APPENDIX K

COMMENTS ON THE DRAFT ENVIRONMENTAL STATEMENT

This section contains the comments received on the Draft Environmental Statement and the ERDA response to those comments. Each of the incoming comment letters was serially assigned a number as it was received. The assigned numbers were used throughout the text to indicate topic areas where text changes were made as a result of comments. For example, Comment Letter 3 is identified K.3. Any text changes made as a result of comments contained in Letter 3 are identified (K.3) in the text of the statement. Comments from each letter are shown in this section, followed by the ERDA staff response to the comment. Each comment letter is exhibited at the end of this section.

The following index to the comment letters is provided for the reader's convenience:

K.1 Comment Letter, Federal Power Commission, Washington, D. C. 20426

A response was not required.

K.2 Comment Letter, United States Department of Agriculture
Soil Conservation Service
240 Stoneridge Drive
Columbia, South Carolina 29210

Comment

Assuming that the radioactive materials in the swamp are being attached to soil particles and carried off as sediment, the control of erosion and sediment should be planned to reduce further contamination of the swamp area.

Response

The radiocesium in Steel Creek and the swamp did not result from erosion of contaminated surface soil. Most of the cesium-137 in the swamp was released to Steel Creek in the liquid effluent from L and P reactor fuel storage basins in the 1960s. The discharges to Steel Creek were substantially reduced in 1970 following modifications in P Area and shutdown of L Area reactor.

Comment

The identification of the source of the soil contamination is of paramount importance.

Response

The source of the cesium is known. See response above.

Comment

Reference is made to the second paragraph on Page J-4 which indicates that the contaminated sediment is relatively immobile and is expected to remain immobile. We do not agree with this statement since with the next major storm, sediments could be transported downstream.

Response

Three consecutive annual surveys of the swamp during the dry season indicate that the cesium is relatively immobile. The swamp will be monitored at least annually in the future to provide a basis for continued evaluation. Surveys of the swamp are reported annually in "Environmental Monitoring in the Vicinity of Savannah River Plant." Even in the unlikely event the entire 25 curies of radiocesium in the offsite downstream swamp migrated to the river in one year, the exposure to a person using untreated riverwater downstream from the swamp would be only 0.13 mrem compared with an exposure of approximately 120 mrem from natural sources.

Comment

Every effort should be made to eliminate further contamination of the swamp.

Response

The discharges to the swamp were significantly reduced in 1970 following modifications to P Area and shutdown of L Area reactor. No increase in exposure rate in the swamp is expected from current releases of radioactivity.

K.3 Comment Letter, W. P. Bebbington
905 Whitney Drive
Aiken, South Carolina 29801

Comment

With regard to the National Academy of Sciences/National Research Council position, the passage quoted on page H-5 of the Statement does not appear to be the formal "Conclusions and Recommendations" of the Committee, which appears on pages 3 and 4 of their report. The latter material should be added or substituted in the Final Statement.

Response

Text changes were made in Appendix H to include conclusions and recommendations of the National Academy of Sciences as stated in the report *An Evaluation of the Concept of Storing Radioactive Waste in Bedrock Below the Savannah River Plant Site.*

Comment

The abstract of "Effects of Normal Operations" that occupies most of page III-1 would be more useful if each item included a brief quantitative or qualitative statement of the significance of the effect.

Response

Page III-1 is intended only as a listing of topics that are discussed extensively, together with their effects, in Section III-A.

Comment

On page III-19 there is a summary of continuing environmental effects of the solid radioactive waste storage site. It would be good to have a similar summary for the liquid radioactive waste tank farm.

Response

Pages III-19 and III-20 describe the surveillance program at the burial ground for solid radioactive waste and the monitoring results of this program. Corresponding information for the high-level waste tank farms is described on pages III-82 through III-93.

K.4 Comment Letter, Department of Health, Education, and Welfare
Office of Environmental Affairs
Washington, D. C. 20201

Comment

Although the presently employed monitoring program may be adequate, the results of the analyses for particular radionuclides in most of the foods and waters sampled were not reported in the draft environmental statement. Specifically, tables should be included in the document which give the results of analyses of fish and vegetation in and alongside streambeds which are downstream from plant emissions and groundwater near burial ground and high-level radioactive waste tanks for ^{137}Cs, ^{90}Sr, ^{131}I, ^{239}Pu, and ^{3}H as a minimum.

Response

The 1975 environmental monitoring results are discussed in narrative form on pages III-21 through III-26. The environmental monitoring program is described more extensively in Appendix E. Results of the comprehensive environmental monitoring program, including tabular presentations of radioactivity in fish and vegetation and in the groundwater near the burial ground and high-level waste tanks are reported annually in the documents shown as references for Appendix E.

Comment

The flocculation of seepage basin feeds in order to reduce radioactive releases into seepage basins seems like an alternative which should be implemented.

Response

A cost-benefit analysis is being made for flocculation treatment of the influents to the separations areas seepage basins. These influents contain low levels of radioactivity. If the cost-benefit analysis shows that flocculation can be justified, this treatment will be proposed for budgetary considerations.

K.5 <u>Comment Letter</u>, R. O. Pohl
Laboratory of Atomic and Solid
State Physics
Cornell University
Ithaca, New York 14853

Comment

The Environmental Statement should contain more specific information on the long-term commitment of land, and the surveillance requirements of radioactively contaminated burial grounds, seepage basin, facilities like buildings and equipment, etc., and accidentally contaminated land within and outside the Plant boundaries.

Response

As stated in the Foreword, the Federal action under review is specifically the interim management of waste at the Savannah River Plant. Future environment impact statements will include consideration of the long-term commitment of land, decommissioning of plant facilities, the long-term surveillance requirements as well as long-term management of SRP wastes.

K.6 Comment Letter, United States Department of
the Interior
Office of the Secretary
Washington, D. C. 20240

Comment

It should be clarified whether the 2600 cubic meters of transuranium waste shown in Table I-1 includes older (pre-1965) TRU waste.

Response

As indicated by the title of Table I-1, Radioactive Effluents and Generated Radioactive Waste at SRP - 1975, this is the volume generated in 1975 only. The total volume of transuranium waste stored at SRP is shown in Table II-16.

Comment

The final statement should clarify what measures are recommended for ultimate disposition of waste in any burial sites that may contain unsegregated transuranic wastes.

Response

As stated in the Foreword, the action under review in this environmental statement is the interim management of SRP waste. The long-term management of SRP waste will be addressed in a future environmental statement.

Comment

In view of the past history of tank leakage, the occurrence of most leaks in close proximity to welds, who will inspect the X-ray of welds on future waste storage tanks and what standards will be required for examination and filing of such X-rays for future reference?

Response

Extensive testing and metallurgical evaluation indicate leaks occurred as a result of stress corrosion cracking. The stress corrosion cracks occurred in or adjacent to welds, i.e., areas heated during fabrication welding. All tanks build since 1967 have been stress relieved after fabrication to prevent stress corrosion cracking. Welds are inspected by two independent groups of certified weld inspectors and all radiographs are stored for future reference. Text changes were made on page II-94 regarding the weld inspections.

Comment

The final statement should indicate what measures are planned for removal of radioactive material from the annular space when the tank is completely deactivated.

Response

Decommissioning waste tanks is part of the long-term waste management plan and will be addressed in a future environmental statement. However, a method has been developed for recovery of radioactive waste from the annuli, and a demonstration of the method is planned in 1977.

Comment

It would be helpful in the final statement to clarify present policies regarding burial of plutonium in earthen trenches, whether consistent policies are being followed with regard to burial of plutonium at the Savannah River Plant, the Hanford Reservation, and the Idaho National Engineering Laboratory, and whether such plutonium will be fully recoverable from earthen trenches if such an option should be favored at some future date.

Response

The policy for storage of transuranium waste generated at ERDA sites is stated in ERDA Manual, Chapter 0511. This policy and its administration at the Savannah River Plant are described on page II-120. In accordance with recommendations of the National Academy of Sciences plans, to exhume transuranium waste buried directly in earthen trenches will be re-examined and re-evaluated for risks-benefits before such a project is undertaken.

Comment

In the summary of radioactive deposits in the soil discussed on page II-40, it is not clear why the third entry in Table 10 and page A-94 is omitted from the discussion since the amount of radioactivity is larger than two of the three deposits described on page II-40.

Response

The description of radioactivity in the soil on page II-40 is in a section of the statement describing the chemical separations areas. The third item in Table 10 on page A-94, a reactor area seepage basin, is discussed in Appendix A, page A-14. Additional details are given in DP-1349.

Comment

It is mentioned on page I-6 in the draft statement that only one leakage episode from a tank into the ground has occurred. It would be advisable to mention at the same place in the final statement that several leaks occurred into the ground during transfers of liquid from H-Area waste tanks.

Response

A text change was made on page I-6 for clarity. A detailed discussion of spills during waste transfers is presented on pages III-82 through III-93.

Comment

Because of the large number of values given as less than one curie in Appendix A, Table 10, "Miscellaneous Radioactive Waste in Soil," it would be helpful for the final statement to explain the basis for estimating the amount of activity.

Response

It is not always feasible to specifically quantify small amounts of radioactive waste in soil. Usually the contaminated zone is defined, and representative samples are taken for analyses of radionuclide concentration. When this method indicates any quantity less than one curie, it is reported in that manner to avoid the implication of a precise measurement.

Comment

It is stated on page III-90 of the draft statement that "Although stress cracks in several of the steel primary tanks have allowed waste to pass into the secondary pans under and around the primary tanks, leakage outside the secondary container into the surrounding soil occurred only once." This is followed by an account of a leak of 10 to 500 curies of cesium-137 into the soil from Tank 16 in 1960. However, it had been stated earlier on page I-6 that "leakage of waste from cracks in a primary tank past the five-foot-high secondary steel pan or liner and the concrete container into the surrounding ground has occurred only once"; this is followed by an account of a leak in 1961 from Tank 8 of 3,000 to 5,000 curies of cesium-137 into the soil. It is not understood why both leaks should not be mentioned in each of these two places in the final statement.

Response

Text change made on page I-6 for clarity. Waste that escaped Tank 8 resulted from overfilling the tank, not through stress cracks. This is described on page III-82.

Comment

In the detailed account of the history of Tank 16 on page C-9 of the draft statement, the largest number of leaks that is mentioned is 175 leaks. However, the number of leaks in the tank was given as "approximately 300" on Table II-13, and a still larger number was given on page III-90 of the draft statement, where the number of leaks in Tank 16 is described as "about 350." These numbers of leaks from Tank 16 should be reconciled in the final statement.

Response

In the detailed account of the history of Tank 16 on page C-9 it is stated "Periscope inspections in 1961-1962 revealed about 175 individual leak sites,..."; the statement is correct. On page III-90, "The number of leak sites is ... about 350 in Tank 16"; the statement is correct and reflects the number of leak sites in 1972. Table II-13 shows 300 leak sites in Tank 16 which is incorrect. Table II-13 was revised to show 350 leak sites in Tank 16.

Comment

Since the "tan clay" and "green clay" and the piezometer measurements made in the H Area are so important in the natural mitigation and prevention of impacts on the principal aquifer, we believe the locations of the piezometers should be shown on a map at suitable scale and that other documentation for the reported great areal extent of the "green clay" should be given in the final statement.

Response

The geology and hydrology of Savannah River Plant are described on pages II-134 through II-152. The location of the piezometers is given on page II-150. The areal extent of the green clay is reported in DP-1455, *Savannah River Laboratory Environmental Transport and Effects Research, Annual Report - 1976*.

Comment

Although the draft statement indicates from observation of various releases the effects of selective sorption of radionuclides, the final statement should present at least examples or ranges of actual ion exchange capacities and any other characteristics which will be significant in evaluating future effects. Ultimate limits and reversibility of some types of sorption mechanisms should be discussed with reference to the appropriate materials found at SRP.

Response

Savannah River Plant soils are generally clayey sand or sandy clay containing 20 to 40% clay. The dominant clay mineral is kaolinite with small amounts of other clays including weathered mica. The ion exchange properties of the soil are due mainly to the presence of clays within the soil complex. Radioisotopes present in process liquid wastes at SRP exist as cations, and, as such, are capable of being adsorbed or exchanged by the soil. The negative charge increases with pH as a result of increased ionization of the acidic group. Kaolinite clays, therefore, have variable ion exchange capacities depending on pH. For additional information on ion exchange characteristics of SRP soils see Section III, Reference 35.

Comment

The final statement should also evaluate the potential for effects of the discharge of detergents (15,000 pounds per year) to the seepage basins on ion exchange, sorption, and radionuclide retention. Disposal of detergents in the seepage basins was begun in 1976; therefore, a careful scrutiny of impacts seems warranted.

Response

The effects of discharging detergent to the F-Area seepage basin are continuing to be evaluated. Early results indicate no adverse effect on the seepage basin. The evaluation will require at least a few years. If unacceptable adverse effects are found, the laundry waste will be disposed of in another manner.

Comment

Data in Table 4 on page A-9 of the draft statement show that most of the cesium released is not transported downstream in the Savannah River. However, the draft statement has no information on the whereabouts of the released cesium not found in transport. Cesium retention in the stream sediments downstream from the Plant should be discussed and relevant data, if available, should be presented in the final statement.

Response

As indicated in the comment, the portion of the released radiocesium not in transport in the river can logically be presumed to be in sediment along the streambeds. Radiocesium that has migrated offsite but is not in the river is discussed in Appendix J. Based on monitoring data, the cesium in the swamp is relatively immobile. If, in the unlikely event, that all the cesium released through 1975 and not yet in the river (375 curies as shown in Table 4, page A-9) were released to the river in one year, the exposure to a person consuming water downstream from the Plant would be only 1.9 mrem and the total population dose would be 133 man-rem compared to a population dose of 8,200 man-rem from natural sources.

K.7 Comment Letter, United States Department of Commerce
The Assistant Secretary for
Science and Technology
Washington, D. C. 20230

Comment

The final environmental statement should include estimates of current and possible accidental releases of radionuclides and other contaminants introduced into the Savannah River that do or will enter the Savannah River estuary and adjacent coastal waters. In addition, estimates should be made of the probable effect that accidental releases of radionuclides will have on living marine resources or their use by man.

Response

As indicated in Section III, pages III-30 through III-40, releases of radionuclides from SRP have no significant impact on the population using river water downstream from the Plant and eating fish from the Savannah River. The dose contributed by SRP releases to the downstream population is 0.2% of the dose received from natural radiation sources (Table III-13). Potential radiation doses for postulated low-probability accidents, accompanied by unlikely failures of protective devices installed to prevent large amounts of activity from reaching Plant streams, are shown on page I-13.

K.8 <u>Comment Letter</u>, The Georgia Conservancy
3110 Maple Dr., Suite 407
Atlanta, Georgia 30305

Comment

Several "dose conversion factors" are not given in Table G-5, pages G-26 and 27. Specifically, the ^{89}Sr, ^{90}Sr, ^{134}Cs, ^{137}Cs dose conversion factors resulting from atmospheric release through surface water, vegetable, meat, and milk vectors and the dose conversion factor for ^{3}H are deleted for atmospheric releases through surface water, vegetable, and meat vectors.

Response

The dose conversion factors for the surface water, vegetable, meat, and milk vectors of ^{89}Sr, ^{90}Sr, ^{134}Cs, and ^{137}Cs released to the atmosphere were omitted because the quantity of these radionuclides released to the atmosphere is insignificant. As can be seen in Appendix A, Table 1, page A-3, the total quantities of $^{89,90}Sr$ and $^{134-137}Cs$ released to the atmosphere from 1954 through 1975, was 1.35 curies and 0.117 curies, respectively. The dose conversion factors for surface water, vegetable, and meat vectors of ^{3}H released to the atmosphere were omitted because the dose conversion factors for inhalation and milk vectors are sufficiently conservative to more than compensate for all vectors; this has been confirmed by a limited quantity of bioassay samples from people who reside adjacent to the plantsite.

Comment

The tritium release could be significantly reduced if it is captured at each source of high concentration.

Response

Dose to man from tritium releases is well within limits specified in ERDAM 0524, which are based on the recommendations of the Federal Radiation Council, Environmental Protection Agency, and the National Council on Radiation Protection and Measurements. In the context of reducing SRP releases to levels as low as practicably achievable, a number of cost-benefit analyses have been made (see Table IX-3). Where these analyses have shown that further controls would be practical, action has been taken or is planned to reduce the tritium releases.

Comment

We are concerned about the calculated dose of 800 mrem/year in the swamp downstream from the site. It is also puzzling that no assessment was made of the overall effects of this level of radiation on the plant and animal life in the swamp, or the predicted migration of these materials in years to come.

Response

As stated in Appendix J, page J-4, gamma radiation exposure rates range from 6 to 120 μR/hr above background in affected areas of the swamp. The maximum possible exposure in only 0.25 to 0.5 acre of the swamp having the highest level of radioactivity deposition is about 800 mR/yr. No restrictions on use of the swamp are considered warranted nor are remedial actions needed. Based on studies at SRP and other sites, there is no evidence that the levels of radiation in the swamp will have a detrimental effect on indigenous plant or animal life (no people live in the swamp). Also, as stated in Appendix J, page J-4, the contaminated sediments are relatively immobile and are expected to remain so. This statement is confirmed by monitoring, and the swamp will continue to be monitored at least annually in the future to provide a basis for continued evaluation. However, if all of the radiocesium in the offsite downstream swamp (approximately 25 curies) migrated to the river in one year, the exposure to a person consuming river water downstream would be only 0.13 mrem and the dose to the 70,000 users of river water downstream from SRP would be 9.1 man-rem compared to 8,200 man-rem from natural sources.

Comment

We are concerned with the continued storage of high heat waste (HHW) in liquid or salt/sludge form, in large storage tanks located near the ground surface and in proximity to the local water table. The alternative of long-term, intensive management of these wastes in such form is difficult to accept, since there is considerable evidence at SRP and Hanford to indicate that these tanks will leak within their design lifetimes. The construction of additional tanks of similar design at SRP using low carbon steel should be reconsidered, with the option of the acid waste stream stored in stainless steel given maximum priority.

Response

Storage of SRP wastes as acid solutions in stainless steel tanks has been evaluated as an alternative to the present neutralized waste system. Safety, technical, and economic considerations were included in these evaluations. Acidic waste from SRP processing would involve storing of solids; the amount of solids might be as high as 0.1% (by weight) of the fuel processed. It was concluded that storage of liquid waste in either mode was probably feasible. The risk of either system could be reduced to negligible levels by adequate design and engineered safeguards. The stress corrosion cracking observed previously in carbon steel tanks would not have occurred had they been stress relieved and protected by hydroxide and nitrite ions which are stress corrosion inhibitors. Although either system would provide adequate safety, the neutralized wastes possess certain inherent safety advantages for SRP; namely, the inclusion of the majority of radionuclides in an insoluble and relatively immobile sludge phase and negligible mobility of neutralized waste in SRP soil due to soil pluggage by hydroxide ions. Since there were no safety advantages for the stainless steel tanks at SRP, the decision between the two systems was made in favor of continued use of carbon steel tanks.

Comment

We question the continued use of tanks which have demonstrated leakage, for periods as long as 10 years after the leaks were discovered.

Response

Tanks have been reused only if the leak sites had become inactive; i.e., sealed with waste salts. Seventeen waste tanks, with capacities of 1.3 million gallons each, are under construction at SRP currently. Four more tanks are planned for each FY 78 and FY 79 authorization. Plans are to remove waste from all tanks that have leaked from the seven single-wall tanks, and from all tanks without full-height secondary containment. Text changes made on pages II-71 and II-79 will clarify these plans.

Comment

We would like to see estimates of the effects of earthquakes and other stresses on stress corrosion cracked tanks.

Response

The effect of earthquake-induced stress on waste tank cracks is discussed in Section III-B, "Potential Effects of Abnormal Operations of Waste Storage and Handling Facilities," pages III-112 and 113.

Comment

We did not note any assessment of the possible damage to the tank cooling system due to earthquakes or other shocks (such as explosions). It appears that if the cooling system were disabled for an extended period of time the resulting releases of radioactivity offsite would be greater than predicted.

Response

Loss of waste tank cooling is discussed in Section III-B, Potential Effects of Abnormal Operation of Waste Storage and Handling Facilities, page III-96.

Comment

Although it is stated that the facility is designed for the worst probable earthquake, some assessment should be made of the effects of a larger quake which could possibly occur. What would be released to the environment in such a case?

Response

The design basis earthquake for SRP waste tanks incorporates ground acceleration of 0.2 g. The basis for selecting this particular intensity for the design basis earthquake is discussed in detail in Section II-C, "Seismicity," pages II-160 through II-166.

Failure of a primary waste tank and subsequent seepage of waste through the secondary barrier (concrete portion) is discussed on page III-113.

Comment

We note the low level waste trenches are only 10 feet above present ground water levels. In the light of experience at Hanford where waste migrated laterally 90 feet and 70 feet deep, or at Maxey Flats where movement of one kilometer has been detected, establishment of a ten-foot barrier seems excessively casual, if not irresponsible.

Response

Migration of radionuclides from buried solid waste at SRP is discussed on pages III-19 and III-20. The monitoring observations clearly demonstrate that SRP is handling solid radioactive waste in a responsible manner that protects public and the environment.

Comment

Increasing numbers of examples of the harmful effects of using the environment as a disposal system for chemical discharges would seem to generate a more careful assessment of the consequences of such a practice at SRP. A mere cataloguing of the amounts of chemicals, some of which (like mercury) are extremely harmful to humans, is inadequate.

Response

Calculations of the concentration changes in the Savannah River water from various components of concern in Public Health Service drinking water standards illustrate the negligible effect of these discharges compared to the standards (Table III-26).

Comment

The description of failures under the heading "Depleted Uranium Metal Targets" is disturbing. What is the frequency of these phenomena? Is there not a possibility that a sequence of events might ensue which could result in a vapor explosion?

Response

Depleted uranium metal target slug failures from 1968 through 1976 averaged 5.4 per million slugs irradiated. There are no credible circumstances under which a depleted uranium metal target failure in a Savannah River Plant reactor would cause a vapor explosion and in the very unlikely event that one should occur the radionuclides would be contained in the reactor coolant.

K.9 Comment Letter, State of Georgia
Office of Planning and Budget
270 Washington St., SW
Atlanta, Georgia 30334

Comment

The EIS indicates (p. II-46) that spent drum cleaning solution is discharged without treatment in 16,000 gallon batches "after analyses to confirm acceptability of the release." The "analysis" to determine "acceptability" clearly applies only to radioactive contamination. Discharge contains 10,000 lb/yr of trisodium phosphate and 9,000 lb/yr of phosphoric acid. Raw discharge of this waste water does not reflect good waste treatment practice and would not comply with minimum treatment requirements in Georgia.

Response

The phosphate concentration in the effluent to Beaver Dam Creek averages about 0.015 mg/l. As shown in Table III-26, the calculated change in phosphate in the river (at minimum flow) from all SRP sources is 3×10^{-3} ppm. No further expenditure for phosphate control appears justified at this time.

Comment

According to the EIS (p. II-53), various unspecified waste water sources contribute to the trade waste system which is "designed to handle ordinary waste chemicals that are not contaminated beyond trace levels." Although "trace levels" clearly refers to radioactive contamination only, this waste water is discharged untreated. Throughout this EIS, the assumption seems to be that any processing waste not contaminated with radioactive material requires no treatment. Non-Federal public and private facilities are not generally allowed the luxury of discharging all process waste water untreated after merely confirming that it is not radioactive.

Analytical laboratory waste water is discharged without treatment (p. II-46). No chemical or biological characterization of this waste water is given.

Response

Based on applicable water quality standards and monitoring data, the EPA Regional Administrator will establish National Pollutant Discharge Elimination System (NPDES) permit limitations for process sewer effluents including one or more of the following: discharge volume, pollutant quantity, or pollutant concentration. SRP plans to initiate action wherever needed to comply with the NPDES permit limitations.

Comment

The EIS states (p. II-55, II-56) that sulfuric acid and sodium hydroxide used as regenerants in the deionized water systems in the reactor and separations areas are discharged after "moderate neutralization." Water regenerants in the heavy water area don't even receive "moderate" neutralization. Moderate neutralization or non-neutralization does not appear to constitute good waste water treatment practice as would be required by various state and Federal regulations for non-Federal facilities.

Response

SRP plans to install facilities to control the deionizer regenerant effluents to a pH between 6 and 9. The control facilities are required to comply with NPDES Permit No. SC0000175.

Comment

Coagulant chemicals and suspended solids removed in water treatment facilities are discharged back to the Savannah River (p. II-55, II-56). The draft EIS indicates (p. V-15) that alternative procedures were studied but rejected as uneconomical. Discharge of solids removed in water treatment plants back to surface waters by non-Federal facilities has not been allowed in various permits issued by EPA. These non-Federal facilities are not generally allowed the alternative of ignoring such requirements because they are considered uneconomical.

Response

In order to remove suspended solids as required to comply with NPDES Permit No. SC0000175, SRP will provide lagoons and spray fields to avoid discharge of the suspended solids.

Comment

The EIS indicated (p. V-15) that conversion from chromate-containing to organic corrosion inhibitors is being studied. The Georgia Environmental Protection Division is presently requiring other dischargers in the same area to either discontinue use of metallic inhibitors or provide treatment to remove the metals from the waste water. The Division sees no good reason why a more lenient standard should be applied to this Federal facility.

Response

Page V-15 gives a concise statement of SRP's status on corrosion inhibitors. Corrosion inhibitors currently used in closed-loop cooling systems contain chromium. Less-toxic materials for preventing corrosion are being studied to determine if they are suitable replacements for chromium-containing corrosion inhibitors. Occasional leaks do occur in closed-loop systems. Effluent from the area which has had the greatest number of leaks has been less than 0.02 ppm compared to the drinking water limit of 0.05 ppm for chromium. As shown in Table III-26, the calculated change in chromium in the river (at minimum flow) from all SRP sources is 4×10^{-5} ppm.

Comment

The report states that the use and disposal of polychlorinated biphenyls (PCB's) at SRP has been specifically controlled since 1972. How were they previously handled before 1972 when they weren't controlled? Since PCB has been detected in sediments from Four Mile Creek and Pen Branch it would be reasonable to expect that this residual concentration is a result of operations prior to 1972. The conclusion presented that offplant sources may be the primary contributors of PCB may not be correct. A detailed discussion of this issue is necessary and in particular its probable relationship to any possible future actions that might be needed to remove previously deposited PCB.

Response

The only routine disposal of polychlorinated biphenyls at SRP is discarded ballasts from fluorescent light fixtures. The ballasts have always been buried in SRP disposal pits but are now buried at one location near the center of the site. The nearest stream is 1500 ft from the disposal pit. PCB's have been detected in river sediment and in sediments near the mouth of two plant streams, Four Mile Creek and Pen Branch. Further studies are being conducted to determine if SRP is releasing any PCB to either SRP streams or the river.

Comment

In Section III-73 of the report, the concentration of several parameters in ash basin effluent water is compared with drinking water standards. This presentation shows the concentration of selenium to be 0.02 parts per million in the effluent vs. 0.01 parts per million for the drinking water standard. This is double the standard, yet there is no discussion of the significance or impact presented in the report.

Response

Ash basin effluents are monitored for selenium and other heavy metals as required by NPDES Permit No. SC0000175. Monitoring results are routinely reported to EPA. Specific ash basin effluent limitations for selenium have not yet been established. Ash disposal basin effluents flow into creeks where the effluents are greatly diluted and before the creeks flow into the river at the plant boundary; the overall dilution factor is more than 10^3.

Comment

In Section V-15 of the report under "Alternatives Studied but not Adopted," it is indicated that alternative methods for water treatment associated with chemical discharges to seepage basins are not economically feasible. There is no discussion of what methods were studied nor is there any indication of the basis for reaching the conclusion that was reached. This could be a very important issue as it relates to the equilibrium adsorption of radionuclides in the soils beneath the basins.

Response

Only low-level liquid waste with radionuclide concentrations which can be discharged to the environment pursuant to ERDA Manual chapter 0524, which is based on the recommendations of the Federal Radiation Council, Environmental Protection Agency, and the National Council on Radiation Protection and Measurements are routinely transferred to the seepage basins. However, a cost-benefit analysis is being made for flocculation treatment on the influents to the separations areas seepage basins. If the cost-benefit analysis shows that flocculation can be justified, this treatment will be proposed for budgetary consideration.

Comment

The report indicated (p. III-59) that the calculated contributions to the annual average SO_2 ambient concentration at the SRP boundary is less than 33 micrograms per cubic meter. This compares to the Georgia standard of 43 micrograms per cubic meter. This is 76% of Georgia's standard and essentially means that any industrial development on the Georgia side of the Savannah River near SRP must be limited. Fuel burning equipment of the capacity being used should reasonably not be allowed to make such a reported impact. In effect, it is endangering the economic development of Georgia.

Response

Calculated concentrations of SO_2 have consistently been higher than measured concentrations, indicating conservatism in the model. As stated on page III-59, additional data will be collected at Site 3 (as shown in Figure III-B) to enable a better prediction of extreme SO_2 concentration. Site 3 is near the estimated point of maximum ground level concentration of SO_2 from the D-Area power plant and even though it is on the SRP site in South Carolina, it is being conservatively reported as the ambient concentration at the Georgia boundary.

Comment

The report gives conflicting efficiencies of the electrostatic precipitators that were installed in November 1975. On page II-60, a value of greater than 99% is reported while on page III-61 they report a value of 95%. Also, no increment of particulate contribution to the ambient air by SRP is reported in the EIS.

Response

Design data for the electrostatic precipitators specified efficiency greater than 95%. Actual performance of the precipitators has been greater than 99% efficient. A text change was made on page III-61 to reflect the actual performance. No data are available on the increment of particulate contribution to the ambient air by SRP. Particulate emissions from fuel burning operations, the primary source of particulate releases from SRP, are shown in Table III-22.

Comment

Under normal conditions there should be no significance from other nonradioactive air emissions; however, there is a possibility that hydrogen sulfide odor could be detected during adverse meteorological conditions.

Response

A response is not required.

Comment

The Energy Research and Development Administration (ERDA) should be aware that the State of Georgia is opposed to any bedrock or other underground storage of radioactive materials. Furthermore, it is emphasized that the State of Georgia does not concur with the position of ERDA that consideration of bedrock or other long-term storage of radioactive materials does not fall within the purview of this Environmental Impact Statement. ERDA is requested to include adequate consideration of the long-term alternatives and plans for waste storage as a part of this Environmental Impact Statement prior to finalization of the documentation. It is suggested that perhaps a supplement to this Environmental Impact Statement be prepared and submitted for review in draft form by the State prior to any final documents being prepared.

Response

Long-term management of high-level waste will be the subject of another environmental statement; the draft statement is scheduled for issuance in 1978. It would be impractical now to evaluate in the full context of NEPA requirements all the alternatives which are technically feasible for long-term management of the high-level radioactive waste. Such an evaluation is not considered necessary within the scope of ERDA-1537. The Federal action under review in this EIS is the interim management of SRP waste in accordance with ERDA policies and standards that require continued efforts to reduce releases to values that are as far as practical below guidelines which minimize risk to the population, and to develop improved methods of waste storage. The status of SRP long-range waste management research and development program is presented in Appendix I of ERDA-1537.

Comment

About 80-130 million gallons of water containing various radionuclides are discharged to several different seepage basins at SRP. In addition to the radionuclides other chemicals are also discharged to these same basins (600,000 lb of HNO_3, 200,000 lb of NaOH, 12,000 lb of H_3PO_4, 1200 lb of Na_2-Cr_2O_7, and 50 lb of Hg). The report makes a strong case for the ion exchange capability of the soil in the retention of the radionuclides; however, there is no evidence presented to show any recognition of the effect of the chemicals on the adsorption capability of the soils. If transport models are being used to predict the distribution and concentration of radionuclides in the groundwater contacting the soils, how have the shifts in equilibrium adsorption due to the chemicals been factored into the models?

Response

Only low-level liquid waste with radionuclide concentrations which can be discharged to the environment pursuant to ERDA Manual Chapter 0524, which is based on the recommendations of the Federal Radiation Council, Environmental Protection Agency, and the National Council on Radiation Protection and Measurements, are routinely transferred to the seepage basins. Any holdup on soil columns permits radionuclide decay and results in a lower quantity of radionuclides being released to the public zone. Transport modeling is not used; all data reported are based on sample results.

Comment

The EIS (p. III-78) considers the additive impact of other non-SRP facilities. One such facility is the proposed Barnwell reprocessing facility and the report indicates that 16,000,000 curies of ^{85}Kr will be discharged via atmospheric releases from Barnwell. SRP discharges 520,000 curies of ^{85}Kr per year itself. These numbers compare to the SRP guide release number at 950,000 curies. Very little attempt is made in the report to discuss the additive impact of both facilities in relationship to SRP's waste management program. This is an important issue and it should be discussed thoroughly in Chapters II, III, and IV of the report.

Response

The additive radiological impact of atmospheric releases from SRP and neighboring nuclear facilities is shown in Table III-34. In the evaluation of the additive effects of other nuclear facilities, a factor of primary importance is the maximum dose to an offsite individual from SRP operations. In 1975, the maximum dose to the hypothetical person was 0.66 mrem (see Table III-6). According to the recent EPA regulation for light-water reactor fuel cycle facilities such as the Barnwell and Vogtle plants, the maximum dose to an offsite individual should not exceed 25 mrem per year. In the context of this limit, the maximum individual dose caused by SRP operations is so small that it would have practically no significance in the consideration of additive effects of the local nuclear facilities.

Comment

In Section V-6 of the report, alternatives associated with ^{85}Kr atmospheric discharges are discussed. It is stated that there are no plans for an active research program aimed at ^{85}Kr removal from effluent gases during fuel reprocessing and that pertinent R&D at other sites will be followed for possible application. This is improper consideration of the whole issue. We agree that research is <u>not</u> necessary at SRP and it is not necessary elsewhere either because it has already been completed and commercial equipment for ^{85}Kr removal is available <u>now</u>. This is supported by ERDA's own contractor, Battelle, in its preparation of ERDA-76-43 report entitled *Alternatives for Managing Wastes from Reactors and Post-Fission Operations in the LWR Fuel Cycle.* Georgia expects ERDA to exercise its responsible role in the establishment of an abatement plan and timetable for the control of ^{85}Kr releases to the atmosphere. This should be treated properly in the EIS before it is released in final form. Georgia's position has already been expressed on this issue regarding the proposed Barnwell facility.

Response

The paragraph on page V-6 reflects ERDA's position on ^{85}Kr containment at SRP. Because of the insignificant exposure from release of this radionuclide (less than 1 man-rem dose to the 100-km population), none of the current ^{85}Kr containment technology is cost-effective. In another perspective, the population dose caused by ^{85}Kr releases from SRP is less than 0.001% of the dose from natural radiation sources.

K.10 <u>Comment Letter</u>, U. S. Nuclear Regulatory Commission
Division of Site Safety and
Environmental Analysis
Washington, D. C. 20555

Comment

The design of the reactor building ventilation exhaust activity collection (confinement) system does not incorporate a means to control the humidity of the exhaust air in the event of an accident before the air is passed through the HEPA filter-charcoal adsorber system. An engineered safety feature (ESF) filter system should consist of heaters, demisters, prefilters, HEPA filters, charcoal adsorbers, and afterfilters.

Response

The reactor building ventilation exhaust activity collection (confinement) system is designed to collect and retain radioactive particulates and iodine vapors. The system is designed primarily to limit the consequences of unlikely reactor accidents and is online at all times. It consists of (1) moisture separators (crimped wire mesh and teflon fibers intended to prevent entrained water particles from collecting on the particulate filters), (2) high-efficiency particulate filters, and (3) carbon adsorbers designed to remove elemental iodine vapor and gaseous iodine compounds.

Comment

Consideration should be given to replacing the portable demineralizers in the fuel and target storage basin cleanup system with a permanent system. Also, the handling of demineralizer regenerant solutions is not described. Systems should be provided to maintain discharges of regenerant wastes to as low as reasonably achievable (ALARA) levels.

Response

The deionizers are mounted on trailers so they can be transported to the chemical separations area for regeneration. In the chemical separations area equipment is available to handle the regenerant waste solutions according to the ALARA principle, as described on page II-36. A text change made on page II-12 will clarify this point.

Comment

The report states on page II-16 that leakage in the process heat exchangers represents approximately one-fourth of the total releases from the reactor area. However, no mention is made of measures taken to isolate the leaking heat exchanger or to otherwise control releases. The capability of the systems to maintain releases ALARA in the event of process heat exchanger leakage should be described in the EIS.

Response

Effluent cooling water from each process heat exchanger is continuously monitored by in-line gamma monitors capable of detecting heavy water leakage from a single exchanger of about 0.3 lb/hr. This monitoring is supplemented by more sensitive tritium analyses on samples taken each week during operations. When a leak is detected a heat exchanger can be isolated with valves remotely operated from the reactor control room.

Comment

In order to achieve optimum control of releases from the fuel and target storage basins and to maintain releases of radioactive materials in liquid effluents ALARA, releases should be collected in monitor tanks and each batch sampled before discharge. Releases should be monitored continuously and if activity levels exceed predetermined limits, the capability should exist to further process these effluents.

Response

Releases of radioactive materials in the liquid effluent from the fuel and target storage basins are controlled according to the ALARA principle. The basins are purged only as necessary to control personnel exposure to airborne tritium. Prior to beginning a purge of water from the basins, the water is recirculated through deionizers until the radionuclide concentrations are reduced to procedural limits shown on page II-18.

Comment

In order to maintain releases of radioactive iodine from the chemical separations areas as low as is reasonably achievable, consideration should be given to adding iodine adsorbers after the sand filters used to process effluents from the canyon processing areas and process vessel vents.

Response

The dissolver off-gases are passed through iodine absorbers located upstream of the sand filters. The iodine releases have been significantly reduced in recent years by longer decay times before dissolving. In 1975 and 1976, the iodine releases were less than 1 curie per year.

Comment

There appears to be an inconsistency in the methods for handling of drummed solid TRU waste (20-year retrievable storage) versus bulky solid waste and contaminated equipment (buried directly in earthen trenches). The latter method could lead to migration of activity into the groundwater with eventual release to the environment. The environmental statement does not provide the details necessary to show that radioactive materials contained in these wastes will not migrate.

Response

TRU wastes are stored in accordance with ERDA Manual Chapter 0511 which permits bulky waste contaminated with transuranium nuclides to greater than 10 nCi/g and also intensely contaminated with gamma emitters to be stored directly in earthen trenches protected from contact with water-saturated soil. Extensive monitoring with test wells in the burial ground, described on pages III-19 and III-20, indicate there is no migration of plutonium from the solid waste burial trenches.

Comment

In order to prevent overflow from waste tank risers and vents, level controllers and alarms that will automatically terminate transfer of waste into the tank should be installed in all tanks.

Response

Automatic liquid level measuring devices, as described on page II-99, were installed in each waste tank in 1974. These automatic liquid level measuring devices include audio-visual alarms for both high- and low-liquid level. In addition, installation of a second liquid level instrument in each tank was authorized in the FY-77 budget. The second instrument will be in a fixed position at the upper operating fill limit, which is approximately 10 inches below the maximum fill limit of each tank. This instrument will also have audio-visual alarms in the control room.

Comment

The draft environmental statement (DES) summary states, in effect, that options for long-range waste management and retrievability are not being foreclosed by current operations. However, retrieval of the salt cake from storage tanks has not been demonstrated to date. In addition, retrieval of the following wastes may not be technically feasible or economically practical:

- Residual sludge in storage tanks.
- Sludge in the R-Area emergency basin
- Salt cake which has leaked into annulus pans surrounding the inner tanks.
- Approximately 2 kg of plutonium buried through 1975 in the burial ground.

The DES should either fully support the contention that the above wastes are retrievable or modify the statements on retrievability which appear in the summary.

Response

The long-term management of SRP waste will be addressed in a future environmental statement. However, SRP has demonstrated the capability to safely remove sludge and salt cake from its waste tanks. Salt cake in SRP tanks is easily redissolved in water, and transfer of the resultant solution from one tank to another is a routine SRP operation. Sludge was first resuspended and pumped from a waste tank in 1966 by slurrying with water. Sludge has also been water slurried from several other tanks since then. A more cost-effective technique for slurrying the sludge with supernate is being developed, and a demonstration with actual waste is planned. Experience has demonstrated that essentially all the salt cake and about 90-95% of the sludge can be removed by direct slurrying, and tests indicate that in excess of 95% of the residue can be removed by simple chemical cleaning. More advanced cleaning methods are under development.

A method for removing salt cake from waste tank annuli has been developed, and a demonstration is planned in 1977.

Future environmental statements will address the technical and economic feasibility of removing the sludge from the R-Area emergency basin and the TRU solid waste buried directly in earthen trenches. The National Academy of Sciences has recommended that plans to exhume transuranium waste be re-examined and re-evaluated for risks-benefits before such a project is undertaken.

Comment

One alternative being considered by SRP for low-level waste is storage in concrete-lined trenches instead of the earthen trenches currently used. The DES does not state what type of trench cover is envisioned for this variation. If the cover material was permeable, use of concrete liners might create a situation in which overflow was possible.

A more detailed description of this alternative would facilitate an assessment of its potential benefits for low-level waste confinement.

Response

A detailed description of the alternative is not feasible until the engineering study is completed. However, as stated on page V-12, one of the criteria is to maintain waste in a dry condition.

K.11, <u>Comment Letter</u>, United States Environmental Protection Agency
Office of Federal Activities
Washington, D. C. 20460

Comment

Although EPA agrees that there should be a long-range plan for nuclear waste management and decommissioning of facilities, assessment of the impacts of decommissioning should be done at the same time the necessary funding is allocated.

Response

As stated in the Foreword, the Federal action under review is specifically the interim management of waste at the Savannah River Plant. Future environmental statements will include consideration of long-term commitment of land, decommissioning of plant facilities, long-term surveillance requirements, and long-term management of SRP wastes.

Comment

The final statement should give a more-detailed plan for these standby units (the "R" and "L" production reactors) and if they are eventually to be decommissioned, this should be clearly stated and procedures and timetables representing the decommissioning effort provided.

Response

As stated in the Foreword, the Federal action under review is the interim management of SRP wastes; therefore, the scope of statement, as it pertains to production reactors, is limited to effluent control. Background information on production reactors is given primarily in support of this. Future environmental statements will include consideration of decommissioning of plant facilities.

Comment

If bedrock storage is still a viable option (for long-term waste storage at SRP), then it should be more specifically addressed, with particular attention paid to the question of isolating shafts and tunnels from the Tuscaloosa aquifer, the principal water supply for most of southeastern Georgia.

Response

Consideration of long-term waste management options is beyond the scope of the present statement. ERDA has prepared a Defense Waste Document (DWD) on long-term management of high-level radioactive waste at Savannah River. A Federal Register notice (38 FR 21955) announced the availability of the DWD and ERDA's intent to prepare an environmental impact statement on the long-term disposition of SRP high-level waste.

The DWD, *Alternatives for Long-Term Management of Defense High-Level Waste* (Report ERDA-77-42), describes the alternative technologies with respect to their probable relative costs, risks, and uncertainties. A total of 23 plans are included in the DWD ranging from continuing the storage as salt cake and sludge in tanks (which is the "no action" alternative) to conversion of the waste to a glass form before shipping it to an offsite Federal repository; bedrock storage is one of these plans.

The programmatic EIS will assess the environmental impact of the main alternative candidate plans using the DWD as the principal reference source. The EIS will provide the environmental input into decisions related to the research, development, demonstration activities, and engineering design studies required to establish an environmentally acceptable mode of disposal for the high-level radioactive wastes.

Comment

On page III-32: "...individuals served by the water treatment plants consume 1200 ml of water each day." Doses are calculated based on this level of consumption. Since, however, the drinking water standards are based on 2 liters/day consumed, the impact assessment should be readjusted to reflect this higher volume.

Response

The daily consumption of water (for purposes of dose calculations from ingestion of river water) was taken to be 1200 ml/day, based on "Standard Man" intake data published by the International Commission on Radiological Protection[1] (ICRP) presented in the table below:

	Standard Man Water Intake, ml/day
Food	1000
Water	1200
Oxidation	300
Total	2500

A more recent publication by ICRP[2] gives the following water intake values for "Reference Man":

	Water Intake, ml/day		
	Adult Man	*Adult Woman*	*Average Adult***
Milk	300	200	250
Tap Water	150	100	125
Other (beverages*)	1500	1100	1300
Food	700	450	575
Oxidation	350	250	300
Total	3000	2100	2550

* In tea, coffee, soft drinks, cider, beer, wine, etc.
** ICRP does not specify an average adult.

From this table, the average daily water intake of tap water and beverages (excluding milk) by an adult is 1425 ml/day, about 19% higher than the value used in this environmental statement (ERDA-1537). Milk consumption is excluded because there is no significant consumption of Savannah River water by daily herds.

The publication of the new physiological data on "Reference Man" is a first step by the ICRP in providing revised parameters necessary for dosimetry of individuals as well as population groups. New comprehensive guidance for radiation dosimetry such as (a) effective half-lives of radionuclides, (b) quality factors, (c) distribution factors, (d) fraction of material reaching organ of interest, etc., are currently being prepared by the ICRP. The new ICRP data will be incorporated into the SRP systems for calculating offsite doses when available.

The use of the new ICRP water intake value would increase the offsite dose for ingestion of river water by 19%. However, there is substantial indication that the quality factor for tritium, the main radioisotopic contributor to the dose to the downstream population, will be changed from 1.7 to 1.0. The use of this lower quality factor and the new ICRP water intake value would decrease by 40% the calculated dose to the downstream population shown in ERDA-1537.

Comment

On page III-28 "...dose commitment means radiation dose equivalent that will be received in a lifetime (70 years) by population groups...". We believe this method does not reflect the total environmental impact. It is EPA's position that the potential total environmental impact in subsequent years is best estimated by calculating the "environmental dose commitment," the sum of all doses to individuals over the entire time period that radionuclide persis in the environment in a state available for interaction with humans. The environmental dose commitment is usually expressed for a period of 100 years recognizing that it is difficult to estimate the population growth much beyond this time period.

Response

EPA has developed the concept of environmental dose commitment and then applied it to estimate total health effects from projected releases of radioactivity from the nuclear power industry.[3] The EPA estimates of health effects are projected over a 100-year period following the releases. An estimate of the SRP environmental dose commitment was calculated, in terms of total potential worldwide consequences. This estimate was made by comparing the releases and consequences in the EPA study[3] with the SRP releases in the manner described in the environmental statement on waste management operations at Hanford.[4] This comparison incorporates EPA methodology for the radionuclides, time periods, and population distributions. The releases from SRP and the calculated maximum health effects from these releases are shown in the following table.

Maximum Potential Worldwide Health Effects from SRP Releases in 1975 According to the EPA Approach

Nuclide	*Quantity*[a] *Released, Ci*	*Maximum Potential Number of Worldwide Health Effects*	
Tritium	579,700	1.0	(2/3 fatal)
^{85}Kr	520,000	0.17	(2/3 fatal)
^{129}I	0.14	0.002	(1/4 fatal)
Actinides	0.0025[b]	0.0008	(all fatal)

a. Table III-1, ERDA-1537.
b. Atmospheric releases.

The significance of these health effect values is not known. Although the dose rate is extremely low, the population exposed is taken to be very large. The uncertainties involved in using health effects data from high dose and high dose rate exposures to estimate the effects for extremely low doses and extremely low dose rates were reviewed in Section III.A.4 of the environmental statement.

Comment

On page I-12 "...long-term offsite effects of SRP releases to the surrounding population will be much smaller than the effects in the year of actual release...". This statement should be clarified since cancer has a long latency period.

Response

Text changes have been made on pages I-12, III-39, and III-41 for clarity.

Comment

Tables III-33 and III-34 appear to imply that the total whole body population doses from atmospheric releases from Vogtle Nuclear Plant (VNP), Barnwell Nuclear Fuel Plant (BNFP), and Savannah River Plant (SRP) should be additive since the plantsites are so near to one another. The inference drawn from these tables is that BNFP operations would have a significant effect on the whole body population dose from atmospheric releases as compared to the corresponding dose calculated for SRP in 1975. We would suggest that two scenarios be offered, one with SRP doses and another with combined doses from BNFP, VNP, and SRP. This would give a broader spectrum of possible offsite population doses.

Response

The reasons for not combining these doses already exist in the preceding discussion on p. III-78 and in the footnotes accompanying the tables.

REFERENCES

1. *Report of Committee II on Permissible Dose for Internal Radiation (1959).* International Commission on Radiological Protection, Publication No. 2 (1960).

2. *Report of the Task Group on Reference Man.* International Commission on Radiological Protection, Publication No. 23 (1975).

3. *Environmental Radiation Dose Commitment: An Application to the Nuclear Power Industry.* Report EPA-520/4-73-002, U. S. Environmental Protection Agency (1974).

4. *Final Environmental Statement, Waste Management Operations, Hanford Reservation.* USERDA Report ERDA-1538, p. III.1-18 (1975).