Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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STATEMENT OF S. JACOB SCHERR

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November 14, 1983

Mr. M. J. Sires, III
Assistant Manager for Health,
Safety, and Environment
U.S. Department of Energy
Savannah River Operations Office
P.O. Box A
Aiken, South Carolina 29801

Dear Mr. Sires:

Comments on the Draft Environmental
Impact Statement on L-Reactor Operation

I am writing on behalf of the Natural Resources Defense Council, Energy Research Foundation, The Georgia Conservancy, Coastal Citizens for Clean Energy, Environmental Policy Institute, S. David Stoney, Justin Stephens McMillan, and Judith Gordon to provide our comments on the Draft Environmental Impact Statement on L-Reactor Operation, Savannah River Plant, Aiken, S.C. (DOE/EIS-0108D) (September 1983) ("the Draft EIS").

The above-named organizations and individuals are plaintiffs in the case of NRDC et al. v. Vaughan, C.A. No. 82-3173 (D.C.C., July 15, 1983) which ordered the Department of Energy ("DOE") to prepare an EIS on the L-Reactor "as soon as practicable." A number of the plaintiffs have already submitted their own comments on the Draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-1 | The Draft EIS appears to be a half-hearted attempt to rationalize and justify a decision already made to start up the L-Reactor as soon as possible without implementation of improved safety or environmental safeguards. The Draft EIS fails to provide a convincing case for the early start up of the L-Reactor, to disclose fully the impacts of its operation, or to provide meaningful consideration to all reasonable alternatives. Our specific comments on the Draft EIS are as follows: | The Draft EIS was prepared based on the substantive comments that were received during the public scoping process, including the comments of NRDC. The purpose of the EIS is to evaluate the environmental consequences of the restart of L-Reactor. This EIS together with other studies on need will be used by the Department to prepare its Record of Decision. The restart of L-Reactor in this final EIS is based on the need for defense nuclear materials as defined in the FY 1984-1989 NWSM. The restart of L-Reactor as soon as practicable is not considered to be an "early" restart. |
| | A. Need for the L-Reactor | |
| EN-2 | The failure of the Draft EIS to provide an adequate justification (Section 1) for the immediate startup of the L-Reactor has already been discussed at length in the statement of Dr. Thomas B. Cochran submitted at a DOE hearing on the Draft EIS in Beaufort, S.C. on November 3, 1983. A copy of Dr. Cochran's statement is attached. It is important to emphasize once again that the issue of the need for the L-Reactor is linked directly to the question of whether DOE can implement measures to avoid or reduce environmental harm prior to the proposed operation of the L-Reactor. | Responses have been developed for the specific comments contained in this statement. Responses to the statement submitted by Dr. Cochran on November 3, 1983, are contained in this appendix under the letter designation "BL."<br><br>The need for defense nuclear material is discussed in Chapters 1 and 2 in as great a detail as classification regulations will allow. A classified Appendix available to the decisionmaker, contains a discussion of the need and production alternatives and will be considered in the final decisionmaking. |
| | We would like to make the following additional specific comments: | |
| EN-3 | 1. The Draft EIS discussion of need relies heavily upon the requirements set forth in the Nuclear Weapons Stockpile Memorandum ("NWSM"), in particular on a declassified quote from the FY 1983-1988 NWSM which states that "...DOE shall...(b) restart the L-Reactor at the Savannah River Plant, Aiken, South Carolina, as soon as possible, but no later than October 1983." The Draft EIS should indicate precisely when the FY 1983-1988 NWSM was approved by the President and whether DOE recommended | As indicated in Section 1.1.1 of the EIS, the FY 1983-1988 NWSM was approved by the President on November 18, 1982. The indicated statement was first proposed by DOE on October 19, 1982, as a means of communicating the urgency of restarting L-Reactor. The quantitative analyses of nuclear material supply and demand in the NWSM fully support this statement and the statements in Section 1.1.2 of the EIS indicating that any delays in the implemented and proposed initiatives, including |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | the above-quoted language. We are concerned that it was added following the start of the controversy in August 1982 over the operation of the L-Reactor and may have been viewed as a means of shielding DOE from criticism. | the restart of L-Reactor, will directly affect the needed supply of defense nuclear materials for our nation's nuclear force structure. |
| EN-4 | Since it appears that at least a portion of the FY 1983-1988 NWSM could be declassified and published, DOE should review both this document, the FY 1981-1983 NWSM and the classified Appendix A to the DEIS to determine whether other segregable portions could be released in order to allow a more meaningful evaluation of DOE's justification for the startup of the L-Reactor. In any event, the following questions must be answered publicly: | Information on weapon builds, stockpile, retirements, and on plutonium and tritium supply, demand, production, and stockpile are classified and, by law, cannot be divulged. No portions of the FY 1981-1983 NWSM, FY 1983-1988 NWSM, or 1984-1989 NWSM containing substantive information pertinent to the need and timing for the restart of L-Reactor can be declassified. All substantive unclassifed information in Appendix A to the EIS has been included in Chapters 1 and 2. |
| EN-5 | a. Has not DOE's plutonium equivalent production rate exceeded the previously planned (as authorized in the FY 1981-83 NWSM) rate?<br><br>b. Has not the delay in the production of enhanced radiation 155 mm AFAP, the reduction or deferment in the production of ALCM warheads and the reduction of MX warheads lowered the plutonium equivalent requirements set forth in the FY 1983-88 NWSM relative to the needs projected in 1980, at the time the decision was made to restart the L-Reactor?<br><br>c. The DEIS states that "the increased defense nuclear material requirements and production initiatives...have been reaffirmed in subsequent stockpile memoranda (1-2)." Thus, if the answer to either question a. or b. above is "yes," it follows that any reaffirmation of production initiatives in subsequent NWSM's must reflect a desire or intention by DOE to build a plutonium surplus, perhaps on the order of several tons. Is this the case? | The development of each NWSM is based on a detailed analysis of scheduled and planned new weapons systems, scheduled and planned weapons retirements, the current status of material inventory, material supply from retirements, production and processing plans, and capability. This analysis uses data consistent with the current status of legislative actions and administration plans concerning weapons systems and material production. This information, including statements concerning production rates, projected material shortages, or adverse impacts on weapon system deployment, is classified and, by law, cannot be divulged.<br><br>Changes in weapon builds and schedules cannot be considered independently of changes in weapon requirements and the status of defense nuclear material inventories and production and processing capabilities. Each NWSM provides the results of a detailed analysis of all these factors based on the information available when the NWSM was developed; therefore, changes in the status and plans for production and deployment of weapons are fully accounted for from one NWSM to the next. As indicated in Section 1.1.1 of this EIS, the FY 1984-1989 NWSM considers the fact that Congress has delayed or failed to fund certain nuclear weapons systems. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | d. Is not the desire for a stockpile, rather than projected shortages in meeting weapons requirements, the actual basis for DOE's desire to startup the L-Reactor in January 1984? Discuss in detail the national security reasons for such a large stockpile. Is the stockpile simply a means to justify the early startup of the L-Reactor when it is clear from public statements that warhead requirements have been reduced? | Although these changes have affected the required delivery of defense nuclear materials, they do not significantly change short- and intermediate-term requirements that L-Reactor must help satisfy. Therefore, all the implemented and proposed initiatives, including L-Reactor restart, are needed as soon as practicable to meet the increased nuclear material requirements.<br><br>Also see the response to comment BL-15 regarding the analysis of effects of delayed L-Reactor restart. |
| | e. If the L-Reactor startup were delayed three years, would the effect be simply to draw down the projected plutonium surplus by some 1.5 MT, or to defer the date when the desired surplus level is obtained? | |
| | f. How long could L-Reactor startup be deferred and the plutonium foregone made up through alternative production initiatives without slippage of the date the desired surplus is presently projected to be achieved? | |
| EN-6 | g. Is not there sufficient flexibility in the rate of retirement of obsolete weapons to meet future contingencies should the L-Reactor be delayed and additional plutonium be required? | See the response to comment AB-8 regarding the availability of material from retired weapons. |
| EN-7 | 2. The Draft EIS fails to mention the results of the review last year of the White House Science Board, chaired by Dr. Sol Buchsbaum, on the need for new tritium/plutonium production. What were the conclusions of this review? Did the review conclude that a New Production Reactor ("NPR") could not be justified on the basis of tritium/plutonium needs at this time, but that the concentration of all production at the Savannah River Plant (SRP) was undesirable from a national security standpoint? What are the implications of this review for the need for the L-Reactor? | Although the DOE is not in receipt of a report containing the results of the review conducted by the White House Office of Science and Technology Policy, the Department understands that the review supported proceeding on a timely basis with the new production reactor (NPR) and that, for reasons of national security, a site other than Savannah River was recommended for the NPR. The Department is not aware of any recommendations arising from this review concerning L-Reactor. |
| EN-8 | 3. The EIS should take into account events and findings since the publication of the Draft which have direct bearing on the question of the need for the plutonium to be produced by the L-Reactor. In late October 1983, the Senate cut further | See the response to comment DI-2 regarding the supply of fuel-grade plutonium to CRBR. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | funding for the construction of the Clinch River Breeder Reactor (CRBR) and DOE has now apparently begun to terminate the project. The decision not to build the CRBR will reduce significantly the demand for DOE fuel-grade plutonium, which may then be available for blending or enrichment to weapons grade. | |
| EN-9 | Secondly, scientific studies presented at the Conference on the Long-Term Worldwide Biological Consequences of Nuclear War, October 31 - November 1, 1983, found that even a limited exchange of nuclear weapons or first strike (100 to 1000 MT) may result in severe climatic changes with profound effects on human health, agriculture, and other aspects of the global environment. | The national policy on weapons, their deployment, and the need for increased weapons is beyond the scope of this EIS. |
| EN-10 | 4. The EIS should make clearer the fact that NWSM is not a static document, but rather that it is subject to revision and updating. Indeed, the EIS should indicate that the NWSM is now under review and that DOE is free to make recommendations as to changes which might result from this NEPA review of the L-Reactor. | The FY 1984-1989 NWSM approved by the President with the authorization and appropriation of funds by the Congress, serves as the basis for DOE production of weapons and materials. As indicated in Section 1.1.2 of the EIS, any delays in the implementation of the proposed initiatives, including the restart of L-Reactor, will directly affect the needed supply of defense nuclear materials for our nation's nuclear force structure. Also, see the response to comment EN-5. |
| | B. Thermal Discharges and Cooling Water Alternatives | |
| | 1. Thermal Discharges (Section 4.1.1.4) | |
| EN-11 | Because it is based on incorrect interpretations of law and inadequate information, this section on the predicted effects of the cooling water discharges on the environment, particularly with reference to South Carolina Water Quality Standards, is extremely difficult to assess. The entire discussion is apparently based on the incorrect and outdated interpretation of these Standards previously applied by the U.S. Environmental Protection Agency, reflected in the NPDES permit issued by EPA in October 1976. Under this interpretation, the Standards apply to the Savannah River, but not to Steel Creek or the other tributaries of the Savannah River within the boundaries of SRP. | The discussion in Section 4.1.1.4 of the Draft EIS for direct discharge was based on the draft NPDES permit received from SCDHEC in August 1982 which proposed thermal limitations as described in Section 4.1.1.4 of the Draft EIS, in the Savannah River. Subsequent drafts of the NPDES permit changed the compliance point from the Savannah River to the discharge point in Steel Creek.<br><br>On December 15, 1983, SCDHEC announced its determination to issue an NPDES permit to the DOE for the Savannah River Plant effective January 1, 1984. Based on this permit and a mutually agreed upon Consent Order, all discharges except the thermal discharge from L-Reactor would be permitted under the terms of |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | The South Carolina Department of Health and Environmental Control (DHEC), which now has NPDES permitting authority, has made it clear that it considers Steel Creek (into which DOE proposes to discharge wastewaters from the L-Reactor) to be part of the "waters of the United States" as defined by the Clean Water Act. Consequently, the water quality standards of the State of South Carolina apply to Steel Creek as well as the Savannah River. DOE was aware of this new interpretation of the law at the time that the Draft EIS was written, yet the analysis of thermal impacts in the Draft EIS is based on the old interpretation of the standards.1/ | the NPDES permit. The thermal discharge from the three operating SRP reactors (C, K, and P) would be permitted provided that DOE would: (1) complete a comprehensive study of the thermal effects of all operations at SRP; (2) complete and submit thermal mitigation studies to SCDHEC within 9 months of the signing of the Consent Order; (3) implement the recommended thermal mitigation alternative approved by SCDHEC under a schedule to be established by SCDHEC in a subsequent Order; and (4) submit and actively support funding requests to accomplish any actions resulting from the thermal studies.<br><br>Section 4.4.2 of the EIS, which discusses cooling-water mitigation alternatives, has been revised based on public comments received on the draft EIS. Specifically, Section 4.4.2 has been revised to provide a detailed discussion of additional combinations of various cooling-water systems. In Section 4.4.2, each of the cooling-water mitigation systems is evaluated for attaining the thermal discharge limits of the State of South Carolina. Section 4.4.2 and a revised Appendix I, Floodplain/Wetland Assessment, discuss the wetland impacts of each of the systems considered.<br><br>The Department of Energy has been reviewing and evaluating alternative cooling-water systems for L-Reactor. Based on these reviews and evaluations, and consultations with representatives of the State of South Carolina regarding a mutually agreed upon compliance approach, a preferred cooling-water mitigation alternative is identified in this EIS. This preferred cooling-water alternative is to construct a 1000-acre lake before L-Reactor resumes operation, to redesign the reactor outfall, and to operate L-Reactor in a way that assures a balanced biological community in the lake. The Record of Decision prepared by the Department on this EIS will state the cooling-water mitigation measures that will be taken which will allow L-Reactor operation to be in compliance with the conditions of an NPDES permit to be issued by the State of South Carolina. |

1/ The "Environmental Information Document, L-Reactor Reactivation, Supplement Number 1, DPST-83-470 (July 1983) prepared by DuPont for DOE states, at 7-5, that:

> SCDHEC thereby considers SRP onsite streams and ponds as Class B waters of the State.

DOE's request for a reclassification of SRP onsite streams was rejected by DHEC prior to the publication of the Draft EIS.

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-12 | By ignoring the current interpretation of the water quality standards, upon which the limits in the draft NPDES permit issued by DHEC months before the Draft EIS was published were based, the Draft EIS has failed to present a relevant or meaningful analysis of the impacts of the cooling water alternative favored by DOE--direct discharge into Steel Creek without any treatment for cooling, or any of the alternatives to this approach. | See the response to comment EN-11. |
| EN-13 | The Draft EIS (at 4-8) notes that the temperature at the end of the effluent canal would at times reach 80°C, but does not note that this greatly exceeds the water quality standard of 32.2°C for Steel Creek, into which the cooling water would be discharged. It also fails to note that the draft NPDES permit issued by the State of South Carolina sets a limit of 32.2°C on the temperature of the cooling water effluent from the L-Reactor, based on the water quality standards. | See the response to comment EN-11. |
| EN-14 | The State set the discharge limit equal to the water quality standard because when the L-Reactor is operating its cooling water discharge would make up over 90% of the flow of Steel Creek. The flows in Steel Creek under natural condtions are given on page 3-22, but should be repeated on page 4-8 so the comparison of the natural flow of around 1 cubic meter/second could be compared with the cooling water flow of 11 $m^3$/sec. | Section 4.1.1.4 of the EIS has been revised to reflect this comment. |
| EN-15 | The Draft EIS also does not point out that the temperature at the point where Steel Creek enters the swamp--40°C during a typical spring and 45°C in the severe parts of summer--would also exceed the applicable water quality standard of 32.2°C. Table 4-3 also indicates that DOE predicts that during extreme summer conditions the temperature at the mouth of Steel Creek at the Savannah River would be just under 34°C, but fails to mention the fact this still exceeds the water quality standard. | Table 4-3 of the Draft EIS presents the predicted water temperatures of Steel Creek in spring and summer as a result of direct discharge of cooling water from L-Reactor operation, including the temperature data given in this comment. Also see the response to comment EN-11. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-16 | The Draft EIS states (at 4-10), "Because the water temperature at the confluence of Steel Creek and the Savannah River is estimated to be only slightly higher than that typical of southeastern warm-water streams, no significant impact on riverine vegetation is expected." Yet, Figure 3-7 (at 3-21) indicates that temperatures in the Savannah River in the spring average between 15°C and 20°C. Table 4-3 indicates that typical spring temperatures at the mouth of Steel Creek would be 29°C. In addition, Figure 3-7 (at 3-20) shows that monthly average daily-maximum temperatures at Ellenton Landing on the Savannah River upstream from SRP are around 21°C to 23°C from June through September, while Table 4-3 indicates that the temperature at the mouth of Steel Creek during the most severe 5-day summer conditions would be 34°C.<br><br>Both of these sets of data indicate that temperatures at the mouth of Steel Creek will frequently be 10°C higher than the background temperature in the Savannah River. Perhaps the Savannah River is not typical of southeastern warm-water streams. If so, this fact should be noted, as should the very substantial difference in temperature between the waters of Steel Creek at its mouth (during L-Reactor operation) and the waters of the Savannah River upstream from SRP. | During the warmer months the average creek-to-river delta-T is about 7.2°C, with both K- and L-Reactors operating. Persistence analyses, indicate that on the average 10 events per year can be expected with delta-Ts equal to or greater than 11.1°C; the length of these events can be expected to average about 2.5 days. Riverine vegetation in the vicinity of the mouth of Steel Creek consists primarily of bottomland hardwood forests; emergent and submergent macrophytes are sparse or absent. It is improbable that temperatures as high as 11° above ambient for short periods of time would impact these flora. |
| EN-17 | The Draft EIS lists the thermal effluent criteria contained in the NPDES permit written by EPA in 1976 (at 4-12). But, as mentioned previously, by the time of the preparation of the Draft EIS, a draft revised NPDES permit had been issued by DHEC. The draft revised permit contained very different thermal limits. Since the far more stringent limits in the permit prepared by DHEC are likely to be the ones applicable to the L-Reactor if it is started up, these should be the focus of the Draft EIS's discussion of thermal discharges, not the limits in the old EPA-written permit. At the very least, the Draft EIS should contain analyses based on the proposed new permit limits as well as those in the EPA-prepared permit. | See the response to comment EN-11. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-18 | The listing of the thermal effluent criteria used in the old EPA-prepared permits is incomplete. These criteria, actually the water quality standards applicable to the Savannah River if Steel Creek is considered a 7-mile-long discharge ditch, also include a downstream limit on the mixing zone of 100 yards below the mouth of Steel Creek. (There is reference to how the cross-sectional and surface area limitations on the mixing zone apply within 91 meters of the mouth of Steel Creek, but the permit specifies that the length of the mixing zone is 100 yards (91 meters).) The analyses of the effects of the L-Reactor discharge on attainment of water quality standards in the Savannah River is not only deficient because it is based on an outdated interpretation of those standards but also inadequate because it fails to consider an important component of those standards. This is particularly disturbing since the Draft EIS states (at 4-12) that "the thermal plume from Steel Creek (would become) completely mixed with (Savannah) River water aobut 1.5 miles downstream." This indicates that reactivation of the L-Reactor would result in failure to meet even the no longer applicable, less stringent interpretation of state water quality standards applied to the SRP discharges in the past.<br><br>Data and information presented in the Draft EIS suggest that not only will temperatures outside the downstream boundary of the mixing zone exceed the water quality standard, but also the difference between the temperature at the edge of the mixing zone allowed by the state standards (25% of the cross sectional area of the river) and the background temperature of the river would be greater than the 2.8°C allowed by the standards. (Of course, DHEC has ruled that the definition of water quality standards and mixing zones used in the Draft EIS are not appropriate, but it is useful to observe that the L-Reactor would likely cause violations of even this out-of-date, far less stringent interpretation of the standards.) The following information presented in the Draft EIS supports the conclusion that the "delta-T" standard would be exceeded at the cross-sectional boundary of the mixing zone: | As given in the August 1982 draft NPDES Permit, the compliance monitoring point was to be the mouth of Steel Creek with delta-T calculated for daily average on the monthly bases or daily maximum. Modified reactor operation could be implemented to reduce temperature of cooling water if environmental conditions exist that could indicate potential for exceeding the NPDES permit conditions.<br><br>The delta-T values (8.3°C and 11.1°C) used in the persistence analysis in the Draft EIS were selected because they represent the most limiting criteria for the creek-to-river delta-Ts prescribed in the 6 August 1982 draft NPDES permit. It is noted that these delta-Ts are determined by subtracting the temperature of the Savannah River measured at Ellenton Landing from the temperature recorded at the mouth of Steel Creek. The revised section 4.4.2 provides data for each of the cooling water mitigation alternatives with respect to attaining a discharge to water body temperature difference of 5°F. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | * Figure 4-4 indicates that to meet the water quality standards in the Savannah River at $_7Q_{10}$ flow (159 $m^3$/sec), with the L-Reactor and the K-Reactor operating, the delta-T between Steel Creek and the Savannah River at the creek's mouth would have to be equal to or less than 7.8°C. With the river flowing at 170$m^3$/sec, the creek-to-river delta-T would have to be equal to or less than 8.3°C.<br><br>* Table 4-4 shows that during 1963-1967 a delta-T of 8.3°C or greater at the creek/river boundary occured as many as 122 days/year. The chart gives an average yearly occurrence over this 5 year period of 107 days, but there appears to be a division error, and the average is actually 86 days/year at 8.3° or higher. During this time there were periods of as long as 23 consecutive days with a creek/river delta-T of 8.3° or greater.<br><br>By considering these two sets of information simultaneously--something not done in the Draft EIS--one can see that delta-T conditions at the mouth of Steel Creek that would cause violations of the state water quality standard of a delta-T at the edge of the mixing zone (25% of the cross sectional area of the river) of 2.8°C or less can be expected to occur as much as one-third of the time during some years and 20% of the time per year on the average. Clearly the Draft EIS's analysis of potential violations of water quality standards in the Savannah River should include a statistical determination of the probability of the Steel Creek/Savannah River delta-T being 8.3°C or greater coincident wtih flows in the Savannah River being 170 $m^3$/sec or less (violations of the water quality standard are predicted to occur when the creek-to-river delta-T is 8.3°C or more. Such a probability analysis is not included in the Draft EIS. | |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | Although a consideration of the chances of exceedances of violations of the now defunct interpretation of the state's water quality standards is to a large degree a moot point, the above discussion illustrates how inadequate the Draft EIS's discussion of thermal issues is, even if one accepts, for point of discussion, their incorrect, overly lax, definition of what would constitute a violation of state water quality standards.<br><br>Also, comparison of information presented in Figure 3-6 (at 3-19) and information in Tables 4-4 and 4-5 gives further support to the conclusion that water quality standards violations could occur with signifcant frequency, even based on the now rejected DOE/EPA interpretation of these standards.<br><br>No explanation is ever given as to why the delta-T values of 8.3°C and 11.1°C were used as the basis for calculating the frequency and persistence of temperature differences at the edge of the boundary between Steel Creek and the Savannah River. Absence of such an explanation makes it difficult to interpret the information that is presented, leaving one in the position of raising further questions and seeking additional information, as was done above in these comments. | |
| EN-19 | Since DHEC has made it clear that its water quality standards apply to Steel Creek, the Draft EIS should include a discussion of whether the state water quality standard of a delta-T of 2.8°C or less could be met at any point in Steel Creek, if the proposed cooling water discharge alternative is employed. | See the response to comment EN-18 regarding the analysis of cooling-water mitigation alternatives in Section 4.4.2 of this EIS. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | 2. Cooling Water Alternatives (Section 4.4.2) | |
| EN-20 | Overall, this section suffers from the same major flaw as the previously discussed section--failure to acknowledge the State of South Carolina's determination that their water quality standards apply to Steel Creek and the other Savannah River tributaries within the boundaries of the SRP. As a consequence, many of the cooling water alternatives presented in this portion of the Draft EIS are totally irrelevant, because they would involve using Steel Creek as a treatment system for the cooling of the discharges from the L-Reactor. South Carolina's standards are clear in prohibiting the waters of the state for this purpose. This section should be rewritten, excluding all such alternatives and focusing more on alternatives that could meet state water quality standards.<br><br>The following alternatives clearly would not meet state water quality standards:<br><br>(1) once-through cooling (the Draft EIS's preferred alternative)<br><br>This alternative would result in the discharge of cooling water into Steel Creek at a temperature of 79°C, far in excess of the water quality standard of 32.2°C or less; since the cooling water would constitute the vast majority of the flow of Steel Creek when the L-Reactor was operational, the water quality standard and limits on the effluent have to be the same, as reflected in the draft NPDES permit issued by S.C. DHEC. Consequently both the water quality standard and the proposed NPDES permit limit would be violated by this option. | See the response to comment EN-11 regarding cooling-water mitigation alternatives. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | (2) once-through spray canal system<br><br>This results in discharges into Steel Creek of 75°C during the summer months, exceeding water quality standards and the proposed permit limit by more than a factor or two.<br><br>(3) once-through impoundments on Steel Creek<br><br>Both the alternatives presented under this heading are unacceptable and illegal because they involve turning large parts of Steel Creek into cooling reservoirs. Neither the small rubble dam or the single impoundment option are acceptable or worthy of discussion.<br><br>(4) diversion to Pen Branch<br><br>This would result in discharges to this stream at temperatures of 70°C, which would clearly cause violations of the 32.2°C maximum temperature water quality standard.<br><br>(5) 500-acre lake with spray cooling<br><br>Though the water coming out of the spray cooling system would be at 32°C, this option involves discharging once-through cooling water at a temperature of 75° into an impoundment built on Steel Creek. Once again, Steel Creek would be used as a cooling water facility and water quality standards would be violated most of the time.<br><br>(6) several small dams plus spray cooling<br><br>Same problems as the previous option.<br><br>(7) recirculation through creation of L-Pond<br><br>This option is unacceptable and illegal because it involves the damming of Steel Creek and use of the resulting reservoir as a cooling pond. | |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | (8) recirculation through creation of Kal Pond<br><br>Unacceptable and illegal for the same reason as the L-Pond option. | |
| | (9) recirculation through creation of High-Level Pond<br><br>Unacceptable and illegal because it involves damming Pen Branch to form a cooling pond. | |
| | (10) low-head hydropower<br><br>Unacceptable and illegal for same reasons as for all the other alternatives that involve impounding natural streams to create ponds to be used to cool water. | |
| | Based on the information provided in the Draft EIS, it appears that the following alternatives might meet water quality standards, but more information needs to be presented to make a meaningful assessment possible: | |
| | (1) mechanical draft cooling towers with complete recirculation<br><br>This would result, according to the Draft EIS, in a discharge to Steel Creek at a maximum of 34°C, much closer to the water quality standard and draft NPDES permit limit of 32.2°C; furthermore, the volume of the discharge would be much less than with any of the previous alternatives, although the Draft EIS fails to present any figures on the expected volumes and frequencies of discharges. This option might meet the water quality standards, at least for much of this option is needed, including how frequently, if ever, water quality standards would be violated. | |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | (2) mechanical draft cooling towers with partial recirculation<br><br>The Draft EIS states that cooling water would be discharged into Steel Creek at "near ambient" temperatures, but never gives the exact figures needed to compare this alternative to the others presented; because the amount of wastewater discharged would be much higher most of the time than with cooling towers with complete recirculation, the exact temperature of the discharged cooling water must be known in order to determine if water quality standards would be violated. | |
| | (3) once-through mechanical draft cooling towers with discharge to the mouth of Steel Creek via a canal/pipeline system<br><br>Once again, the Draft EIS states that the discharges of cooling water would be discharged at "near ambient" temperatures without specifying the exact temperatures expected; this alternative might result in compliance with water quality standards most or all of the time, but it is impossible to tell based on the information presented in the Draft EIS. | |
| | The following options presented in the Draft EIS appear to have some potential for meeting water quality standards when combined with other cooling operations such as cooling towers and spray systems; however, further study and additional information are needed in order to perform a meaningful analysis of these options: | |
| | (1) thermal cogeneration<br><br>Operating alone, this option would not achieve the 30°C to 40°C temperature decrease needed to meet water quality standards (the Draft EIS says the effluent would be cooled 11°C to 17°C), but perhaps in | |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | combination with cooling towers or spray systems this option, which has the benefit of recovering some of the waste heat energy from the reactor, might prove sufficient.<br><br>(2) modified reactor operation<br><br>Though use of this option cannot alone reduce the temperature or flow of the discharge sufficiently to result in achievement of water quality standards, it might if employed in conjunction with other systems; unfortunately, the Draft EIS fails to provide any meaningful data on these kinds of options, but simply states that "evaluation of these combined alternatives is part of the current comprehensive cooling water study being conducted on SRP thermal discharges." | |
| EN-21 | The discussion in the Draft EIS of cooling water alternatives is also flawed as a result of superficiality and incompleteness of the cost and schedule comparison of the various alternatives (4-122). Neither the Draft EIS nor the underlying Environmental Information Document ("EID") prepared by DuPont provide any discussion of how these estimates were derived. Indeed, there are some inconsistencies among the figures provided in the Draft EIS, the EID, and the NUS presentation "Comparison and Evaluation of Alternative Cooling Systems (undated)." Without full information on the assumptions and methods employed to develop these estimates, it is impossible to assess their validity. | The costs and schedules presented in the EIS reflect the latest engineering estimates of required earth and civil work, rerouting services, and equipment requirements (pipes, valves, pumps, etc.). All information on cost and schedule are either taken from the referenced documents or reflect the best judgment of the experts in preparing this EIS. |
| EN-22 | Finally, the Draft EIS provides no data at all on the socioeconomic effects of the adoption of various alternatives. The Final EIS must include an estimate of the number of jobs which would be created and effect upon the local economy of each of the acceptable alternatives. | Section 4.4.2 of this final EIS has been modified to include an estimate of the number of construction personnel required for each alternative. The potential economic effects on the local economy due to implementation are considered to be small in relation to the restart of L-Reactor and current construction programs at the SRP. Due to the relatively short period of construction required both indirect and induced economic impacts are also expected to be small. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | C. Groundwater Impacts<br><br>The deficiencies in the discussion on groundwater impacts of L-Reactor operation are detailed in the attached analysis by Professor Yaron M. Sternberg of the University of Maryland. Professor Sternberg points out that: | |
| EN-23 | 1. The Draft EIS is seriously flawed in the lack of hydrogeological data for the immediate vicinity of the L-Reactor and its reliance, without proper justification, upon data for the F and H areas, which are some 10 km away. | Details on the hydrostratigraphy of L-Area (developed from several source including soil borings and drill logs and geophysical well logs) are presented in the EIS. Specifically this topic is discussed in Section F.2.10 which includes three cross-sections and a depth-to-ground-water map for L-Area and vicinity. The elevation of the ground-water table is mapped in Section 3.4.2.2. Pumping test data for the new Tuscaloosa wells in L-Area was used to assess drawdowns in the Tuscaloosa beneath L-Area (Section 4.1.1.3). L-Area water quality data are described in Section F.5.2. This information, together with our understanding of the hydrogeological conditions of the F- and H-Areas, provided sufficient justification for the assessment of potential L-Reactor impacts on the groundwater. |
| EN-24 | 2. The Draft EIS suggests that it is not likely that pollutants in the L-Reactor area would contaminate the Tuscaloosa aquifer because the hydraulic head of this aquifer at this location is higher than that in the Congaree Formation. However, no data is presented on (1) what data was used to locate head reversals between these two areas and (2) what are the future anticipated head differences in view of the continuous decrease of the piezometric head in the Tuscaloosa Formation and increases in pumping rates on and off site. The consequences of possible head reversal in the L-Reactor area must be evaluated. | See the responses to comments AJ-1, AW-1, BT-7, and EL-15. The discussions on the effects of increased pumping on the head differential between the Tuscaloosa and Congaree Aquifers given in Sections 4.1.1.3, 4.1.2, 5.1.1.2, 5.1.1.4, and 5.2.3 have been expanded. Based on Figures F-9 and F-18, Figure F-29 has been revised to depict the head difference between the Tuscaloosa and Congaree Formations.<br><br>In A- and M-Areas, where the green clay is discontinuous, the cones of depression in wells producing from the Tuscaloosa are not reflected in water levels in the shallow aquifers. This fact and data related to the contamination of the shallow ground water with chlorinated hydrocarbons shows that the basal clay of the Congaree and the upper clay of the Ellenton are effective confining units for the underlying Tuscaloosa sands throughout the SRP, including L-Area. The ground water in the Tuscaloosa and Congaree beneath L-Area flows to the Savannah River. The public risk from the potential migration of contaminants, which might migrate into formations underlying the |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | | McBean Formation from the L-Area seepage basin, are considerably reduced by this flow path, the protracted travel time, and dispersion. |
| EN-25 | 3. The startup of the L-Reactor would add waste discharges in the F, H, and M areas and thereby contribute to future contamination and aggravation of the already acknowledged groundwater problem at SRP. These areas should not receive additional wastes, and "seepage basins should not be used anywhere at the SRP for disposal of any hazardous material because such activity poses a potential serious health hazard to users of groundwater." | See the responses to comments DA-2 through DA-8. |
| | D. Safety of the L-Reactor and Alternatives | |
| EN-26 | As discussed at length in the attached statement of Dr. Cochran, the EIS should state that the L-Reactor as presently designed does not meet the same basic safety criteria which are applied to commercial nuclear reactors. Dr. Cochran further points out that the analysis on the Draft EIS of safety improvements is seriously flawed. We would like to add the following comments on L-Reactor safety and alternatives. | L-Reactor does meet the pertinent basic safety criteria that is applied to commercial nuclear reactors. See the responses to comments BL-1 through BL-14. |
| EN-27 | 1. The Draft EIS fails to provide the required "worst case" analysis of the possible consequences of a major nuclear accident at the L-Reactor.2/ The Draft EIS examines the consequences of only a 10% meltdown of the reactor's core with the active confinement system operating as designed. It is clear that greater meltdowns and active confinement system | Analysis of a full core meltdown is not required to test compliance with 10 CFR 100. See the responses to comments BL-1 and BL-4.<br><br>To provide a further perspective on the overall accident risk (defined as consequence times probability) or L-Reactor operation, the EIS contains in Section 4.2.1.6 and Appendix G a preliminary total risk curve that depicts the annual probability of an individual living at the SRP site boundary receiving more than a certain dose from postulated severe accidents. The results shown in this curve were based on the Safety Analysis Report, and include high probability low consequence accidents to low probability high consequence accidents including the hypothetical 100-percent core melts at the upper bound of the consequence spectrum. |

2/ EIS's must include "worst case" scenarios where there is a lack of scientific certainty. The Nuclear Regulatory Commission ("NRC") has recognized the technical difficulties in predicting both the probabilities and consequences of nuclear accidents in the wake of the Three Mile Island nuclear accident--an accident which was viewed as "incredible" before it happened.

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | failures could physically occur. Since a full core meltdown with active confinement failure is a possibility, no matter how slight, DOE is obliged to present the analysis in its EIS. Also, as noted in the attached statement of Dr. Cochran, an analysis of a full core meltdown is also required to test compliance with 10 CFR 100 standards. | The Department of Energy recognizes uncertainties inherent in the prediction and consequences of extremely low-probability but high-consequence accidents. The worst-case analysis required by NEPA is intended to provide the decisionmaker with information to balance the need for the action against the risk and severity of possible adverse impacts if the action proceeded in the face of uncertainty. The "uncertainity" in this instance, however, is not one that questions the severity of the consequences if this class of accident were to occur, but rather the degree of improbability of its occurrence (i.e., whether once in 10 million years or once in a billion or more years). The detailed analyses of the very-low-probability, 10-percent, core-melt accident, together with available information on the consequences and probabilities of a spectrum of more severa but even less probable accidents included in the EIS are judged to provide the decisionmaker with sufficient information for this purpose. |
| EN-28 | DOE's failure to present data on the consequences of a full core meltdown is rather puzzling since its contractor, NUS Corporation, performed such a computer analysis in August 1983, prior to the issuance of the Draft EIS. The section of the Draft EIS on accident consequences must be totally rewritten to include full consideration of the most severe accidents involving a full core meltdown and failure of the active confinement system. | The NUS analysis of a full core meltdown using the CRAC2 code was done to assure that the consequences predicted were not different in kind from those for the 10-percent core-melt case; that is for example, no prompt fatalities in either the 10-percent or the 100-percent core-melt case. Since that was the case, the health effects predictions are directly scalable (i.e., the 100-percent core-melt consequences are 10 times those of the 10-percent core melt) and the decision was made to include only the results of 10-percent core-melt analysis in the EIS as representative of an accident whose consequences are "not exceeded by those from any accident considered credible" [10 CFR 100.1 (a)]. |
| EN-29 | 2. The Probabilistic Risk Assessment ("PRA") for the L-Reactor (DPST-83-717) appears to exclude external events, including earthquakes, hurricanes, and tornadoes. The failure to consider such events in the PRA makes the use of the PRA results in the Draft EIS extremely questionable.<br><br>a. Earthquakes beyond the design basis should be evaluated as an accident initiator using PRA for the L-Reactor since the general area in which the site is situated includes the Charleston area affected by the great 1886 earthquake and falls in a large region subject to earthquakes of about Mercalli Intensity VII (DPSTSA-100-1, Rev. 12/81, at 2-16 and Figure 2-8, at 2-17). The recent | As noted in Section 4.2.2.3 a design-basis earthquake of 20 percent of gravity with a return period of 5000 years has been established for the Savannah River Plant and improvements have been made to the reactors to meet the seismic criteria of the design-basis earthquake. A panel of eight experts in the earthquake sciences, led by George W. Housner, all concurred with 20 percent of gravity ground motion as being a conservative design basis. In a similar study the Tera Corporation (1982; "*Seismic Hazard Analysis for the Savannah River Plant*, South Carolina") concluded that the best estimate of the return period for 20 percent of gravity ground motion was 5800 years, which is in good agreement with the information presented in Section 4.2.2.3. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | publications of Algermission et al., should be consulted for probability statistics for ground acceleration values, as well as the recent USGS and NRC reports (the NRC report was in the form of a SECY paper and a Board Notification) concerning the Charleston earthquake. These reports indicated that such a quake could occur anywhere along the East Coast and the 1886 quake was not associated with any known tectonic features. A probability of exceeding the design basis earthquake of one in 5000 years is too high if such an earthquake could lead to a full core meltdown.<br><br>b. Hurricanes should be evaluated as an accident initiator since hurricanes affect South Carolina about every seven years and hurricane force winds have been measured at the site during the passage of Hurricane Gracie to the north of SRP in 1959. There were 38 historical hurricanes affecting South Carolina between 1700 and 1971; and there may have been others since 1971 (DPSTSA-100-1, Rev. 12/81, at 2-9 to 2-10).<br><br>c. Tornadoes should be evaluated as an accident initiator using PRA for the L-Reactor; tornadoes striking a specific point within the SRP site have an estimated recurrence interval of about 1,500 years (DPSTSA-100-1, Rev. 12/81, at 2-10). This recurrence interval is far from trivial in the context of a PRA. In addition, the confinement filter compartments will not withstand a hypothetical design-basis tornado (DPSTSA-100-1, Rev. 12/81, at 3-4). | The responses of reactor structures and equipment to ground accelerations greater than 0.20g have not been explicitly analyzed. Such accelerations cannot be ruled out as possibilities in seismic events with return periods in excess of 5000 years. However, the 0.20g is not a threshold beyond which extensive failures of industrial facilities designed to conservative engineering codes and standards, as are SRP reactor systems, with no explicit seismic design consideration, indicates such facilities can be expected to survive accelerations well in excess of 0.20g without experiencing important failures or significant damage. This is, in particular, true of welded piping systems, which have proven to be nearly invunerable to ground accelerations up to 0.5g and beyond.<br><br>As noted in Section 4.2.2.4, the SRP reactor blast resistant design criteria offers protection to tornadoes and hurricanes. The reactor building itself can withstand a tornado-induced pressure drop that is twice the pressure drop associated with a tornado which has a $2.61 \times 10^{-6}$ probability of occurrence (Section 4.2.2.4). Attachments to the reactor building such as the 61-meter-tall stack and the confinement system filter compartments are not as resistant to tornadoes. However, damage to such attachments will not cause a reactor accident. Damage to such attachments immediately following an independently caused reactor accident would increase offsite dose effects; however, the probability of independent occurrence of an accident followed by a severe tornado or hurricane is so low that it need not be considered.<br><br>Also see response to comment BL-12 concerning NRC's position regarding PRA analysis of accident sequences initiated by events more severe than the design bases for natural phenomena. |
| EN-30 | 3. The Safety Analysis Report ("SAR") for the SRP reactors discusses the presence of a heavy water plant four miles from one of the reactors (unspecified) from which a "massive release" of hydrogen sulfide gas could occur, and also discusses a chlorine source 100 meters from an SRP reactor (again, unspecified). The SAR argues, however, that safe shutdown could be attained from a remote control station located more than 10 miles away. The EIS should clarify how the remote control station operates and the criteria used to activate it. | Recent changes in plant operation have essentially eliminated hazards in L-Area from hydrogen sulfide and chlorine as noted in Section 4.2.2.1 of the EIS.<br><br>Section 2.2.2.7 has been revised to provide additional information regarding remote control station operation and activation. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-31 | 4. The SAR quotes an existing probability for SCRAM failure together with failure of backup shutdown system of 6 x 10E-5, but mentions a planned project to reduce the probability of failure of the primary scram systems from 1:1,000 to less than 1:1,000,000 (DPSTSA-100-1, Rev. 12/81, at 4-59). The EIS should specify what the improvements to the scram system consist of and whether they have been implemented. | The proposed project to further reduce the probabilities associated with failure of the primary scram system would increase the redundancy and independence of the scram system at both the channel and system level. It is not necessary that the EIS address this project which would increase the overall system reliability because the analyses conducted in the EIS are based on the probabilities of the systems as currently installed. |
| | 5. The discussion of the CRAC2 analysis of accident consequences in the Draft EIS (4-56) fails to disclose many important underlying assumptions, including the following: | |
| EN-32 | a. The CRAC2 analysis cites zero early fatalities and zero people with whole body and thyroid doses greater than 25 rem and 300 rem respectively. This is due to the failure to consider the consequences to people on site. The EIS should take into consideration the SRP work force including the consequences under a delayed or no evacuation scenario. Even with evacuation, some of the SRP workers will be required to remain onsite for security reasons. | The CRAC 2 analysis treats on-site personnel as a transient population similar to schools, shopping centers, and factories. This treatment of on-site personnel is consistent with similar CRAC analysis performed in the Reactor Safety Study and consequence assessments of light-water reactors which only consider resident populations. |
| EN-33 | b. The CRAC2 analysis does not report results for the 100% core melt case though, as noted above, DOE's contractor performed such an analysis. | The 100-percent core-melt accident is not considered credible. However, even if a 100-percent core-melt accident is assumed the conclusions given in the EIS are valid. These conclusions are that there will be no early fatalities, no cases where the thyroid dose exceeds 300 rem and no cases where the whole body dose exceeds 25 rem. The mean population whole body dose would be 10 times that given in the EIS for the 10-percent core melt, that is, $7.7 \times 10^{-2}$ person-rem per reactor year (for the population within 80 km of the reactor site). This whole body dose is negligible in comparison to the effects of natural background radiation of $8 \times 10^{4}$ person-rem per year for this population. |
| EN-34 | c. The conditional probabilities presented, e.g. in Figure 4-11, are wrong becuase they consider only meteorology and do not consider the probability of confinement system failure and other common cause failure scenarios. | See the responses to comments BL-9 and BL-12. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| EN-35 | d. The CRAC2 model utilized by the DOE assumes the $LD_{50}/_{60}$ (lethal dose to 50% of the exposed population within 60 days) is 510 rads. This assumption is overly optimistic. This assumes the victims receive "supportive treatment," which includes barrier nursing, copious use of antibiotics, massive transfusions, reverse isolation, and other special sterile procedures. It is far from clear that this can be provided for all those in need in the event of a severe accident at SRP. How, for example, will the victims of the highest exposures be identified when there will be many others who may be suffering symptoms of radiation sickness (such as prodromal vomiting) from lesser exposures.<br><br>There is considerable controversy over the use of the 510 rads $LD_{50}/_{60}$. The Risk Assessment Review Group (NUREG)/CR-0040, "Risk Assessment Review Group Report to the U.S. Nuclear Regulatory Commission," Harold W. Lewis, Chairman, September 1978) concluded that scientific opinion supports a range from 400-600 rads. This range could cause a factor of two change either way in the number of early fatalities. Moreover, the Risk Assessment Review Group concluded with regard to supportive treatment that "the ability to carry out such intervention has not only not been demonstrated, but isn't even well planned at this time (NUREG/CR-0040, at 19). Changing the $LD_{50}/_{60}$ from 510 rads for "supportive treatment" to the level of "minimal treatment," i.e., 340 rads, could increase the number of fatalities on the SRP site by a factor of two to four (WASH-1400, Appendix VI, at 13-50; NUREG-0340, at 26-28).<br><br>Other groups have used more realistic dose-response relationships which are closer to the "minimal treatment" curve used in WASH-1400. The California underground siting study used an $LD_{50}/_{60}$ for minimal treatment of 286 rads and for supportive treatment of 429 rads (Subcommittee on Energy and the Environment, House Committee on Interior and | In CRAC 2 analyses, most early fatalities are predicted to be caused by irradiation of the bone marrow. For this reason, the LD 50/60 doses established in the Reactor Safety Study are based on bone marrow exposures. The CRAC 2 results for the L-Reactor indicate a peak bone marrow dose for a 10-percent core-melt accident is 78.4 rem and this occurs at a distance of 0.5 mile from the plant. At a distance of 5 miles, the peak dose drops to 11.5 rem. Therefore, even under an extremely conservative assumption of 100 rads, the number of early fatalities among the general public would remain unchanged at a value of zero.<br><br>The general question of whether the Reactor Safety Study (RSS) methods for calculating health effects (both early and latent) should be revised was considered in the PRA Procedures Guide (NUREG/CR-2300, January 1983). After extensive peer review of a draft report, the authors of the section of the Procedures Guide that deals with Environmental Transport and Consequence Modeling came to the follow conclusions:[1]<br><br>"As this chapter was being written and reviewed, it became apparent that the topics of dosimetry and dose-response relationships generate considerable scientific controversy. After detailed discussion, the authors have decided to make the following recommendations. First, the state-of-the-art has not yet "solidified" to the extent that it is possible to recommend unequivocally a replacement for the RSS methods. Hence, the RSS remains the best comprehensive treatment of dosimetry and dose-response relationships in the context of consequence modeling, and its methods remain acceptable. Second, because considerable work has been done since the publication of the RSS, those who wish to try to update the methods are encouraged to do so. However, those who vary from the RSS values should use sources that have been subjected to a peer review, such as<br><br>[1]Section 9.3.5.3 of NUREG/CR-2300. |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | Insular Affairs, "Reactor Safety Study Review," Serial No. 96-3, 1979, at 366, attachment to letter dated 21 February 1979, from Bryce W. Johnson, Peter R. Davis, and Long Lee to Hon. Morris Udall, at D-7. In addition, the "Accident Evaluation Code" (AEC) used to calculate health effects in CRBRP-1 utilizes an $LD_{50/60}$ of 350 rems (SAI-978-78-PA, Z. T. Mendoza and R. L. Ritzman, "Final Report on Comparative Calculations for the AEC and CRAC Risk Assessment Codes," Science Applications, Inc., December 1978, at 3-6 and 3-8). | the BEIR III report (1980), the UNSCEAR (1977) report, and ICRP Publication 26 (1977). Finally, studies intended to update the RSS methods are in progress: the NRC is funding work on age- and sex-specific dose-conversion factors at the Oak Ridge National Laboratory, and work on health-effects modeling is under way at Harvard University's School of Public Health. When their results have been published, a comprehensive updating of the RSS methods in codes like CRAC2 will be in order."<br><br>Since the Procedures Guide was written, the Harvard School of Public Health has published "A Critical Review of the Reactor Safety Study Radiological Health Effects Model" by Douglas W. Cooper et al., NUREG/CR-3185, March 1983.<br><br>This report list many aspects of health effects modeling that need to be investigated. These investigations are under way at the Harvard School of Public Health and are being funded as part of the Nuclear Regulatory Commission's MELCOR project, which has as one of its aims the updating of the CRAC2 consequence modeling code. Meanwhile, the conclusion of the Procedures Guide, that "the RSS remains the best comprehensive treatment of dosimetry and dose-response relationships in the context of consequence modeling and its methods remain acceptable" still stands. |
| EN-36 | e. The CRAC2 code contains several "hidden" assumptions regarding the cancer risk estimator for latent cancers, including an assumption that the cancer risk at low dose is a function of dose rate. The net effect of these assumptions appears to be to reduce the estimate of latent cancer fatalities (exclusive of thyroid cancers) by a factor of about 5 or more compared to the opinion of NRDC and a number of experts, including Radford, Morgan, Gofman, Stewart, Mancuso, Kneale, and Tamplin. Furthermore, DOE should report cancer incidence, rather than cancer fatalities. The cancer incidence risk is 1.5 to 2 times the fatality risk. The old WASH-1400 cancer risk values which DOE relies upon are no longer valid in light of BEIR III as modified by consideration of the recent finding regarding dosimetry at Nagasaki and the latest ABCC mortality data. | The assumption that the cancer risk at low doses is a function of dose rate is also explained in the PRA Procedures Guide, (pp. 9-53 and 9-54):<br><br>"The estimates of latent cancer calculated by the CRAC code are based on the BEIR I report with leukemia and bone-cancer values modified to reflect new data that became available between 1972 and 1975. The RSS developed three estimates of risk. The upper-bound estimate used the linear, no-threshold estimators from the BEIR I report (1972). The central estimate incorporated a dose-effectiveness factor for exposures delivered at low dose rates. The lower-bound estimate took into account the large uncertainty in estimating effects from low doses and low dose rates and assumed a threshold of 10 or 25 rem for latent-cancer fatalities. The central-estimate approach is consistent with the BEIR III report (NAS-NRC), 1980), which used a linear-quadratic model to calculate risk estimators for |

Table M-2. DOE responses to comments on Draft EIS (continued)

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| | | latent-cancer fatalities. In addition, the BEIR III report published ranges that indicate some of the uncertainty associated with these factors. The upper and the lower bounds of the ranges were obtained with the linear model and the pure quadratic model, respectively. The risk estimates, based on the linear-quadratic model, of BEIR III (1980) are approximately 2 times lower than the BEIR I (1972) estimates based on the linear model."<br><br>In summary, the authors of the EIS believe that the central estimate is consistent with a reasonable concern of expert opinion and should therefore be used in point estimate calculations of the public risk of latent-cancer fatality. |
| EN-37 | f. As noted above, the CRAC2 accident consequence calculations ignore any possible common cause failure of the confinement systems and the ECCS, e.g., due to external events. Certainly both of these systems are dependent upon offsite and onsite power supplies, and both will fail if all power is lost. | The intent of this calculation was to show the consequences of a beyond design basis accident. No attempt was made to do a PRA that would consider the common-cause failures described. |
| EN-38 | 6. The discussion of the Draft EIS of alternative safety systems for the L-Reactor (Sec. 4.4.1.6) appears to be premised upon a fundamental misunderstanding of reactor safety philosophy. The EIS erroneously implies that the cost/benefit methodology used in the NRC regulations 10 CFR Appendix I for limiting radiation releases under normal operations is equally appropriate for defining safety requirements for mitigating severe nuclear reactor accidents. However, the NRC regulations do not suggest in any way that such requirements (see 10 CFR 100) can be waived if an analysis "demonstrates" that the containment system has an unfavorable cost/benefit ratio.3/ While<br><br>3/ DOE must surely recognize the fallacy of this approach since conceptual designs for a New Production Reactor ("NPR") appear to include a passive containment building. See Memorandum from D. E. Hostetler to P. L. Roggenkamp, "Alternatives to L-Reactor Startup: New Production Reactor: Savannah River Laboratory (DPST-83-643, June 29, 1983). In addition to a containment building, the NPR would have a number of other "enhancements" over current SRP reactor design, including cooling towers and $D_2O$ detritiation. A schematic of the NPR at SRP, is attached. | In any application of technology, whether nuclear or not, cost/benefit methodology has always been a factor either implicitly or explicitly.<br><br>This is particularly true in considering modifications to existing equipment or facilities and is recognized by Federal legislation in a number of areas. For example, air pollution control requirements are different for "new sources" than for existing plants; old automobiles are not required to be modified to meet current emission standards; existing power plants have not been generally required to backfit cooling towers, although new plants at similar locations do employ them. Thus, the feasibility and cost of incorporating a variety of enhancements on a new reactor, which are greatly different than for existing reactors, are justifiable considerations.<br><br>The identification of the EPA and NRC valuations of person-rem was for the purpose of providing a perspective which DOE regards as important but not determinative in deciding upon the need for and nature of safety system augmentation for the existing reactors. However, in view of the high degree of |

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
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| | the NRC has used cost/benefit analysis in its safety goal development program (NUREG-0880 Rev. 1), it has not chosen to use such analysis to replace the current design basis requirements in 10 CFR 100 for containment/confinement systems.4/ | isolation provided by the SRP site (compared to any nuclear power plant site), the engineered safety features of the existing reactors are considered to be entirely in philosophic accord with the spirit of 10 CFR 100.10(d) which suggests that sites may be found acceptable if the site features are complemented "by appropriate and adequate compensating engineering safeguards." |
| | In sum, this section of the EIS must be totally recast to examine which confinement/containment system alternative meets 10 CFR 100, using the appropriate methodology (95% meteorology and a source term of 100% noble gases, 50% of the halogens and 1% of the solid fission products and plutonium inventory). Only then should the EIS apply cost/benefit analyses to determine which alternative of those that meet 10 CFR 100 is preferred. | |
| | E. Miscellaneous Comments | |
| EN-39 | The Draft EIS mentions (at 3-31) the criteria which were used over 30 years ago to choose the site for the Savannah River Plant. This is somewhat misleading since it implies without any documentation that these exact same conditions exist today. However, as an example, it is now clear that there are competing uses for "the large cooling water supply" and the SRP's outdated reliance on the Savannah River methods for cooling purposes is a matter of substantial concern. | The siting criteria, which were used to select SRP from among 100 potential locations, are identified as a matter of record. These statements do not imply that conditions have remained unchanged. For example, placing R-Reactor and the Heavy Water Production Facility in standby status and construction of Par Pond have greatly reduced SRP's surface-water requirements. Also, see the responses to comments AB-13 and EN-11. |
| EN-40 | Most of the maps in the Draft EIS (see Figures 3.1, 3.2, 3.4, 5.1) do not make clear, through differences in shading, that there are private lands (i.e., Little Hell's Landing and the Creek Plantation Swamp) which are bounded on three sides by SRP and on the fourth by the Savannah River. The reader may be left with the mistaken impression that DOE has control over this entire area. These maps should be accordingly revised. | Maps depicted in Figures 3.2 and 5.1 clearly indicate the boundary of the Savannah River Plant. Potential impacts on offsite areas such as Little Hell's Landing and Creek Plantation Swamp are specifically described in appropriate sections of the EIS in terms of being privately owned or located offsite (e.g., Section 3.7.2.1--Radiocesium). |

4/ Even if DOE were correct in its interpretation of NRC safety requirements, its analysis of safety system alternatives is in error. See attached statement of Dr. Cochran at 14-15.

Table M-2. DOE responses to comments on Draft EIS (continued)

| Comment number | Comments | Responses |
|---|---|---|
| | Conclusion | |
| EN-41 | For the reasons set forth above, we believe that the Draft EIS does not provide an adequate basis under the National Environmental Policy Act for decisionmakers to determine whether, and if so, under what conditions to proceed with the operation of the L-Reactor. In order for DOE to meet its responsibilities under NEPA and given the grave deficiencies in the Draft EIS, we would strongly urge that a new substantially revised draft environmental impact statement be issued for further public review and comment. Only if such action is taken, can DOE decisionmakers, the Congress, and the public be able to assess the effects of L-Reactor operation and availability of alternatives which would avoid or reduce environmental harm.<br><br>If you have any questions with regard to these comments, please don't hesitate to contact me.<br><br>Sincerely yours,<br><br>S. Jacob Scherr<br>Counsel for Natural Resources Defense Council, Energy Research Foundation, The Georgia Conservancy, S. David Stoney, Jr., Judith E. Gordon, Justin Stephens McMillan, Coastal Citizens for Clean Energy, Environmental Policy<br><br>(Note: Dr. Cochran's Statement of November 3, 1983 is contained in this appendix as statement "BL") | DOE believes that sufficient information is available in the EIS for the public and decisionmakers to assess the environmental impacts of L-Reactor operation. Changes to the Draft EIS were made in this Final EIS and these changes are clearly marked to allow the reviewers to differentiate between the draft EIS and final EIS. |