SUMMARY

PURPOSE

The U.S. Department of Energy (DOE) has prepared this environmental impact statement (EIS) to assess the environmental consequences of the implementation of modified waste management activities for hazardous, low-level radioactive, and mixed wastes for the protection of groundwater, human health, and the environment at its Savannah River Plant (SRP) in Aiken, South Carolina. This EIS, which is both programmatic and project-specific, has been prepared in accordance with Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969, as amended. It is intended to support broad decisions on future actions on SRP waste management activities and to provide project-related environmental input and support for project-specific decisions on proceeding with cleanup activities at existing waste sites in the R- and F-Areas, establishing new waste disposal facilities, and discharging disassembly-basin purge water. In preparing this dual-purpose EIS, the U.S. Department of Energy (DOE) has considered the comments submitted by Government agencies, private organizations, and individuals during the public scoping meetings and comment period in May 1985, and in the public comment period on the draft EIS from May 8, 1987, through June 30, 1987. Public hearings to receive comments on the draft EIS were held June 2 and June 4, 1987. TC

BACKGROUND AND NEED FOR ACTION

The Savannah River Plant is a major DOE installation that produces nuclear materials for national defense and research purposes. TC The SRP operations generate hazardous, radioactive [including transuranic (TRU) and high-level wastes (HLW)], and mixed (radioactive and hazardous) wastes. Previously acceptable waste disposal practices have included the use of seepage basins for liquids (i.e., acceptable under then existing regulations); disposal pits and waste piles for solids, and solid waste burial grounds for low-level radioactive wastes. C-22 E-41 E-43

Groundwater contamination of some aquifers has occurred because of the previously acceptable waste management practices which predated environmental regulations such as those cited below. A-1 The contaminants detected include volatile organic compounds (degreasing solvents), heavy metals (lead, chromium, mercury, and cadmium), radionuclides (tritium, uranium, fission products, and plutonium), and other miscellaneous chemicals (e.g., nitrates); concentrations of these substances have exceeded maximum contaminant levels (MCLs) and other regulatory standards or guideline concentrations. TE

This EIS uses the terms "hazardous," "low-level radioactive," and "mixed" (i.e., hazardous and low-level radioactive) in their everyday sense, without specific regard to technical or regulatory definitions, unless indicated. DOE does not intend this EIS to be a permit application for existing SRP facilities or a vehicle to resolve the applicability of the requirements of the Resource Conservation and Recovery Act (RCRA), the Hazardous and Solid Waste Amendments (HSWA), the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), and the Superfund Amendments and Reauthorization Act (SARA) to existing SRP facilities or waste sites. Ongoing regulatory activities and the expanded SRP groundwater monitoring and characterization program will provide the bases for the application of specific regulations to existing facilities and waste sites following the publication of a Record of Decision by DOE.

As a result of legislative actions [Public Law 98-181, RCRA, HSWA, CERCLA, SARA, and the South Carolina Hazardous Waste Management Act (SCHWMA)], their implementing regulations, and DOE Administrative Orders, as well as DOE concerns to protect the environment, many remedial or corrective actions have been initiated and are under way at the SRP. These actions include the removal and storage of previously buried wastes and contaminated soils; the design, construction, and operation of liquid effluent treatment facilities; the use of recovery wells and an air stripper to remove volatile organic compounds from contaminated groundwater; the design of a two-stage, rotary-kiln incinerator to detoxify hazardous wastes; and other waste disposal demonstrations.

Current demonstration programs that affect waste management activities include a "beta-gamma" incinerator, a box/drum compactor, and a greater confinement disposal (GCD) demonstration. DOE expects these programs to result in improved methods of disposal for mixed and low-level radioactive wastes or reduction in waste volumes to meet applicable regulations.

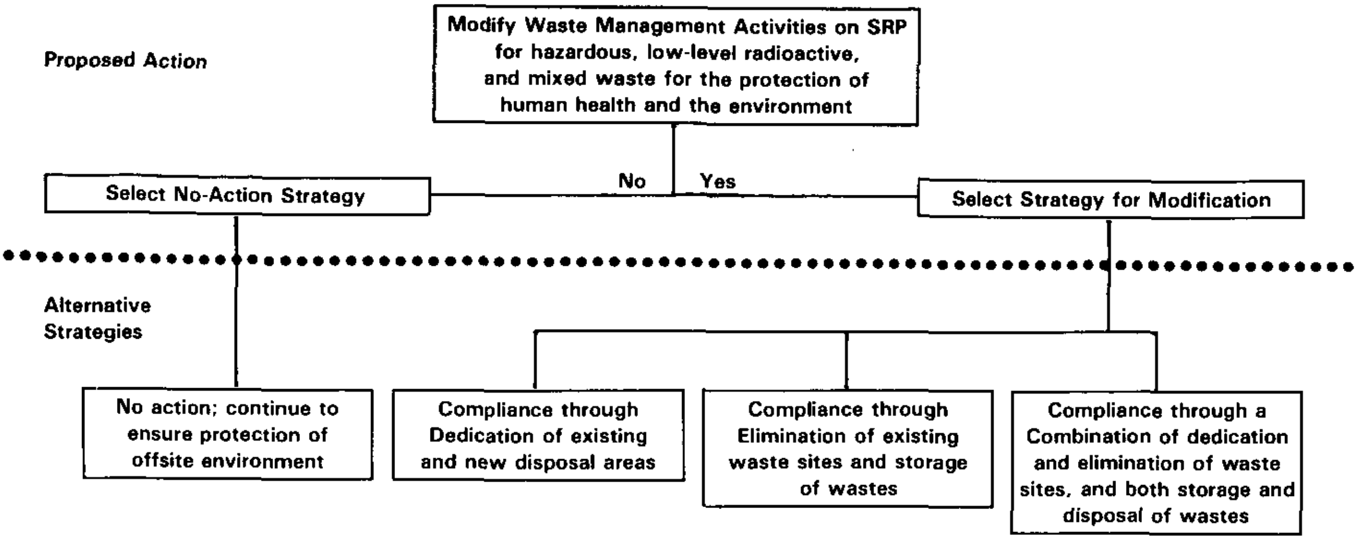
DOE plans to close existing waste sites and seepage basins; to construct new waste disposal or storage facilities to manage hazardous, low-level radioactive, and mixed wastes that might be removed from existing waste sites or that might result from ongoing and planned operations; and to consider alternative methods for the treatment of reactor-area disassembly-basin purge water.

PROPOSED ACTION AND ALTERNATIVE

The proposed action considered in this EIS is the modification of waste management activities for hazardous, low-level radioactive, and mixed wastes to protect groundwater, human health, and the environment. The alternative to the proposed action is a No-Action strategy, to be evaluated as required by the National Environmental Policy Act (NEPA) and guidelines of the Council on Environmental Quality (CEQ). DOE does not consider no action to be a "reasonable" alternative, because parts of the existing waste management program would not comply with current groundwater protection and other requirements.

ALTERNATIVE STRATEGIES

DOE could use several alternative strategies to modify the SRP waste management program for hazardous, low-level radioactive, and mixed wastes (see Figure S-1). These strategies differ in the actions proposed for existing waste sites, new waste management facilities, and discharge of disassembly-basin purge water, and in the degree to which they require dedication of land areas, long-term monitoring, and oversight to ensure that groundwater resources, human health, and the environment are protected adequately. (The disassembly basins receive irradiated reactor fuel and targets from the SRP reactors prior to transfer to reprocessing facilities. The water in the basins is purified continuously by filtration and demineralization but must

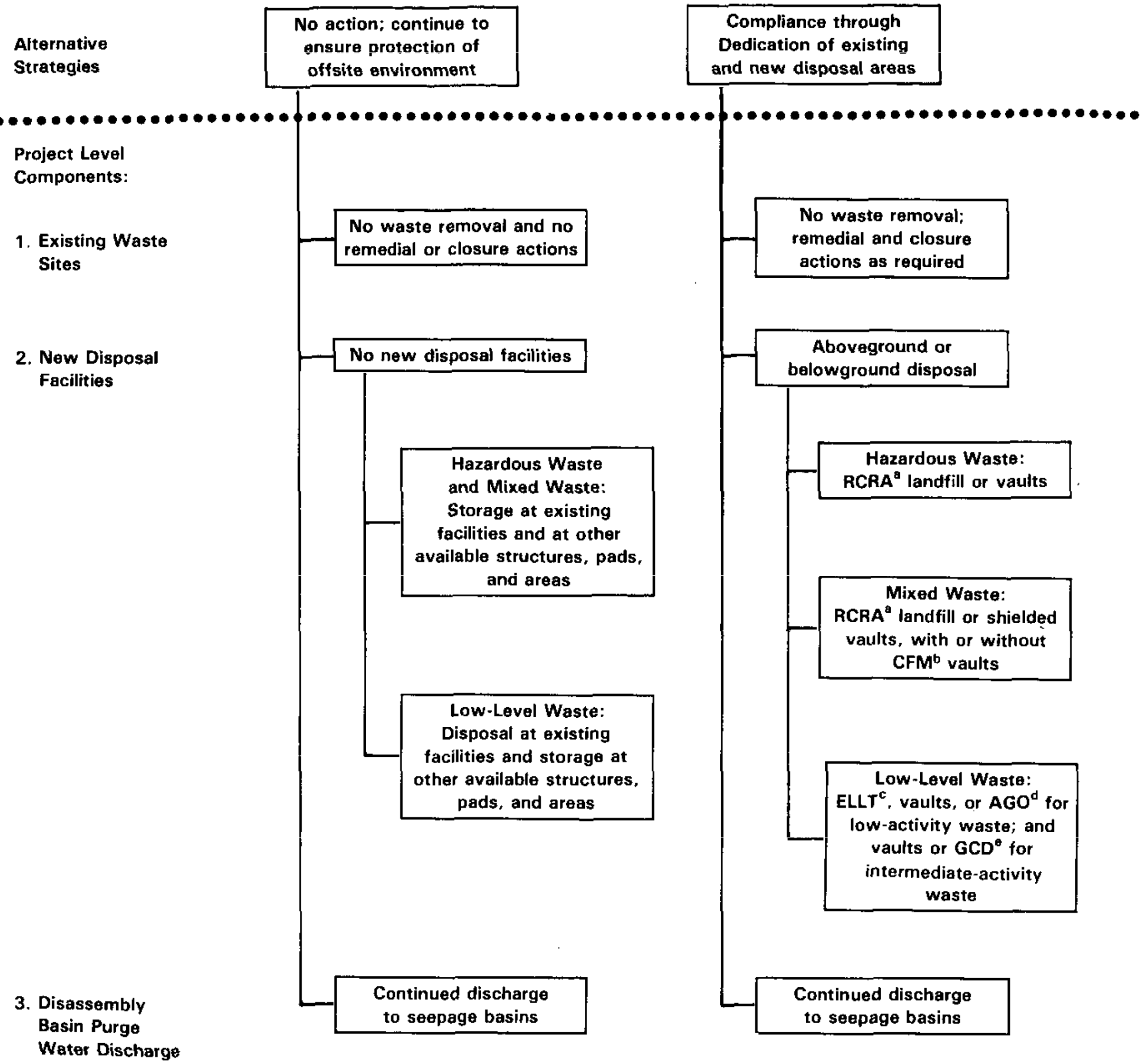


Legend:

[a] RCRA = Resource Conservation and Recovery Act
[b] CFM = Cement Flyash Matrix
[c] ELLT = Engineered Low-Level Trench
[d] AGO = Abovegrade Operation
[e] GCD = Greater Confinement Disposal
[f] Selected Sites to be identified and determined by regulatory interactions

TE

Figure S-1. Project-Specific Components of Alternative Strategies (page 1 of 3)



TE

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Figure S-1. Project-Specific Components of Alternative Strategies (page 2 of 3)

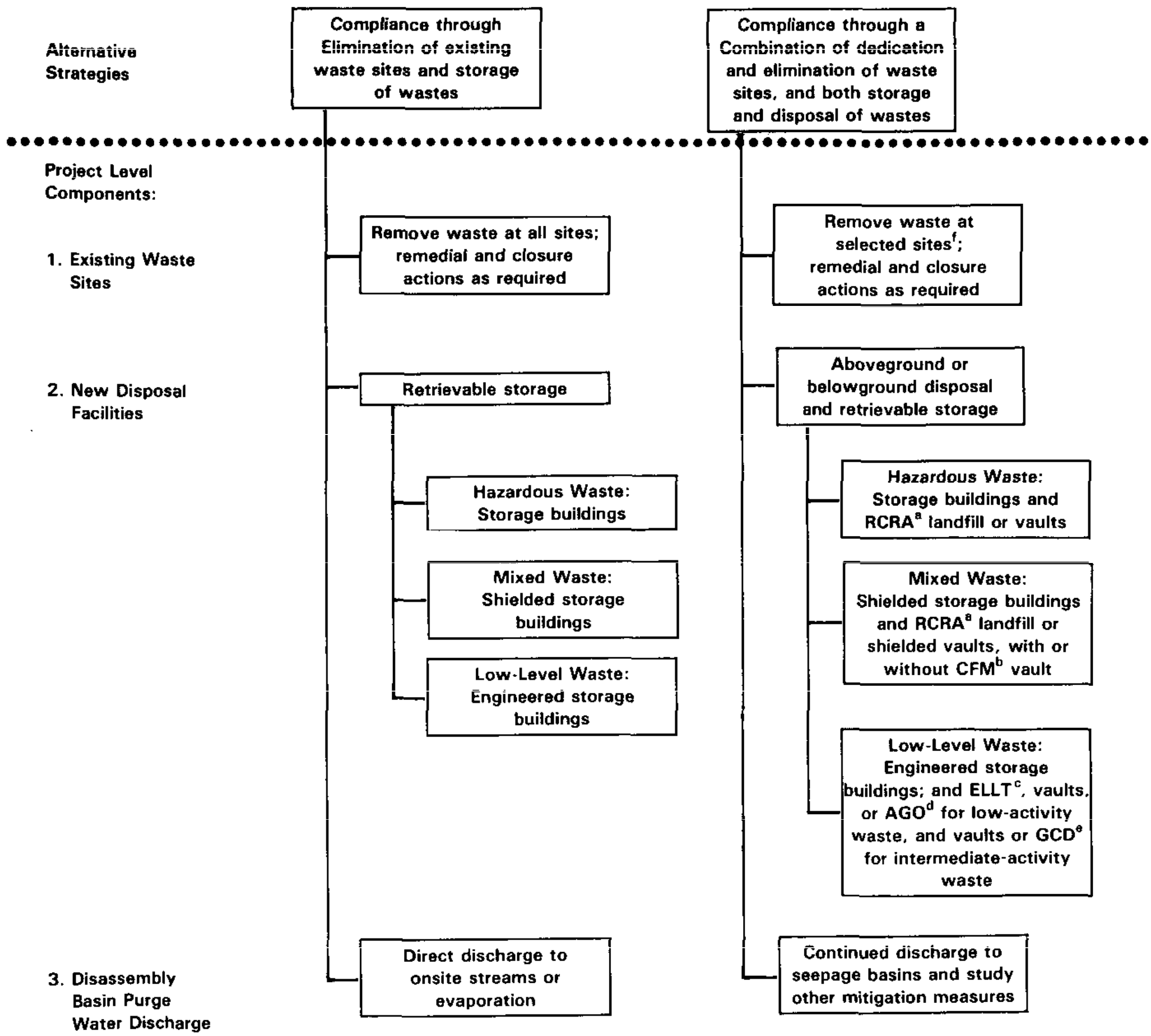

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Figure S-1. Project-Specific Components of Alternative Strategies (page 3 of 3)

be purged periodically to maintain required tritium oxide concentrations and resultant worker exposures, as low as reasonably achievable. These purges are discharged to seepage basins at each reactor site and to the containment basin in K-Area.)

RCRA reflects the differences in strategies by requiring the owner of a RCRA-regulated hazardous waste site that is releasing waste constituents to remove and control contaminants from the soil, surface water, and groundwater outside the site, or to remove the source of contamination from the site to achieve background levels or agreed-to alternative concentration limits. If the owner removes and controls the contaminants in environmental media outside a waste site leaving the source in place, that site, in effect, becomes a RCRA TE disposal facility and remains dedicated to waste management; long-term monitoring and oversight are required to ensure environmental protection. If the owner removes the source of contamination (i.e., the waste material and contaminated soil within the site), the site no longer requires dedication to waste management purposes, nor does it require long-term monitoring and over-F-15 sight. Long-term monitoring would be necessary at any site where waste is left in place (i.e., closed as a landfill) or where groundwater contamination is confirmed.

The requirement for dedicating land areas for waste management purposes and committing resources to long-term monitoring and oversight is also reflected in the choice between disposing of or storing wastes. The disposal of wastes that retain their hazardous or radioactive characteristics requires permanent or long-term dedication and monitoring. Alternatively, the use of storage as an isolation technique implicitly assumes that research and development will TE provide acceptable or improved alternatives for treatment of the stored waste before its ultimate disposal.

The following paragraphs describe alternative strategies for modifications of SRP hazardous, low-level radioactive, and mixed waste management activities. These strategies are based on combinations of closure and remedial actions at existing waste sites, the construction of new storage and disposal facilities, and the discharge of disassembly-basin purge water. The modification of a waste management activity, such as a closure and remedial action at existing waste sites, might require the modification of another activity (e.g., the number, size, and design of new disposal facilities). The following paragraphs also present combinations of various activities and analyses to provide an overview of the environmental effects of proposed modifications of the SRP waste management program (see Figure S-1).

In this EIS, DOE presents analyses of the environmental impacts of alternative waste management strategies. DOE, in its Record of Decision (ROD) on this TE EIS, will select a single strategy from those described below. Site-specific or project-specific actions will be based on ongoing investigations and interactions with appropriate regulatory agencies throughout the permitting process.

NO-ACTION STRATEGY

TE The NEPA regulations of the CEQ require an agency to evaluate the environmental consequences of no action (40 CFR 1502.14). As a potential implementation strategy, no action would not involve changes in current practices. It would consist of the following:

- No removal of waste at existing waste sites, and no closure or remedial actions
- No construction of new facilities for the storage or disposal of hazardous, low-level radioactive, or mixed wastes
- Continuation of periodic discharges of disassembly-basin purge water to seepage basins

Parts of the existing program would not comply with groundwater-protection requirements. DOE does not consider the continuation of a noncomplying program to be a "reasonable" alternative strategy.

DEDICATION STRATEGY

Under the Dedication strategy, DOE would modify its waste management activities to comply with all groundwater-protection requirements, including those pursuant to RCRA, by:

- Implementing closure (dewatering, stabilizing, capping) and groundwater corrective actions (installing grout curtains or barrier walls, as required) to control contamination from existing waste sites in accordance with applicable state and Federal standards C-28
- Establishing new disposal facilities (e.g., above- or belowground disposal)
- Continuing the use of seepage and containment basins for the periodic discharge of reactor disassembly-basin purge water

Under this strategy, DOE would dedicate for waste management purposes those waste sites and contaminated areas that could not be returned to public use after a 100-year institutional control period. At least 300 acres of land would be dedicated for these purposes; this is less than 0.2 percent of the total SRP land area. DOE would control releases of hazardous substances from existing waste sites that contain hazardous or mixed wastes through the closure of such sites pursuant to applicable requirements, corrective actions to control groundwater contaminant plume migration and restore groundwater quality, and other corrective actions (excluding waste removal) at the sites. TE

To accommodate hazardous, low-level radioactive, and mixed wastes generated from ongoing SRP operations, those presently in interim storage, and those from existing and planned waste management actions (e.g., sludges from new effluent treatment facilities), DOE would establish new disposal facilities at the SRP which would meet applicable requirements.

The periodic discharges of filtered and deionized disassembly-basin water from C-, K-, and P-Reactors to seepage and containment basins would continue. The use of basins for these discharges, which are not hazardous but are contaminated with small quantities of radionuclides (principally tritium), would allow time for the radionuclides to decay while migrating through shallow groundwater formations to outcrops along onsite streams. DOE would dedicate for waste management purposes those seepage and containment basins and areas contaminated with radioactivity that could not be returned to public use after a 100-year institutional control period.

ELIMINATION STRATEGY

Under the Elimination strategy, DOE would modify its waste management program to comply with all groundwater-protection requirements, including those pursuant to RCRA, by:

C-26
- Removing wastes to the extent practicable from all existing waste sites and implementing closure and groundwater corrective actions, as required by applicable state and Federal regulations

- Establishing new retrievable storage facilities

- Directly discharging disassembly-basin purge water to onsite streams, or evaporating such discharges through the use of a small commercially available boiler, vent stack, and dispersion fan

Under this strategy, DOE would not dedicate any land areas for hazardous, low-level radioactive, and mixed waste management purposes. Such wastes, including contaminated soils, would be removed from all existing waste sites to the extent practicable. After a maximum 100-year institutional control period, these sites could be used for purposes other than waste management.

TC

DOE would store wastes removed from existing waste sites and those generated from ongoing SRP operations and existing and planned waste management actions, such as sludges from new effluent treatment facilities, in facilities from which they could be retrieved. Hazardous and mixed wastes in interim storage at the SRP would remain in the interim-storage buildings. DOE would research new technologies and eventually implement technologies for the permanent disposal of hazardous, low-level radioactive, and mixed wastes.

DOE would discharge the filtered and deionized disassembly-basin purge water from C-, K-, and P-Reactors to onsite streams within National Pollutant Discharge Elimination System (NPDES) permit limits, or would evaporate such discharges with a small commercially available boiler, vent stack, and dispersion fan. In either case, DOE would eliminate the seepage and containment basins now used for the discharge of disassembly-basin purge water. DOE would take closure and remedial actions at these basins, if necessary, to ensure that contaminated areas could be returned to public use after a 100-year institutional control period.

COMBINATION STRATEGY

Under the Combination strategy, DOE would modify the SRP waste management program to comply with all groundwater-protection requirements, including those pursuant to RCRA, by:

TC
C-26
- Removing wastes at selected existing waste sites to the extent practicable and implementing closure and groundwater remedial actions, as required by applicable state and Federal regulations

- Establishing a combination of retrievable storage, aboveground, and belowground disposal facilities

- Continuing the use of seepage and containment basins for the periodic discharge of reactor disassembly-basin purge water

Under this alternative, DOE would remove hazardous, low-level radioactive, and mixed wastes (including contaminated soils) to the extent practicable from selected existing waste sites based on cost-effectiveness and environmental/ human health risk evaluations. Based on the preliminary evaluations in this EIS, seven sites were selected as suitable for waste removal. The final decision on sites to be selected for waste removal would be made through regulatory agency interactions. After a maximum 100-year institutional control period, the areas from which waste material and contaminated soil had been removed (about 30 acres) could be used for purposes other than waste management. Sites from which waste material and contaminated soil were not removed (about 270 acres) would be dedicated for waste management purposes if they could not be returned to public use after the 100-year control period.

DOE would establish new retrievable storage and disposal facilities to accommodate wastes removed from existing waste sites and those generated from ongoing SRP operations and existing and planned waste management actions. Disposal facilities for hazardous or mixed waste would be permitted in accordance with applicable regulations. The combination of new retrievable-storage and disposal facilities would allow DOE to investigate and implement new technologies for permanent disposal of stored wastes. DOE would dedicate for waste management purposes the sites of disposal facilities established under this strategy.

Periodic discharges of filtered and deionized disassembly-basin purge water from C-, K-, and P-Reactors to seepage and containment basins would continue; DOE's assessment of the feasibility of alternative mitigation measures at the SRP would continue. If DOE determines that detritiation or another mitigation measure is appropriate in an overall waste management strategy, it could discontinue the use of these basins and evaluate actions to return the basin areas to public use after a 100-year institutional control period.

PROJECT-SPECIFIC ACTIONS

NO ACTION

In this EIS, DOE has assumed that the SRP would continue to operate and generate wastes. Under no action, current waste management activities would continue at existing waste sites, no wastes would be removed from the sites, and no remedial or closure actions would occur.

Under no action, no new facilities such as sites, buildings, landfills, vaults, engineered trenches, or boreholes would be established for waste management. Existing SRP facilities would be used until their capacities were reached, after which unpermitted structures, pads, or areas with minimal preparation for indefinite waste storage would be used.

No action would continue the present practice of periodic discharges of disassembly-basin purge water to active reactor seepage and containment basins.

EXISTING WASTE SITE REMEDIAL AND CLOSURE ACTIONS, WITH AND WITHOUT WASTE REMOVAL

A range of project-specific actions can be applied at the SRP for existing hazardous, low-level radioactive, and mixed waste sites. These actions include allowing waste to remain in sites and providing some type of closure, such as backfilling and capping. Wastes and contaminated soils would be removed at selected sites (seven sites were identified in the R- and F-Areas). Remedial actions, if required to correct groundwater contamination, could include groundwater recovery and treatment or the installation of barrier walls or grout curtains, along with suitable closure actions.

ESTABLISHMENT OF NEW STORAGE/DISPOSAL FACILITIES

A number of waste storage and disposal technologies that meet standards can be applied at the SRP for hazardous, low-level radioactive, and mixed wastes. These include RCRA-type vaults (i.e., above- and belowground double-lined vaults meeting RCRA minimum technology requirements) or RCRA-type landfills with double liners and leachate collection systems for hazardous and mixed wastes. Low-level radioactive wastes would be disposed of in facilities meeting the requirements of DOE Orders, including engineered low-level trenches (ELLTs) for low-activity wastes, GCD for intermediate-activity wastes, shielded above- or below-grade vaults, or above-grade operations (AGO).

TE

The retrievable-storage technologies for hazardous and mixed wastes, which are similar, would meet applicable standards. These facilities would be designed for essentially zero releases. For mixed waste, in addition to meeting RCRA requirements, such facilities would provide shielding of radiation sources. The technologies for low-level waste would consist of engineered storage of waste with varying degrees of isolation and shielding to accommodate different levels and types of radioactivity. These facilities would be designed to meet the as-low-as-reasonably-achievable (ALARA) requirements of DOE Orders.

DISCHARGE OF DISASSEMBLY-BASIN PURGE WATER

Project-specific actions for managing the discharge of disassembly-basin purge water could include discontinuing the use of the active reactor seepage and containment basins by discharging the purge water directly to surface streams (which currently receive purge water via outcrops) or by evaporating it to the atmosphere through commercially available equipment. Releases to surface streams caused by residual seepage from prior use would continue for several years.

TC

AFFECTED ENVIRONMENT

The Savannah River Plant is a 780-square-kilometer (192,700-acre), controlled-access area near Aiken, South Carolina. This major DOE installation was established in the early 1950s for the production of nuclear materials for national defense. More than 90 percent of the site is forested.

A very complex geohydrologic regime underlies the SRP. This regime contains a series of Coastal Plain sediments (Coastal Plain Mosaic) interspersed with clay and sandy clay layers. Two major regional aquifers, the Congaree and the Middendorf/Black Creek (Tuscaloosa), lie beneath the site, overlain by several shallower formations that produce smaller quantities of water. The deep regional aquifer (the Middendorf/Black Creek), which becomes shallower to the north and northwest of the SRP, forms the base for most municipal and industrial supplies in Aiken County. Farther south, this formation deepens and shallower aquifers such as the Congaree and McBean provide water for municipal, industrial, and agricultural uses. The Barnwell aquifer, located above the Congaree and McBean aquifers, also supplies limited quantities of domestic water in the SRP vicinity.

The water table is fairly shallow beneath most of the Plant, ranging from 10 to 30 meters below the surface. The SRP draws water from the Middendorf/Black Creek Formation, with the exception of some low-volume shallow domestic water wells.

Total groundwater use at the Plant is about 40,000 cubic meters (1 cubic meter = 264 gallons) per day. Large users of water within 32 kilometers of the center of the Plant withdraw about 135,000 cubic meters per day for municipal, industrial, and agricultural needs. Withdrawals by small users such as schools, mobile home parks, and small communities total about 2000 cubic meters daily.

E-44

The flow of groundwater at the SRP is generally toward discharge zones ("outcrops") along the onsite surface streams. Water-table aquifers discharge to Upper and Lower Three Runs Creek, Pen Branch, Four Mile Creek, Tims Branch, and Steel Creek. The flow direction of these creeks is generally toward the southwest, except near the Savannah River swamp where some flow to the southeast. Groundwater from the Middendorf/Black Creek Formation discharges to the Savannah River. Wells near the river are under artesian pressure. Extensive recharge areas for the Middendorf/Black Creek Formation lie to the north and northwest of the SRP and generally to the south of the Fall Line, which separates the Coastal Plain from the Piedmont geologic province.

TE

Groundwater quality in the Coastal Plain sediments is good and requires minimal treatment for industrial and municipal use. The water is soft, slightly acidic (pH range 5.5 to 6.5), and has a low total dissolved solids (TDS) content. The quality of the groundwater varies slightly from aquifer to aquifer.

Groundwater quality has been evaluated by DOE on the basis of geographic and functional groupings for most of the sites considered in this EIS that received or might have received hazardous constituents, low-level radioactive wastes, or mixed wastes.

TE

Surface water at the SRP consists of the Savannah River, surface streams that transect the Plant and drain to the Savannah River, and two cooling lakes, Par Pond and L-Lake. (One small onsite stream flows to the east and joins tributaries of the Salkehatchie River.) A swamp borders the Savannah River along most of the southwestern Plant boundary. Surface-water quality is characterized by low mineral content, low TDS, and a pH range of 5.6 to 8.4.

TE

ENVIRONMENTAL CONSEQUENCES

The determination of the environmental consequences associated with the alternative waste management strategies is based on a combination of data and analyses derived from:

TC
- Groundwater monitoring and soils/sediment analyses
- Groundwater flow and transport modeling
- Estimation of waste site inventories
- Estimation of onsite and offsite doses, health effects, and risks for radionuclides and hazardous chemicals through surface and groundwater, atmospheric, and occupational pathways
- Estimation of ecological impacts
- Estimation of risks to onsite occupants following a 100-year period of institutional control

These assessment methodologies required the use of flow and solute transport models for groundwater; atmospheric dispersion models for radiological and nonradiological constituents; and estimation of health risks through radiological and/or chemical health risk models.

C-12 S-15

Groundwater monitoring has been performed at the SRP routinely, and data from these efforts have been made available in many reports, most recently in the Environmental Information Documents (EIDs) prepared for this EIS. Several groundwater flow and transport models were used, in particular the PATHRAE model, to provide a basis for comparing the relative effects of the alternative strategies, particularly in respect to the existing waste sites. Other codes were used in health effects assessments. One-meter and 100-meter downgradient wells were used as hypothetical receptors for groundwater modeling at existing waste sites. Boundary wells were assumed at proposed new disposal facilities for the same purpose. Onsite surface streams and the Savannah River were assumed as receptor locations for assessing ecological impacts and offsite drinking-water radiological dose and chemical substance exposures. These doses and exposures are primarily intended to evaluate the alternatives with respect to each other; site-specific groundwater modeling would be required for more precise, absolute exposure assessments.

Modeling calculations to determine atmospheric exposures to radioactive and hazardous waste materials were made for the EIS using a number of computer codes for soil and airborne contaminant loadings, transport of radioactive and hazardous materials, population exposures (including evaluation data), and food uptake. Another code was used to calculate airborne risks for the population and the maximally exposed individual. Onsite worker exposure was also estimated.

C-12

Existing waste site inventories for transport modeling efforts were established using physical records or calculations involving either groundwater monitoring results or soil core sampling results. These data resulted in estimates of potential waste inventories (waste disposal mass) for comparisons of alternative removal, remedial, or closure actions. Historic information on operations and waste disposal and storage activities was used to estimate the mass or volume of waste that would be contained in proposed new disposal facilities. A computer code modeled these sites for boundary wells, surface streams, and future site-occupant scenarios, as in existing waste site modeling. C-12

COMPARISON OF ALTERNATIVE WASTE MANAGEMENT STRATEGIES

This EIS compares the alternative waste management strategies, as well as the project-specific actions. It evaluates health effects, doses, and exposures to the general population or workers, the level of environmental impact, volumes and kinds of wastes, and retrievability of wastes for future treatment.

NO-ACTION STRATEGY

No major onsite environmental benefits are expected from the No-Action strategy; however, the offsite environment would be protected as a result of continuing waste management practices such as groundwater cleanup in the A/M-Areas. This strategy would result in the following: TE

- Onsite groundwater (water-table) impacts
- Elevated concentrations of tritium, strontium-90, and nitrate in Four Mile Creek E-45
- Potential terrestrial impacts from open pits and basins
- Accidental releases from stored wastes with possible impacts on aquatic and terrestrial ecology and socioeconomics TE
- Continued minor habitat and wetlands impacts
- Occupational exposures and risks of fires, spills, and leaks due to waste transportation and accidents

This strategy would not produce any impacts to archaeological or historic resources or endangered species. In addition, noise impacts associated with this strategy would not be produced. This strategy probably would require the dedication of about 300 acres at existing waste sites plus a significant amount of land in areas receiving adverse impacts, primarily from shallow-aquifer groundwater contamination. In the future, occupants of the SRP site would be exposed to the largest areas of unmitigated contamination. TE

The estimated total capital cost to continue current practices is about $17 million. Total 20-year operating costs for the No-Action strategy are estimated at about $86 million. Estimated lifetime maintenance and monitoring costs are about $51 million. TC

DEDICATION STRATEGY

The major environmental benefits predicted to occur from the implementation of the Dedication strategy include improvement of onsite groundwater quality from remedial and closure actions at existing waste sites; improvement of onsite surface-water quality; reduction of potential public health effects; and reduction in atmospheric releases. A disadvantage would be the removal of some sites from public use through their dedication for waste management purposes; as much as 700 acres would be affected. Environmental impacts under this strategy could include the following:

- Local and transitory onsite groundwater drawdown effects
- Minor short-term terrestrial impacts due to the use of borrow pits for backfill
- Impacts to wildlife habitat due to land clearing and development
- The dedication of about 400 acres of land to new above- and belowground disposal facilities
- The dedication of about 300 acres at existing waste sites

There would be no impacts to archaeological or historic resources, socioeconomic resources, or endangered species; there would be no impacts from
TC noise. Accidents and occupational risks could occur due to waste material transportation and handling resulting from spills, leaks, or fires.

The total capital cost for implementation of this strategy ranges from about $281 million to $788 million. Total 20-year operating costs range from about
TC $51 to $258 million. Estimated costs for closure range from about $19 to $31 million. Estimated post-closure maintenance and monitoring costs range from about $65 million to $119 million. The cost ranges are based on the types of facilities that would be selected.

ELIMINATION STRATEGY

The environmental benefits expected from the implementation of the Elimination strategy include improvement to onsite groundwater and surface-water quality from the removal and closure of all existing waste sites and remedial actions, as required; reduction of potential public health effects and atmospheric releases (except increased tritium air releases under the evaporation option); and no requirement for dedication of sites at the SRP. Disadvantages include higher occupational risks than with other strategies and the absence of assurance of the future availability of disposal sites in other areas. Environmental impacts that could occur under this strategy include:

- Onsite groundwater drawdown effects (local and transitory)
- Added tritium releases to surface streams from direct discharge or increased atmospheric (evaporation) releases
- The highest occupational risks of all the strategies during waste removal, closure, and remedial actions
- Terrestrial impacts at borrow pits that were greater than those for other strategies

* Some loss of habitat (up to 400 acres) due to land clearing and development during the construction of the retrievable-storage facilities TC

* The greatest risk of spills, leaks, and fires, and the greatest worker exposures due to waste removal and transportation

There would be no impacts to archaeological or historic resources, socioeconomic resources, or endangered species; there would be no impacts from noise. This strategy would result in the lowest future risks to future occupants at the waste sites and contaminated areas following the extensive removal, remedial, and closure actions, but there are unknown, unquantifiable impacts associated with the eventual retrieval, treatment, and disposal of these stored wastes. TE

The total capital cost for implementation of this strategy during the 20-year operational period would range between $2.0 billion and $4.8 billion. Total 20-year operating costs would range from about $370 million to $2.4 billion. Estimated post-closure maintenance and monitoring costs are about $37 million. TC

COMBINATION STRATEGY

Major environmental benefits to be derived from implementation of the Combination strategy include secure, retrievable storage and disposal of wastes; improvement to onsite surface water and groundwater from removal of wastes at selected sites, closure of selected waste sites, and remedial actions, as required; reduction of potential public health effects; and reduction of atmospheric releases. The dedication of some sites for waste management purposes would be required. This strategy could cause the following impacts: TE

* Local and transitory groundwater drawdown effects

* Some habitat disruption on up to 400 acres of land required by the new disposal facilities TC

There would be no impacts to archaeological or historic resources, socioeconomic resources, or endangered species; there would be no impacts from noise. Waste removal and handling would pose fewer occupational risks from accidents, fires, spills, and leaks because fewer waste sites would be involved. Potential impacts to future occupants would be between the extremes of the No-Action and Elimination strategies.

The estimated total capital cost of implementation of the Combination strategy ranges from about $334 to $957 million. Total 20-year operating costs range from about $73 to $397 million. Closure costs range from about $37 to $48 million. Estimated post-closure maintenance and monitoring costs range from $90 to $105 million. TC

SUMMARY

Considering all environmental factors and costs, a Combination strategy (i.e., compliance through a combination of site dedication, elimination of some existing waste sites, and disposal/storage of wastes) would be DOE's preferred alternative. The Combination strategy includes project-specific actions of waste removal at selected existing waste sites and remedial and closure actions as required; above- and belowground disposal and retrievable storage for new disposal and storage facilities; and continuation of the discharge of disassembly-basin purge water to seepage basins, with continued studies on detritiation or other mitigation measures.