DOE/EA-0908

**Environmental Assessment
for the
New Sanitary Sludge
Land Application Sites
at the
Savannah River Site**

FEBRUARY 1994

**U. S. DEPARTMENT OF ENERGY
SAVANNAH RIVER OPERATIONS OFFICE
SAVANNAH RIVER SITE**

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United States Government

Department of Energy

memorandum

DATE: February 7, 1994

REPLY TO: Office of NEPA Oversight:Mansoor:202-586-9326
ATTN OF:

SUBJECT: Environmental Assessment (EA) for New Sanitary Sludge Land Application
Sites at the Savannah River Site (SRS) (DOE/EA-0908)

TO: Victor H. Reis
Assistant Secretary for Defense Programs

This is in response to your request of September 23, 1993, for approval of the subject EA and issuance of a finding of no significant impact (FONSI). On December 2, 1993, the Office of NEPA Oversight authorized a 30-day preapproval review by the States of South Carolina and Georgia, and on December 15, 1993, you transmitted the EA to the States. Pat Stone, NEPA Compliance Officer's staff, Savannah River Operations Office, informed us on January 11, 1994, that neither State had comments on the EA.

The Office of Environment, Safety and Health has reviewed the EA in accordance with our responsibilities under DOE 5440.1E regarding compliance with the National Environmental Policy Act (NEPA). Based upon my staff's review and recommendation, and after consultation with the Office of General Counsel, I have determined that the EA is adequate for publication and is hereby approved, subject to your accommodation of the attached comments, with which Savannah River Operations Office staff has agreed. Based on the EA, I have determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment, within the meaning of NEPA. Therefore, the preparation of an environmental impact statement is not required and I have signed the attached FONSI.

Please note that the Office of Defense Programs is responsible for providing public notice of the availability of the EA and FONSI in accordance with the Council on Environmental Quality NEPA Regulations (40 CFR 1506.6), DOE NEPA Regulations (10 CFR 1021.322(c)), and DOE 5440.1E, paragraph 6a(24). Please provide an electronic file of the EA, five copies of the EA, and a record of distribution of the EA and FONSI to the Office of NEPA Oversight and send one copy of the EA and FONSI to the Public Reading Room in the Forrestal Building.

Tara O'Toole, M.D., M.P.H.
Assistant Secretary
Environment, Safety and Health

Attachments

cc: Henry Garson, NEPA Compliance Officer, DP-3.2
Steve Wright, NEPA Compliance Officer, SR

MASTER

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**FINDING OF NO SIGNIFICANT IMPACT
FOR NEW SANITARY SLUDGE LAND APPLICATION SITES
SAVANNAH RIVER SITE, AIKEN, SOUTH CAROLINA**

AGENCY: Department of Energy

ACTION: Finding of No Significant Impact

SUMMARY: The Department of Energy (DOE) has prepared an environmental assessment (EA), DOE/EA-0908, to assess the potential environmental impacts of reusing treated sanitary sludge from the Savannah River Site (SRS) through land application on two SRS sites over the next 5 years. Based on the analyses in the EA, DOE has determined that the proposed action is not a major Federal action significantly affecting the quality of the human environment within the meaning of the National Environmental Policy Act (NEPA) of 1969. Therefore, the preparation of an environmental impact statement (EIS) is not required, and DOE is issuing this finding of no significant impact.

COPIES OF THE EA ARE AVAILABLE FROM:

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Office of Processing and Reactor Facilities
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FOR FURTHER INFORMATION ON THE DOE NEPA PROCESS, CONTACT:

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BACKGROUND: Action is necessary to provide for the efficient disposal of SRS sanitary sludge from SRS sanitary wastewater treatment plants. The sludge is nonhazardous and virtually nonradioactive. Currently SRS is transporting the sludge offsite for disposal; from 1986 to 1992, it was applied on SRS lands in accordance with the South Carolina Department of Health and Environmental Control (SCDHEC) permit requirements as part of the reclamation of SRS's F- and H- Area borrow pits. This reclamation is essentially complete and has proven the value of sewage sludge as a recyclable resource.

PROPOSED ACTION: The proposed action is to reuse treated sanitary sludge from SRS wastewater treatment plants through onsite land application. The sludge would be applied as a soil conditioner and fertilizer to two pine stands of 20 and 38 acres, respectively. The two proposed sites are located in a remote wooded area in the middle eastern side of SRS near R-Area. Application would be in accordance with the requirements of a SCDHEC Category 3 land application permit granted to DOE for this proposed action, effective January 1, 1994.

Currently, SRS sludge is treated to Class B standards (40 CFR Part 503) by aerobic digestion and dewatering in sludge holding tanks adjacent to the SRS wastewater treatment plants. Under the proposed action, the sludge would be removed from the tanks, transported via truck to the application sites, and applied by a sludge applicator or a similar-type applicator on a sludge spray truck at an approximate rate of 9,500 gallons per acre per year for 5 years at each of the sites. The 5-year application would be equivalent to a one-time application of approximately 388 pounds of nitrogen per acre. The application sites would be managed by the U.S. Forest Service, with expectation of harvesting the trees in 40 to 50 years.

ENVIRONMENTAL IMPACTS: The potential consequences of reusing treated sanitary sewage sludge from SRS over the next 5 years on two SRS land application sites were analyzed to determine if there were any significant environmental impacts. Potential impacts considered were: impacts to soil, water, and air quality; ecological impacts, including sensitive environmental resources; and occupational safety and health. The implementation of the proposed action would have minimal, if any, adverse impacts. The principal impact associated with the proposed action would be beneficial, in that sanitary sludge from the SRS wastewater treatment plants would be recycled as a fertilizer to enhance timber yield.

Because of the topography of the two application sites (flat with limited runoff), depth to groundwater, the forested condition of the two sites (impeding runoff), and the absence of surface water, wetlands, or water supply wells within 1,000 feet of the application sites, there is negligible risk to surface water or groundwater from the land application of the sludge. Applications rates are below Environmental Protection Agency allowable limits; SCDHEC would not require groundwater monitoring due to low risk to groundwater. A 50-foot buffer zone where no sludge would be applied to the sites would be maintained to protect surrounding lands from any possible overspray per SCDHEC guidance.

The nearest surface water is the headwaters of Pen Branch, a small intermittent wet area 30 feet wide and 400 feet long. An additional 50-foot buffer zone (total of 100 feet) would be maintained around this area so that no sludge would be applied to it.

Negligible air emissions from volatile organic compounds and ammonia are expected from land application of sludge. No odor problems have been reported from past sanitary sludge land applications at SRS and, due to the remoteness of the proposed application sites, no odor problems are expected.

No environmentally sensitive areas or natural resources such as historical or archaeological sites, and endangered species or their habitats are present on the proposed land application sites. There would be no noticeable effects on flora except for increased tree growth as a result of the sludge application.

The SRS sanitary sludge is nonhazardous and virtually nonradioactive; no adverse impacts to workers are expected as a result of implementing the proposed action. No sludge would be transported offsite, thereby eliminating the risk of offsite accidents. There would be no impacts to the public.

ALTERNATIVES CONSIDERED: DOE considered the following alternatives to the proposed action: (1) no action (i.e., continued offsite disposal); (2) application of the sludge to a different location on SRS; and (3) other disposal alternatives that do not involve onsite reuse of the sludge.

These alternatives were not selected for the following reasons: (1) continued offsite disposal would not be compatible with current Federal land management policy concerning beneficial reuse of sewage sludge as a recyclable resource and is not cost-effective; (2) other onsite locations would not offer the same advantages of accessible location, flat topography, limited runoff, distance from wetlands, and proper tree age to provide adequate nitrogen uptake; and (3) other disposal alternatives would not reuse the sludge onsite as a recyclable resource.

DETERMINATION: Based on the information and analyses in the EA, DOE has determined that the proposed action does not constitute a major Federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, the preparation of an EIS is not required for this proposed action.

Issued at Washington, D.C., this 4th day of February 1994.

for Tara O'Toole, M.D., M.P.H.
Assistant Secretary
Environment, Safety and Health

ENVIRONMENTAL ASSESSMENT
for the
NEW SANITARY SLUDGE
LAND APPLICATION SITES
at the
SAVANNAH RIVER SITE

February 1994

U. S. Department of Energy
Savannah River Operations Office
Savannah River Site

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TABLE OF CONTENTS

<u>SECTION</u>	<u>Page</u>
1.0 NEED FOR ACTION	1
2.0 PROPOSED ACTION AND ALTERNATIVES.....	1
2.1 Proposed Action	1
2.2 Alternatives to the Proposed Action	5
3.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION	5
3.1 SRS Sludge Application Studies.....	7
4.0 REGULATORY AND PERMITTING CONSIDERATIONS.....	8
4.1 National Environmental Policy Act of 1969, as amended	9
4.2 Clean Water Act Regulations and Sewage Sludge Guidance	9
4.3 CERCLA Regulations	9
5.0 REFERENCES	10

1.0 NEED FOR ACTION

Action is necessary to allow the Savannah River Site (SRS) to provide for efficient disposal of sanitary sludge for SRS as forecast by the latest site projections (WSRC, 1991) and modified by the latest U. S. Department of Energy (DOE) planning guidance for SRS (Stello, 1993). From 1986 to 1992, sanitary wastewater sludge was applied on SRS lands in accordance with a South Carolina Department of Health and Environmental Control (SCDHEC) permit as part of the reclamation of SRS's F- and H-Area borrow pits (disturbed land). This reclamation is essentially complete and, if land disposal of sludge is to continue, new land application sites on SRS must be selected as the extended permit for applying sludge to the borrow pits expired in 1992. Currently, sludge is being trucked offsite for disposal by a subcontractor to a Publicly Owned Treatment Works (POTW) near Augusta, Georgia (WSRC, 1992a).

This sewage sludge is a beneficial by-product of the site's wastewater treatment package plants with proven value as a renewable resource recycling nutrients back to the environment. This is particularly true for sanitary sludge application to managed forest stands at SRS where sludge application experiments since 1980 have increased timber yields and wood fiber by shortening wood production cycles (Davis and Corey, 1989). The Environmental Protection Agency (EPA, 1992) points out that "it is a federal policy that federal land management agencies will consider beneficial use of municipal sewage sludge for fertilizer, soil conditioner, or other uses..."

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

This Environmental Assessment (EA) has been prepared by DOE to assess the potential environmental impacts of onsite land disposal of treated sanitary sewage sludge from SRS. The proposed action is to replace the present offsite disposal of the treated sanitary sludge from existing SRS wastewater treatment plants with onsite reuse through land application. The proposed action is independent of SRS production operations and is necessary for more efficient disposal of SRS sanitary sludge at lower costs. The proposed land application at SRS is treated as part of the preliminary Reconfiguration Programmatic Environmental Impact Statement (EIS) "No Action" alternative (DOE, 1991).

The sludge from SRS sanitary wastewater treatment plants is nonhazardous. Onsite disposal of this sludge allows SRS to comply with current DOE policies to keep any DOE wastes onsite where possible and to eliminate any potential accidents due to continuing offsite transportation of sanitary wastes (DOE, 1990a).

The sludge would be applied approximately monthly to SRS planted pine forests in accordance with SCDHEC permit requirements to act as a soil conditioner and fertilizer on two new managed timber stand sites of 20 and 38 acres on SRS. They are located in a remote wooded area in the middle eastern side of SRS near R-Area (Figure 1).

Sanitary wastewater at SRS is currently treated using the extended aeration, activated sludge method. SRS sludge is further treated to Class B standards (40 CFR Part 503) (EPA, 1993) by aerobic digestion and dewatering in sludge holding tanks adjacent to the wastewater treatment plants. Under the proposed action, the sludge would be removed from SRS sludge holding tanks as they become full and transported via truck to the application sites to provide for its efficient disposal and reuse. When the centralization and upgrading of the sanitary wastewater system is completed (see proposed action in Environmental Assessment DOE/EA-0878), all sludge would go through a volume reduction process to reduce pathogen levels through an air drying process as per 40 CFR Part 503 requirements.

The sludge would be sampled for 16 parameters, including solids, nitrogen compounds, and heavy metals to assure that the sludge is nonhazardous per 40 CFR Part 503 before its disposal (WSRC, 1993b). Currently, the SRS sanitary sludge holding capacity at existing plants is 80,783 gallons for a storage capacity of up to 59 days (WSRC, 1992a). Under the draft SCDHEC permit for land application of sludge, the sludge would be applied approximately monthly (5 acres per month) for five years by an AG-GATOR 2004 sludge applicator or a similar type applicator on a sludge spray truck at an approximate rate of 9,500 gallons/acre/year at each of the two sites. At this rate, the permit could be modified or extended and the sludge could be applied to SRS forests for additional five year periods as necessary. This application rate would be equivalent to a nitrogen application of approximately 78 pounds/acre/year.

The application sites would be managed by the U. S. Forest Service, which expects to harvest the trees in 40-50 years (see section 4.1). Each site contains trees of 8-20 years of age, planted approximately 12 feet apart (Figure 2). The U. S. Forest Service would remove every fourth row of trees to provide a path for the sludge spray truck to drive. This area of removal on the 58 acres represents less than one percent of the pine forest at SRS. No erosion control problems are anticipated as the stumps will remain in place on the flat topography. Signs would be posted every 500 feet at the perimeter of the two land application sites identifying the sites and restricting site access. The sites would be halved into separate application sections and a 50-foot buffer zone would be maintained around the perimeter of each of the sites where no sludge would be applied to assure containment of the sprayed sludge within the boundaries of the sites as per SCDHEC guidance.

Figure 1. Location of the proposed sanitary sludge land application area on Savannah River Site, South Carolina.

Figure 2. Site map of the two sanitary sludge land application sites on the Savannah River Site, South Carolina.

2.2 Alternatives To The Proposed Action

Among the alternatives considered to the proposed action is the alternative to take no action. This alternative would result in SRS continuing to transport and dispose of the sanitary sludge from the SRS wastewater treatment plants offsite to a POTW rather than dispose and reuse onsite (DOE, 1990a). The impacts associated with the proposed action would not occur. This alternative would not be compatible with current federal land management policy concerning beneficial reuse of sewage sludge as a recyclable resource (U. S. EPA, 1992) and is not considered further.

A second alternative to the proposed action would be to reuse and apply the sludge to a different location on SRS. Many SRS forest lands and reclamation areas could be used for sludge application and benefit from it (Corey, Lower, and Davis, 1985). Over 90 percent, or about 179,000 acres, of SRS is forested and managed by the U. S. Forest Service, Savannah River Forest Station, for sustained yield timber production which provides a variety of stand age classes and conditions for forest research purposes. However, these sites were selected because of their location (e.g., away from wetlands, close to roads, and central to all sanitary plants), topography (flat with limited runoff), and tree age (trees of proper age for adequate nitrogen uptake). No other sites have this combination of characteristics and thus use of other sites would have more adverse impacts than use of the proposed sites.

Other alternatives to the proposed action considered were land filling, incineration, composting, ocean dumping, and marketing as commercial fertilizer. These alternatives were not considered further because they are disposal-only and/or do not comply with current DOE policies.

3.0 ENVIRONMENTAL CONSEQUENCES OF THE PROPOSED ACTION

The SRS occupies about 199,000 acres in southwestern South Carolina located 25 miles southeast of Augusta, Georgia (Figure 1). The SRS site contains other facilities including five nuclear production reactor areas; two chemical separations areas; waste processing, storage, and disposal facilities; and various supporting facilities. At present 21,000 people work at SRS and would be served by the proposed action. A comprehensive discussion of SRS and associated environs is presented in the *Final Environmental Impact Statement, Continued Operation of K-, L-, and P-Reactors, Savannah River Site*, (DOE, 1990b).

The proposed action would take place on two land application sites of 20 and 38 acres located in a remote, wooded area in the middle eastern side of SRS near R-Area and Par Pond some five miles from the nearest SRS boundary. The sites are flat and present little risk to the water table from the land application due to

depth to groundwater (3-4 ft. to impermeable layer) and forested condition. Because application rates are below allowable limits (U.S. EPA, 1993), SCDHEC would not require any groundwater monitoring due to the low risk to the groundwater.

There are no surface water, wetlands, or water supply wells located within 1000 feet of the sites. The proposed action would have no impacts on floodplains. The topography of the sites, as well as the roadways and railroad lines at the perimeter of the sites, prevent any possible run-off from entering surface waters. A 50-foot buffer zone where no sludge would be applied would be maintained around the sites (about 1000 feet between sites) to protect surrounding lands from any possible overspray as per SCDHEC guidance.

The nearest surface water is the headwaters of Pen Branch, a small intermittent wet area, 30 ft. wide and 400 ft. long, located about 1/2 mile south of SRS Road 6 at Road F (Figure 2). It would be flagged and an additional 50-foot buffer zone (total 100 feet) would be maintained around the area so that no sludge would be applied on it (Rogers, 1993).

Only negligible air emissions from volatile organic compounds and ammonia are expected from the land application of sludge at SRS (WSRC, 1993b). Standard land application methods would be used in the proposed action (EPA, 1993). The total level of nitrogen (ammonia, nitrates, nitrites, and organic nitrogen) would be negligible due to the uptake by the trees. No odor problems have been reported from any past sanitary sludge land applications at SRS. Due to the remoteness of the sites, no odor problems are expected. Odor control measures can be used if necessary to mitigate any odors that might arise unexpectedly.

The trees on each site are 8-20 years of age. Trees of this age were chosen because of the closed canopy which would prevent airborne pollen and seed from germinating and taking up the nitrogen in the sludge which is needed by the trees. There is approximately 90 square feet of basal area per acre and at least 8 years of tree litter at the sites.

A standard SCDHEC Category 3 land application permit would be required for this action on SRS. In addition, the proposed action conforms with EPA's 40 CFR Part 503 regulations that became effective March 22, 1993 (U. S. EPA, 1993).

SCDHEC performed hydrogeological sampling and inspection on both proposed sites in September 1992 before drafting the new permit. The draft SCDHEC permit limits the application to the two proposed sites to 9,500 gallons/acre/year for five years and can be modified or extended as necessary (SCDHEC, 1993). Applications would be divided into five applications of less than 80 pounds of nitrogen/acre to prevent any runoff impacts since 400 pounds/acre of SRS sludge is equivalent to 52,000 gallons/acre. This application rate would be equivalent to an application of approximately 388 pounds/acre of nitrogen for

five years. The average annual uptake of nitrogen by pine trees normally is about 150 pounds/acre/year or almost double that being applied to the sites on an annual basis. SRS would continue monitoring sludge produced at SRS sanitary wastewater treatment plants and other monitoring including 16 parameters and daily inspections as required in the draft SCDHEC permit. Sludge from each holding tank would be sampled at least annually. When final, the new SCDHEC permit would not require additional monitoring wells or groundwater sampling.

SRS sanitary sludge composition and pH have been analyzed and determined to be nonhazardous (Beavers, 1991). Sanitary wastes including sludge from SRS sanitary treatment plants, have been and will continue to be analyzed for radioactivity. Current results of sludge testing indicate that: (1) all tritium concentrations are below the drinking water standard of 20 pCi/ml; (2) isotopic alpha spectroscopy samples are essentially void of transuranic radionuclides; and (3) there is a lack of detectable fission (man made) products in most of the sludge samples analyzed by mass spectroscopy (WSRC, 1993a). For those samples where fission products were detected, the man made radionuclides found in the sludge were consistent with fallout levels (background levels) and the radioactivity in the sludge was below drinking water standards. These results indicate that SRS sanitary sludge has no radiological impact on site workers because they are not exposed to any radiological levels through any exposure pathways. There are no nonradiological impacts to site workers such as from dust, pathogens, or hazardous chemicals.

No offsite transportation of sanitary sludge would occur under the proposed action, thus eliminating any potential for offsite accidents. There would be no exposure or impacts to the public. No environmentally sensitive areas or natural resources such as historical or archaeological sites, endangered species or their habitats are present on the proposed sites (Banks, 1993; Irwin, 1993; WSRC, 1992b). There is an abundance of similar and alternative habitats available for other wildlife on SRS's 199,000 acres. There would be no noticeable effect on flora except for increased tree growth from the applications.

The principal cumulative impact of the use of the SRS sanitary sludge in land application for five years is beneficial in that sanitary wastes from the SRS waste treatment package plants would be recycled as a fertilizer to enhance timber yield for commercial purposes. In addition, laboratory analyses indicate that the composition, including nitrogen, of SRS sludge is well below the levels of concern identified by the U. S. EPA in 40 CFR Part 503 and will not cause any toxicity to vegetation.

3.1 SRS Sludge Application Studies

Additional studies have identified minimal impact and beneficial use of similar past sludge applications at SRS. In 1980, a five year sewage sludge application

study was initiated on about 30 acres on the SRS (Davis and Corey, 1989). The purpose was to evaluate the effects of sanitary sludge additions on nutrient cycling processes in loblolly pine stands and to determine whether or not such additions beneficially enhance forest productivity. This study was conducted on similar land and conditions as the proposed action. Sludge was applied to 1-28 year old pine stands at the rate of up to 560 pounds/acre of nitrogen (525,000 gallons of liquid sludge and 560 tons of solid sludge) in excess of planned application rate of the proposed action at the two sites currently under consideration. Sludge additions were closely monitored for potential impacts on water quality, nutrient and heavy metal cycling, and stand growth (Davis and Corey, 1989). Treatment inputs showed no nutrient or heavy metal leaching into local groundwater. The study concluded that using rates of about 360 pounds/acre of nitrogen as a silvicultural treatment to fertilize pine stands resulted in increased productivity without environmental or wood quality degradation (Davis and Corey, 1989).

In 1986, SCDHEC issued SRS Permit No. 12,076 to SRS for the application of waste activated sludge to two borrow pits located near F- and H-Areas. Extensive sludge and soil analyses from both sites and groundwater monitoring have confirmed that there has been no adverse affects to the environment (parameters measured per SCDHEC permit included heavy metals, nitrogen, arsenic, phosphorus, potassium and fecal coliform) from the nonhazardous sludge generated from the 19 site package treatment plants (Beavers, 1991).

During the 1980s under the DOE Biomass Fuels Program, 1.8×10^6 gallons of liquid sludge and 500 tons of solid sludge were applied on 46 acres of forest pine plots and 75 acres of borrow pits at SRS. A SCDHEC permit mandated that three groundwater wells be installed at each forestry and borrow pit site (total of 27 wells). After 4.5 years of intensive groundwater monitoring, no groundwater contamination was found as a consequence of sludge application (Pickett and Looney, 1986). Pickett and Looney (1986) point out that sludge land application has been practiced at SRS since 1980 at loading rates well in excess of 400 pounds/acre (388 pounds/acre/year proposed action) of nitrogen with no negative effects on soils or groundwater.

4.0 REGULATORY AND PERMITTING CONSIDERATIONS

It is DOE policy to carry out its operations in compliance with all applicable Federal, State, and local laws and regulations, as well as DOE orders. This section discusses the major regulatory permit programs that are applicable to the proposed action.

4.1 National Environmental Policy Act of 1969, as amended (42 usc 4321 et seq.)

This EA has been prepared in accordance with NEPA and the Council on Environmental Quality Regulations for Implementing NEPA (40 CFR Part 1500-1508), and DOE Regulations for Implementation of NEPA (10 CFR Part 1021) and DOE Order 5440.1E.

The proposed action encompassed by this EA and the proposed action described in the Environmental Assessment for the Centralization and Upgrading of the Sanitary Wastewater System at the Savannah River Site (DOE/EA-0878, 1993a) are separate actions at SRS. The implementation of either of these actions does not depend on the other.

The environmental impacts of the U. S. Forest Service timber management activities at SRS have had NEPA review in the EA for Natural Resource Management Activities of SRS (DOE/EA-0826, 1993b). No significant impacts from SRS timber management were noted (DOE, 1993c). The actions described in this Sanitary Sludge Application EA (DOE/EA-0908) and the SRS Natural Resource Management Activities EA (DOE/EA-0826) are independently justified.

4.2 Clean Water Act Regulations and Sewage Sludge Guidance

In accordance with the sewage sludge use and disposal standards (40 CFR Part 503) required by section 405 (d) of the Clean Water Act (CWA) of 1977, SCDHEC would issue a No Discharge (ND) Land Application Permit for the proposed SRS sanitary sewage sludge application listing effluent characteristics, application limitations, monitoring, and reporting requirements. The final rule (58 FR 32, 9248-9404) became effective on March 22, 1993. In addition, the proposed action conforms with the EPA policy for the beneficial use of municipal sewage sludge on federal land issued in 56 FR 30448-30450 in 1992.

4.3 Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

See Section 4.2 on application of sewage sludge to land as required and permitted by Section 405(d) of the Clean Water Act. This qualifies as a Federally permitted release as defined in CERCLA regulations and requires no CERCLA action.

5.0 REFERENCES

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- Irwin, J. G., 1993. Letter and attached report to B. C. Marcy, February 3, 1993, **Biological Evaluation: Proposed Sewage Sludge Land Application Site**, Reply to 2670, Savannah River Forest Station, U.S. Forest Service, Aiken, SC.
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DATE

FILMED

5/23/94

END