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United States Department of Energy

Savannah River Site

Record of Decision
Remedial Alternative Selection for the D-Area Burning/Rubble Pits (431-D and 431-1D) (U)

WSRC-RP-96-867
Revision 1
February 1997

Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808

SAVANNAH RIVER SITE

Prepared for the U.S. Department of Energy under Contract No.DE-AC09-96SR18500

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RECORD OF DECISION
REMEDIAL ALTERNATIVE SELECTION (U)

D-Area Burning/Rubble Pits (431-D and 431-1D)

WSRC-RP-96-867
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Savannah River Site
Aiken, South Carolina

Prepared by:

Westinghouse Savannah River Company
for the
U. S. Department of Energy Under Contract DE-AC09-96SR18500
Savannah River Operations Office
Aiken, South Carolina

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DECLARATION FOR THE RECORD OF DECISION

Unit Name and Location

D-Area Burning/Rubble Pits (431-D and 431-ID)
Savannah River Site
Aiken, South Carolina

The D-Area Burning/Rubble Pits (DBRP) (431-D and 431-lD) Waste Unit is listed as a Resource Conservation and Recovery Act (RCRA) 3004(u) Solid Waste Management Unit/Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) unit in Appendix C of the Federal Facility Agreement (FFA) for the Savannah River Site (SRS).

Statement ***o fBasis and Purpose***

This decision document presents the selected remedial alternative for the DBRP located at the SRS in Aiken, South Carolina. The selected alternative was developed in accordance with CERCLA, as amended, and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the Administrative Record File for this specific RCRA/CERCLA unit.

Description of the Selected Remedy

The preferred alternative for the DBRP source operable unit soils is Institutional Controls which will restrict this land to future industrial use. Additional groundwater monitoring as ***discussed in Section IX of the ROD, will also be*** conducted. ***Based on the groundwater monitoring history, the probable condition is that no significant groundwater contamination has originated from the DBRP. Thus, no remedial action and a period of continued monitoringfor confirmation is the only appropriate action for the groundwater at the DBRP. In the event that the probable condition of the local groundwater is no longer appropriate, DOE will evaluate the need for remedial action.*** Implementation of the Institutional Controls alternative will require both near- and long-term actions which will be protective of human health and the environment. For the near-term, signs will be posted at the waste unit which indicate that this area was used for the disposal of waste material and contains buried waste. In addition, existing SRS access controls will be used to maintain the use of this site for industrial use only.

In the long-term, if the property is ever transferred to non-federal ownership, the U.S. Government will create **a** deed **for the new** property owner which would contain information in compliance with Section 120(h) of CERCLA. The deed **would include notification disclosing former waste management and disposal activities as well as** remedial actions taken on the site, and any continuing groundwater monitoring commitments. The deed notification would, in perpetuity, notify any potential purchaser that the **property has** been used for the management and disposal of construction debris and other materials, including hazardous substances.

The deed would also include deed restrictions precluding residential use of the property. However, the need for these restrictions may be reevaluated in the event that contamination no longer poses an unacceptable risk under residential use. In addition, if the site is ever transferred to non-federal ownership, a survey plat of the area will be prepared, certified by a professional land surveyor, and recorded with the appropriate ***Barnwell County*** recording agency.

The post-ROD document, the Corrective Measures Implementation/Remedial Action Report (CMI/RAR), will be submitted to the Regulators four months after the issuance of the ROD. The CMI/RAR will contain a detailed monitoring strategy which will outline the submittal schedule and contents of the periodic monitoring reports to include: an analysis of the data, a conclusion, and a

recommendation. The regulatory review period, SRS revision period, and final regulatory review and approval period will be 90 days, 60 days, and 30 days, respectively.

The South Carolina Department of Health and Environmental Control has modified the SRS RCRA permit to incorporate the selected remedy.

Statutory Determination

Based on the DBRP RCRA Facility Investigation/Remedial Investigation (RFI/RI) Report and the BRA, the DBRP source operable unit poses no significant risk to the environment and minimal risk to human health. Therefore, a determination has been made that Institutional Controls are sufficiently protective of human health and the environment for the remaining contamination in the DBRP soils and groundwater. The selected remedy is protective of human health and the environment, complies with Federal and State of South Carolina requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The random distribution and low levels of contamination preclude a remedy in which treatment is a practical alternative. ***Because treatment of the principal threats of the site was found to be impracticable, this remedy does not satisfy the statutory preference for treatment as a principal element***

Institutional Controls will result in hazardous substances, pollutants, or contaminants remaining in the waste unit. Section 300.430 (f)(4)(ii) of the NCP requires that a Five Year Review of the Record of Decision be performed if hazardous substances; pollutants, or contaminantts remain in the waste unit. The three Parties have determined that a Five Year Review of the Record of Decision for the DBRP will be performed to ensure continued protection of human health and the environment.

2/10/97
Date

Thomas F. **Heenan**
Assistant Manager for Environmental **Quality**
U. S. Department of Energy, Savannah River Operations **Office**

3/27/97
Date

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Regional Administrator
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4/22/97
Date

R **Lewis Shaw**
Deputy Commissioner
Environmental Quality Control
South Carolina Department of Health and Environmental Control

DECISION SUMMARY
REMEDIAL ALTERNATIVE SELECTION (U)

D-Area Burning/Rubble Pits (431-D and 431-1D)

WSRC-RP-96-867
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Savannah River Site
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Aiken, South Carolina

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L Site and Operable Unit Name, Location, and Description

The Savannah River Site (SRS) occupies approximately 310 square miles of land adjacent to the Savannah River, principally in Aiken and Barnwell counties of western South Carolina. SRS is a secured U.S. Government facility with no permanent residents. SRS is located approximately 25 miles southeast of Augusta, Georgia and 20 miles south of Aiken, South Carolina.

SRS is owned by the U.S. Department of Energy (DOE). Management and operating services are provided by Westinghouse Savannah River Company (WSRC). SRS has historically produced tritium, plutonium, and other special nuclear materials for national defense and the space program. Chemical and radioactive wastes are by-products of nuclear material production processes.

The Federal Facility Agreement (FFA) lists the D-Area Burning/Rubble Pits (DBRP), 431-D and 431-lD, as a Resource Conservation and Recovery Act/Comprehensive Environmental Response, Compensation and Liability Act (RCRA/CERCLA) unit requiring further evaluation using an investigation/assessment process that integrates and combines the RCRA Facility Investigation (RFI) process with the CERCLA Remedial Investigation (RI) to determine the actual or potential impact to human health and the environment.

The DBRP are located in the western part of the SRS in Barnwell County, approximately 2600 feet west of D Area and 1.6 miles west of State Highway 125 (Figure 1). The topography of the area is flat and the surf' of the DBRP is at an elevation of 130 feet above mean sea level and 45 feet above the Savannah River (Figure 2). The water table is approximately 10 feet below ground surface in the area of the DBRP (Figure 3). Surface drainage is to the west-southwest toward a nearby ephemeral tributary of the Savannah River.

The two contiguous waste pits are designated as 431-D and 431-lD and cover a total area of 0.54 acre. Approximate dimensions of 43 1-D are 257 feet by 46 feet by 10 feet, and the dimensions of 431-lD are 229 feet by 36 feet by 10 feet. The two pits are separated by a 15-foot wide berm of undisturbed soil. The total planar area of the DBRP is assumed to be 257 feet by 97 feet (24,929 ft^2). The pits have been backfilled with soil and vegetation has been established on the resulting surface. The pit cover is raised above the surrounding terrain, which is essentially level, to enhance drainage.

IL Operable Unit History and Compliance History

Operable Unit History

Between 1951 and 1973, burning pits were used at SRS to burn a variety of hazardous and non-hazardous waste. The chemical composition and volumes of the disposed waste are unknown. Combustible materials, which were burned monthly, included paper, plastics, wood, rubber, rags, cardboard, oil, degreasers, and spent organic solvents. No known or suspected radioactive materials were allowed in the burning pits.

Burning of waste in the SRS pits was discontinued by October 1973. A layer of soil was then placed over the residue in the pits and they were subsequently used as rubble pits. Materials allowed in the rubble pits generally included concrete, bricks, tile, asphalt, plastic, metal, empty drums, wood products, and rubber. When the pits were filled to capacity in 1983 or were no longer needed, a 1 to 3 foot layer of clayey soil was placed over the contents and the surface was compacted and mounded above the surrounding terrain, which is essentially level, to enhance drainage. Vegetation was established to reduce erosion.

Compliance History

At SRS, waste materials are managed which are regulated under RCRA, a comprehensive law requiring responsible management of hazardous waste. Certain SRS activities have required Federal operating or post-closure permits under RCRA. SRS received a hazardous waste permit from the South Carolina Department of Health and Environmental Control (SCDHEC) on September 5, 1995.

Figure L Location of the D-Area Burning/Rubble Pits in relation to major facilities at the Savannah River Site.

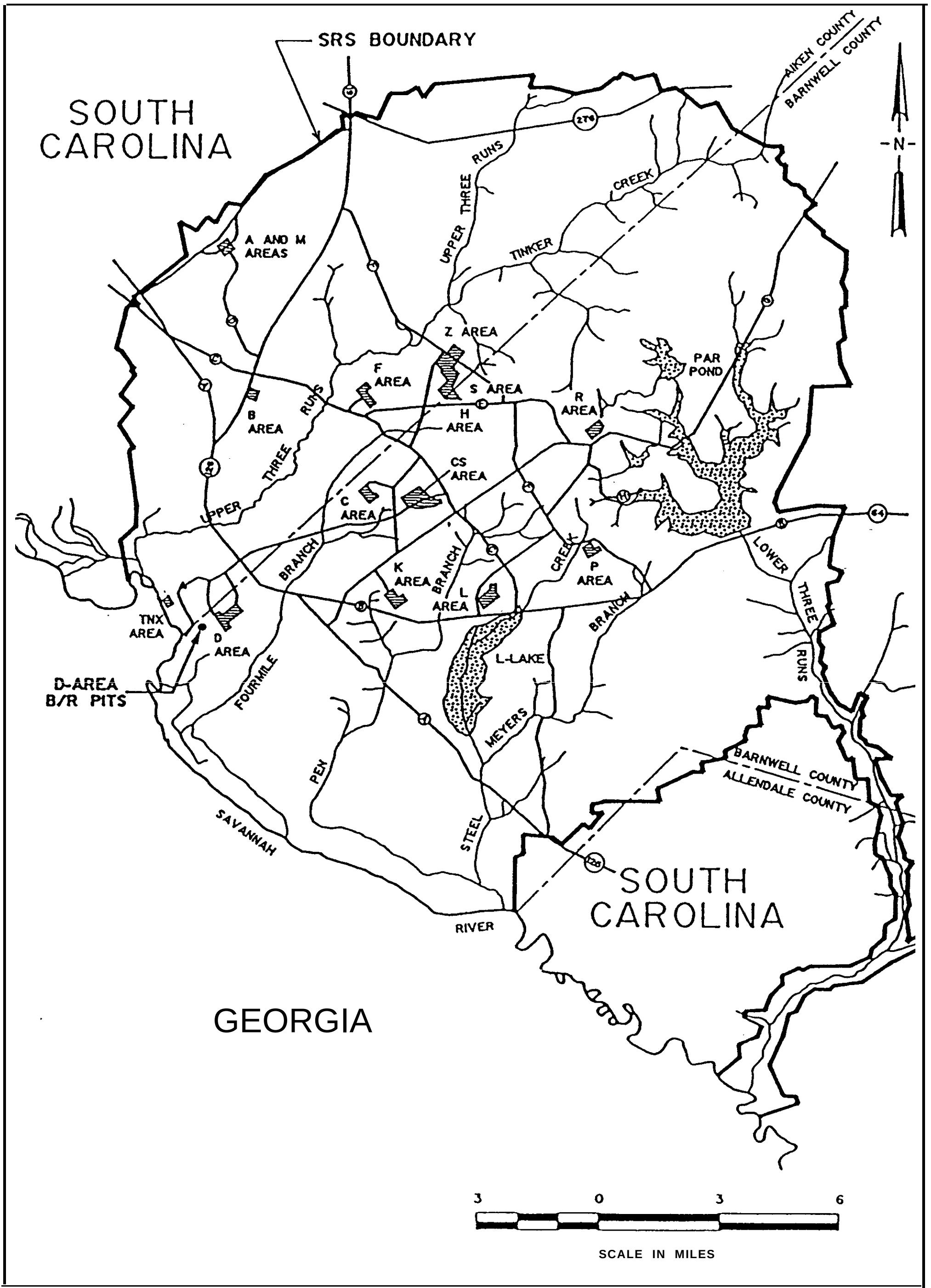
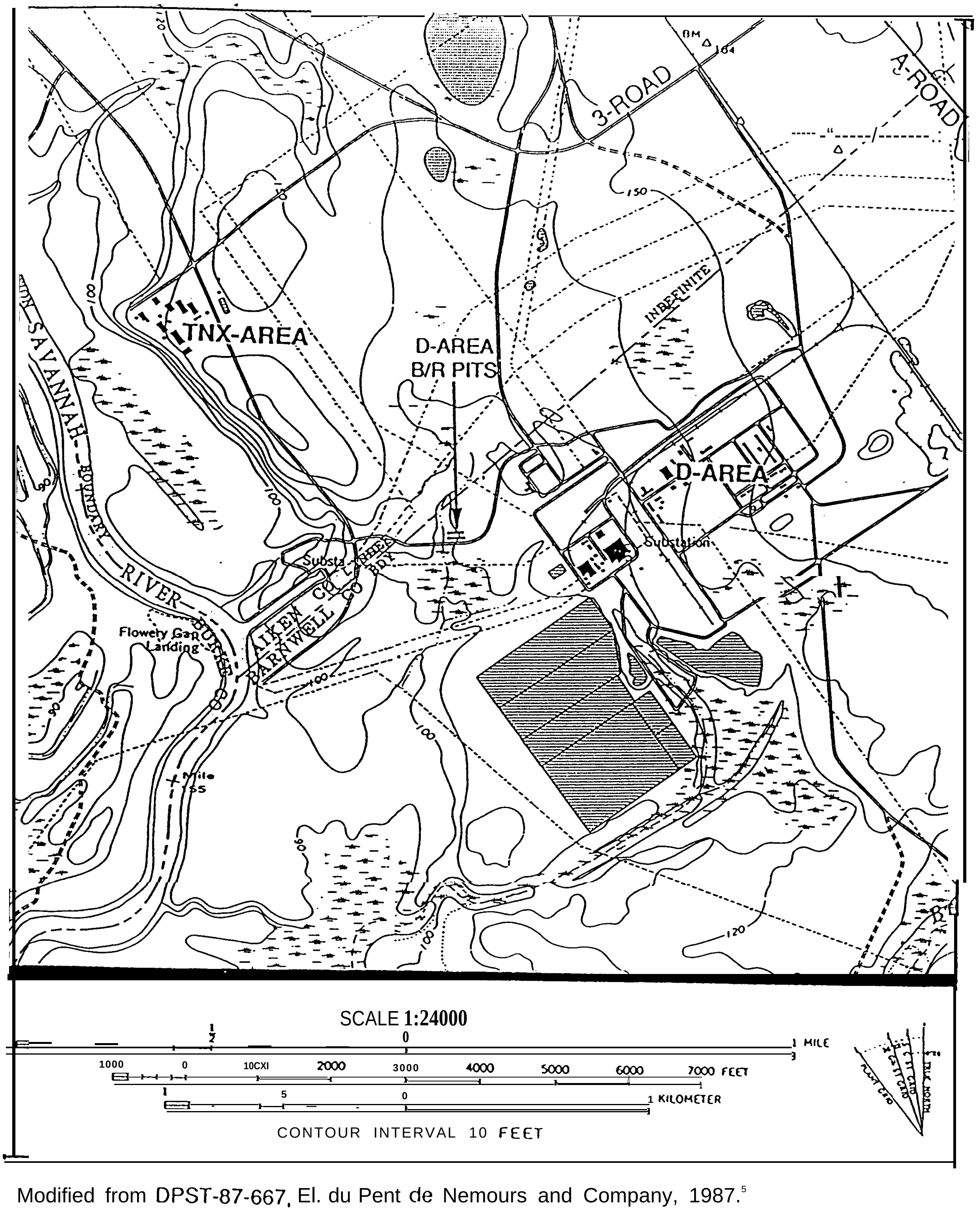
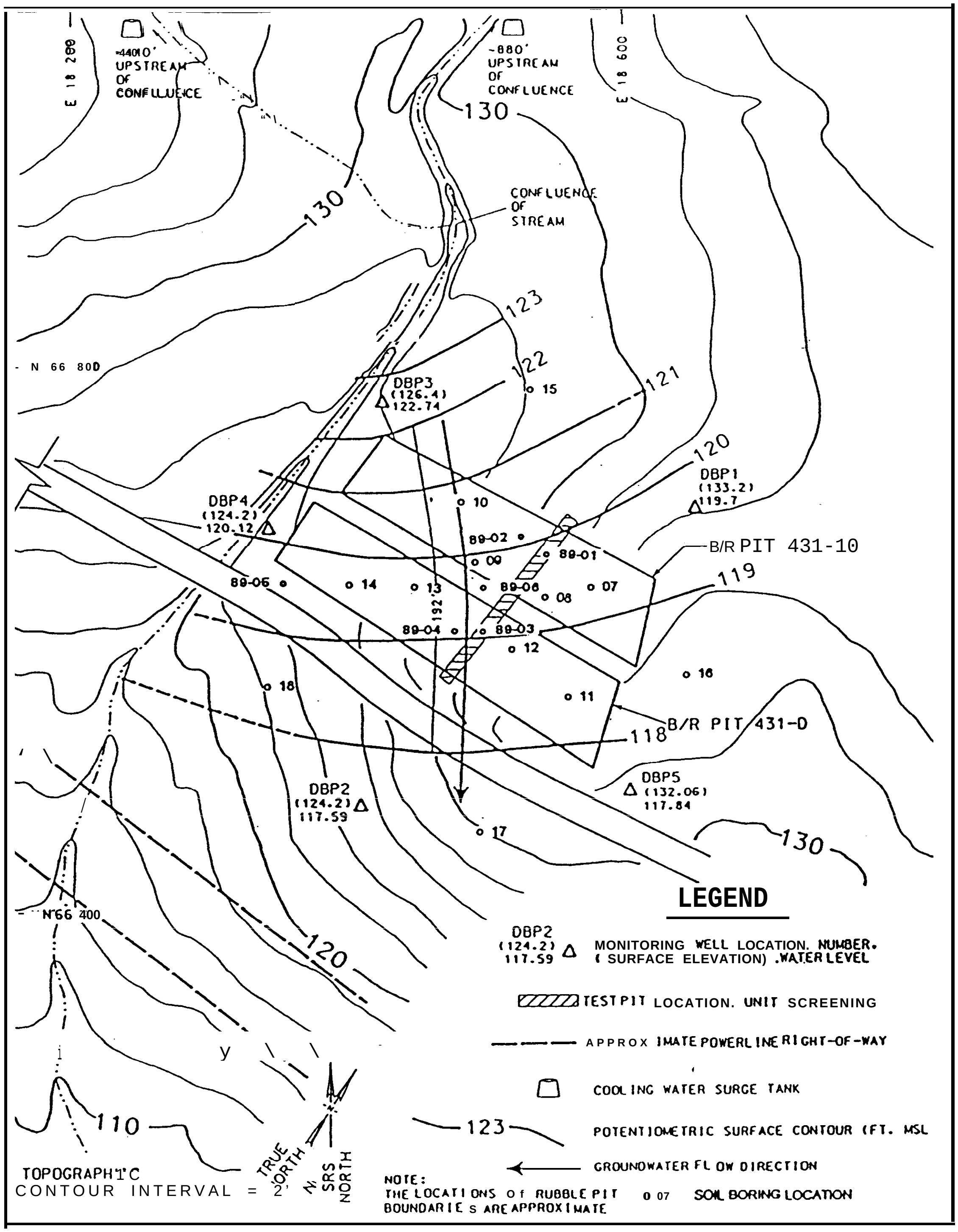


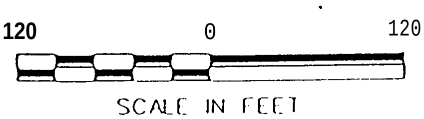
Figure 2. Topography of the D-Area Burning/Rubble Pits and surrounding area.



Modified from DPST-87-667, El. du Pent de Nemours and Company, 1987.[5]

Figure 3. Topography and Water Table Potentiometric Map of the D-Area Burning/Rubble Pits.





HYDRAULIC GRADIENT = VERTICAL CHANGE IN HEAD (dh) / HORIZONTAL DISTANCE (dl) = 4 FT. / 192 FT. = .02 FT./FT.

Part V of the permit mandates that SRS establish and implement an RFI program to fulfill the requirements specified in Section 3004(u) of the Federal permit.

On December 21, 1989, SRS was included on the National Priorities List (NPL). This inclusion created a need to integrate the established RFI Program with CERCLA requirements to provide for a focused environmental program. In accordance with Section 120 of CERCLA, DOE has negotiated a Federal Facility Agreement (FFA, 1993) with U. S. Environmental Protection Agency (EPA) and SCDHEC to coordinate remedial activities at SRS into one comprehensive strategy which fulfills these dual regulatory requirements.

III. Highlights of Community Participation

Both RCRA and CERCLA require that the public be given an opportunity to review and comment on the draft permit modification and proposed remedial alternative. Public participation requirements are listed in South Carolina Hazardous Waste Management Regulation (SCHWMR) R.61-79.124 and Sections 113 and 117 of CERCLA. These requirements include establishment of an Administrative Record File that documents the investigation and selection of the remedial alternatives for addressing the DBRP soils and groundwater. The Administrative Record File must be established at or near the facility at issue. The SRS Public Involvement Plan (DOE, 1994) is designed to facilitate public involvement in the decision-making process for permitting, closure, and the selection of remedial alternatives. The SRS Public Involvement Plan addresses the requirements of RCRA, CERCLA, and the National Environmental Policy Act, 1969 (NEPA). SCHWMR R.61-79.124 and Section 117(a) of CERCLA, as amended, require the advertisement of the draft permit modification and notice of any proposed remedial action and provide the public an opportunity to participate in the selection of the remedial action. The *Statement of Basis/Proposed Plan for the D-Area Burning/Rubble Pits* (WSRC, 1996c), which is part of the Administrative Record File, highlights key aspects of the investigation and identifies the preferred action for addressing the DBRP.

The FFA Administrative Record File, which contains the information pertaining to the selection of the response action, is available at the EPA office and at the following locations:

U. S. Department of Energy
Public Reading Room
Gregg-Graniteville Library
University of South Carolina-Aiken
171 University Parkway
Aiken, South Carolina 29801
(803) 641-3465

Thomas Cooper Library
Government Documents Department
University of South Carolina
Columbia, South Carolina 29208
(803) 777-4866

Reese Library
Augusta State University
2500 Walton Way
Augusta, Georgia 30910
(706) 737-1744

Asa H. Gordon Library
Savannah State University
Tompkins Road
Savannah, Georgia 31404
(912) 356-2183

The public was notified of the public comment period through mailings of the *SRS Environmental Bulletin*, a newsletter sent to approximately 3500 citizens in South Carolina and Georgia, through notices in the *Aiken Standard*, the *Allendale Citizen Leader*, the *Augusta Chronicle*, the *Barnwell People-Sentinel*, and *The State* newspapers. The public comment period was also announced on local radio stations.

The 45-day public comment period began on September 17, 1996 and ended on October 31, 19%. A public comment meeting was held on October 15, 1996. A Responsiveness Summary was prepared to address comments received during the public comment period. The Responsiveness Summary is available with the final RCRA permit and is also provided in Appendix A of this Record of Decision (ROD).

IV. Scope and Role of Operable Unit Within the Site Strategy

The overall strategy for addressing the DBRP was **to:**

1) characterize the waste **unit** delineating the **nature** and extent of **contamination** and **identifying** the media of **concern (WSRC,** 1994 and WSRC, **1995b);**
2) perform a baseline risk assessment to evaluate media of **concern,** constituents of **concern (COCs),** exposure pathways, and characterize potential risks **(WSRC,** 1995a);
3) evaluate applicable technologies and isolate a preferred technology to **remediate** the waste site as needed **(WSRC, 1996b** and WSRC, **1996c);** and
4) perform a final action to **remediate** the identified media of **concern** to the remedial action objectives.

The DBRP is an operable unit **located within** the Savannah River Floodplain Swamp Watershed. Several **source** control and **groundwater** operable units within this watershed will be evaluated to determine impacts, if any, to **associated** streams and wetlands. SRS will manage all source control and **groundwater** operable units to **minimize impact** to the watershed. Based on **characterization** and risk assessment **information,** the DBRP does not **significantly** impact the watershed. Upon disposition of all source control and groundwater operable units within this **watershed,** a final, comprehensive evaluation of the watershed will be **conducted to** determine whether any additional actions are **necessary.** The groundwater at the DBRP was investigated **during** the **RFI/RI** conducted in 1993. The Baseline **Risk** Assessment **(BRA) (WSRC,** 1995a) found no **risks** exceeding 1.0 x 10^{-6} for ingestion of the DBRP soil by future industrial workers, but calculated a risk of 3.0x 10^{-4} for ingestion of **groundwater** by future industrial workers. Additional **groundwater** monitoring of the **groundwater** for modeled risk and hazard drivers at the DBRP will be conducted and reported in the five-year ROD reviews.

V. Summary of Operable Unit Characteristics

The SRS burning/rubble pits were excavated in 1951, during the construction of most of the major **facilities** at the Savannah River Plant. The DBRP received waste materials produced during **construction** of D-Area facilities. The **chemical** composition and volumes of the disposed waste are unknown. During the operation of the burning/rubble pits, **combustible** materials (including paper, plastics, **wood,** rubber, rags, **cardboard,** oil, **degreasers,** and spent organic solvents) were burned monthly, as was the **practice** at that time, for volume **reduction.** This **practice** would have eliminated many of the combustible organic materials while **creating** combustion by-products. No known or **suspected** radioactive materials were disposed in the burning pits.

Open burning of waste material was discontinued at SRS in **1973.** At that time, the waste residue was covered with soil and the pits were used as rubble pits. Materials allowed in the rubble pits included **concrete,** bricks, tile, **asphalt,** plastic, **metal,** empty drums, wood **products,** and rubber. When the pits were filled to **capacity** about 1983, a 1 to 3 **foot** layer of clayey soil was placed over the contents and the **surface** was **compacted, mounded,** and seeded.

Media Assessment

*The Data Summary **Report*** **(WSRC, 1994),** *BRA* **(WSRC,** 1995a), ***RFI/RI Report*** **(WSRC, 1995b),** and *Corrective Measures **Study/Focused** Feasibility **Study*** **(WSRC, 1996b)** contain **detailed** analytical data for all of the environmental media samples taken in the characterization **of** the **DBRP.** These documents are available in the **Administrative Record** (See Section III).

Soils

Analytical ***data indicate*** that little or no **contamination** of the soil outside of the DBRP has **occurred.** Figure 3 shows the sample locations for the Phase I characterization in 1989 and the Phase II{ characterization in 1993. The 1989 program included two locations in **each pit,** one in the berm between the pits, and one directly down gradient of the pita. The 1993 program consisted of four soil borings in each pit and four **borings** around the pits.

In the **BRA,** the analytical data **from** the 1993 soil samples were divided into two groups:

- **surface** soils, 0.0 to 2.0 feet **(primary** direct contact exposure interval for soils) and

- subsurface soils, 0.0 to 4.0 feet (potential exposure interval for future scenarios where excavation may occur).

The BRA identified the following constituents of concern:

arsenic,
benzo(a)pyrene,
chromium,
manganese,
octachlorodibenzo-p-dioxin,
PCB-1260, and
total alpha emitting radium.

Dieldrin was identified as a modeled-DBRP-soils-to-groundwater ingestion risk driver to future residents, 81% of $8x10^{-4}$ in Revision O of the BRA. Dieldrin was only detected two times out of 45 soil samples collected in the DBRP. The maximum value reported was J0.0165 mg/Kg in the 4 to 6 foot interval of boring 11, the "J" qualifier indicates that the analyte was recognized below detection limits and the value was estimated. The risk contribution of dieldrin was reevaluated in the BRA, Revision 1 and dieldrin was eliminated as a risk driver based on its high uncertainty of detection and low number of occurrences.

Two times the mean background value for a constituent was used in screening that constituent for consideration as a constituent of potential concern. The mean background value for arsenic at the DBRP is 2.3 mg/kg. In the O-2 foot interval of the DBRP, arsenic only exceeds 2 times mean background (4.6 mg/kg, parts per million) at one location, boring 7 (7.6 mg/kg). The levels of arsenic detected are consistent with the levels found throughout SRS. Arsenic may be naturally occurring, added to the soils as a pesticide, or a constituent of waste materials disposed in the DBRP. Arsenic in the soil at SRS is believed to be primarily the residue of pre-SRS agricultural pesticide application. The occurrence of arsenic will be evaluated on a site-wide scale in the forthcoming SRS background soils study report.

In the near-surface soil at the DBRP, chromium only exceeded 2 times mean background (80.8 mg/kg) in boring 12 (339 mg/kg). The chromium present in the DBRP is believed to be predominantly CrIII (chromium in the +3 valence state) which is much less mobile and toxic than the CrVI (chromium+6) assumed in the BRA evaluation. CrVI is thermodynamically unstable in soils in the region including SRS and is rapidly reduced to CrIII. Manganese only exceeded 2 times mean background (242 mg/kg) in the near-surface internal in boring11 (260 mg/kg).

Benzo(a)pyrene (BaP) did not exceed detection limits in the O-2 foot interval at the DBRP. Octachlorodibenzo-p-dioxin (OCDD), which comprised only 9% of the risk via soil ingestion for future on-site workers, was detected at low concentrations in all of the shallow soil samples. Dioxins are common products of incomplete combustion. Polychlorinated Biphenyl-1260 (PCB-1260) was identified in only one location, soil boring 12; the maximum concentration of PCB-1260, 3.39 mg/kg, was found in the 0.5-2.0 foot interval. Total alpha emitting radium was only detected in the O-2 foot interval (1.2 pCi/g) in boring 7; 2 times mean background was 2.49 pCi/g.

Based on the fact that all the soil analytes passed either the simple site-specific or detailed site-specific method of screening, there is little or no chance for the residual waste at the DBRP to be a source of future contaminati'on. The remaining soil contaminantts pose little, if any threat for future contamination.

Groundwater

Groundwater monitoring data indicate that no significant release of hazardous substances to groundwater from the DBRP has occurred. However, risk evaluation indicates a groundwater ingestion risk of $3.0x 10^{-4}$ for future workers and $1.0x 10^{-3}$ for future residents due to arsenic (discussed later in this section). There are 5 monitoring wells in the DBP (D-Area Burning Pit) well series: DBP-1, -2, -3 (installed in September 1983), DBP- 4 (installed in June 1984), and DBP-5 (installed in June 1993). Figure 3 shows the locations of the monitoring wells comprising the DBP network and the potentiometric water table map.

Comparison of constituent concentrations, from 1984 through 1992 in the four downgradient DBP wells with concentrations in the upgradient well, DBP-3, indicates little or no constituent concentration increase in groundwater after flowing beneath the DBRP. The only constituents which show any apparent increase are **iron,** manganese, **lead,** sulfate, and possibly **gross alpha** and **total** radium. **Iron, manganese,** and sulfate are covered by the Secondary Drinking Water Standards which **deal** with the aesthetic properties of public drinking water. The RCRA **groundwater** protection **standard** for lead is 0.05 **mg/L.** The highest value of lead reported for the period of interest was 0.013 **mg/L.**

The measured groundwater risk drivers under the **future** resident scenario are: arsenic **(dermal,** 3 x 10^{-6} and **ingestion,** 1 x 10-3); **dichloromethane (inhalation,** 2 x 10^{-8}**);** Ra-226 and Ra-228 **(ingestion,** 2 x 10-5); and **tritium (inhalation,** 3 x 10^{-9}**).** The **modeled-DBRP-soils** to groundwater risk drivers are **octachlorodibenzo-p-dioxin (OCDD)** and **heptachlorodibenzo-p-dioxin (HpCDD) (dermal,** 1 x 10^{-4}**); polyaromatic** hydrocarbons **(PAHs)** and **1,1,2-trichloroethane (1,1,2-TCA) (ingestion,** 2 x 10^{-4}**); 1,2-dichloroethane (1,2-DCA), 1,1,2-TCA,** and chloroform **(inhalation,** 3 x 10^{-5}**);** and **tritium (ingestion,** 2 x 10^{-5} and inhalation 3 x 10-5). The measured **groundwater** hazard drivers are: **manganese (dermal,** 1.0); arsenic and manganese **(ingestion,** 50.0); and **toluene (inhalation,** 0.005). **The modeled-DBRP-soil-to-**groundwater hazard drivers are: OCDD and **HpCDD (dermal,** 5.0); acetone and **naphthalene (ingestion,** 20.0); and carbon **disulfide (inhalation,** 0.3). Many of these exposure scenarios are well below the 1 x 10^{-6} risk and 1.0 hazard **levels.**

Arsenic was the sole nonradioactive contributor to risk under the measured groundwater ingestion **pathway in the BRA.** The risk to the **future** on-unit worker was 3.0 x 10^{-4}**;** to the **future** on-unit resident the risk was 1.0 x 10^{-3}. The maximum contaminant level for arsenic in drinking water is 0.05 **mg/L.** Arsenic was only detected twice in the DBP monitoring **network;** the higher value in the December 1993 sample from well **DBP-5** was reported as 0.044 **mg/L.** The following quarter when the well was **resampled,** arsenic was reported below detection limits of 0.002 **mg/L.** Therefore the risks attributed to this single arsenic value are believed to be exaggerated.

Manganese is covered by the secondary maximum contaminant level of 0.05 **mg/L.** This contaminantt level addresses the aesthetic properties of public drinking water rather than dealing with **health-based** concerns. The maximum value of manganese reported in the DBP well series was 1.44 mg/L from well DBP 2 in the fourth quarter of 1993.

Dichloromethane (methylene chloride), a common laboratory **artifact,** was only reported in three soil samples in a total of 55 samples collected **from** the DBRP with a maximum of VO.06 **mg/Kg** (boring 7 at a depth of **4.0-6.0 feet). The "V"** qualifier indicates that the **analyte** was also detected in the associated method **blank,** indicating **laboratory contamination.** The risk attributed to **dichloromethane** via the groundwater inhalation pathway by **future** residents was 2 x 10', well below 1 x 10^{4}. **Dichloromethane** was detected in the groundwater in excess of the 0.005 mg/L maximum contaminantt level four times since January 1993, two of these **exceedances** were in upgradient well DBP 3. **Dichloromethane** was evaluated and determined to be a laboratory artifact. Likewise, acetone has been detected in up- and downgradient wells and is a **common** laboratory **artifact.**

Gross alpha and total **radium** were the only radioactive constituents in the Unit Assessment samples **(covering** three quarters in 1993) for which **primary maximum** contaminantt levels may have been exceeded. The maximum contaminantt level **(MCL)** for gross alpha is 15 **pCi/L,** this level may have been exceeded in the December 1993 sample from well DBP-2 (15 **pCi/L** ± 0.21 **pCi/L).** ' This gross alpha anomaly occurred only once in a single well that had previously contained no detectable gross alpha and may be due to field or laboratory contamination.

The MCL (regulatory standard) for **total** radium is 5 **pCi/L;** an increase to 20 **pCi/L** is being considered under proposed regulations **(56FR33050).** Total radium in the **groundwater** has only exceeded 5 **pCi/L** once since monitoring began at the DBRP. This **exceedance** occurred in the sample collected from well DBP-2 in December 1993 (the same sample which yielded the gross alpha anomaly); **Ra-226** was 4.8 **pCi/L** and **Ra-228 was** 3.5 **pCi/L.** The relationship of the gross alpha and **Ra-226/228** anomalies in the same sample suggests that these anomalies could be due to problems with laboratory or field sampling techniques.

During evaluation performed for the BRA, the assumption was made that all the radium present was Ra-226, the only radium species for which slope factors have been determined and the most toxic radium species. This assumption contributed to an exaggeration of the risk attributed to radium. The ingestion of radium in the groundwater pathway risks was evaluated at 6.0 x 10^{-6} for future workers and 2.0 x 10^{-5} for future residents.

Tritium was recognized as a risk driver in the modeled-DBRP-soil-to-groundwater exposure pathway as discussed in the preceding paragraphs. Tritium only exceeded the two times mean background screening level (5.26 pCi/g) in the DBRP soils seven times in 49 soil samples, the maximum value reported was 13.'5 pCi/g from the 2 to 4 foot interval in boring 8. The maximum contaminantt level for tritium is 20,000 pCi/L, the highest value of tritium reported from the groundwater was only 3400 pCi/L, 17% of the MCL. The maximum modeled-soil-to-groundwater concentration was 11,500 pCi/L.

The PAHs, HpCDD, OCDD, 1,1,2-TCA, 1,2-DCA, carbon disulfide, and chloroform have not been detected in groundwater. These constituents have very low solubilities in aqueous systems and tend to be strongly adsorbed to clays and humates in the soil; they are not readily transferred from soil to groundwater. The modeling in the BRA is conservative in that it assumes that the contaminant t is present at its maximum detected concentration throughout the waste body and that the contaminantt does not suffer degradation or depletion, thus the modeled-DBRP-soil-to-groundwater risks are exaggerated.

Under current land use (and recommended institutional controls)' the on-site visitor is supplied with drinking water from the SRS drinking water supply system. Under SRS institutional control, the local groundwater at the DBRP is not used for drinking or hygienic purposes.

VI. Summary of Operable Unit Risks

Human Health Risk Assessment

As part of the investigation/assessment process for the DBRP waste unit, a BRA was performed using data generated during the assessment phase. Detailed information regarding the development of constituents of potential concern (coPCs), the fate and transport of contaminantts, and the risk assessment can be found in the *BRA* (WSRC, 1995a) and the *RFI/RI Report for the D-Area Burning/Rubble Pits (431-D and 431-ID) (U)*, (WSRC, 1995b).

COPCs are site- and media-specific, man-made and naturally occurring, inorganic and organic chemicals, pesticides, and radionuclides detected at a unit under investigation. These constituents are potentially site-related and data treating their distribution and concentration are of sufficient quality for use in the risk assessment. The process of designating the COPCs was based on consideration of background concentrations, frequency of detection, the relative toxic potential of the chemicals, and chemical nutrient status.

Constituents of concern (COCs) are isolated from the list of COPCs by calculating carcinogenic (cancer-causing) risks and noncarcinogenic hazard indices. A COC contributes significantly to a pathway that contributes to either a cumulative site carcinogenic risk greater than 1.0 x 10^{-6} or a hazard index greater than 1.0.

An exposure assessment was performed to provide an indication of the potential exposures which could occur based on the chemical concentrations detected during sampling activities. The only current exposure scenario identified for the DBRP was for on-site workers, who may perform environmental research or maintenance activities (such as mowing and inspections) on the DBRP on a limited and intermittent basis. Conservative future exposure scenarios identified for the DBRP included future environmental researchers and maintenance workers and future resident adults and children. The reasonable maximum exposure concentration value was used as the exposure point concentration.

Per EPA guidance, the carcinogenic risks and noncarcinogenic hazards must be calculated to determine the appropriate remedial action for a waste unit. Carcinogenic risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of pathway-specific exposure to cancer-cawing contaminant ts. These risks are expressed as the increased likelihood that an exposed individual will develop cancer during his lifetime (70 years) because of a 30-year (chronic) exposure to the contaminant ts at a given waste site.

Cancer risks are related to the EPA target risk range of one in ten thousand (1.0 x 10^{-4}) to one in one million (1.0 x 10^{-6}) for incremental cancer risk at National Priorities List sites.

Remedy selection, addressing significant risks and/or principal threat source material, was completed in a comprehensive Corrective Measures Study/Feasibility Study (CMS/FS). Alternatives that are permanent and/or employ treatment as a principal element of the remedy are necessary for inclusion in the CMS/FS.

Non-carcinogenic effects are also evaluated to identify a level at which there may be concern for potential health effects other than cancer. The hazard quotient, which is the ratio of the exposure dose to the reference dose, is calculated for each contaminant. Hazard quotients are summed for each exposure pathway to determine the specific hazard index (HI) for each exposure scenario. If the hazard index exceeds unity (1.0), there is concern that adverse health effects might occur.

Exposure risks and hazards for the three land use scenarios are presented in Tables 1 through 3. The future residential scenario includes homegrown produce as an exposure point, which is not considered under the current on-unit visitor or future industrial worker scenarios.

Current Land Use - Noncarcinogenic Hazards

Under the current land use scenario, human health risks and noncarcinogenic hazards were characterized for the current on-unit visitor. An on-unit visitor is described as an employee of SRS who works at the DBRP for short periods on an infrequent basis, (i.e., a few hours per month performing environmental sampling or maintenance activities). Current on-unit visitors are supplied with drinking water from the SRS drinking water supply system, the local groundwater is not used for drinking or hygiene.

The *BRA* **(WSRC, 1995a) shows that potential adverse noncarcinogenic health effects are not likely to occur, because none of the hazard indices exceeds a value of one.** Table 1 contains a summary of noncarcinogenic hazards under the current land use scenario.

Current ***Land Use - Carcinogenic Risks***

Under the current land use scenario, human health risks were characterized for the current on-unit visitor. Table 1 contains a summary of carcinogenic risks. All of the estimated nonradiological cancer risks were less than 1.0 x 10^{-6}, indicating that carcinogenic risk from the unit is not significant. Media evaluated include soil inside the DBRP, soil outside the DBRP, associated airborne soil particulate, and surface water and sediment in the Stream/wetland.

All of the estimated radiological risks were less than 1.0 x 10^{4}. Radiological risks were estimated for three exposure pathways: ingestion of soil inside the DBRP, inhalation of particulate from soil inside the DBRP, and ingestion of sediment.

Future Land Use - Noncarcinogenic Hazards

The HIs were less than one, indicating adverse noncarcinogenic effects are unlikely for the following pathways:

- direct exposure of on-unit workers to soils inside and outside the DBRP (Table 2)
- direct exposure of adult and child residents to soils inside and outside the DBRP (Table 3)
- direct exposure of child-only residents to soils inside and outside the DBRP
- exposure of a child to surface water and sediment

Table 1. Summary of Carcinogenic Risk and Noncarcinogenic Hazards for Current On-Site Visitors at the D-Area Burning/Rubble Pits.

Exposure Point / Exposure Route	Nonradiological Current On-Unit Visitor Risk	Nonradiological Risk Drivers	Nonradiological Current On-Unit Visitor Hazard	Nonradiological Hazard Drivers
Soil (0-2 foot inside DBRP)				
dermal	2E-09	PCB-1260 52%, OCDD 43%	3E-03	Cr
ingestion	5E-09	PCB-1260 78%, BaP 10%	6E-04	Cr, PCB-1260
Soil (0-2 foot outside DBRP)				
dermal	7E-11	OCDD 100%	6E-06	OCDD
ingestion	4E-11	OCDD 97%	4E-06	OCDD
Surface Water				
dermal	1E-09	As 100%	5E-05	As, F
Sediment				
dermal	4E-09	As 61%, BaP 22%	3E-04	Cr
ingestion	4E-08	As 96%, BaP 3%	1E-03	As
Air (0-2 foot inside DBRP)				
soil particulate inhalation	9E-10	Cr 99%	NC	NA
soil vapor inhalation	2E-10	1,2-DCA 77%, 1,1,2-TCA 23%	NC	NA
Air (0-2 foot outside DBRP)				
soil particulate inhalation	5E-15	OCDD 97%	NC	NA
soil vapor inhalation	3E-09	1,2-DCA 82%, 1,1,2-TCA 18%	NC	NA

Exposure Point / Exposure Route	Radiological Current On-Unit Visitor Risk	Radiological Risk Drivers
Soil (0-2 foot inside DBRP)		
dermal	NC	NA
ingestion	3E-13	Tritium 100%
[illegible]-4 foot inside DBRP		
dermal	NA	NA
ingestion	NA	NA
Soil (0-2 foot outside DBRP)		
dermal	NR	NA
ingestion	NR	NA
Sediment		
ingestion	E	Radium 100%
Air (0-2 foot inside DBRP)		
soil particulate inhalation	1E-18	Tritium 100%
Air (0-2 foot outside DBRP)		
soil particulate inhalation	NR	N

NA - Not applicable for this receptor.
NC - No data was available for the toxicity of the COPCs in this medium, for this exposure route. Therefore, a quantitative risk value could not be calculated.
NR - No radiological COPCs in soils outside the pits.
Air exposures are modeled values based on soil contaminant data.

Table 2. Summary of Carcinogenic Risk and Noncarcinogenic Hazards for Future On-Site Workers at the D-Area Burning/Rubble Pits.

Exposure Point Exposure Route	Nonradiological Future On-Unit Worker Risk	Nonradiological Risk Drivers	Nonradiological Future On-Unit Worker Hazard	Nonradiological Hazard Drivers
Soil (0-2 foot inside DBRP) ingestion	1E-06	PCB-1260 78%, BaP 10%, OCDD 9%	3E-02	Cr
Soil (0-4 foot inside DBRP) ingestion	1E-06	PCB-1260 78%, BaP 10%, OCDD 9%	3E-02	Cr
Soil (0-2 foot outside DBRP) ingestion	8E-09	OCDD 97%	1E-04	OCDD
Groundwater (measured) ingestion	3E-04	As 100%	6E+00	As, Mn
Groundwater (modeled) ingestion	4E-05	PAH 55%, 1,2-DCA 10%, As 9%	2E+00	Acetone
Air (0-2 foot inside DBRP soil particulate inhalation	4E-07	Cr 100%	NC	NA
Air (0-4 foot inside DBRP) soil particulate inhalation soil vapor inhalation	 6E-07 4E-09	 Cr 100% 1,2-DCA 77%, 1,1,2-TCA 23%	 NC NC	 NA NA
Air (0-2 foot outside DBRP) soil particulate inhalation soil vapor inhalation	 1E-12 1E-07	 OCDD 97% 1,2-DCA 82%, 1,1,2-TCA 18%	 NC NC	 NA NA

Exposure Point Exposure Route	Radiological Future On-Unit Worker Risk	Radiological Risk Drivers
Soil (0-2 foot inside DBRP) direct radiation ingestion	 NC 7E-11	 NA Tritium 100%
Soil (0-4 foot inside DBRP) direct radiation ingestion	 NC 7E-11	 NA Tritium 100%
Soil (0-2 foot outside DBRP) direct radiation ingestion	 NR NR	 NA NA
Groundwater (measured) ingestion and inhalation	6E-06	Ra-226 55%, Ra-228 32%
Groundwater (modeled) ingestion and inhalation	5E-06	Tritium 100%
Air (0-2 foot inside DBRP) soil particulate inhalation	3E-17	Tritium 100%
Air (0-4 foot inside DBRP) soil particulate inhalation	3E-17	Tritium 100%

NA - Not applicable for this receptor.
NC - No data was available for the toxicity of the COPCs in this medium, for this exposure route. Therefore, a quantitative risk value could not be calculated.
NR - No radiological COPCs in soils outside the pits.
Air exposures are modeled values based on soil contaminant data.

Table 3. Summary of Carcinogenic Risk and Noncarcinogenic Hazards for Future On-Site Resident Adults and Children at the D-Area Burning/Rubble Pits.

Exposure Point / Exposure Route	Nonradiological Risk Future On-Unit Resident Adult and Child	Child Only	Nonradiological Risk Drivers	Nonradiological Hazard Future On-Unit Resident Adult and Child	Child Only	Nonradiological Hazard Drivers
[illegible] foot inside DBRP)						
dermal	1E-06	NA	PCB-1260 52%, OCDD 43%	9E-02	6E-02	Cr, OCDD
ingestion	1E-05	NA	PCB-1260 79%	7E-0	7E-0	Cr, PCB-1260
Soil (0-4 foot inside DBRP)						
dermal	1E-06	NA	PCB-1260 52%, OCDD 43%	1E-01	7E-02	Cr, OCDD
ingestion	1E-05	NA	PCB-1260 79%	9E-01	8E-01	Cr. PCB-1260
Soil (0-2 foot outside DBRP)						
dermal	4E-08	NA	OCDD 100%	2E-03	1E-03	OCDD
ingestion	7E-08	NA	OCDD 97%	4E-03	4E-03	OCDD
Groundwater (measured)						
dermal	3E-06	NA	As 100%	1E+00	8E-01	Mn
ingestion	1E-03	NA	As 100%	5E+01	4E+01	As, Mn
inhalation	2E-08	NA	Methylene chloride 100%	5E-03	3E-03	Toluene
Groundwater (modeled)						
dermal	1E-04	NA	OCDD 53%, HpCDD 34%	5E+00	3E+00	OCDD, HpCDD
ingestion	2E-04	NA	PAHs 61%, 1,1,2-TCA 22%	2E+01	1E+01	Acetone, Naphthalene
inhalation	3E-05	NA	1,2-DCA 48%, 1,1,2-TCA [illegible]%, Chloroform [illegible]%	3E-01	2E-01	Carbon disulfide
Surface Water (measured)						
dermal	NA	1E-07	As 100%	NA	3E-03	As
ingestion	NA	2E-07	As 100%	NA	3E-03	As
Surface Water (modeled)						
dermal	NA	1E-08	1,1,2-TCA 47%, 1,2-DCA 34%	NA	1E-02	2-Methylnaphthalene
ingestion	NA	7E-09	As 54%, 1,2DCA 28%	NA	4E-04	2-Methylnaphthalene, Acetone
Sediment						
dermal	NA	1E-07	As 61%, BaP 22%	NA	5E-03	Cr
ingestion	NA	7E-06	As 96%	NA	1E-01	As
Air (0-2 foot inside DBRP						
soil particulate inhalation	1E-06	NA	Cr 100%	NC	NC	NA
Air ([illegible] foot inside DBRP)						
soil particulate inhalation	1E-06	NA	Cr 100%	NC	NC	NA
soil vapor inhalation	9E-09	NA	1,2-DCA 77%, 1,1,2-TCA 23%	NC	NC	NA
Air ([illegible] foot outside DBRP)						
soil particulate inhalation	2E-12	NA	OCDD 97%	NC	NC	NA
soil vapor inhalation	3E-07	NA	1,2-DCA 82%, 1,1,2-TCA 18%	NC	NC	NA

Table 3 (Continued). Summary of Carcinogenic Risk and Noncarcinogenic Hazards for Future On-Site Resident Adults and Children at the D-Area Burning/Rubble Pits.

Exposure Point Exposure Route	Rad....gica. Ri... Future On-Unit Resident Adult and Child	Child Only	Radiological Risk Drivers
...... foot ins.de DBRP,			
direct radiation	NC	NA	NA
ingestion	3E-10	NA	Tritium 100%
foot ins.de DBRP,			
direct radiation	NC	NA	NA
ingestion	3E-10	NA	Tritium 100%
...... foot .....de DBRP,			
direct radiation	NR	NR	NA
in esti	NR	NR	N
Groundwater (meas ....,			
ingestion	2E-05	NA	Ra-226 55%, Ra-228 32%
inhalation	3E-09	NA	Tritium 100%
Groundwater (mode ed,			
ingestion	2E-05	NA	Tritium 100%
inhalation	3E-05	NA	Tritium 100%
..rface Water (meas.....,			
ingestion	NA	2E-10	Radium, total alpha emitting 100%
Surface Water (modeled)			
ingestion	NA	3E-09	Tritium 76%
ediment			
ingestion	NA	5E-08	Radium, total alpha emitting 100%
Air ... foot ins.de DBRP,			
soil particulate inhalation	4E-17	NA	Radium, total alpha emitting 100%
Air ... foot ins.de DBRP,			
soil particulate inhalation	4E-17	NA	Tritium 100%
Homegrown Produce ... foot ins.de DBRP,			
ingestion of leafy vegetables	NA	NA	NA
ingestion of tuberous vegetables	NA	NA	NA
ingestion of fruits	NA	NA	NA
Homegrown Produce ... foot inside DBRP,			
ingestion of leafy vegetables	NC	NA	NA
ingestion of tuberous vegetables	NC	NA	NA
ingestion of fruits	NC	NA	NA

NA - Not applicable for this receptor.
NC - No data was available for the toxicity of the COPCs in this medium, for this exposure route. Therefore, a quantitative risk value could not be calculated.
NR - No radiological COPCs in soils outside the pits.
Air and homegrown produce exposures are modeled values based on soil contaminant data.

The groundwater ingestion and inhalation pathway yielded a HI of 50 from arsenic and manganese to future resident adults and children. This hazard is reduced to 6 for future on-unit workers.

Future Land Use - Carcinogenic Risks

Several exposure pathways for the future on-unit resident had estimated nonradiological carcinogenic risks exceeding the lower bound of the target risk range, 1.0 x 10^{-6} (Tables 2 and 3). No contamination was found in concentrations that yielded risks greater than the upper bound of the risk range of 1.0 x 10^{-4} except for arsenic by groundwater ingestion. Under the groundwater ingestion pathway, the risk due to arsenic to the future on-unit worker was 3.0 x 10^{-4}; to the future on-unit resident the risk was 1.0 x 10^{-3}. These risks were based on a single measured arsenic value in the groundwater which was less than the MCL for drinking water.

For the future on-unit worker, cancer risks for ingestion of soil from inside the DBRPs were equal to the EPA point of departure of 1.0x 10^{-6} for the 0-2.0 foot and 0-4.0 foot depth intervals. Estimated risks for dermal contact with soil and inhalation of soil particulate at both depths inside the DBRP were equal to 1.0 x 10^{-6}.

Ecological Risk Assessment

Based on characterization of the environmental setting and identification of potential receptor organisms, a conceptual site model was developed to determine the complete exposure pathways through which receptors could be exposed to COPCs.

Interpretation of the ecological significance of the unit-related contamination at the DBRP indicated that there was essentially no likelihood of unit-related chemicals causing significant impacts to the community of species in the vicinity of the unit.

Site-Specific Considerations

Site-specific considerations, based on the conclusions of the BRA and RFI/RI, which suggest limited or no potential for significant risk include:

1) The DBRP contain a large volume of buried non-hazardous waste material and cover soil.
2) The levels of contamination recognized during Phase II characterization are generally very low, there is a preponderance of non-detects. The contaminants are very stable chemically and exhibit limited mobility in the soil.
3) The groundwater monitoring program indicates that there has not been significant impact from the waste materials in the pits.
4) The DBRP are in a remote area which has been recommended as a future industrial zone by the Citizens Advisory Board (CAB) and in the *Savannah River Site Future Use Project Report* (DOE, 1996).

Remedial Action Objectives

Remedial action objectives specify unit-specific contaminantts, media of concern, potential exposure pathways, and remediation goals. The remedial action objectives are based on the nature and extent of contamination, threatened resources, and the potential for human and environmental exposure. Initially, preliminary remediation goals are developed based upon Applicable or Relevant and Appropriate Requirements (ARARs), or other information from the RFI/RI Report and the BRA. These goals should be modified, as necessary, as more information concerning the unit and potential remedial technologies becomes available. Final remediation goals will be determined when the remedy is selected and shall establish acceptable exposure levels that are protective of human health and the environment.

Risk levels at or above the upper-bound of the target risk range 1.0 x 10^{-4} are considered significant and are expected to undergo remediation.

Location-specific ARARs must consider Federal, State, and local requirements that reflect the physiographical and environmental characteristics of the unit or the immediate area. Remedial actions may be restricted or precluded depending on the location or characteristics of the unit and the resulting requirements.

None of the risks associated with the soil in the DBRP was found to be greater than 1.0 x 10^{-4}. PCB-1260 from the 0-2 foot soil interval in Pit 431-D was the predominant risk driver for future residents, contributing 79?! of the 1.0 x 10^{-5} risk.

The hazard index for this exposure scenario was 0.7. The only guidance that was exceeded for soil concentrations was for PCB-1260 which had a maximum value of 3.39 mg/kg in the O-2 foot interval of boring 12 in Pit 431-D. The to-be-considered guidance for PCBS is recommended soil action levels of 1.0 mg/kg for residential use and 10-25 mg/kg for industrial use (EPA, 1990). The PCB-1260 concentration in Pit 431-D is well below the range for industrial land use.

VII. Description of the Considered Alternatives for the DBRP Source Control Operable Unit

The RFI/RI and BRA indicate the DBRP pose minimal risk to the environment. The risk to future on-unit workers is only 1.0 x 10^{-6}. Ingestion of soil in the top two foot layer by future residents poses a risk of 1.0 x 10-s, primarily from PCB-1260. The Corrective Measures Study/Focused Feasibility Study (CMS/FFS) was developed to consider possible actions which could reduce the risks to 1.0x 10^{-6} or less.

A broad suite of treatment alternatives has already been considered in the *F-Area Burning/Rubble Pits (231-F, 231-1F and 231-2F) Corrective Measures Study/Feasibility Study* (U) (WSRC, 1996a). Both sets of burning/rubble pits received similar wastes which were managed under similar conditions and practices; similar constituents of concern have been recognized for both facilities. On July 20, 1995, SRS, SCDHEC, and EPA held a scoping meeting for the DBRP CMS/FS. The agenda of this meeting included discussion of the site specific considerations and uncertainties, the limited risks associated with the DBRP, and the CAB proposed industrial land use zones. The conclusion of the scoping meeting was that focusing on a limited suite of alternatives in the feasibility study for the DBRP would be appropriate. Therefore, SRS conducted the CMS/FFS (WSRC, 1996b) for the DBRP, reducing the number of treatment options to be considered to the five alternatives discussed in the following paragraphs.

Five alternatives were evaluated for remedial action at the DBRP source control operable unit. Each alternative is described below:

Alternative 1 No Action

Under this alternative, no action would be taken at the DBRP. EPA policy and regulations require consideration of a no action alternative to serve as a basis against which other alternatives can be compared. Because no further action would be taken and the DBRP would remain in their present condition, there are no costs associated with this alternative and there would be no reduction of risk. Potential risks of 1.0 x 10-s due to soil ingestion and 1.0 x 10^{-3} from ingestion and inhalation of groundwater would remain for possible future residents. However, the groundwater risk is believed to be overestimated based on the groundwater monitoring history and contaminant t concentrations in the DBRP soil as discussed in Section V.

Alternative 2 Institutional Controls

Under this alternative, institutional controls would be implemented at the DBRP. Implementation of this alternative will require both near- and long-term actions. For the near-term, signs will be posted indicating hat this area was used to manage hazardous materials. In addition, existing SRS access controls will be used to maintain the use of this site for industrial use only.

In the long-term, if the property is ever transferred to non-federal ownership, the U.S. Government would create a deed for the new property owner in compliance with Section 120(h) of CERCLA. The deed would include notification disclosing former DBRP waste management and disposal activities, results from groundwater monitoring and remedial actions taken on the site. The deed notification would, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of non-hazardous, inert construction debris, and that wastes containing hazardous substances, such as degreasers and

solvents, were also managed and burned on the site.

The deed would also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions **could** be reevaluated at the time of transfer in the event that **contaminati'**on no longer poses an unacceptable risk under residential use.

In **addition,** if the site is ever transferred to **non-federal** ownership, a survey plat of the area will be **prepared,** certified by a professional land **surveyor,** and recorded with the appropriate county recording agency.

There are no construction costs associated with this alternative. The cost for surveying the land and filing with the **Barnwell County** Records is estimated to be $2,000. If five year reviews of remedy are **required,** the estimated present value for these reviews over the next 30 years **is** $8,000. The total present value **costs** for Alternative 2 are $10,000. Additional **groundwater** monitoring and reporting **costs** would total about $12,000 annually, these costs may not continue **indefinitely** and are not included in the **total** cost **used** for comparison.

With essentially no further action except for the modest cost of deed notifications and restrictions upon transfer of the **land** and five **year** reviews, under Alternative 2 **Institutional** Controls, risks attributable to future workers at the **DBRP** would be 1.0X 10^{-6}.

Alternative 3 " Native Soil Cover (4') .

A four foot thick cover of native soil would be installed over the present **surface** of the **DBRP** to reduce the likelihood that **future** excavation for construction of a typical basement would expose waste or contaminated soil. If the property is ever transferred to private ownership, in compliance with CERCLA 120(h), the U. S. Government would create a deed with notifications and restrictions similar to those identified in Alternative 2. Future deed restrictions on excavation below four **feet** would be necessary to prevent potential exposure of **future** workers or residents to buried waste which may contain low concentrations of hazardous constituents.

The preparation of a Remedial Design/Remedial Action Work Plan **would** cost $50,000. The construction **costs** associated with this alternative are estimated at $160,000 for the installation of a four foot thick native soil coder. The cost for **surveying** the land and filing with the **Barnwell County** Records is **estimated** to be $2,000. **Maintenance costs** for 30 years are estimated at $15,000. If five year reviews would **be required; the estimated** present value for these reviews over the next 30 years is $8,000. Total present value costs for this alternative **are** estimated at $235,000.

With deed restrictions upon the transfer of the land to **non-federal** ownership per Section 120(h) of **CERCLA,** the risk to **future** workers and possible **future** residents would be reduced to less than 1.0 x 10^{-6}. The need for the deed restrictions would be reevaluated prior to transfer.

Alternative** 4 **Thermal Desorption/ Incineration

Under this alternative, the upper two **feet** of contaminated soil would be excavated for treatment to eliminate the **PCB-1260,** BaP, and OCDD. The soil would be fed through a high **temperature rotary** kiln to **extract** the volatile **organic** contaminantt**s from** the soil. The **extracted** gases would then be destroyed in the incinerator. The treated soil would be **returned** to the site and vegetation would be established **to** prevent erosion. If the property is **ever** transferred to **private** ownership, in compliance with CERCLA 120(h), the U. S. **Government** would create a deed with notifications and restrictions similar to those identified in Alternative 2. Future deed restrictions (upon **transfer** of the land to non-federal ownership) on excavation below two feet would be **necessary** to prevent potential exposure of **future** workers or residents to buried waste which may contain low levels of hazardous constituents. The need for these deed restrictions could be reevaluated at the time of transfer in the event that contamination no longer poses an unacceptable risk under residential use.

Preparation of the Remedial Design/Remedial Action Work Plan to implement this alternative would cost $150,000. A National Emission

Standards for Hazardous Air Pollutants permit would be required at a cost of $150,000 because of the potential for atmospheric releases during remediation. The treatment cost for this alternative would be $1,500,000 and the deed restriction on excavation below two feet would cost $2,000 for a total cost of $1,502,000.

This alternative is protective of human health and would permanently reduce risk to less than 1.0 x 10^{-6} for ingestion of soil from PCB-1260 for future on-site workers and future residents.

Alternative 5 Offsite Soil Disposal

Under this alternative, the upper two feet of contaminated soil would be excavated and transported to a licensed offsite disposal facility. The excavation would be filled to grade with clean native soil and cover vegetation would be established. If the property is ever transferred to private ownership, the U. S. Government would create a deed with notifications and restrictions similar to those identified in Alternative 2 in compliance with CERCLA 120(h). The potential risk for exposure of future workers and possible residents to low concentrations of hazardous constituents in the remaining waste would necessitate the filing of a deed restriction on excavation below two feet upon the transfer of the land to non-federal ownership. The need for these deed restrictions could be reevaluated at the time of transfer in the event that contamination no longer poses an unacceptable risk under residential use.

The preparation of a Remedial Design/Remedial Action Work Plan would cost $150,000. The cost for excavation, transportation, disposal fees, and backfilling would be $932,000. The total cost for this would be $1,084,000, including $2,000 for recording the deed notifications and restrictions.

The risk to future workers and possible future residents would be reduced to less than 1.0 x 10^{-6} from ingestion of PCB-1260 contaminated soil.

VIII. Summary of Comparative Analysis of the Alternatives

Description of Nine Evaluation Criteria

Each of the remedial alternatives was evaluated using the nine criteria established by the National Oil and Hazardous Substances Contingency Plan (NCP). The criteria were derived from the statutory requirements of CERCLA Section 121. The NCP [40 CFR § 300.430 (e) (9)] sets forth nine evaluation criteria that provide the basis for evaluating alternatives and selecting a remedy. The criteria are:

- overall protection of human health and the environment
- compliance with ARARs,
- **long-term effectiveness and permanence,**
- **reduction of toxicity, mobility, or volume through treatment,**
- **short-term effectiveness,**
- implementability,
- cost,
- state acceptance, and
- community acceptance.

In selecting the preferred alternative, the above mentioned criteria were used to evaluate the alternatives developed in the *D-Area Burning/Rubble Pits (43X-D and 431-ID) Corrective Measures Study/Focused Feasibility Study (U)* (WSRC, 1996b). Seven of the criteria are used to evaluate all the alternatives, based on human health and environmental protection, cost, and feasibility issues. The preferred alternative is further evaluated based on the final two criteria: state acceptance and community acceptance. Brief descriptions of all nine criteria are given below.

<u>Overall Protection of Human Health and the Environment</u> - The remedial alternatives are assessed to determine the degree to which each alternative eliminates, reduces, or controls threats to human health and the environment through treatment, engineering methods, or institutional controls.

<u>Compliance with Applicable or Relevant and Appropriate Requirements</u> - ARARs are Federal and state environmental regulations that establish standards which remedial actions must meet. There are three types of ARARs: (1) chemical-

specific, (2) **location-specific, and** *(3)* **action-**specific.

Chemical-specific **ARARs** are usually health- or risk-based levels or methodologies **which,** when applied to **unit-specific conditions,** result in the establishment of, numerical values. **Often** these numerical values are promulgated in Federal or state regulations.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in specific locations. Some examples of specific locations include floodplains, wetlands, historic places, and sensitive ecosystems or habitats.

Action-specific **ARARs** are usually technology- or remedial activity-based requirements or limitations on actions taken with respect to **hazardous** substances or unit-specific conditions. **These** requirements are triggered by the particular remedial activities that are selected to accomplish a remedy.

The remedial **activities** are **assessed** to determine whether they attain **ARARs** or provide grounds for invoking one of the five waivers for **ARARs**. These waivers are:

- the remedial action is an interim measure and will become apart of a total remedial action that will attain the **ARAR,**
- compliance will result in greater risk to **human** health and the **environment** than other alternatives,
- **compliance** is technically impracticable from an engineering perspective,
- the alternative remedial action will attain an equivalent standard of performance through use of another method or **approach,**
- the state has not consistently applied the promulgated requirement in similar circumstances or at other remedial action sites in the state.

In addition to **ARARs,** compliance with other **criteria,** guidance, and proposed standards that are not legally binding, but may provide useful information or recommended procedures should be reviewed as To-Be-Considered when setting remedial objectives.

Long-Term Effectiveness and Permanence - The remedial alternatives are **assessed** based on their **ability** to maintain reliable protection of human health and the environment after implementation.

Reduction of **Toxicity**, Mobility, or Volume **Through** Treatment - The remedial **alternatives** are **assessed** based on the degree to which they employ treatment that reduces toxicity (the **harmful** nature of the contaminant**ts),** mobility (ability of the contaminant ts to move through the environment), or volume of contaminant**ts** associated with the unit.

Short-Term **Effectiveness** - The remedial alternatives are assessed considering **factors** relevant to implementation of the remedial **action,** including risks to the community during **implementation,** impacts on **workers,** potential environmental impacts (e.g., air emissions), and the time until protection is achieved

Implementability - The remedial alternatives are **assessed** by considering the **difficulty** of implementing the alternative including technical **feasibility, constructability,** reliability of technology, ease of undertaking additional remedial actions (if required), **monitoring** considerations, administrative **feasibility** (regulatory requirements), and availability of **services** and **materials**.

Cost - The evaluation of remedial alternatives must include **capital** and **operational** and maintenance costs. Present value **costs** are estimated within +50/-30 **percent,** per EPA **guidance**. The **cost** estimates given with each alternative are **prepared** from information available at the time of the estimate. The final **costs** of the project will depend on actual labor and material costs, actual site conditions, productivity, competitive market conditions, final project scope, final project schedule, and other variable factors. As a **result,** the final project costs may vary from the **estimates** presented herein.

State **Acceptance** - In accordance with the **FFA,** the State is required to **comment on/approve** the **RFI/RI Report,** the Baseline Risk **Assessment,** the Corrective Measures **Study/Feasibility** Study, and the Statement of Basis/Proposed Plan.

community **Acceptance** - The community acceptance of the preferred alternative is **assessed** by giving the public an opportunity to comment on the remedy selection process. A public comment period was held and public comments concerning the proposed remedy are addressed in the Responsiveness Summary of this Record of Decision.

Detailed Evaluation

***The remedial action alternatives discussed in* Section VII have been evaluated using the nine criteria just described.** Tables 4 through 8 present the evaluation of the soil remedial alternatives.

IX. The Selected Remedy

Based on the BRA, the DBRP unit soil poses a risk of 1.0 x 10^{-6} for future workers in an industrial land use scenario via ingestion of the soil in the top 2 foot layer. Analysis of the risk evaluation indicated that calculated risks to future workers and residents under the inhalation and ingestion of groundwater pathway were exaggerated because of conservative assumptions in the modeling. The probable condition is that the DBRP source unit is not contributing to groundwater contamination. As a result, no remedial action for the groundwater with a period of continued monitoring for confirmation is the only appropriate action.

Institutional Controls (Alternative 2) for the DBRP Source Unit and no remedial action for the groundwater with a period of confirmatory groundwater monitoring is the preferred action at the DBRP because:

1) the groundwater history at the DBRP (summarized in Section V) indicates low frequency of occurrences at low concentrations of gross alpha and total radium,
2) the DBRP soils do not represent a credible threat to the quality of groundwater in the future.

A plan for continued annual groundwater monitoring, during the second quarter of each calendar year, for the five wells at the DBRP will be included in the post-ROD document, the Corrective Measures Implementation/ Remedial Action Report (CMI/RAR). The groundwater samples will be analyzed for following proposed list of constituents many of which have not been detected in the groundwater at the DBRP since monitoring began in 1983.

- arsenic
- benzene
- benzo(a)anthracene
- benzo(a)pyrene
- benzo(b)fluoranthene
- benzo(k)fluoranthene
- chromium
- chrysene
- 1,2-dichloroethane
- dichloromethane
- endrin
- manganese
- octachlorodibenzo-p-dioxin
- PCB-1260
- total radium
- 1,1,2-trichloroethane
- tritium

The CMI/RAR will contain a detailed monitoring strategy which will outline the submittal schedule and contents of the monitoring reports, which will include an analysis of the data, a conclusion, and a recommendation. The recommendation section of the CMI/RAR will provide for appropriate changes to the monitoring program with SCDHEC and EPA concurrence.

Table 4. Summary of the Evaluation of Alternative 1 No Action under the Nine CERCLA Criteria.

Alternative 1 No Action

Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness	Reduction of Toxicity, Mobility, or Volume	Short-term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance
Protectiveness	*Comp*	*Magnitude of residual risk*	*Treatment process used and materials treated*	• *Protection of community during remedial actions*	• *Ability to construct and operate the technology*	• *Capital costs*	• *Features of the alternative the state supports*	• *Features of the alternative the community supports*
No actions taken. Will not reduce risks from those reported in the BRA.	PCB-1260 exceeds the TBE guidance 1.0 mg/kg for residential use.	Risks within EPA risk range 1 x 10^{-4} to 1 x 10^{-6}, HI<1.	No treatment used.	Not applicable. No remediation performed.	Not applicable. No action taken.	None.	None.	None.
	• *Compliance with action-specific ARARs*	• *Adequacy and reliability of controls*	• *Amount of hazardous materials destroyed or treated*	• *Protection of workers during remedial action*	• *Reliability of the technology*	• *Operating and maintenance costs*	• *Features of the alternative about which the state has reservations*	• *Features of the alternative about which the community has reservations*
	No action taken. Not applicable.	Not applicable.	None destroyed or treated.	Not applicable. No remediation performed.	Not applicable. No technology applied.	None.	Not applicable.	Not applicable.
	• *Compliance with location-specific ARARs*		• *Degree of expected reduction in toxicity, mobility, and volume*	• *Environmental impacts*	• *Ease of undertaking additional remedial action, if necessary*		• *Elements of the alternative the state strongly opposes*	• *Elements of the alternative the community strongly opposes*
	The site is in compliance with all location-specific TBCs.		No reduction in toxicity, mobility, or volume.	None.	Very easy.		Not applicable. The state has concurred with Institutional Controls.	Not applicable. The community supports Institutional Controls.
	• *Compliance with other criteria, advisories, and guidance*		• *Degree to which treatment is reversible*	• *Time until remedial action objectives are achieved*	• *Ability to monitor effectiveness of the remedy*			
	No action taken. Not applicable.		Not applicable.	Not applicable.	Easy to monitor.			
			• *Type and quantity of residuals remaining after treatment*	• *Contaminants*	• *Coordination with and ability in obtaining approvals from other agencies*			
			Not applicable. Nothing is changed.	PCB-1260 not reduced.	Not applicable. No action taken.			
					• *Availability of necessary equipment and specialists and off-site services*			
					Not applicable. No action taken.			
					• *Availability of prospective technologies*			
					Not applicable. No action taken.			

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Table 5. Summary of the Evaluation of Alternative 2 Institutional Controls under the Nine CERCLA Criteria.

Alternative 2 Institutional Controls

Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness	Reduction of Toxicity, Mobility, or volume	Short-term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance
• *Protectiveness*	. *Compliance*	• *Magnitude of residual risk*	• *Treatment process used and materials treated*	. *Protection of community during remedial actions*	. *Ability to construct and operate the technology*	• *Capital costs*	. *Features of the alternative the state supports*	• *Features of the alternative the community supports*
Exceeds TBCs for future residents only. Precludes residential use of this property.	DBRP complies with industrial TBC guidance 10-2s mg/kg.	Overall risk is 1 x 10^{-6}, HI is 0.03.	No treatment used.	Not applicable. No remediation performed.	Not applicable. No action taken.	Low.	Risks below 1 x 10^{-6}.	Risks below 1 x 10^{-4}.
	• *Compliance with action-specific ARARs*	• *Adequacy and reliability of controls*	• *Amount of hazardous materials destroyed or treated*	• *Protection of workers during remedial action*	• *Reliability of the technology*	• *Operating and maintenance costs*	• *Features of the alternative about which the state has reservations*	• *Features of the alternative about which the community has reservations*
	No action taken. Not applicable.	Deed restrictions will prevent future residential use.	None destroyed or treated.	*Not applicable. No* remediation performed	Not applicable. No technology applied.	Low.	State supports Institutional Controls.	Community supports Institutional Controls.
	• *Compliance with location-specific ARARs*		• *Degree of expected reduction in toxicity, mobility, and volume*	• *Environmental impacts*	• *Ease of undertaking additional remedial action, if necessary*		. *Elements of the alternative the state strongly opposes*	• *Elements of the alternative the community strongly opposes*
	The site is in compliance with all location-specific guidance.		*No reduction in* toxicity, mobility, or volume,	None.	Very easy.		State supports Institutional Controls.	Community supports Institutional Controls.
	• *Compliance with other criteria, advisories and guidance*		. *Degree to which treatment is reversible*	• *Time until remedial action objectives are achieved*	. *Ability to monitor effectiveness of the remedy*			
	No action taken. *Not* applicable.		Not applicable.	Not applicable.	Easy to monitor.			
			• *Type and quantity of residual.? remaining after treatment*	• *Contaminants*	• *Coordination with and ability in obtaining approvals from other agencies*			
			All contaminants remain.	PCB-1260 not reduced.	Not applicable. No action taken.			
					• *Availability of necessary equipment and specialists and off-site services*			
					Not applicable. No action taken.			
					• *Availability of prospective technologies*			
					Not applicable. No action taken.			
Selected (Yes/No): Yes		Rationale: Low cost alternative. Complies with CAB recommendation for future industrial use of the land ARARs arc met (TBC = To be considered)						

Table 6. Summary of the Evaluation of Alternative 3 Native Soil Cover (4') under the Nine CERCLA Criteria.

Alternative 3 Native Soil Cover (4')

Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness	Reduction of Toxicity, Mobility, or Volume	Short-term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance
• *Protectiveness*	• *Compliance*	• *Magnitude of residual risk*	• *Treatment process used and materials treated*	• *Protection of community during remedial actions*	• *Ability to construct and operate the technology*	• *Capital costs*	• *Features of the alternative the state supports*	• *Features of the alternative the community supports*
Risk below 1 x 10⁻⁴.	Will meet PCB TBC guidance for residential 1 mg/kg.	Risk remains, however 4' layer would allow shallow excavation.	No treatment used.	No risk to community while cover is installed.	Easy to install cover.	Low.	Low cost, soil cover provides barrier.	Low cost, soil cover provides barrier. CAB recommended future industrial use.
	• *Compliance with action-specific ARARs*	• *Adequacy and reliability of controls*	• *Amount of hazardous materials destroyed or treated*	• *Protection of workers during remedial action*	• *Reliability of the technology*	• *Operating and maintenance costs*	• *Features of the alternative about which the state has reservations*	• *Features of the alternative about which the community has reservations*
	Must meet CAA requirements for dust control.	Reliable unless deed restrictions on deep excavation are not enforced.	None destroyed or treated.	Minor risk to workers during installation due to heavy equipment and dust.	Cover can be breached. May be difficult to prevent deep excavation.	Low. Inspection and maintenance will be required.	Contaminants remain.	Contaminants remain. CAB recommended future industrial use.
	• *Compliance with location-specific ARARs*		• *Degree of expected reduction in toxicity, mobility, and volume*	• *Environmental impacts*	• *Ease of undertaking additional remedial action, if necessary*		• *Elements of the alternative the state strongly opposes*	• *Elements of the alternative the community strongly opposes*
	None applicable.		No reduction in toxicity or volume, dust and leaching to groundwater reduced.	Potential impacts to environment from heavy equipment and dust.	Easy, additional remediation may require removal of cover.		None.	None.
	• *Compliance with other criteria, advisories, and guidance*		• *Degree to which treatment is reversible*	• *Time until remedial action objectives are achieved*	• *Ability to monitor effectiveness of the remedy*			
	Must comply with OSHA.		Cover is completely reversible.	Cover can be installed in < 1 year.	Easy to monitor effectiveness.			
			• *Type and quantity of residuals remaining after treatment*	• *Contaminants*	• *Coordination with and ability in obtaining approvals from other agencies*			
			All contaminants remain.	PCB-1260 remains, but cover provides a barrier to exposure.	Relatively easy to obtain approval for installing cover.			
					• *Availability of necessary equipment and specialists and off-site services*			
					Easily available.			
					• *Availability of prospective technologies*			
					Readily available.			

Selected (Yes/No): Yes   Rationale: ARARs are met. Would allow restricted future residential use of property. (TBC = To be considered guidance)

Table 7. Summary of the Evaluation of Alternative 4 Thermal Desorption/Incineration under the Nine CERCLA Criteria.

Alternative 4, Thermal Desorption/Incineration

Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness	Reduction of Toxicity, Mobility, or volume	Short-term Effectiveness	Implementability	Cost	State Acceptance	Community Acceptance
• *Protectiveness*	• *Compliance*	• Magnitude *of residual risk*	• *Treatment process used and materials treated*	• *protection of community during remedial actions*	• *Ability to construct and operate the technology*	• *Capital costs*	• *Features of the alternative the state support?*	• *Features of the alternative the community supports*
Offers complete protection of human health and the environment.	Will meet PCB TBC for residential use 1 mg/kg.	Remaining risk will be below 1 x 10^{-6}.	PCBs will be destroyed.	Community will be protected from off-gas and dust by engineering controls.	Implementable.	High.	Complete remediation.	Complete remediation.
	• *Compliance with action-specific ARARs*	• *Adequacy and reliability of controls*	• *Amount of hazardous materials destroyed or treated*	• *Protection of workers during remedial action*	• *Reliability of the technology*	• *Operating and maintenance costs*	• *Features of the alternative about which the state has reservations*	• *Features of the alternative about which the community has reservations*
	Must meet CAA requirements for dust and off-gas control.	Reliable unless deed restrictions on deep excavation are not enforced.	PCBs will be destroyed.	Manageable risk to workers due to equipment, Off-gEs, and dust.	Very reliable.	High. Subsequent maintenance will not be required.	None.	CAB recommended future industrial use. High cost for slight risk reduction.
	• *Compliance with location-specific ARARs*		• *Degree of expected reduction in toxicity, mobility, and volume*	• *Environmental impacts*	• *Ease of undertaking additional remedial action, if necessary*		• *Elements of the alternative the state strongly opposes*	• *Elements of the alternative the community strongly opposes*
	None applicable.		Virtually *complete.*	Potential impacts to environment from equipment, gas, and dust.	Easy, *no additional* remediation should be required.		None.	None.
	• *Compliance with other criteria, advisories, and guidance*		• *Degree to which treatment is reversible*	• *Time until remedial action objectives are achieved*	• *Ability to monitor effectiveness of the remedy*			
	Must comply with OSHA.		Irreversible.	Can be completed in < 1 year.	Easy to monitor effectiveness.			
			• *Type and quantity of residuals remaining after treatment*	• Contaminants	• Combination *with and ability in obtaining approvals from other agencies*			
			None.	PCB-1260 destroyed.	Air permits required.			
					• Availability *of necessary equipment and specialists and off-site services somewhat limited.*			
					• *Availability of prospective technologies*			
					Somewhat *limited,*			
Selected (Yes/No): Yes	Rationale: ARARs are met Would allow future residential use of property with restrictions on excavation below 2 feet. (TBC = To be considered							

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Table 8. Summary of the Evaluation of Alternative 5 Offsite Soil Disposal under the Nine CERCLA Criteria.

Alternative 5 Offsi soil Disposal

Overall Protection of Human Health and the Environment	Compliance with ARARs	Lung-turn Effectiveness	Reduction of Toxicity, Mobility, or volume	Short-term Effectiveness	Implementability	Cost	tate Acceptance	[redacted]y Acceptance
• *Protectiveness* Offers complete protection of human health and the environment.	• *Compliance* Will meet PCB TBC guidance for residential use, 1 mg/kg. • *Compliance with action-specific ARARs* Must mat CAA requirements for dust control. ● *Compliance with location-specific ARARs* None applicable. • *Compliance with other criteria, advisories, and guidance* *Mix!* comply with OSHA.	• *Magnitude of residual risk* Remaining risk will be below 1 x 10^{4}, • *Adequacy and reliability of controls* Reliable unless deed restrictions on deep excavation are not enforced.	• *Treatment process used and materials treated* PCB contaminated soil will be removed. . *Amount of hazardous materials destroyed or treated* PCB contaminated soil will be removed and replaced with clean fill. • Degree of *expected reduction {n toxicity, mobility, and volume* Virtually complete, PCB is removed. •*Degree to which treatment is reversible* Irreversible. • *Type* and *quantity of residuals remaining after treatment* None.	• *Protection of community during remedial* actions Community will be protected from dust by engineering controls. • *Protection of workers during remedial action* Manageable risk to workers due to equipment and dust . *Environmental mpacts* Potential impacts to environment from equipment and dust. . *Time until remedial action objectives are achieved* Can be completed in *Six months.* • *Contaminants* PCB-1260 removed	• *Ability to construct* and *operate the technology* Implementable. • *Reliability of the* technology Very reliable. • *Ease of undertaking additional remedial action, if necessary* *Easy, no* additional remediation should be required. • *Ability to monitor effectiveness of the remedy* Easy to monitor effectiveness. • Coordination *with* and *ability {n obtaining approvals* from other *agencies* DOT regulations. • *Availability of necessary ● quipment and specialists and off-site services* *Readily* available. . *Availability of prospective technologies* Readily available.	• Capital *costs* High. • Operating and *maintenance costs* High. Subsequent maintenance will not be required.	• *Features of the alternative the state supports* complete remediation. • *Features of the alternative about which the state has reservations* *None.* • *Elements of the alternative the state strongly opposes* None.	• *Features of the alternative the community supports* Complete remediation. • *Features of the alternative about which the community has reservations* CAB recommended future industrial use. *High cost far alight* risk reduction. • *Elements of the alternative the community strongly opposes* None.

Selected (Yes/No): Y | Rationale: ARARs arc met Would allo\ ıuture residential use of property with restrictions on excavation b\ ıw 2 feet. (TBC = T ◦ considered)

Implementation of this alternative will require both near- and long-term actions. For the near-term, signs will be posted indicating that this area was used to manage hazardous materials. In addition, existing SRS access controls will be used to maintain the use of this site for industrial use only.

In the long-term, if the property is ever transferred to non-federal ownership, the U.S. Government will create a deed for the new property owner in compliance with Section 120(h) of CERCLA. The deed will include notification disclosing former waste management and disposal activities, results from groundwater monitoring, and remedial actions taken on the site. The deed notification will, in perpetuity, notify any potential purchaser that the property has been used for the management and disposal of non-hazardous, inert construction debris, and that wastes containing hazardous substances, such as degreasers and solvents, were also managed and burned on the site.

The deed will also include deed restrictions precluding residential use of the property. However, the need for these deed restrictions could be reevaluated at the time of transfer in the event that contamination no longer poses an unacceptable risk under residential use.

In addition, if the site is ever transferred to non-federal ownership, a survey plat of the area will be prepared, certified by a professional land surveyor, and recorded with the appropriate county recording agency.

The Institutional Controls Alternative is intended to be the final action for the DBRP Source Unit. The solution is intended to be permanent and effective in both the long and near terms. This alternative is considered to be the least cost option which is still protective of human health and the environment.

The SCDHEC has modified the SRS RCRA permit to incorporate the selected remedy.

This proposal is consistent with EPA guidance and is an effective use of risk management principles.

X. Statutory Determinations

Based on the DBRP RFI/RI Report and the BRA, the DBRP source operable unit poses no significant risk to the environment and minimal risk to human health. Therefore, a determination has been made that Institutional Controls are sufficiently protective of human health and the environment for the remaining contamination in the DBRP soils and groundwater.

The selected remedy is protective of human health and the environment, complies with Federal and State of South Carolina requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. The random distribution and low levels of contamination preclude a remedy in which treatment is a practical alternative. Institutional Controls will result in hazardous substances, pollutants, or contaminants remaining in the waste unit. Because treatment of the principal threats of the site was found to be impracticable, this remedy does not satisfy the statutory preference for treatment as a principal element.

Section 300.430 (f)(4)(ii) *of the NCP requires that* a five-year review of the ROD be performed if hazardous substances, pollutants, or contaminants remain in the waste unit. The three Parties, DOE, SCDHEC, and EPA, have determined that a Five Year Review of the ROD for the DBRP will be performed to ensure continued protection of human health and the environment.

XI. Explanation of Significant Changes

The Statement of Basis/Proposed Plan and the draft RCRA permit modification provided for involvement with the community through a document review process and a public comment period. A public meeting was advertised and held on October 15. Comments that were received during the 45-day public comment period (September 17 through October 31, 19%) are addressed in Appendix A of this Record of Decision and are available with the final RCRA permit.

The only changes to the remedy proposed for the DBRP in the Statement of Basis/Proposed Plan (WSRC, 1996c) "are: (1) that the probable condition is that no significant groundwater contamination is originating in the DBRP and no remedial action for the groundwater with a period of continued monitoring for confirmation of no leaching to groundwater is the only appropriate action, and (2) it was determined that it was not appropriate to append the continued groundwater monitoring plan to the ROD as proposed in the Statement of Basis/Proposed Plan. The plan for continued groundwater monitoring will be included in the CMI/RAR. In the event that the probable condition is no longer appropriate, DOE will evaluate the need for remedial action.

XII. Responsiveness Summary

There were three comments received during the public comment period. The Responsiveness Summary (see Appendix A) of this Record of Decision addresses these comments.

XIII. Post-ROD Document Schedule

The post-ROD document schedule is listed below and is illustrated in Figure 4:

1. Corrective Measures Implementation/ Remedial Action Report (CMI/RAR) Revision O for the DBRP will be submitted for EPA and SCDHEC review four months after issuance of the ROD.

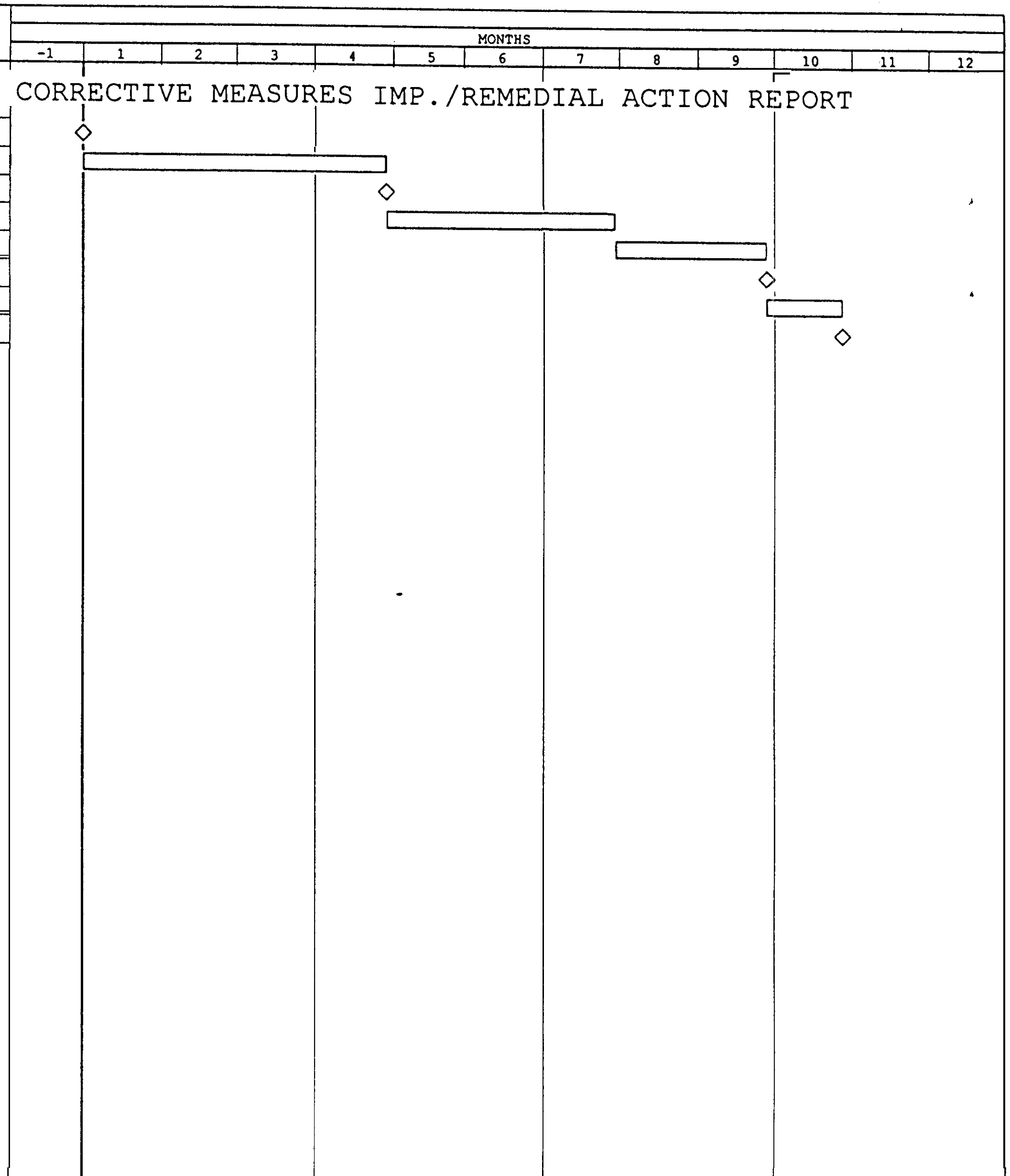
2. EPA and SCDHEC review of the DBRP CMI/RAR Revision O will last 90 days.

3. SRS revision of the DBRP CMI/RAR Revision O will be completed in 60 days after receipt of all regulatory comments.

4. EPA and SCDHEC final review and approval of the DBRP CMI/RAR Revision 1 will last 30 days.

CORRECTIVE MEASURES IMP./REMEDIAL ACTION REPORT

ACTIVITY DESCRIPTION	ORIG DUR
EPA/SCDHEC ROD ISSUANCE	0
DEVELOP CMI/RAR	120
SRS SUBMITTAL OF REV.0 CMI/RAR	0
EPA/SCDHEC REVIEW	90
SRS INCORPORATE EPA/SCHDEC COMMENTS	60
SRS SUBMITTAL OF REV.1 CMI/RAR	0
EPS/SCHDEC FINAL REVIEW & APPROVAL	30
EPA/SCDHEC APPROVAL	0



Plot Date	4FEB97	
Data Date	1OCT96	
Project Start	1OCT96	
Project Finish	27JUL97	

Activity Bar/Early Dates
Critical Activity
Progress Bar
Milestone/Flag Activity

LMT1

Sheet 1 of 1

ENVIRONMENTAL RESTORATION
D-AREA BRP
POST ROD IMPLEMENTATION SCHEDULE

Date	Revision	Checked	Approved

Figure 4. Schedule for the Corrective Measures Implementation/Remedial Action Report

XXV. REFERENCES

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WSRC, 1996c. *Statement of Basis/Proposed Plan for the D-Area Burning/Rubble Pits (431-D and 431-ID) (U). WSRC-RP-95-905, Rev. 1.3,* Westinghouse Savannah River Company, Aiken, South Carolina (August 1996).

Record of Decision
Remedial Alternative Selection for the D-Area Burning/Rubble Pits (431-D and 431-1D) (U)

WSRC-RP-96-867
Revision 1
February 1997

Appendix A
Responsiveness Summary

The 45-day public comment period for the Statement of Basis/Proposed Plan for the D-Area Burning/Rubble Pits (43 1-D and 431-lD) (U) began on September 17, 1996 and ended on October 31, 1996. A public meeting was held on October 15, 1996. Specific comments and responses are found below. The comments are italicized and the responses are **bolded.**

Public Meeting Comments

The following comments were received during the Limited Action Proposed Plans/Permit Modifications presentations. These comments were taken from the October 15, 1996 Public Meeting as recorded in the Savannah River Site Information Exchange transcript.

Comment 1: Public Citizen: "What risk is there for animals or I guess future environmental, like if you were going to turn this into a park?"

Response to Comment 1: As a part of the baseline risk assessment process for the DBRP, an ecological risk assessment was conducted to assess the potential impacts to biota caused by exposure to chemical and radiological constituents at the DBRP. A site ecological reconnaissance survey was conducted in April 1994. No stressed vegetation was observed on or around the DBRP. No threatened and endangered species were observed in the vicinity of the DBRP or the adjacent ephemeral stream.

Based on the ecological risk assessment, there is little or no risk of adverse ecological effects from the DBRP. Therefore, if the unit is turned into a park in the future, the animal and plant species would not be affected.

Comment 2: ***Public*** *Citizen: "Are you using like private* ***landfills*** *and private - or* ***I guess*** *what* ***other communities*** *have developed? I mean it* ***looks like*** *a* ***landfill*** *to me. And it looks like there are* ***landfills all over*** *the country and there's a whole lot of landfills that have been turned into like parks and* ***stuff.*** *Is that an opportunity here to turn it into a park or to use private models and maybe look at who has done this a lot?* ***I*** *guess the EPA guy was talking about streamlining. Are you guys using private streamlining ideas?"*

Response to Comment 2: There is *a* proposal for the entire Savannah River Site (SRS) to become a national research park at some time in the future. Even now, the SRS is a national environmental research park and as such, the site is/will be used for environmental research. For the institutional control units, the only thing that our remedial decision has done is to state that on this waste unit there will not be any residential use.

Due to its location, approximately 0.7 mile from the Savannah River and the absence of remarkable scenery, the DBRP would be unlikely to become a recreational site. The risk levels for the soils alone barely exceed the threshold for residential use; the presence of buried waste should not interfere with the use of the DBRP as *a* park. However, there is groundwater contamination at the DBRP that could preclude use of the local shallow groundwater as *a source* of drinking water. Groundwater risk modeling indicates that there are constituents present which could exceed primary drinking water standards in the future

It should also be noted that the use of the DBRP as an environmental research or recreational park would be evaluated at the time of property transfer if ownership of the land is ever transferred from the Federal government DBRP is one of the first burning/rubble pits at SRS to be evaluated and will contribute to a streamlined process for characterization, technology evaluation, and determining likely response actions at subsequent burning/rubble pits.

The following comment was received during the Formal Public Comment Session.

Comment 3: ***Mike Rourak:*** ***My*** *name is* ***Mike Rourak*** *and my question is directed to Mr. Brian* ***Hennessey's*** *earlier discussion (unintelligible)* ***Silverton*** *Roadproperty, for example. In the* **Future Use Manual** *that was sent out to some of us about the disposal of* ***close*** *to a million acres of property for DOE, in your deed restrictions there's things that we cannot do. And we* ***'re*** *going to need a* ***little*** *bit before we can respond back to Washington.* ***Those*** *of us who received the manual, we almost are going to need to know what those deed restrictions are because if we cannot have a subdivision then there's no need to bid the price accordingly or say that's what we want to use it for. If we cannot graze cattle here like we do in Tennessee at (unintelligible) or something or grow crops because we* ***cannot put*** *a well in for contamination, then we are* ***left*** *with only looking at* ***it for*** *the pine trees.*

So being federal, you own this property, Even with deed restrictions you ***'ve*** *got to give us either a Phase I,* ***II,*** *or III audit. In this case, it's the seller who has to provide this liability, not necessarily the buyer's neglect of liability to due diligence.* ***So*** *it would really help* ***if*** *we knew what deed restrictions would be there to a more extent and also what we can use the land for. If* ***I*** *want to use it for applying 50-- under the Code of Federal Regulations 503,* ***if I*** *want to use it for bio solid disposal, can* ***I*** *do so? Because it's adjacent to your other property. So the deed restrictions that you brought up were of immense concern about responding back to the future use and the disposal of roughly*

849,000 acres nationwide for - to be put back into - I understand from Washington, they would like to put it back mainly into public use to get the taxes off of it. Maybe not so for the government, but for the local entities who lose the tax base. Thank you.

Response to Comment 3: **The SRS *Future Use Project Report* was distributed to inform citizens of the planned future uses of the SRS. The recommendations that were presented in the report may change over time and will be discussed with the stakeholders. Deed restrictions for federal property are not determined until the land is transferred to non-federal control. At the time of property transfer, the need for deed restrictions will be evaluated. Due to natural attenuation, decay, etc., the conditions at specific areas may not warrant any deed restrictions. All legal requirements will be met at the time of property transfer.**