussion of alternatives to the proposed action is "absolutely essential" to the NEPA

^{3/} The basis for many of the Staff's conclusions in the FES is the concept that CRBR risks are or can be made comparable to those associated with LWRs. NRDC is not prepared to endorse this concept, particularly since we do not believe that the Staff has any meaningful measure of either the overall risks of LWRs or of the CRBR, nor has the Staff even attempted to document that "comparability" has been achieved. Nonetheless, since "comparability" is the touchstone of this portion of the FES, we accept the concept for purposes of this argument.

process. Natural Resources Defense Council, Inc. v. Calloway 524 F.2d 79 (2d. Cir. 1975). The Commission has held that a discussion of alternative sites both within and outside of the Tennessee Valley Authority service area is relevant to the CRBR proceeding and must be included in the CRBR FES. In the Matter of United States Energy Research and Development Administration, Project Management Corporation, Tennessee Valley Authority (Clinch River Breeder Reactor Plant), CLI-76-13, 4 NRC 67 (1976). The 1977 FES analysis of alternative sites must be supplemented to take into account several potential sites that have recently become available, such as TVA Hartsville, Yellow Creek, and WPPSS-4 in Hanford, Washington. NRC must also reanalyze the desirability of alternative sites in light of new NRC policy favoring remote reactor siting.

On July 29, 1980, NRC published an advance notice of rulemaking on the revision of reactor siting criteria. 45 Fed. Reg. 50350. The notice pointed out (ibid.):

Events during the past year, including the events at the Three Mile Island Nuclear Station, have made the NRC, the Congress, and the public increasingly concerned that past siting practice may not afford sufficient protection to the public health and safety. Considering revision of NRC siting policy using the Task Force's recommendations is, therefore, particularly relevant at this time.

The NRC recently articulated its intent "to re-emphasize the desirability of site isolation * * *," Id. at 50351. Moreover, new emergency planning regulations have been promulgated. 45 Fed. Reg. 55402, August 19, 1980. In

addition, the Office of Nuclear Reactor Regulation has issued A Report of the Siting Policy Task Force (NUREG-0625) which recommends numerous changes to NRC policy on nuclear power reactor siting. See also NRC, A Comparison of Site Evaluation Methods, (NUREG/CR-1684) (July 1981); and the proposed rule regarding the review of alternative sites under NEPA, 45 Fed. Reg. 24168, April 9, 1980.

The siting decisions for the Clinch River project will thus have to be reevaluated in light of new information including siting criteria which are in the process of being developed. This is particularly essential because it has been acknowledged that the Clinch River site is not the best alternative, from the standpoint of public health and safety, even using the criteria applicable in 1977. In the CRBR FES, pp. 9-22 to 9-23, the NRC Staff admits that radiological exposure at alternative sites would be significantly lower--by as much as a factor of 10--than at Clinch River, and that alternative sites would offer a relative advantage with regard to accidental releases of radioactivity. Nonetheless, because of the 1986 decision date then thought to be controlling, the Clinch River site was approved. Clearly, now that this deadline does not exist, and the criteria for siting are being revised to provide greater protection to the public, the decision as to the site of the Clinch River plant must be totally reconsidered.

5. New Information on Radiological Health

Two significant pieces of new information bearing on the potential consequences of CRBR accidents and the environmental impacts on nearby residents are the publication of the Recommendations of the International Commission on Radiological Protection (Jan. 17, 1977) (ICRP Publication 26) (and related reports); and the Environmental Protection Agency (EPA) "Proposed Guidance on Dose Limits for Persons Exposed to Transuranium Elements in the General Environment."^{4/} The ICRP 26 Report recommends a new methodology for establishing dose equivalent limits for combined internal and external radiation exposures.

The NRC Staff did not utilize this approach in its 1977 CRBR Site Suitability Report. In updating this Site Suitability Report in May 1982, (NUREG 0786), the Staff has endorsed the ICRP 26 methodology (p. III-9) but has failed to apply it properly and failed to consider the alternative method of application recommended by the EPA. The proper application of the ICRP 26 (or EPA) approach, including the recommended use of separate organ dose limits to prevent non-stochastic effects, would have significant bearing on NRC's calculations of the potential radiological impacts of CRBR accidents on those living near the CRBR site.

^{4/} EPA 520/4-77-016, September 1977.

Similarly, EPA has recently proposed guidelines for the reduction of potential health impacts from future unplanned releases of plutonium and transuranium elements as might occur, for example, in an accident at the CRBR plant. This proposed guidance is in the form of limits on lung and bone dose associated with exposure to transuranium elements in the general environment. These limits are considerably lower than those currently being utilized to assess the potential radiological impacts of the CRBR. The NRC is obligated under NEPA to examine the implications of using the proposed EPA dose limits for transuranium element exposure and/or to explain the basis for the Staff's failure to consider separate control measures for limiting land contamination from transuranic elements with long radiological half-lives.

6. Changes in Safeguards Regulations

The 1977 FES contains a detailed discussion of the proposed safeguards measures to be employed by Applicants to prevent the theft or diversion of special nuclear materials and the sabotage of the CPBR or its fuel cycle facilities. This FES section must be completely redone since the protective safeguards requirements applicable to the CRBR and fuel cycle facilities in 1977 have been completely superseded by new NRC regulations. 10 CFR §73.55, "Requirements for Physical Protection of Licensed Activities in Nuclear Power Reactors Against Radiological Sabotage." The new

regulations will result in a complete overhaul of the licensing, inspection, and enforcement requirements imposed on the CRBR plant, as well as the measures employed by Applicants for personnel screening, physical security organization, physical barriers, access requirements, detection aids, response requirements, testing and maintenance. Id.

The Atomic Safety and Licensing Board has held that "an evaluation of the potential cost of safeguarding the CRBR, fuel cycle facilities and transportation supports should be included in the NEPA cost-benefit analysis." In the Matter of Project Management Corporation, Tennessee Valley Authority (Clinch River Breeder Plant), LBP-76-14, 3 NRC 430, 435 (1976). If the new safeguards regulations are in fact more stringent than the previous requirements, then the cost of additional personnel, equipment, etc. must be included in the FES and factored into the cost-benefit analysis. If the regulations are less stringent in some respects, then the additional risks to the public of theft or sabotage must also be evaluated. NRC may not avoid assessing the costs and impacts of CRBR's safeguards system and making the results of that analysis available for public comment by blithely characterizing these changes as an "improvement" over the previous system.^{5/}

^{5/} The NRC Staff has admitted that the FES discussion of CRBR safeguards must be revised. See, e.g. NRC Staff's answers to Natural Resources Defense Council, Inc. and the Sierra Club Twenty-Fourth Set of Interrogatories to Staff, pp. 10-11.

7. Endangered Species

Since the 1977 FES was issued, the U.S. Fish and Wildlife Service has notified the NRC that eleven species of freshwater mussels from the family Unionidae and one species of fish from the family Cyprinidae, each federally listed as threatened or endangered, may be present in the Clinch River near the proposed CRBR site. And, in fact, the March 1982 Survey of the Clinch River by the Applicants discovered one mussel specimen of Lampsilis Orbiculata, an endangered species, at Clinch River Mile 19.1. Clinch River Breeder Reactor Plant Site Preparation Activities Report, June 1982, Section 2.6.2.1. This species is hypersensitive to increased radioactive and other effluent levels, and would also be affected by increased thermal levels and sedimentation from dredging and barging.

The 1977 FES states only that "no species designated as rare or endangered by any governmental agency were collected or observed in the baseline ecological survey performed from March 1974 through January 1975." FES p. 2-17. This FES must be revised to discuss the implications of the proposed construction and operation of the CRBE on the endangered mussels, and any mitigating measures proposed by Applicants. Such discussion is required by both NEPA and the Endangered Species Act of 1973, 16 U.S.C. § 1531 et seq.

8. Cost-Benefit Analysis

Finally, the cost-benefit analysis presented in section 10.4 of the FES is hopelessly out of date, and could not by any stretch of the imagination serve as an adequate basis for decisionmaking by the Licensing Board or the public. The estimated project cost of \$1.95 billion has increased over 80% to a new official estimate of at least \$3.5 billion (Final Environmental Impact Statement (Supplement to ERDA-1535, Dec. 1975) on the Liquid Metal Fast Breeder Reactor Program, DOE/EIS-0085-FS (May 1982)). The estimated \$1.5 million capital costs and \$2 million annual operating costs for the safeguards system may also be greatly increased, as noted above. Furthermore, the costs of various CRBR components such as the steam generator system must be revised to consider the extensive problems with such systems in both LWRs and other breeder reactors since 1977, and the additional costs and delays that might be necessitated by redesigning, modifying, and testing. A recent GAO report on the Clinch River Breeder Reactor Steam Generator Testing Program indicated that, according to DOE officials, testing a full-scale CRBR-design steam generator could delay the project by as much as 45 months if fabrication of the CRBR steam generator is halted. See GAO/EMD-82-75, May 25, 1982. Such a testing program might be required in light of the steam generator leaks that occurred less than three months ago in the French Phenix demonstration breeder reactor. NRC must consider these additional costs and

reveal such costs to the public and the Licensing Board in order that both can judge whether the CRBR can meet the objectives of the LMFBR program.

CONCLUSION

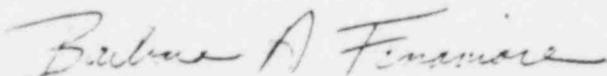
The above topics constitute only a few of the myriad changes and new data compelling the need for a supplement to the five-year old CRBR impact statement. NRC must itself scrutinize each area of the FES to determine if supplementation is necessary. We wish to emphasize that this discussion deals only with the need for supplementation of the 1977 FES, and not with the adequacy of the information that was presented in that document, which we continue to challenge.

NRDC fully intends to file suit against the NRC if it fails to supplement the CRBR FES. As a practical matter, such litigation could cause significant delays to the CRBR licensing schedule. However, should the NRC supplement the FES, only a minor delay of several months would ensue. NRDC understands that the FES update is substantially completed, and need only be circulated to the public to meet the requirements of NEPA.

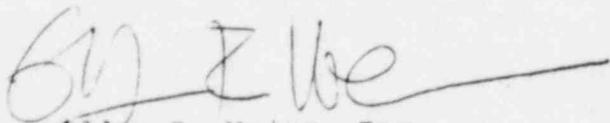
Instead of time consuming litigation, this minor delay would have a beneficial result: the production of a supplement to the FES with a more adequate evaluation of the total environmental impact of the CRBR. Allowing the public the opportunity to comment on the "revised" Clinch River Project

would increase public confidence in both the NRC and the projects it licenses. This project was shelved for five years because of unprecedented controversy over its safety, cost, need, and foremost, the threat which it may pose to national security by increasing the risk of nuclear proliferation. At the very least, the agency owes the public an opportunity to voice its views on this EIS before the project goes forward.

Sincerely,



Barbara A. Finamore, Esq.,
Attorney, NRDC



Ellyn R. Weiss, Esq.
Harmon & Weiss



Dr. Thomas B. Cochran
Senior Staff Scientist, NRDC

cc: William J. Dircks, Executive
rector for Operations

ATTACHMENT A
MEMORANDUM OF LAW

The function of an environmental impact statement is to aid the decisionmaker/agency and the public in making meaningful decisions whether to pursue a project or program. Save Lake Washington v. Frank, 641 F.2d 1330, (9th Cir. 1981); Suffolk County v. Secretary of Interior, 569 F.2d 1368 (2d Cir. 1977), cert. denied, 434 U.S. 1064 (1978). The EIS facilitates and provides a record of the agency decision making process. NRDC v. NRC, ___ F.2d ___, No. 74-1586 (D.C. Cir., April 27, 1982) at 32.

The detail required in an EIS is that which is sufficient to enable those who did not have a part in its preparation, such as the public, to understand and consider the factors which the agency took into account in reaching an informed decision. Suffolk County, 562 F.2d at 1375. See also Weinberger v. Catholic Action of Hawaii, ___ U.S. ___, 50 U.S. L.W. 4027, 4028 (Dec. 1, 1981) (dual aim of EIS is to inject environmental considerations into decision making process and to inform the public that the agency has addressed environmental concerns).

If an EIS issued by an agency fails to conform to the mandates of the National Environmental Policy Act, 42 U.S.C. s 4321 et seq. (1976) (NEPA), as implemented by the Council on

Environmental Quality regulations, 40 C.F.R. § 1500 et seq. (CEQ regulations),^{1/} the impact statement must be supplemented and circulated before it can be used by the agency in its decisionmaking process. NRDC v. Callaway, 524 F.2d 79, 91-92 (2d Cir. 1975) (use of supplemental EIS is permissible to bolster deficient EIS when supplement remedies the deficiency and is properly circulated before a final decision is reached by the agency); see NRDC v. Morton, 337 F. Supp. 170 (D.C. 1972); I-231 Why? Ass'n v. Burns, 372 F. Supp. 223, 253-260 (D. Conn. 1974), aff'd 517 F.2d 1044 (2d Cir. 1975).

^{1/} "The CEQ regulations, applicable to all federal agencies, including the [Nuclear Regulatory] Commission ... were expressly designed to establish uniform procedures for implementing NEPA and to eliminate inconsistent agency interpretations." People Against Nuclear Energy v. NRC, ___ F.2d ___, No. 81-1131, slip op. at 19-20 (May 14, 1982) [emphasis added]; see Andrus v. Sierra Club, 442 U.S. 347, 356-57 (1979) (interpretation of NEPA by CEQ under its mandatory regulations is entitled to substantial deference); E.O. No. 11991, 42 Fed. Reg. 26967 (1977) (adding sec. 2(g) to E.O. 11514: federal agencies have the responsibility to comply with regulations issued by the CEQ unless inconsistent with statutory requirements). Cf. 40 CFR 1502.9(c)(4) (agencies shall prepare, circulate and file an EIS supplement in same manner as a draft and final EIS unless alternative procedures are approved by the CEQ). It is thus indisputable that the NRC is bound by the procedural requirements of the CEQ regulations. See generally Leibesman, NEPA's Substantive Mandate, 10 E.L.R. 50039, 50044-52 (1980) (the rationale for making agency compliance with CEQ regulations mandatory includes furthering NEPA's substantive goals).

The CEQ regulations specifically call for preparation of a supplemental EIS if "the agency makes substantial changes in the proposed action that are relevant to environmental concerns" or there are "significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts." 40 CFR § 1502.9(c)(1)(i) and (ii). CEQ has recently elaborated on these provisions, noting that EISs more than five years old should be carefully reexamined to determine if Section 1502.9 compels preparation of an EIS supplement. 46 Fed. Reg. 18036 (1981).

In the instant proceeding, the 1977 CRBR FES is legally insufficient because it fails to address substantial changes in the proposed project as well as significant new circumstances and information which have arisen since the FES was issued in 1977. See Letter of July 1, 1982 from Barbara A. Finamore, Ellyn R. Weiss, and Dr. Thomas B. Cochran, NRDC, to NRC Chairman Nunzio Palladino; 40 CFR 1502.9(c)(1)(i) and (ii). Therefore, to comply with NEPA the FES must be supplemented and the supplement circulated for comments.

In EDF v. Marsh, 651 F.2d 983, 991 (5th Cir. 1981) plaintiffs claimed that the Army Corps of Engineers violated NEPA by failing to supplement the FES for the Tennessee-Tombigbee Waterway following the project changes which resulted in increased projected traffic use, increased flooded land and a design change for the waterway. The court

indicated that NEPA should not be read so narrowly as to leave the decision to supplement an EIS solely to the discretion of the agency. An EIS should be supplemented when subsequent project changes can, in qualitative or quantitative terms, be classified as major federal actions significantly affecting the environment. Id. Another court has noted that the legislative history of NEPA indicates that major federal actions include expansion or revision of ongoing projects. City and County of Denver v. Bergland, 517 F. Supp. 155, 202 (D. Colo. 1981), citing S. Rep. No. 91-296, p. 20 (1969). Cf. EDF v. Andrus, 619 F.2d 1368, 1377 (10th Cir. 1980) (supplement will be required to program EIS if significant change occurs).

Similarly, the existence of significant new information and circumstances such as those discussed in the letter referenced supra, p. 3 mandate that the NRC supplement and circulate the FES since it is well established that a supplement must be prepared when such new information becomes available after the preparation of the final statement.^{2/}

^{2/} See, e.g., Society for Animal Rights v. Schlesinger, 512 F.2d 915, 917-918 (D.C. Cir. 1975); Natural Resources Defense Council, Inc. v. Callaway, 524 F.2d 79, 91-92 (2nd Cir. 1975); Essex County Preservation Ass'n v. Campbell, 536 F.2d 956, 960-961 (1st Cir. 1976); Warm Springs Dam Task Force v. Gribble, 621 F.2d 1017, 1023-1024 (9th Cir. 1980); Red Line Alert v. Adams, 10 ELR 20314, 20316, (D. Mass. 1980); Monarch Chemical Works, Inc. v. Exxon, 452 F. Supp. 493, 500 (D. Neb. 1978).

In Essex County Preservation Ass'n v. Campbell, 536 F.2d 956, 960-61 (1st Cir. 1976), the court addressed the sufficiency of an EIS prepared for a highway expansion project. The court noted that the effects of a subsequent state moratorium on highway construction, which had not been addressed in either the draft or final EIS, warranted ventilation in a supplemental EIS.

As stated recently by the D.C. Circuit, the purpose of NEPA is to assure that agencies such as the NRC take a hard look at the environmental consequences of major proposed actions. See People Against Nuclear Energy (PANE) v. NRC, ___ F.2d ___, No. 81-1131, slip op. at 23 (D.C. Cir. May 14, 1982). In PANE, the court addressed whether psychological health effects of the Three Mile Island accident were cognizable under NEPA. The court held that the TMI restart proceeding EIS would have to be supplemented to address post-traumatic psychological health effects of the TMI accident unless the Commission could reasonably find that the psychological health information was not new or significant. Id. Reasonableness would be evaluated by such criteria as the environmental significance of the new information, the probable accuracy of the new information and the degree of care used by the agency in its explanation not to supplement the EIS. Id. at 26; accord, Warm Springs Dam Task Force v. Gribble, 621 F.2d 1017, 1025 (9th Cir. 1980). Cf. Citizens Against 2,4-D v. Watt, 527 F. Supp. 465, 468 (W.D.

Okla. 1981) (an agency determination not to prepare an EIS is reasonable only if the agency can demonstrate a compelling case of nonsignificance of the proposed action; in this case, since the agency showed that applications of pesticide would not increase 2,4-D levels above EPA minimums, the court held that the action was not significant).

Beyond merely supplementing the deficient CRBR EIS, however, the NRC must circulate the supplement in draft form for comments by agencies and the interested public before using it in the LWA-I proceedings. See n. 1, supra, p. 2. Circulating a draft EIS allows the agency to receive comments from individuals not involved in its preparation; this fundamental procedural requirement guards against objective error and excessive bias which might otherwise go undetected in the EIS. Essex County Preservation Committee, 536 F.2d at 961; I-291 Why? Ass'n 372 F. Supp. at 258. The EIS decisionmaking structure, which requires circulation of supplements for comments by the interested public, is not inherently flexible nor subject to agency discretion. See, e.g., NRDC v. NRC, supra, at 32; 40 CFR 1502.9(c)(4). Therefore, it is irrelevant under NEPA whether the NRC believes ab initio that the comments which might be received on a supplemental EIS would not affect their ultimate decision to proceed with the CRBR project; they still must conform to NEPA procedural requirements. See I-291 Why? Ass'n, 372 F. Supp. at 260, citing NRDC v. Morton, 337 F. Supp. 167, (D.D.C. 1971), aff'd, 458 F.2d 827.

The unique NRC regulation which allows modification of the content of a final EIS during the LWA-I proceedings, 10 CFR 51.52(3), does not alter the need to supplement the FES and circulate the supplement in the instant proceeding to conform with the procedural requirements of NEPA. In Public Service Co. of Oklahoma, (Black Fox Stations Units 1 and 2), ALAB-573, 10 NRC 775, 786 (1970) the appeal board, citing NRDC v. Morton and 1-291 Why? Ass'n, noted that recirculation of a FES, rather than the 51.52(3) procedure, may be required if the proposed project had been so changed as to not have been "fairly exposed to public comment" during the initial circulation of the FES. And in Florida Power & Light Co. (Turkey Point Plant Units 3 and 4), ALAB-660, 14 NRC 987, 1014 (1981) the appeal board, citing Black Fox Station, supra, said that there may be instances where absence of discussion in an FES "is so fundamental an omission" as to call for recirculation of the FES. The Board determined that the failure to discuss the impact of severe storms on low level waste was not such a fundamental omission; however, if the FES had disregarded important alternatives or failed to apprise the public of the nature of the project or its expected consequences, then such omissions could not be cured by evidentiary submissions to the Licensing Board. Id. Both these decisions support the proposition that agency regulations do not override NEPA procedural requirements.

The fundamental nature of the omissions in the instant proceedings is also distinguishable from those involved in New England Coalition v. NRC, 582 F.2d 87 (1st Cir. 1978). In New England Coalition, the court affirmed a decision by the Commission, Public Service Co. of N.H. (Seabrook Units 1 and 2) CLI-78-1, 7 NRC 1 (1978) not to supplement and recirculate a FES. After the FES was prepared the EPA required that the applicant move an intake from 3,000 to 7,000 feet offshore to minimize environmental impacts. Id. at 93. The Licensing Board evaluated the impact of the 7,000 foot location during the construction permit stage pursuant to 10 CFR § 50.52(b)(3). The Court held that this procedure satisfied NEPA because the NRC was entitled to rely on the EPA conclusion that the 7,000 foot location would have less impact than the 3,000 foot location addressed in the FES. "The FES ... consider[ed] a stronger case against the plant." Id. at 94.^{3/} Such a minor modification of the FES at the hearing complied with the "spirit of NEPA," Id. See also Citizens for Safe Power v. NRC,

^{3/} This is distinguishable from a situation such as the instant case where new regulations create stricter standards which the NRC must utilize in making decisions regarding siting and other safety issues.

Environmental analysis in the prior EIS utilizing the less stringent regulations would not constitute a "stronger case against the plant." On the contrary, new regulations might increase expenses or render a previously-suitable site unusable. Therefore, the impact of the new regulations upon the CRBR must be factored into an updated cost/benefit analysis of the environmental costs and benefits of the plant.

524 F.2d 1291, 1294 and N.5 (D.C. Cir. 1975) (radiological stipulation could be included in FES via 51.52 procedure); Philadelphia Electric Co. (Limerick), ALAB-262, NRCI-75/3 163, 195-7 (1975) (appeal board stressed that single new factor--adoption of alternative method of providing supplemental cooling water--did not constitute a major alteration of the proposal).

However, in the instant proceeding, in light of the quantity of new information and changed circumstances which have arisen during the five year hiatus, the action of the board could not possibly constitute a "minor modification" of the FES. Therefore, to comply with the mandates of the National Environmental Policy Act, the Council on Environmental Quality Regulations, case law and prior decisions of the NRC, the NRC must supplement and circulate the CRBR FES before relying on it in the LWA-1 proceedings.

ITEM 290.1R

Provide a succinct summary and discussion in table form, by ER section, of differences between currently projected station design and environmental effects (including those that would degrade, and those that would enhance environmental conditions) and the effects discussed in the environmental reports submitted in 1975, Amendments 1 through 7.

Summary of Response:

The changes to CRBRP design which have occurred since 1977 and the expected environmental effects of these changes are summarized succinctly by ER section in the attached table. Most of the ER sections have already been modified to reflect the design changes and their environmental effects. The sections that are yet to be modified in future amendments to the ER are highlighted in boxes in the table and for your convenience are listed below.

<u>ER Section</u>	<u>Summary of Change(s) to be Reflected in Future ER Amendments</u>
1.0	Heterogeneous core replaces homogeneous core arrangement. This section will also address the supplement to the LMFBR Program Final Environmental Statement.
2.2	Inclusion of the most recent demographic data available.
3.5	Numerous refinements in the plant systems designs that result in changes to the effluent from the plant.
4.1.2.1	Construction water consumption estimates have been increased.

- 5.2 Changes to radiological source term and pathway analysis.
- 5.3 Changes to the radiological source term, pathway and population data.
- 5.4.3 Instead of being directly discharged to the Clinch River via catch basins, storm water collected by the roof and yard drains is sent via the storm drainage system to the impounding ponds for settlement and ultimate discharge to the river.
- 5.8.1 Increased total acreage commitment.
- 6.1.4.2 Inclusion of most recent demographic data available.
- Chapter 7 X/Q's based on a complete on-site meteorology data base have been provided; changes to the plant design and analysis methods which result in modified source terms require updated dose calculations.
- Chapter 8 Revised construction manpower requirements, 1980 census and other recent demographics data.
- Chapter 9 A supplement to the LMFBR Program Final Environmental Statement will be issued; responses will be provided for recent NRC questions.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
1.0	TO BE PROVIDED		Heterogeneous core replaces homogeneous core arrangement (See Section 3.8). This Section will also address the supplement to the LMFBR Program Final Environmental Statement.	
2.1	2.1-1 thru 2.1-10	Plant	Construction site acreage increased. Plant arrangements updated. Five impounding ponds were identified and located on Figure 2.1-3.	See Section 4.0
2.2	TO BE PROVIDED		Evaluation of demographic changes in process. Changes will be provided in a future amendment.	
2.3			No change.	
2.4	2.4-15 thru 2.4.22	Geology	Changed to provide data for 24 additional boreholes, taken from September 1976 to June 1977.	Environmentally inconsequential.
2.5				
2.5.1	2.5.1 thru 2.5-10	River	Updated river levels, flows, temperatures, etc.	Environmentally inconsequential.
2.5.2				
2.5.2.1			No change.	
2.5.2.2			No change.	
2.5.2.3			No change.	
2.5.2.4	2.5-18	Ground-water	Established piezometric gradient.	Environmentally inconsequential.
2.5.2.5			No change.	
2.5.2.6			No change.	
2.5.2.7			No change.	
2.6	2.6-1 thru 2.6-99	Meteorology	Updated to include data accumulated using permanent meteorological tower.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
2.7				
2.7.1				
2.7.1.1	2.7-1a	Forest Manage-	Incorporates ORNL forest management activities from 1976 through 1980.	No change in estimated environmental effects for CRBRP. Mitigation measures for Southern Pine Beetle and Pitch Canker infestations.
2.7.1.2			No change.	
2.7.1.3	2.7-7 thru 2.7-9	Flora	Update vegetation inventory reporting.	Environmentally inconsequential.
	2.7-24, -37	Flora	Correct pine designation.	Environmentally inconsequential.
	2.7-38l, -38m	Flora	Revise category designation from "threatened" to "rare" to reflect current terminology.	Environmentally inconsequential.
2.7.1.4	2.7-38o thru 2.7-38t	Fauna	Update wildlife occurrence data.	Environmentally inconsequential.
	2.7-38ee	Insects	Update reporting concerning insect pests.	Environmentally inconsequential.
	2.7-38ff	Fauna	Revised to include possibility of eastern cougar occurrence on Oak Ridge Reservation.	Occurrence on CRBRP site not confirmed. Also, cougar home range is sufficiently extensive to absorb effect of CRBRP installation. Environmentally inconsequential.
	2.7-38gg	Avifauna	Adds mention of osprey nest occurrence at Watts Bar Lake.	Osprey nesting at CRBRP site has not been observed. Environmentally inconsequential.
2.7.1.5			No change.	
2.7.1.5	2.7-38tt	Avifauna	Update classification of American osprey.	Occurrence of nesting at site has not been observed.
2.7.1.7	2.7-38ww	Surveys	Report on 1980 reconnaissance surveys.	Environmentally inconsequential.
2.7.2				
2.7.2.1			No change.	
2.7.2.2			No change.	

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
2.7.2.3			No change.	
2.7.2.4	2.7-87g	Fish	Report of occurrences of the blue sucker in Watts Bar Lake. Blue sucker is identified as a threatened species.	Occurrence not reported near Site. Environmentally inconsequential.
2.7.2.5	2.7-87h -87i	Aquatic Surveys	Report on 1980 reconnaissance surveys.	Stocking activities have resulted in reported increases in gamefish. No change in estimated environmental effects due to CRBRP.
2.8	2.8-1 thru 2.8-109	Back-ground Radiation	Complete update reflecting latest ORNL, TVA and similar organization studies and scientific papers.	Data better characterizes the actual site and the surrounding areas. Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
3.0				
3.1	3.1-1	External Appearance	A five foot high animal fence was added at a distance of 33 feet from the security fence.	Preclude small animals from plant site and restrict them to more natural environs. Environmentally inconsequential.
3.1.1	3.1-2	Plant Bldg. & Facilities	Gatehouse, circulating water pump house and fire protection pump house were identified. The switch yard relay house was added. The configuration and location of the emergency cooling tower structure were revised.	Environmentally inconsequential. Environmentally inconsequential.
3.1.2	3.1.4	Plant Site	Five foot high animal fence added.	Environmentally inconsequential.
3.1.3	3.1-4	Other Facilities	The size of paved parking area was reduced for accommodation of 155 cars instead of 250 before.	Environmentally inconsequential.
3.2				
3.2.1			No change.	
3.2.2	3.2-3	Core	Replaced homogeneous core with heterogeneous arrangement resulting in eliminating one fuel enrichment zone (was 2 now 1), reducing number of fuel assemblies from 198 to 156, reducing number of radial blanket assemblies from 150 to 132, adding 82 inner blanket assemblies, and increasing Pu enrichment in fuel assemblies from 18.7-32% to 32-33%.	Net change judged to be insignificant.
3.2.3			No change.	
3.3				
3.3.1	3.3-1	Overall Plant	Average annual consumptive water use figures were revised to be consistent with those in Tables 3.3-1, 3.3-2 and 3.3-3.	Environmentally inconsequential.
3.3.2	3.3-2	Cooling Tower	Flowrate to cooling tower from condenser increased from 209,200 gpm to 212,200 gpm.	Slight increase in plume size will not produce significant environmental impact.
3.3.3	3.3-2	Process Water Treatment System	Added makeup water treatment system	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
3.3.4	3.3-3	Waste Water Disposal System	All process waste water including floor drains, go to Waste Water Disposal System instead of being routed to either cooling tower basin or neutralization and settling facilities.	Results in higher quality of water discharged.
3.3.5	3.3-3	Radwaste Systems	Updated description.	See Section 3.5.
3.3.6	3.3-4	Potable Water Sources	Potable water is supplied by DOE's Bear Creek Road Filtration Plant instead of the Make-up Water Treatment System.	Environmentally inconsequential.
Table 3.3-1	3.3-5	Plant Flow-rates During Maximum Power	<p>Increase in plant make-up flow rate from 5835 gpm to 6145 gpm.</p> <p>Increase in cooling tower evaporation rate from 3475 gpm to 3623 gpm.</p> <p>Increase in cooling tower drift rate from 105 gpm to 106 gpm.</p> <p>Increase in cooling tower blowdown rate from 2210 gpm to 2306 gpm.</p> <p>Decrease in Process Waste Treatment flow rate from 125 gpm to 110 gpm.</p> <p>Waste Water Disposal System Flowrate designed at 100 gpm.</p> <p>Increase in plant discharge rate from 2,251 gpm to 2,411 gpm.</p> <p>Increase in total consumptive use of river water from 3,584 gpm to 3,733 gpm.</p>	<p>Environmentally inconsequential.</p>

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
Table 3.3-2	3.3-6	Plant Flow-rates During Minimum Power	Increase in Plant Make-up Flowrate from 2,361 gpm to 2,527 gpm.	Environmentally inconsequential.
			Increase in cooling tower evaporation rate from 1,390 gpm to 1,450 gpm.	Environmentally inconsequential.
			Increase in cooling tower blowdown rate from 884 gpm to 925 gpm.	Environmentally inconsequential.
			Decrease in process water treatment flow-rate from 125 gpm to 110 gpm.	Environmentally inconsequential.
			Waste Water Disposal System flowrate designed at 100 gpm.	Environmentally inconsequential.
			Increase in plant discharge rate from 925 gpm to 1,030 gpm.	Environmentally inconsequential.
			Increase in total consumption use of river water from 1,436 gpm to 1,496 gpm.	Environmentally inconsequential.
Table 3.3-3	3.3-7	Plant Flow-rates During Temporary Shutdown	Increase in plant makeup flowrate from 625 gpm to 715 gpm.	Environmentally inconsequential.
			Increase in cooling tower blowdown flowrate from 221 gpm to 231 gpm.	Environmentally inconsequential.
			Increase in cooling tower evaporation rate from 348 gpm to 363 gpm.	Environmentally inconsequential.
			Decrease in process water treatment flowrate from 125 gpm to 110 gpm.	Environmentally inconsequential.
			Waste Water Disposal System flowrate designed as 100 gpm.	Environmentally inconsequential.
			Increase in plant discharge flowrate from 262 gpm to 336 gpm.	Environmentally inconsequential.
			Increase in total consumptive use of river water from 363 gpm to 378.	Environmentally inconsequential.
Table 3.3-4	3.3-8	Plant Water Usage Seasonal Variation	Seasonal Flowrates in Table have been adjusted to reflect present design.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
3.4.1	3.4-1	Cooling Tower	Updated Makeup water addition to 6035 gpm.	Environmentally inconsequential.
3.4.2	3.4-3	River Water Pumps	Design flowrate for river water pumps decreased from 10,000 gpm each to 9,000 gpm each.	Environmentally inconsequential.
3.4.3			No change.	
Table 3.4-1	3.4-5	Heat Dissipation Design Parameters & Conditions	Heat rejected from a cooling tower increased from 2.172×10^9 BTU/HR to 2.256×10^9 BTU/HR.	Environmentally inconsequential.
Table 3.4-2	3.4-6	Component Descriptions	Updated Design Parameters.	Environmentally inconsequential.
Table 3.4-4	3.4-8	Cooling Tower Blowdown Temperature	Average monthly cooling tower blow-down temperatures increased slightly.	Environmentally inconsequential.

3.5 (ALL CHANGES TO SECTION 3.5 THAT ARE DESCRIBED BELOW WILL BE PROVIDED IN A FUTURE AMENDMENT TO THE ER.)

3.5.1			No change.	
3.5.1.1			No change.	
3.5.1.2	3.5-3	Filter	A filter deleted from the liquid radwaste system.	Environmentally inconsequential.
3.5.2				
3.5.2.1	3.5-7	Noble Gases	The ^{39}Ar and ^{41}Ar produced by direct activation of ^{38}Ar and ^{40}Ar is now included in the radioactive source terms used for design work.	The additional Argon from this source is negligible and the environmental impact is considered insignificant.
3.5.2.2	3.5-8	Treatment and Release System	Design has been changed so that ^{85}Kr from RAPS is no longer bottled but is processed thru CAPS and released to H&V.	The site boundary beta skin dose is increased by approximately a factor of 2, but the potential for accidental exposure due to ^{85}Kr storage and shipping is removed. The net change in environmental effects is judged to be insignificant.

Continuation

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
			Previously all leakages of cover gas or recycled cover gas were processed through CAPS. Now most of the cells containing components which could leak cover gas vent to H&V.	The site boundary beta and gamma doses are increased; a slightly adverse effect. The beta dose increased by approximately 1.5, gamma dose by approximately 3.
3.5.2.3	3.5-9, 10	Tritium Removal System	The tritium removal unit has been redesigned.	Environmentally inconsequential.
3.5.2.4	3.5-11	Head Seals	<p>The reactor cover gas leakage rate was reduced from 0.012 SCC per minute to 0.0044 SCC per minute.</p> <p>The diffusion of Tritium through piping walls into PHTS and auxiliary Na cells has been added to design assumptions. Any significant amount of Tritium has been included in the current radiological source terms.</p>	<p>The site boundary beta and gamma doses are decreased; a slightly favorable environmental effect.</p> <p>The additional radioactivity contributed by the small amount of Tritium diffusing through piping walls is insignificant compared to the radioactivity contained in the cover gas which is assumed to leak into cells at the rate of 1 cc/min. The impact is judged insignificant.</p>
3.5.2.5	3.5-12	Release Points	<p>Ventilation exhaust rates at radiological release points have been revised. Examples are the release point in the SGB Intermediate Bay which increased from 50,000 SCPM to 64,000 SCPM and the exhaust point on top of the RCB which increased from 415,000 SCPM to 418,000 SCPM.</p> <p>Ventilation exhaust temperature ranges at radiological release points have increased. An example is a release point in the RSB that did have a range of 65°F to 120°F and now ranges from 55°F to 140°F.</p> <p>The CAPS Reactor Service Building H&V Exhaust has been deleted. CAPS now exhausts through the RSB exhaust with safety-related exhaust radiation monitors.</p> <p>RAPS process components have been moved from the RSB to the RCB.</p>	<p>Higher exhaust rates could potentially have more environmental impact due to shorter hold-up of radionuclides. However, the doses resulting from plant releases remain well below guideline limits.</p> <p>This change in temperature range will have no impact. Density variations which could release more or less radioactive material are accounted for in the preceding changes in exhaust rates.</p> <p>No environmental impact for normal release. Improved protection against release of above normal radioactivity from the plant due to off-normal conditions - a slightly favorable effect.</p> <p>No environmental impact for normal operation. Improved protection against release of radioactivity from the plant following RAPS accidents - a slightly favorable effect.</p>

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
3.5.2.6	3.5-13, -14	RAPS	Revises gaseous release data based on relocated RAPS, updated burnup and release point data, and most recent meteorology.	No environmental impact for normal operation. Improved protection against release of radioactivity from the plant following RAPS accidents -- a slightly favorable effect.
3.5.2.7	3.5-14, -15	Balance of Plant	<p>Turbine generator building ventilation exhaust location change from elevation 905'6" to 878'0", release rate decrease from 17,500 cfm to 8,000 cfm, exhaust flow velocity increase from 585 feet/min. with a temperature range of 85 to 120°F to 900 feet/min. with a temperature range from 55°F to 120°F.</p> <p>Plant Service Building ventilation exhaust location changed from elevation 830'0" to 831'2". Number of release points decreased from 2 to 1.</p>	Environmentally inconsequential.
3.5.3 (3.5.3.1 3.5.3.2)	3.5-15	Solid Radwaste System Equipment	Solid radwaste equipment is now is now identified as including a cement filling station, a decanting station, a concentrated waste collection tank, a drumming station, a filter handling machine and a compactor. (See also Tables 3.5-10 and 3.5-11).	Environmentally inconsequential.
3.5.3.3	3.5-15	Noncompatible Solids of Radwaste System	There will be a total of 82 (instead of 202) 55 gallon drums per year used to store the low activity, non-compatible solids after treatment at the solid radwaste system.	Environmentally inconsequential.
3.5.3.4	3.5-16	Radioactive Sodium	There are now 2 drums of waste metallic sodium per year with an activity level of 20 Ci/drum instead of 6 drums/year with an activity level of 1.5 Ci/drum stored and/or processed on site.	Environmentally inconsequential.
3.5.3.5	3.5-17	Sodium Bearing Solids	The disposal of sodium bearing waste, which was not previously identified, has been selected. No currently licensed off-site disposal facility will accept sodium bearing wastes, therefore, for off-site disposal of these wastes, the sodium will be removed. Where sodium removal is not practical, the waste will be stored on-site.	Environmentally inconsequential.
		Activity	Individual primary cold trap contained activity of Tritium increased from 8.7×10^3 Ci to 1.85×5 Ci and activity of fission and corrosion products increase from 1×10^3 Ci to 1.41×10^5 Ci. The	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
			contained activity will not be removed or released from the cold traps. The EVST cold trap contained activity increased from 6.7×10^3 Ci. The Tritium activity increased from 150 Ci to 180 Ci.	
Table 3.5-1	3.5-18, -19	IALL System	Some of the assumptions that Table 3.5-1 had been based upon have changed: <ol style="list-style-type: none"> 1) Intermediate activity concentration for the first rinse computed assuming 10% (instead of 40%) of plated out activity and 100% of sodium activity adhering to the process components is dissolved in 100,000 (instead of 37,000) gallons of water per year. 2) Processed components involve an average annual volume of 3,200 (instead of 14,700) gallons. 	Environmentally inconsequential.
Table 3.5-2	3.5-20 thru -22	IALL System	Some of the assumptions that Table 3.5-2 had been based upon have changed: <ol style="list-style-type: none"> 1) Iodine DF=10^4 included. Monitoring tank volume decreased from 2,500 gallons to 2,400 gallons. 2) Iodine DF=10^4 included. 	Environmentally inconsequential.
Table 3.5-3	3.5-23, -24	IALL System	Some of the assumptions that Table 3.5-3 had been based upon have changed: <u>Low Activity Liquid Waste Assumptions:</u> <ol style="list-style-type: none"> 1) Iodine DF=10^4 and Tritium DF=1 included. <u>Intermediate Activity Liquid Waste Assumptions:</u> <ol style="list-style-type: none"> 1. Liquid waste discharged to the common plant discharger (instead of the coolant water blowdown stream). Iodine DF=10^4 and Tritium DF=1 included. 	Environmentally inconsequential.
Table 3.5-10	3.5-31	Expected Weight, Volume and Activity of Solid Radwaste	Values in table have been changed to reflect current design. Total estimated volume of solid radwaste generated decreased from 3,094 ft ³ /yr to 2,865 ft ³ /yr.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
			Total estimated weight of solid radwaste generated decreased from 2.6×10^5 lbs/yr. to 1.9×10^5 lbs/yr.	
			Total estimated activity of solid radwaste generated decreased from 6.6×10^4 Ci/yr. to 3.2×10^3 Ci/yr.	
Table 3.5-11	3.5-32	Expected Solid Radwaste Shipments per year	Expected containers per year of solidified liquid radwaste decreased from 170 to 135. Expected containers per year of filters and resins decreased from 120 to 30.	Environmentally inconsequential.
Figure 3.5-1	3.5-33	Basic Flow Design	Inlets of collecting tanks now include filters.	Environmentally inconsequential.
Figure 3.5-5	3.5-37	Basic Flow Design	Completely revised to reflect vendor design.	Environmentally inconsequential.
3.6			No change.	
3.6.1			No change.	
3.6.2	3.6-3	Sodium Hypochlorite Injection	Capability of injecting sodium hypochlorite into cooling tower basin, on a continuous or intermittent basis.	Environmentally inconsequential.
3.6.3	3.6-4	Demineralizer	Delete limits on demineralizer chemicals.	Environmentally inconsequential.
3.6.4	3.6-5	Sewage Disposal	Chlorine limits set to meet NPDES permit limits.	Environmentally inconsequential.
Figure 3.6-1	3.6-7		Incorporate changes as described in text.	Environmentally inconsequential.
3.7			No change.	
3.7.1	3.7-1	Sanitary Sewage System	Addition of pretreatment and extended aeration of activated sludge. Compares effluent concentrations to NPDES permit limits (Table 3.7-1).	Environmentally inconsequential.
3.7.2			No change.	

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
3.8				
3.8.1.1	3.8-1, -2	Core Design	<p>Replaced homogeneous core arrangement with heterogeneous core arrangement resulting in reducing the number of fuel assemblies from 198 to 156, increasing the Pu enrichment from 18.7 to 32% fissile to 33.2% total.</p> <p>Deleted option to use natural uranium as alternate material to depleted uranium as feed material for fuel pellets.</p> <p>Revised refueling scheme from replacing approximately one-third annually to batch replacement of all the fuel and inner blanket assemblies at two year intervals with mid-interval replacement of 6 inner blankets with fresh fuel assemblies.</p>	<p>Decreases the heavy metal commitment (U or U + Pu) in the axial blankets and core from 5.4 MT to 4.2 MT and from 6.5 MT to 5.2 MT, respectively. Environmentally inconsequential.</p> <p>Environmentally inconsequential.</p> <p>Average yearly shipments of fresh fuel would therefore increase from about 33 to 42. Environmentally inconsequential.</p>
3.8.1.2	3.8-2	Core Design	<p>Replaced homogeneous core arrangement with heterogeneous core arrangement resulting in increasing the total number of blanket assemblies from 150 (radial) to 214 (82 inner and 132 radial).</p> <p>Revised dimensional parameters of blanket rods (outside diameter decreased from 0.520 in. to 0.506 in.) and assembly weight increased (from 525 lbs. to 536 lbs.).</p> <p>Revised refueling scheme from annual refueling to batch refueling at two-year intervals.</p>	<p>Increases the heavy metal (U) commitment from 16.4 MT to 21.6 MT. Environmentally inconsequential.</p> <p>Environmentally inconsequential.</p> <p>Average yearly shipments fresh blanket assemblies will therefore increase from 13 to 35. Environmentally inconsequential.</p>
Figure 3.8.1	3.8-10	Reactor	Revised to show heterogeneous core layout.	Environmentally inconsequential.
Figure 3.8.2	3.8-11	Fuel	Dimensions removed.	Environmentally inconsequential.
3.8.2.1	3.8-3, -4	Core Design	Replaced homogeneous core arrangement with heterogeneous core arrangement and revised refueling scheme from annual refueling to batch refueling at two year intervals resulting in increasing the average number of fuel assemblies discharged yearly from 65 to 81, decreasing the fuel assembly burnup from	Shipping schedule for spent fuel increases from 8 to 12 shipments per year to one shipment per week. Change judged to be slightly adverse.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
			200,000 MWD/Ton average to 80,000 MWD/Ton average, and the peak burnup to 110,000 MWD/Ton, decreasing the average burnup in the axial blankets from 4,000 MWD/Ton to 2,200 MWD/Ton, and reducing the amount of bred fissile Pu from 1 kg/assy. to 0.3 to 0.4 kg/assy.	
			Revised weight and dimensions of spent fuel shipping cask.	Environmentally inconsequential.
3.8.2.2	3.8-4, -5	Core Design	Replaced homogeneous core arrangement with heterogeneous core arrangement and revised refueling scheme from annual to batch resulting in increasing the number of blanket assemblies discharged from the plant per year from 25 to 70, increasing the burnup per assembly from 5,700 MWD/Ton to 8,000 MWD/Ton, increasing the average and peak heat generation from 1 kw average (radial) to 2.6 kw (inner) and 1.6 kw (radial) and from 7 kw peak (radial) to 19.7 kw (inner) and 12 kw (radial).	Increases the number of spent blanket assembly shipments from 3 to 6-7 per year. Change judged to be slightly adverse.
3.8.3				
3.8.3.1	3.8-5 thru 3.8-7	Core Design	Replacement of homogeneous core arrangement with heterogeneous core arrangement results in reducing the number of primary control assemblies from 15 to 9 and in increasing the number of secondary control assemblies from 4 to 6.	Change judged to be slightly favorable.
			If lifetime considerations permit, control rods could remain in the reactor for two cycles, also the driveline lifetime has been increased from 10 to 15 years.	Change judged to be slightly favorable.
			Revised configuration of radial shield assembly from stacked hexagonal plates to closely packed rods in a hex duct and decreased assembly weight from 750 to 360 lbs.	Environmentally inconsequential.
			Because of the change to the heterogeneous core arrangement the lifetime of the first row of shield assemblies has increased from 3 to 10-to-15 years, part of the second row lifetime has increased from 6-to-12 to 10-to-25 years, and the third	This greatly reduces the number of shipments of irradiated shield assemblies. Change judged to be favorable.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
			and fourth rows are not expected to require replacement during plant lifetime. The number of first row assemblies has been reduced from 72 to 54.	
3.8.3.2	3.8-8	RAPS	Design has been changed so that ^{85}Kr is no longer bottled but is processed through CAPS and released to H&V.	The site boundary beta skin dose is increased by approximately a factor of 2, but the potential for accidental exposure due to ^{85}Kr storage and shipping is removed the net change in environmental effects is judged to be insignificant.
	3.8-8, -9	Primary Cold Trap	The tritium levels were updated from 1.8×10^4 Ci to 1.85×10^5 Ci and the fission products and corrosion products increased from 1×10^3 Ci to 1.41×10^5 Ci. Cold traps are to be stored on site since no currently licensed disposal site will accept sodium-bearing wastes.	Material will not be released so the changes are judged to be environmentally inconsequential.
3.9				
3.9-1			No change.	
3.9-2			No change.	
3.9-3			No change.	
3.9-4	3.9-4	Flora	Update to account for ORNL forest management activities since 1976. (Table 3.9-1)	No change in environmental effects due to CRBRP.
3.9-5			No change.	
3.9-6			No change.	
3.9-7			No change.	
3.9-8			No change.	
3.9-9			No change.	

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
4.1	4.1-1, -2	Site Prep. and Plant Construction	Deletion of borrow area, increase of site temporary acreage to 260 acres from 195 acres required for plant construction, 37 acres inside security barrier, quarry increase from 25 acres to 45 acres, provide crusher facility at quarry (Table 4.1-1, Figure 4.1-1).	Environmentally inconsequential.
4.1.1				
4.1.1.1	4.1-2	Clearing	Choice to use open burning during site clearing.	Change judged to have a slight negative environmental effect.
	4.1-3, -4	Quarry	Excavation depths increased. Eliminate consideration of borrow pit.	Change judged to be slightly favorable as quarry location will be preferable to borrow pit's. Onsite availability of material will reduce offsite hauling requirements.
4.1.1.2			No change.	
4.1.1.3	4.1-5	Access Facility	Modify Barge Unloading Facility.	Change judged to be slightly favorable. Redesign minimizes dredging.
4.1.1.4			No change.	
4.1.1.5			No change.	
4.1.1.6	4.1-7 thru 4.1-8b	Site Extent	Update terrestrial ecological effects of site clearing and construction. (Table 4.2-1 and Table 4.1-3) Include ORNL forest management plan. Updates impacts on wildlife.	Change judged to have slightly negative environmental effect due to increased areas. No change to estimated environmental effects due to CRBRP. No change to estimated environmental effects due to CRBRP.
4.1.1.7	4.1-11	Human Activ-	Eliminates borrow area. Reduces construction activities near cemetery.	Change judged to be slightly favorable; borrow area was in vicinity of Hensley family cemetery.
4.1.1.8	4.1-12	Mitigation	Updates redressability in light of design changes (i.e., choice of quarry rather than borrow pit, addition of demolition fill area, etc.)	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
4.1.2				
4.1.2.1	4.1-13	Water Use	Construction water consumption estimates have been increased and will be provided by ER amendment in the near future.	Environmentally inconsequential. Additional water consumption still is only a very small fraction of the available Clinch River flow.
4.1.2.2			No change.	
4.1.2.3	4.1-15	Barge Unloading Facility	Relocation and redesign will reduce dredging.	Change judged to be slightly favorable.
4.2			No change.	
Table 4.2-1	4.2-9	Transmission Corridor	Transmission corridor acreages updated.	Environmentally inconsequential.
4.3	4.3-1 thru 4.3-3	Re-sources	Updated to account for revised affected areas, and addition of quarry.	Net effect of all changes is judged to be environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
5.1			No change.	
5.1.1			No change.	
5.1.1.1	5.1-3, -4	Cooling System	Updated to reflect effects of cooling system redesign.	Change demonstrates that latest design produces effects that are enveloped by previous (approved) designs.
5.1.1.2	5.1-5	*No Flow* Plumes	Updated plume configurations to reflect effects described in 5.1.1.1.	Change falls within effects that are enveloped by previous approvals.
5.1.2	5.1-6, -7	Thermal Dis-Charge Standards	Revised to include reference to NPDES Permit requirements	NPDES requirements exert positive controls on effluent quality.
5.1.3			No change.	
5.1.3.1	5.1-12 thru	Fish Habitat	Discusses recent studies of fish (striped bass and sauger) behavior in the Clinch River. Includes habitats, migration and spawning.	Environmentally inconsequential.
5.1.3.2			No change.	
5.1.3.3			No change.	
5.1.3.4			No change.	
5.1.3.5			No change.	
5.1.4			No change.	
5.1.5	5.1-22	Con-denser Entrainment	Update condenser water design flow rate. Also updates Clinch River flow data.	Environmentally inconsequential.
5.1.6			No change.	
5.1.7			No change.	
5.1.8			No change.	
5.2		Radio-logical Biota	This section is being reviewed to determine the significance of changes to radiological source term and pathway to warrant re-analysis.	
5.3		Radio-logical Impact	This section is being reviewed to determine the significance of changes to the radiological source term, pathway and population data to warrant re-analysis.	

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
5.4	5.4-1	Effects of Chemical & Biocide Discharges	Editorial change to clarify and explain that an acid feed system is provided. Its use would adjust pH for control of corrosion and scaling, and to assure that the blowdown is in compliance with the the Draft NPDES permit limits.	Environmentally inconsequential.
			Defined the limits of chlorine concentration.	Environmentally inconsequential.
5.4.1	5.4-2	Waste Water Disposal	Adds discussion of changes to waste water disposal system that have been previously described.	Environmentally inconsequential.
5.4.1.1	5.4-4a	Coolant System Discharge	Total volume discharged increased slightly with no changes in chemical concentrations.	Environmentally inconsequential.
5.4.1.2	5.4-5 thru 5.4-8	Discharge Plume	Changed per cent differential between ambient and blowdown concentrations.	Environmentally inconsequential.
		Striped Bass	Described bass response to chemical plume.	Environmentally inconsequential.
		Water Quality	Identifies elements not meeting drinking water standards at 6% isopleth during periods of extended no flow.	Environmentally inconsequential.
			Included consideration of the more stringent of state or federal requirements. (Tables 5.4-1, 5.4-2 and 5.4-5).	Environmentally inconsequential.
5.4.2	5.4-12	Effects of Biocide Discharges	Includes discussion of trihalomethanes (THM's) (Table 5.4-1)	Environmentally inconsequential.
5.4.3	5.4-12a	Storm Water	Instead of being directly discharged to the Clinch River via catch basins, storm water collected by the roof and yard drains is sent via the storm drainage system to the impounding pounds for settlement and ultimate discharge to the river. Change will be provided in a future amendment.	The incorporation of this system provides further assurance that the final effluent discharged to the river via the impounding pound is within applicable effluent standards. The effect is judged to be environmentally favorable.
5.4.4			No change.	
5.4.5			No change.	
5.5			No change.	

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
5.5.1	5.5-1, -2	Effects from Sanitary Wastes	<p>Editorial change to clarify that a package treatment plant will be used during the construction period. A slow sand filter unit will be installed following the CRBRP construction period to form a part of the permanent plant for the normal operation of the plant.</p> <p>Third paragraph deleted since the description of the treatment plant is given in Section 3.7.</p> <p>Treated effluent discharges will be processed to meet the Draft NPDES permit limits instead of "all State and Federal discharge regulations".</p> <p>Discharges from cooling tower blowdown were revised to be consistent with Table 3.3-4.</p>	<p>Environmentally inconsequential.</p> <p>Environmentally inconsequential.</p> <p>Environmentally inconsequential.</p> <p>Environmentally inconsequential.</p>
5.5.2			No change.	
5.6			No change.	
5.7			No change.	
5.8			No change.	
5.8.1	5.8-1	Plant Site	Total acreage committed updated. Changes will be provided in a future amendment.	Environmentally inconsequential.
5.8.2	5.8-2	Water Resources	Water consumption updated to reflect latest estimates.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
5.8.3	5.8-2 thru 5.8-4	Core Design	<p>Replaced homogeneous core arrangement with heterogeneous core arrangement resulting in reducing the number of fuel enrichment zones from 2 to 1, increasing the Pu enrichment in the fuel from 18.7-to-27.1 to 33.2%, reducing the number of fuel assemblies from 198 to 156. This change also increases the number of blanket assemblies from 150 (radial) to 214 (inner and radial).</p> <p>Revised Pu isotopic composition to be similar to FFTF grade instead of characteristic of LWR discharge.</p> <p>Revised refueling scheme from annual to batch which results in increasing the total number of fuel assemblies, required during plant life, from 2,300 to 2,427; increasing the total number of blanket assemblies from 850 to 2,142.</p>	<p>Change decreases the heavy metal commitments in the fuel (U + Pu) from 6.5 MT to 5.2 MT, reduces the stainless steel commitments in the fuel from 26.3 MT to 20.7 MT. The heavy metal commitment in the blanket went from 21.7 MT (radial & axial) to 25.8 MT (inner, radial & axial), and increases the stainless steel commitment in the blankets from 17.3 MT to 27.6 MT. Change judged to be environmentally inconsequential.</p> <p>Environmentally inconsequential.</p> <p>This results in increasing the total heavy metal commitments based on a once through fuel cycle from 20 MT Pu to 27 MT Pu, from 210 MT U to 336 MT U and from 410 MT stainless steel to 600 MT. If reprocessing is assumed, then the total net heavy metal commitment of uranium decreases from 17.7 MT to 14.3 MT and the net gain of bred plutonium decreases from 2.9 MT to 2.3 MT. Change judged to be slightly adverse.</p>
5.8.4			No changes.	
5.9	5.9-1	Plant Site	Permanent plant acreage is increased.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
6.0			No change.	
6.1	6.1-1	Pre-construction Monitoring Program	Changed to indicate that program was conducted.	Environmentally inconsequential.
6.1.1				
6.1.1.1	6.1-1 thru 6.1-24	Baseline Monitoring Program	Completion of baseline aquatic monitoring program description (results of baseline program reported in Section 2.7, (Amendment VIII)).	Environmentally inconsequential.
6.1.1.2	6.1-25 thru 6.1-28e	Pre-construction Aquatic	Provides a summary description and conclusions of the pre-construction aquatic environmental monitoring.	Environmentally inconsequential. Change provides data base for determination of environmental effects due to construction as monitored by the construction environmental monitoring program.
6.1.2	6.1-29	Groundwater	Updated to incorporate reference to the pre-construction monitoring program (1976-1977).	Environmentally inconsequential.
6.1.2.1	6.1-29, -29a	Pre-construction Groundwater Quality	Provides summary conclusions of the pre-construction groundwater quality monitoring program.	Environmentally inconsequential. Changes provides data base for the construction monitoring program.
6.1.3	6.1-30 thru 6.1-33	Meteorology	Updates meteorological description to incorporate description, instrumentation and data acquisition system for the on-site permanent meteorological monitoring stations. Deletes description of on-site temporary meteorological monitoring station.	Environmentally inconsequential. Permanent meteorological facilities will be used during plant construction and operation for on-site meteorological analyses. Environmentally inconsequential.
6.1.4				
6.1.4.1	6.1-35 thru 6.1-37	Geology	Provides update of site geology investigation (results provided in Section 2.4).	Environmentally inconsequential.
6.1.4.2	6.1-38, -39	Land Use & Demographic Surveys	Evaluation of demographic changes in process.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
6.1.4.3	6.1-39 thru 6.1-41	Terrestrial Ecology	Provides update discussion of baseline terrestrial monitoring program. (Conclusions provided in Section 2.7).	Environmentally inconsequential.
	6.1-42	Construction Monitoring	Provides reference to on-site construction environmental monitoring program.	Environmentally inconsequential.
6.1.5			No change.	
6.1.5.1	6.1-42a thru 6.1-43	Preconstruction Radiological Monitoring	Provides complete description and results of pre-construction radiological (river water, groundwater, sediment) monitoring program.	Change is judged to be slightly favorable. Provides basis for improved determination of radiological disturbance as monitored during the construction radiological monitoring program.
6.2			No change.	
6.2.1				
6.2.1.1	6.2-1 thru 6.2-2b	Gaseous Effluents	Updates plant gaseous effluent monitoring locations (32 locations from 13 locations. 1 - steam generator building 9 - reactor containment buildings 3 - reactor service building 1 - radwaste area 1 - plant service building 14 - turbine generator buildings 3 - steam generator buildings	Change is judged to be slightly favorable. System will provide - continuous monitors at those locations which could conceivably undergo significant increase in detectable levels - periodic sampling for areas as necessary.
		PSB Liquid Effluents	Liquid effluents go to liquid radwaste system for reprocessing.	Environmentally inconsequential.
6.2.1.2	6.2-3 thru 6.2-10	Pre-operational Radiological Monitoring	Provides current (atmospheric, terrestrial, aquatic groundwater) radiological monitoring programs for the pre-operational and operational phases.	Environmentally inconsequential.
6.2.2			No change.	
6.2.3			No change.	
6.2.4			No change.	
6.2.5			No change.	
6.3	6.3-1	Other Monitoring	Deletes monitoring stations at TVA's Kingston steam plant and Bull Run steam plant.	Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
7.1	(ALL CHANGES TO SECTION 7.1 THAT ARE DESCRIBED BELOW WILL BE PROVIDED IN A FUTURE AMENDMENT TO THE ER)			
7.1.1				
7.1.1.1	7.1-1	Meteorology	Meterology contained in Section 2.6 as provided by Amendment IX will be used in the computations.	
7.1.1.2	7.1-2 thru 7.1-6	Methodology	Methodology changes, as appropriate, will be provided.	
7.1.1.3				No change.
7.1.2				
7.1.2.1				No change.
7.1.2.2	7.1-8, -9	Steam Drum Valve (2.1)*	The amount of tritiated water released to the environment is 353,000 lbs. instead of 450,000 lbs. The tritium concentration has increased from $.25 \times 10^{-6}$ Ci/g to $.62 \times 10^{-6}$ Ci/g.	The combined effect of these changes is to increase the site boundary whole body dose from 1.77 mrem to 5.50 mrem; both are environmentally inconsequential.
		Condensate Storage Tank Leak (2.2)	The tritium concentration in the Condensate Storage Tank increased to $.62 \times 10^{-6}$ Ci/g from $.25 \times 10^{-6}$ Ci/g.	The short-term downstream tritium concentration in the Clinch River increased from 1.18×10^{-12} Ci/g to 2.89×10^{-12} Ci/g after the postulated leak; both are environmentally inconsequential.
7.1.2.3	7.1-10 thru 7.1-15	RAPS	RAPS components moved to RCB.	The environmental effects are judged to be favorable. RAPS leakage is processed through the RCB HVAC.
		Radwaste System Failures (3.1)	The tritium concentration in the storage tank water has increased to $.62 \times 10^{-6}$ Ci/g from $.25 \times 10^{-6}$ Ci/g. Storage tank cell parameters have changed such as the floor area increase to 1,000 ft ² from 800 ft ² .	The combined effect of these changes is to reduce the postulated spill cleanup time and increase the whole body dose at the site boundary to 1.01×10^{-5} mrem from 9.4×10^{-6} mrem, but both are environmentally inconsequential.
			Sump pump flow capacity increased to 50 gpm from 10 gpm.	

*Refer to accident number in Environmental Report.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
		Liquid Radwaste System Tank (3.2)	Tritium concentration in storage tank water has increased due to change in interface diffusion coefficients. Concentration is now $.62 \times 10^{-6}$ Ci/g in SGS. Spill cleanup time is reduced to 6.7 hours by using higher capacity sump pumps.	The combined effect of these changes is to increase the site boundary whole body dose from this postulated accident to 2.13×10^{-2} from 5.0×10^{-3} mrem; both are environmentally inconsequential.
7.1.2.3.3		RAPS Noble Gas Storage Vessel Rupture (3.3)	Accident redefined due to relocation of RAPS components.	The environmental effects are judged to be favorable.
7.1.2.3.4			Deleted due to deletion of equalization line. Rupture of cover gas Equalization Line (3.4)	
7.1.2.4	7.1-16a thru 7.1-21	Sodium Fire Accidents (4.1) (4.2)	Analyses revised to update computations.	Environmentally inconsequential.
7.1.2.5	7.1-22 thru 7.1-24	Fuel Failures (5.1)	The current plant design has a higher purge rate of the cover gas which has reduced the available Xenon and Krypton activity to 56,588 Ci from 65,816 Ci.	The net effect of the changes is to reduce the site boundary whole body dose to 8.4×10^{-5} mrem from 3.4×10^{-4} mrem; both are environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
7.11-24 thru 7.1-27		Steam Generator Tube Rupture (5.2)	<p>A revised DBL for the steam generator results in 465 lbs. of sodium mixing with water instead of 337 lbs. of sodium.</p> <p>The tritium concentration in SGS is now $.62 \times 10^{-6}$ Ci/g and in the IHTS is $.13 \times 10^{-6}$ Ci/g.</p> <p>Deleted the centrifugal separator from the Sodium-Water Reaction Pressure Relief Subsystem (SWRPRS).</p> <p>The duration of the SWRPR venting to the atmosphere was increased from 15 to 28 seconds as a result of an updated TRANSWRAP code analysis of this event. This more detailed analysis tracks the primary sodium which might leak into the intermediate sodium. It considers the length of piping between the IHX and the superheater inlet, and the reduced sodium flow during blowdown and predicts that no primary sodium will reach the superheater during this event for subsequent release to the atmosphere.</p>	<p>The net effect of the changes is to increase the site boundary whole body dose to 8.3×10^{-2} mrem from 2.1×10^{-2} mrem; both are insignificant.</p> <p>This change is judged to be adverse, since this could potentially result in the release of more sodium-water reaction particulates into the atmosphere.</p> <p>No change to estimated environmental effects.</p>

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
7.1.2.6	7.1-28 thru 7.1-32	Spent Fuel Cladding Failure in the EVTM (6.1)	Earliest scheduled time for fuel assembly handling is increased to 8 days from 87 hours. Revised ORIGEN isotope library was used to generate fission product inventories.	The combined effect of the changes is to increase the site boundary whole body dose from 1.5×10^{-2} mrem to 2.13×10^{-2} mrem; both are environmentally inconsequential.
		Spent Fuel Cladding Failure in the EVTM (6.2)	The same changes that applied to Accident 6.1 apply here.	The net result of the changes is to increase the site boundary whole body dose for this postulated accident from 1.5 mrem to 2.1 mrem, both are environmentally inconsequential.
		Accident-ally Opening a Floor Valve (6.3)	Revised ORIGEN isotope library was used to generator fission product inventories. Revisions were based on newer calculational schemes.	The combined effect of the changes to increase the site boundary whole body dose to 1.08 mrem from .07 mrem; both are environmentally inconsequential.
7.1.2.7	7.1-33	Spent Fuel Cask Drop (7.1)	Isotope inventories were revised using updated ORIGEN libraries. The ORIGEN changes were due to revisions in the library calculational schemes. The fuel has undergone an 80 day cooling period instead of 100 days.	The combined effect of the changes is to decrease the site boundary whole body dose to 2.8×10^{-4} mrem from 9.3×10^{-3} mrem; both are environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
7.1.2.8	7.1-34 thru 7.1-43	Primary Sodium Drain Tank Failure (8.1)	<p>Primary sodium isotope inventory has changed due to revisions in the ORIGEN library calculational schemes.</p> <p>Cell 102A dimensions have changed. For example, the cell volume is 45,000 ft.³ and was 68,000 ft.³.</p> <p>The potential sodium spill volume has increased to 35,000 gallons from 32,000 gallons.</p>	The combined effect of the changes is to reduce the site boundary whole body dose from 9.7×10^{-4} rem to 8.4×10^{-5} rem; both are environmentally inconsequential.
both		Primary Coolant Sodium	The postulated sodium spill has been reduced to 135,000 lbs. from 193,000.	The combined effect of the changes is to increase the site boundary whole body dose from 8.3×10^{-4} rem. to 1.25×10^{-2} rem;
		Spill (8.2)	It was conservatively assumed that the aerosol leaked to the RCB was vented directly to the environmental. Previously a leak rate of .1 vol%/day at 10 psig. was assumed as the leak rate.	are environmentally inconsequential.
		Ex-Con-tainment Primary Coolant Sodium Spill (8.3)	<p>The postulated spill has been reduced from 90,000 gal. to 45,000 gal. of sodium. This is the result of a failure of one of two storage vessels in the cell rather two.</p> <p>The leak rate of aerosol was based on the cell design leak rate of .6 vol%/day at 3.9 psig. rather than 100 vol%/day at 10 psig which was previously used.</p>	The net effect of the changes is to reduce the site boundary whole body dose from 7.9×10^{-3} rem to 4.2×10^{-5} rem; both are environmentally inconsequential.
		Ex-Ves-sel Stor-age Tank Coolant Rupture (8.4)	<p>Aerosol leakage to the RSB from the cell was calculated based on a cell design leak rate of .36 vol%/day at 12 psig. rather than 100 vol%/day at 10 psig.</p> <p>This approach will release less aerosol into the environment.</p>	The net effect is to reduce the site boundary whole body dose from 2.1×10^{-4} mrem to 4.3×10^{-4} mrem; both are environmentally inconsequential.
		Large Steam Line Break (8.5)	<p>The SGS tritium concentration has increased to $.62 \times 10^{-6}$ Ci/g from $.25 \times 10^{-6}$ Ci/g. This is the result of changes in diffusion coefficients across system interface boundaries.</p> <p>The newer design basis results in 312,000 lbs. of water being released from the PRV instead of 479,000 lbs. The power relief vent period has been increased from 1.5 to 5.7 hours.</p>	The combined effect is to increase the site boundary whole body dose to 4.7 mrem from 1.9 mrem; both are environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
7.1.3			No change.	
7.2.1	7.2-1	Hydrogen Gas Storage	The total amount of Hydrogen gas stored has not changed; however, the volume has been restated in terms of standard volume (28,000 SCF) rather than bottled storage capacity. This change will be provided in a future amendment to the ER.	Environmentally inconsequential.
7.2.2	New	Oil and Hazardous Material Spills	Systems/Buildings involved with the storage, transfer, or loading/unloading of any oil or hazardous material are provided with secondary containment systems capable of containing the largest source of an oil or hazardous material spill without any adverse environmental impact. This change will be provided in a future amendment to the ER.	Incorporation of these features in station design provides further protection against spill of oil and hazardous material reaching the local environment. Environmentally inconsequential.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
10			No change has taken place. Refer to response to Question 320.9R.	No change.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
11			No change.	No change.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
12	12.0-1 thru 12.0-7	Permits	Provides revised listing of Non-NRC permits purpose legislation and regulation enacting permit approval or notification.	No changes in estimated environmental effects due to this tabulation.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
13	13.0-3 thru 13.0-38	Refer- ences	Update to include Amendment IX references.	No environmental effects.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
14 (Appendix to Section 2.5)	14.1-2 thru 14.1-81	Clean Water Act of 1977	Incorporates 1977 amendment to the State of Tennessee Water Quality Criteria incorporates the 1977 clean water act amendments to the Federal Water Pollution Control Act.	The change is judged to be slightly favorable. It provides criteria for CRBRP design for reduction of impact on the environment.
14 (Appendix to Section 2.7)	14.3-3	Sauger	Provides update information on spawning of sauger.	No environmental effects.
14 (Appendix to Section 10.3)	14.6-3	Cooling Tower	Updates cooling tower blowdown rate provides current design blowdown temperature values.	The increase in cooling tower blowdown is judged to be insignificant compared to the Clinch River flow rate.

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
8.0				
8.1	(All Future)	Socio-	Complete assessment of socio-economic parameters of CRBRP plant construction and operation is being provided in a future amendment. Assessment is based on current construction manpower requirements 1980 census and 1981 community service and infra-structure data.	This change is judged to be slightly favorable. It provides current data base for evaluation of socio-economic assessment.
8.2		economic		
8.3				

ER SECTION	REVISED	ITEM	DESCRIPTION OF CHANGE	ENVIRONMENTAL EFFECT
9.1	To Be Provided	Alternative Approaches	This section will be addressed in the supplement to the LMFBR Program Final Environmental Statement (PFES). This section of the ER will be revised accordingly.	Environmentally inconsequential.
9.2	To Be Provided	Alternative Sites & Plant Arrangements	<ul style="list-style-type: none"> a) Same as Section 9.1 above. b) For discussion of Hook-on arrangements refer to response to Question 320.1R and 320.2R. c) Further discussion of candidate sites will be provided in the near future. d) Section 9.2.5.3.4 will be updated to reflect response to Question 230.5R. 	Environmentally inconsequential.