

CHAPTER 4. ENVIRONMENTAL IMPACTS

Chapter 4 describes the impacts to the Savannah River Site (SRS) and the surrounding region of implementing each of the alternatives described in Chapter 2. As discussed in Chapter 2, in addition to the No Action alternative, the U.S. Department of Energy (DOE) has identified four *action* alternatives that would meet the purpose and need for action: *to identify and implement one or more technologies to prepare the SRS high-level waste (HLW) salt component for disposal*. The five alternatives are as follows:

- No Action
- Small Tank Precipitation
- Ion Exchange
- Solvent Extraction (DOE's preferred alternative)
- Direct Disposal in Grout

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Environmental impacts could include direct physical disturbance of resources, consumption of resources, or degradation of resources caused by effluents and emissions. Resources include air, water, soils, plants, animals, cultural artifacts, and people, including SRS workers and people in nearby communities. Impacts may be detrimental (e.g., increased airborne emissions of hazardous chemicals) or beneficial (e.g., improvements to the environmental baseline of the SRS HLW System).

Section 4.1 describes the short-term impacts associated with construction and operation of each alternative, including No Action. For purposes of the analyses in this Supplemental Environmental Impact Statement (SEIS), the short-term impacts span from the year 2001 until completion of salt processing operations (approximately 2023). As indicated in Chapter 2, the time of completion varies slightly with the selected tech-

nology. Section 4.2 describes for each action alternative the long-term impacts of the radioactive and non-radioactive constituents solidified in saltstone and disposed of in the saltstone disposal vaults. Long-term assessment of the action alternatives involves a performance evaluation beginning with a 100-year period of institutional control and continuing through an extended period, during which it is assumed that residential and/or agricultural uses could occur. For the No Action alternative, Section 4.2 describes the long-term impacts of the radioactive constituents if salt waste were left in the HLW tanks. The long-term assessment of the No Action alternative involves a 100-year period of institutional control after which the HLW tanks would fail, allowing salt solution to overflow to the ground and run off to surface streams that could serve as sources of drinking water.

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The assessments in this SEIS have generally been performed so that the estimated magnitude and intensity of impacts would not be exceeded by the actual facility. Predictions of the impacts of routine operations are based on monitoring of similar operations and are, therefore, considered realistic estimates. For accidents, there is more uncertainty because the impacts are based on events that have not occurred. In this SEIS, DOE selected hypothetical accidents that would produce impacts as severe or more severe than any reasonably foreseeable accidents, which ensures that DOE has bounded all potential accidents for each alternative.

To ensure that small potential impacts are not over-analyzed and large potential impacts are not under-analyzed, analysts have focused efforts on significant environmental issues and have discussed impacts in proportion to their significance. This methodology follows the recommendation for the use of a "sliding scale" approach to analysis described in *Recommendations for the Preparation of Environmental Assessments and Environmental Impact Statements* (DOE 1993).

4.1 Short-Term Impacts

This section describes the short-term impacts associated with construction and operation of each action alternative (i.e., Small Tank Precipitation, Ion Exchange, Solvent Extraction, and Direct Disposal in Grout). Construction includes those actions necessary to prepare land and erect facilities for the alternatives evaluated in this SEIS. Routine operations would include normal use of those facilities. For the No Action alternative, this section describes the short-term impacts associated with continuing tank space management activities through approximately 2010. Because the specific activities that DOE would pursue after the initial period of tank space management have not been determined, only those No Action activities that would be expected to have an impact on a given resource are addressed in this section. For purposes of the analyses, the short-term impacts span from the year 2001 until completion of salt processing operations (approximately 2023). As indicated in Chapter 2, the time of completion varies slightly with the selected technology.

The structure of Section 4.1 closely parallels that of Chapter 3, Affected Environment, with the addition of sections on traffic and transportation, accidents, and a Pilot Plant. The sections discuss methodology and present the potential impacts of each alternative evaluated. More details on the methodology for accident analysis are provided in Appendix B.

4.1.1 GEOLOGIC RESOURCES

This section describes impacts to geologic resources from activities associated with construction and operation of each salt processing action alternative. For the No Action alternative, this section describes impacts to geological resources from ongoing tank space optimization activities, the construction of new HLW tanks, and reuse of existing HLW tanks.

The sites under consideration for the salt processing facilities are located in existing industrial areas (S and Z Areas), where landforms and surface soils have already been disturbed. The No Action alternative would also occur in previously disturbed areas near S and Z Areas. Geologic deposits of economic value are not known to exist in these areas.

Construction

As shown in Table 4-1, the footprints for proposed facilities under the four salt processing action alternatives are similar and would range from about 26,000 square feet for the Direct Disposal in Grout facility to 42,000 square feet for the Small Tank Precipitation facility. The footprints for the Ion Exchange and Solvent Extraction facilities would be approximately 38,000 square feet each. Between 23,000 cubic yards of soil (Direct Disposal in Grout) and 82,000 cubic yards of soil (Solvent Extraction) would be excavated during construction of the process facility. The total land area that would be cleared in S Area for the Small Tank Precipitation, Ion Exchange, or Solvent Extraction alternative is about 23 acres or 0.12 percent of SRS land dedicated to industrial use. Approximately 15 acres or 0.078 percent of SRS land dedicated to industrial use would be cleared for the Direct Disposal in Grout facility in Z Area. The use of best management practices at existing industrial areas would minimize the impact to the area during construction. Soils excavated during construction would be used as backfill or transported to an appropriate site within 2,500 feet of the facility for disposal (WSRC 1999a). Best management practices would consist of the use of silt fences at the construction site and also at the excavated soil disposal areas. In addition, exposed soils would be stabilized by seeding with grasses or legumes to control erosion. By doing this, DOE would substantially limit the possibility of the soils being eroded and transported to nearby surface waters. Therefore, impacts to geologic resources during construction would be minimal.

Table 4-1. Impact to SRS land from each of the proposed action alternatives.^a

| | Alternative | | | |
|--|-----------------------------|-----------------|-----------------------|-----------------------------|
| | Small Tank Precipitation | Ion Exchange | Solvent Extraction | Direct Disposal in Grout |
| Facility footprint ^b (square feet) | 42,000 | 38,000 | 38,000 | 26,000 |
| Material excavated (cubic yards) | 77,000 | 78,000 | 82,000 | 23,000 |
| Total land area cleared for process facility (acres) ^b | 23 | 23 | 23 | 15 |
| Land cleared as percent- age of SRS industrial area | 0.12 | 0.12 | 0.12 | 0.078 |
| Land cleared as percent- age of total SRS Area | 0.012 | 0.012 | 0.012 | 0.0078 |
| Number of new saltstone vaults ^c | 16 | 13 | 15 | 13 |
| Land set aside for vaults (Acres) | 180 | 180 | 180 | 180 |
| Land set aside as percent- age of SRS industrial area | 0.94 | 0.94 | 0.94 | 0.94 |
| Land set aside as percent- age of total SRS Area | 0.094 | 0.094 | 0.094 | 0.094 |

Total SRS area = 300 square miles (192,000 acres) (DOE 1997b).

Total Industrial area = 30 square miles (19,200 acres) (DOE 1997b).

- a. As many as 18 tanks could be constructed under the No Action alternative. The footprint for each tank constructed under the No Action alternative would be about 5,000 square feet. Approximately 43,000 cubic yards of soil would be excavated for each tank built.
- b. (WSRC 1998a).
- c. (WSRC 1998b).

Saltstone disposal vaults would be constructed as needed throughout the period of salt processing. Construction of new saltstone disposal vaults in Z Area over the period from 2010 to 2023 (Small Tank Precipitation), 2011 to 2023 (Ion Exchange), 2010 to 2023 (Solvent Extraction), or 2010 to 2023 (Direct Disposal in Grout) would require minimal soil excavation. Thirteen to 16 vaults (see Table 4-1), each 300 feet long by 200 feet wide by 25 feet high, would be constructed at or slightly below grade. In accordance with best management practices, DOE would stabilize exposed soils by seeding with grasses or legumes to stabilize disturbed areas and control erosion.

Because of the phased nature – construction of process facilities for all action alternatives

followed by construction of vaults over a 13-year period as additional saltstone disposal capacity is required – some excavation of soils would continue for nearly 20 years.

Under the No Action alternative, DOE would use approved siting procedures to ensure that any new HLW storage tanks would be built in previously disturbed industrial areas. Each new tank would require excavation of approximately 43,000 cubic yards of soil. About 28,000 cubic yards would be used for backfill (DOE 1980). The remaining 15,000 cubic yards of soil would be transported to an appropriate site for disposal. Best management practices would be used to stabilize soils and control erosion. Up to 18 new tanks would be necessary to store the waste generated from sludge-only processing at DWPF.

Operation

Facility operations would not disturb landforms or surface soils under any action alternative. Therefore, regardless of the salt processing action alternative chosen, operation of the selected alternative would have no short-term impact on the geology of the identified sites.

Under the No Action alternative, continuation of tank space optimization activities through approximately 2010 would increase the surveillance necessary to ensure safe and environmentally satisfactory performance of these tanks. The reuse of existing HLW tanks (after 2010) would also increase the risk of tank leaks and spills, resulting in the release of HLW to soils. The operation of any new HLW storage tanks constructed under the No Action alternative would not disturb any landforms or surface soils and, therefore, would have no short-term impact on geological resources.

4.1.2 WATER RESOURCES

This section describes incremental impacts to surface water and groundwater quality from activities associated with each salt processing alternative. For the No Action alternative, this section addresses impacts from ongoing tank space optimization activities, reuse of existing HLW storage tanks, and construction and operation of new HLW storage tanks. Water use is discussed in Section 4.1.12.1.

4.1.2.1 Surface Water

McQueen Branch, a first-order tributary of Upper Three Runs, is the closest surface water body to the proposed construction sites in S and Z Areas (see Figure 3-7). McQueen Branch lies approximately 1,000 feet east of the identified process facility site in S Area (Site B) for the Small Tank Precipitation, Ion Exchange, and Solvent Extraction alternatives, and approximately one mile (5,000 feet) east of the process facility site in the center of Z Area for the Direct

Disposal in Grout alternative (see Figures 3-1 and 3-2). The identified locations for new saltstone vaults, in the eastern portion of Z Area, range from 1,500 to 5,000 feet from McQueen Branch.

Overland runoff from the process facility construction site in S Area (Site B) for the Small Tank Precipitation, Ion Exchange, and Solvent Extraction alternatives generally flows east in the direction of the stream (see Figure 3-1), but is interrupted by a drainage ditch along the eastern perimeter of the site (WSRC 1999b). Runoff moves from the drainage ditch to four culverts that channel water under a roadway and railroad embankment and, once through the culverts, overland by sheet flow to a ravine or ditch that was stabilized with netting and riprap in the past and appears to have received little or no flow in recent years. This lined channel was designed to convey storm water to McQueen Branch during construction of the DWPF, but has grown up in grasses and weeds.

Surface drainage is to the east and northeast from the construction sites for the saltstone disposal vaults and the Direct Disposal in Grout process facility in Z Area (see Figure 3-2). Drainage ditches in the area intercept stormwater flow and direct it to stormwater retention basins on the periphery of the area (WSRC 1999b). Discharge from these basins moves to McQueen Branch via an engineered ditch.

Construction

As discussed in Section 4.1.1 for the action alternatives, up to 23 acres of land would be cleared and 23,000 to 82,000 cubic yards of soil would be excavated for construction of the salt processing facility. A slight increase in suspended solids and particulates in stormwater runoff could occur as soils are disturbed during the four-year period when process and support facilities are being built, but would be expected only during periods of unusually high rainfall. Soil excavated for building foundations would be used as backfill or trucked to suitable disposal sites on SRS, greatly reducing the likelihood that loose or stockpiled soil would be transported to streams along with stormwater.

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In accordance with best management practices, DOE would stabilize exposed soils by seeding with grasses or legumes (e.g., clovers) in a water medium that includes mulch and fertilizer. Hydroseeding is often used at SRS to stabilize disturbed areas and control erosion.

As discussed in Section 2.3.4, DOE could build as many as 18 new HLW storage tanks under the No Action alternative; DOE would use approved siting procedures to ensure that any new tanks would be built in previously disturbed industrial areas with a water table well below ground surface. Each new tank would require excavation of approximately 43,000 cubic yards of soil. Excavated soil would be used as backfill or trucked to suitable disposal sites on SRS. Best management practices would be used to stabilize soils and prevent runoff, reducing the likelihood that loose or stockpiled soil would be transported to streams along with stormwater.

Construction at SRS must comply with the requirements of the South Carolina stormwater management and sediment control regulations, which became effective in 1992 as part of the Clean Water Act. The regulations and associated permits require DOE to prepare erosion and sedimentation control plans for all land-disturbing projects, regardless of the size of the area affected, to minimize potential discharges of silts, solids, and other contaminants to surface waters. Effective January 2, 1997, the South Carolina Department of Health and Environmental Control (SCDHEC) approved a General Permit for stormwater management and sediment reduction at SRS (SCDHEC 1996). Although the General Permit does not exempt any land-disturbing and construction activities from the requirement of state stormwater management and sediment control regulations, it does not require SCDHEC approval of individual erosion and sediment control plans for construction activities at SRS.

Before beginning construction, DOE would develop site-specific erosion and sediment control plans for the proposed facilities. After construction, and depending on the location of the site, it may be necessary to include applicable mitigation measures in the SRS *Storm Water Pollution Prevention Plan* (WSRC 1993), which is a requirement of the General Permit covering industrial activities (Permit No. SCR000000). If the facility to be constructed is in the drainage area of a stormwater collection system permitted as part of National Pollutant Discharge Elimination System (NPDES) Permit No. SC0000175, it would not be necessary to include mitigation measures in the Plan.

DOE anticipates that impacts to McQueen Branch water quality from processing facility construction activities in S Area or Z Area would be small and would cease once construction was completed. Depending on the alternative selected, as many as 16 saltstone vaults (see Table 4-1) would be constructed in Z Area. These vaults would be built as needed during the 13 years required to process the salt solutions. DOE anticipates that impacts to surface water from this construction would be small due to implementation of best management practices and an approved site-specific erosion and sediment control plan.

Under all alternatives, including No Action, construction activities would be confined to established facility areas with established stormwater controls. Discharges from construction sites would be in compliance with SRS's site-wide stormwater permit and mitigated by best construction management practices and engineering controls. Because erosion and sedimentation from land-disturbing activities in S and Z Areas are not expected to degrade water quality in McQueen Branch, downstream impacts to Upper Three Runs would be unlikely.

Operations

Sanitary wastewater from salt processing facilities would be treated in the Centralized Sanitary Wastewater Treatment Facility and discharged to Fourmile Branch via NPDES Outfall G-10.

Process wastewater from salt processing facilities would be treated at the F/H Effluent Treatment Facility (ETF) and discharged to Upper Three Runs via NPDES Outfall H-16. As can be seen in Table 4-2, the volume of sanitary and process wastewater generated by each of the action alternatives is similar and low. The Solvent Extraction alternative would generate the highest volume of both wastewater streams, but would only constitute 2.2 percent of the SRS sanitary wastewater treatment capacity and 0.57 percent of the ETF capacity. In both instances, current treatment capacity would be more than adequate to handle the additional demand from salt processing facilities. Current NPDES discharge limitations would remain in effect, meaning that no degradation of water quality in Fourmile Branch, Upper Three Runs, or the Savannah River would be expected. Under the No Action alternative, sanitary and process wastewater generation rates would continue at current levels.

4.1.2.2 Groundwater Resources

Construction

Elements of the processing facility would be constructed below grade. The depth below grade for the Small Tank Precipitation and Ion Exchange process buildings would be about 45 feet, while the process building for Solvent Extraction would be about 40 feet below grade (WSRC 1998a). Because the surficial water table (Upper Three Runs Aquifer) is about 45 feet below ground surface (see Section 3.2.2.1) at the preferred site in S Area (see Figure 3-9), excavation for the deeper elements of the processing buildings and associated structures would approach groundwater. Therefore, dewatering could be necessary during construction. The dewatering would be performed for a short period of time and impact to the surficial aquifer would be minimal.

The process building in Z Area for Direct Disposal in Grout would be about 25 feet below grade (WSRC 1998a). The saltstone disposal vaults for all action alternatives would be at or slightly below grade. Depth to groundwater in Z Area is about 60 to 70 feet (see Figure 3-10, Section 3.2.2.1). Dewatering at this site would not be required. The potential at Z Area for impacts to groundwater during excavation and construction would be minimal because best management practices would be used, in compliance with Federal and state regulations.

DOE would use the approved siting process to ensure that any new HLW storage tanks built under the No Action alternative would be constructed in a previously disturbed area and not within the groundwater table. Therefore, groundwater impacts from construction of new tanks would be minimal.

Operations

Facility operations would not discharge to groundwater under any action alternative. Therefore, regardless of the salt processing alternative chosen, operation of the selected alternative would create no short-term impact to the groundwater. Groundwater use is discussed in Section 4.1.12, Utilities and Energy.

Under the No Action alternative, continuation of tank space optimization activities through approximately 2010 would increase the potential for tank failure and the resulting release of HLW to groundwater. The reuse of existing HLW tanks (after 2010) would also increase the risk of tank leaks and spills resulting in the release of HLW to groundwater. DOE would increase maintenance, monitoring and surveillances to minimize the potential for leaks and spills. The operation of any new HLW storage tanks constructed under the No Action alternative would not involve discharges to groundwater. Therefore, operation of any new HLW storage tanks would have no short-term impact to the groundwater.

Table 4-2. Total annual wastewater generation and as a percentage of available treatment capacity for all salt processing action alternatives.

| | Baseline ^a | Small Tank Precipitation | | Ion Exchange | | Solvent Extraction | | Direct Disposal in Grout | |
|---------------------|-----------------------|--------------------------|----------------------------------|-------------------------|----------------------------------|-------------------------|----------------------------------|--------------------------|----------------------------------|
| | Percent utilization | Total (million gallons) | Percentage of treatment capacity | Total (million gallons) | Percentage of treatment capacity | Total (million gallons) | Percentage of treatment capacity | Total (million gallons) | Percentage of treatment capacity |
| Sanitary Wastewater | 18 ^b | 6.9 ^c | 1.8 ^b | 6.6 ^c | 1.7 ^b | 8.4 ^c | 2.2 ^b | 5.2 ^c | 1.4 ^b |
| Process Wastewater | 2.67 ^{d,e} | 0.30 ^f | 0.19 ^c | 0.25 ^f | 0.16 ^c | 0.90 ^f | 0.57 ^c | 0.15 ^f | 0.09 ^c |

a. For all scenarios under the No Action alternative, volume of wastewater generated would be similar to the wastewater generation at the existing HLW Tank Farms. Therefore, wastewater generation under No Action would be included in the SRS baseline.
b. SRS Centralized Sanitary Waste Treatment Facility capacity = 1.05 million gallons per day (Schafner 2001).
c. Adapted from WSRC (1999e). Sanitary wastewater based on estimated potable water use.
d. F/H ETF design capacity = 433,000 gallons per day (DOE 1995).
e. ETF percent utilization based on 1994 data (DOE 1995).
f. Total process wastewater (radioactive liquid waste) annually (WSRC 1999b, 2000b).

4.1.3 AIR RESOURCES

To determine impacts on air quality, DOE estimated the nonradiological and radiological emission rates associated with processes and equipment used in each action alternative. This included identifying potential emission sources and any methods by which air would be filtered before being released to the environment. These emissions were entered into air dispersion models to determine potential maximum concentrations at onsite and offsite locations. Air emissions under the No Action alternative would be similar to those from the existing HLW Tank Farm operations for all scenarios. Therefore, the No Action alternative is represented by slight increases above the baseline. The estimated emissions and air concentrations of nonradiological and radiological pollutants are discussed and compared to the pertinent SCDHEC and Federal regulatory limits in the following two sections. Impacts resulting from incremental increases of air pollutant concentrations are measured in terms of human health effects and are discussed in Section 4.1.4, Worker and Public Health.

4.1.3.1 Nonradiological Emissions

Construction

Construction (excluding vaults) would occur over approximately four years for each action alternative. As discussed in Section 4.1.1, 13 to 16 saltstone vaults would be constructed over the 13-year period between 2010 and 2023. Building new tanks under the No Action alternative would require four or more years of construction, depending on the number of tanks needed. Construction activities would involve the use of heavy equipment such as bulldozers, cranes, dump trucks, and backhoes to clear the land, construct buildings, and develop the infrastructure to support the facilities (e.g., paved roads, sewer/potable water and feed lines). Table 4-3 lists the expected construction-related air emission sources for all alternatives, including No Action. Table 4-4 shows the annual air emission rates from all con-

struction-related sources (Hunter 2000). The type and rate of construction emissions for all alternatives would be the same.

During construction, the excavation and transfer of soils and the disturbance of surface dust by heavy equipment all result in particulate matter emissions. These emissions of particulate matter caused by wind or man's activities, or both, are known as fugitive dust. In accordance with good dust control practices required by South Carolina regulations, measures would be implemented to control fugitive particulate matter. Best management practices would be used during land clearing, road grading, and construction to minimize airborne dust. Dust control measures could include seeding, wind speed reduction (e.g., wind barriers), wet or chemical suppression, or early paving. The U.S. Environmental Protection Agency's (EPA's) Fugitive Dust Model (FDM) (EPA 1992) computer program was used to model all fugitive emissions from construction activities.

Heavy-duty construction equipment (i.e., trucks, bulldozers, and other diesel-powered support equipment) would be used for excavation and grading, hauling soil and debris for disposal, and other routine construction activities. Exhaust emissions from these diesel engines would result in releases of sulfur dioxide (SO₂), oxides of nitrogen (NO_x), particulate matter (PM₁₀), carbon monoxide (CO), and total suspended particulate (TSP) matter. A detailed listing of the construction equipment that would be used is documented in WSRC (1999b).

Facility construction (including new tanks under the No Action alternative) would necessitate a concrete batch plant at the building site. Particulate matter, consisting primarily of cement dust, would be the only regulated pollutant emitted in the concrete mixing process. Emissions would occur at the point of transfer of cement to the silo. However, DOE would use filter bags, which have control efficiencies as high as 99 percent, or a similar technology to remove particulate emissions. Particulate emission limits for the operation of a concrete batch plant would be established in a construction permit

Table 4-3. Expected sources of air emissions from construction activities for all alternatives.

| Alternative | Source of air emissions |
|---------------------------------------|---|
| All alternatives, including No Action | Excavation/soil transfers Dust from vehicle traffic on unpaved surfaces Vehicle exhaust Concrete batch plant emissions |

Table 4-4. Estimated nonradiological air emissions (tons per year) from construction activities associated with all alternatives.

| Air pollutant | Vehicle exhaust (tons per year) | Fugitive Dust (tons per year) ^a | Concrete Batch Plant (tons per year) |
|------------------|------------------------------------|---|---|
| SO ₂ | 13 | – | – |
| TSP | 16 | 100 | 14 |
| PM ₁₀ | NA ^b | 25 | NA |
| CO | 60 | – | – |
| NO _x | 150 | – | – |

Source: Hunter (2000).

a. Includes fugitive dust caused from excavation/soil transfers and dust disturbed by moving vehicles used for site preparation and facility construction.

b. NA = Not available. No method for estimating PM₁₀ emissions from this type of emission source is available.

SO₂ = sulfur dioxide, TSP = total suspended particles, PM₁₀ = particulate matter with an aerodynamic diameter ≤ 10 micrometers, CO = carbon monoxide, NO_x = oxides of nitrogen .

granted by SCDHEC. Any fugitive dust emissions from sand and aggregate piles around the batch plant would be controlled by water suppression, chemical dust suppressants, or other approved methods. Using the emission rates from construction vehicles and the concrete batch plant (Table 4-4), maximum concentrations of regulated pollutants were determined, using Release 3 of the Industrial Source Complex – Short Term (ISC3) air dispersion model (EPA 1995).

Meteorological data input into the models (ISC3 and FDM) included sequential hourly averages of wind speed, wind direction, turbulence intensity (stability), and temperature (from SRS meteorological tower network), and twice-daily mixing height (rural) data (for Atlanta, Georgia). A one-year data set (1996) was used.

Using ISC3 and FDM, the maximum concentrations at the SRS boundary were esti-

mated because that is the closest location where members of the public potentially would be exposed. At the Site boundary, concentrations are estimated at ground level because, at this distance from the emission point(s), the vertical distribution of the contaminants would be relatively uniform. The resulting incremental increases to background concentrations (in micrograms per cubic meter) at the SRS boundary are listed in Table 4-5. Particulate matter (TSP and PM₁₀) concentrations would be slightly increased (1 percent and 2 percent, respectively), with fugitive dust emissions accounting for most of the particulate matter emissions. All other regulated pollutant concentrations estimated at the Site boundary increase less than 1 percent of the standard. Because the increases in concentration listed in Table 4-5 would be associated only with construction, they would be temporary, lasting only until construction ended. Also, all the construction emission sources would not be in operation at the same time or throughout the entire construction period.

Table 4-5. Estimated maximum incremental increases of air concentrations (micrograms per cubic meter) of SCDHEC-regulated nonradiological air pollutants at the SRS boundary from construction activities associated with all salt processing alternatives.

| Air pollutant | Averaging time | SCDHEC standard ($\mu\text{g}/\text{m}^3$) ^a | SRS baseline concentration ($\mu\text{g}/\text{m}^3$) ^b | SRS baseline concentration (% of standard) | Maximum concentration ($\mu\text{g}/\text{m}^3$) ^c | SRS baseline + concentration (% of standard) |
|-------------------------------|----------------|---|--|--|---|--|
| SO ₂ | 3-hr | 1,300 | 1,240 | 96 | 5.0 | 96 |
| | 24-hr | 365 | 350 | 96 | 0.7 | 96 |
| | Annual | 80 | 34 | 42 | 0.009 | 42 |
| TSP | Annual | 75 | 67 | 89 | 0.04 | 90 |
| | geometric mean | | | | | |
| PM ₁₀ ^d | 24-hr | 150 | 130 | 88 | 2 | 90 |
| | Annual | 50 | 25 | 51 | 0.03 | 51 |
| CO | 1-hr | 40,000 | 10,350 | 26 | 70 | 26 |
| | 8-hr | 10,000 | 6,870 | 69 | 10 | 69 |
| NO ₂ | Annual | 100 | 26 | 26 | 01 | 26 |

Source: Hunter (2000).

- a. SCDHEC Regulation 61-62.5, Standard 2, "Ambient Air Quality Standards".
- b. Sum of (1) an estimated maximum Site boundary concentration from modeling all SRS sources of the indicated pollutant not exempt from Clean Air Act Title V modeling requirements (maximum potential emissions from the 1998 Air Emissions Inventory data base) and (2) observed concentrations from nearby ambient air monitoring stations (Hunter 2000).
- c. Maximum concentrations would be the same for all alternatives including construction of new tanks under No Action.
- d. New standards for particulate matter will come into effect during the construction of this project.

SO₂ = sulfur dioxide, TSP = total suspended particles, PM₁₀ = particulate matter with an aerodynamic diameter ≤ 10 pm, CO = carbon monoxide, NO₂ = nitrogen dioxide.

Operations

Salt processing activities would result in the release of regulated nonradiological pollutants to the surrounding air. Table 4-6 lists, by alternative, the expected air emission sources during the operation of each action alternative. For all scenarios under the No Action alternative, the only air emission source would be the ventilation exhaust from each utilized tank. As presented in the following tables, the baseline is representative of the No Action alternative. The estimated emission rates (tons per year) for non-radiological pollutants emitted under each action alternative are presented in Table 4-7 (Hunter 2000). These emission rates can be compared against emission rates defined in SCDHEC Standard 7, "Prevention of Significant Deterioration (PSD)," to determine if the emission would exceed this standard or cause a significant pollutant emission increase.

As part of its evaluation of the impact of air emissions, DOE consulted the Guidance on Clean Air Act General Conformity requirements (DOE 2000a). DOE determined that the General Conformity rule does not apply because the area where the DOE action would take place is an attainment area for all criteria pollutants. Therefore, although each alternative would emit criteria pollutants, a conformity review is not necessary.

As can be seen in Table 4-7, sulfur dioxide (SO₂), TSP, PM₁₀, CO, NO_x, lead, beryllium, and mercury emissions are similar for all action alternatives and would be well below their corresponding PSD limits.¹ The estimated emission rates for these air pollutants range from 53 percent of the PSD limit (for NO_x under the Small Tank Precipitation, Ion Exchange, and Solvent

¹ PSD limit refers to the threshold emissions rates that trigger the need for a PSD review.

Table 4-6. Expected sources of air emissions during salt processing for the four action alternatives^a.

| Alternative | Source of air emissions |
|--|---|
| All action alternatives | Minimal new emission sources (S Area) |
| Small Tank Precipitation, Ion Exchange, Solvent Extraction | Exhaust stack for the Process Facility (S Area) Ventilation exhaust from the Cold Chemical Feed Area (S Area) Exhaust stack for existing saltstone facility (Z Area) Exhaust from two emergency diesel generators (S Area) Exhaust from one emergency diesel generator (Z Area) |
| Direct Disposal in Grout | Exhaust stack for the Direct Disposal in Grout Process Facility (Z Area) Ventilation exhaust from the Cold Chemical Feed Area (Z Area) Ventilation exhaust from the Vaults (Z Area) ^b Exhaust from two emergency diesel generators (Z Area) |

a. For all scenarios under the No Action alternative, the expected source of emissions would be the ventilation exhaust from each tank.

b. Vaults for the other three action alternatives would have minimal emissions because the saltstone produced by these action alternatives would have a lower activity level and the vaults would not be ventilated.

Extraction alternatives) to less than 1 percent of the limit for SO₂, lead, and mercury.

The estimated volatile organic compounds (VOC) emissions rate of 70 tons per year for the Small Tank Precipitation alternative would exceed the threshold value established by SCDHEC for PSD permit review, whereas estimated emissions from the other alternatives are either estimated below the PSD limit or covered by existing air permit levels. Implementation of the Small Tank Precipitation alternative would result in small increases in offsite concentrations of benzene and ozone, with minimal impacts to public health. The other alternatives would have lower impacts.

VOC emissions are subject to a PSD limit because they contribute to the formation of ozone. Ozone is a photochemical oxidant and the major component of smog. Ozone is not emitted directly into the air, but is formed through complex chemical reactions between emissions of VOCs and NO_x in the presence of sunlight. Both VOCs and NO_x are emitted by industrial and transportation sources.

Prevention of Significant Deterioration Review

Facilities, such as SRS, that are located in attainment areas for air quality and are classified as major facilities may trigger a PSD review under the new source review requirements of the Clean Air Act when they construct a major stationary source or make a major modification to a major source. (A major source is defined as a source with the potential to emit any air pollutant regulated under the Clean Air Act in amounts equal to or exceeding specified thresholds). The SCDHEC uses a two-step process to determine whether a new source results in a significant emissions increase of a regulated pollutant. First, the potential emissions from the new source are compared to their corresponding PSD significant emission limits. If the emission increase is by itself (without considering any contemporaneous decreases) less than the PSD limit, no further analysis is required. If, however, the emission increase is equal to or greater than the PSD limit, then all contemporaneous emissions increases and decreases must be summed and the net increase is compared to the PSD limit. A PSD permit review is required if that modification or addition to the major facility results in a net increase of any regulated pollutant over the level established in the current permit that is greater than the corresponding PSD limit.

Table 4-7. Estimated nonradiological air emissions (tons per year) from routine operations for salt processing alternatives.^a

| Air pollutant | SRS Permit Allowance | PSD New Source Emission Limit | Small Tank Precipitation | | Ion Exchange | | Solvent Extraction | | Direct Disposal in Grout | |
|------------------------------------|------------------------|-------------------------------|--------------------------|------------------|----------------------|------------------|----------------------|------------------|--------------------------|------------------|
| | (tons/yr) ^b | (tons/yr) ^c | (tons/yr) | (% of PSD limit) | (tons/yr) | (% of PSD limit) | (tons/yr) | (% of PSD limit) | (tons/yr) | (% of PSD limit) |
| SO ₂ | 3.32 | 40 | 0.33 | 0.81 | 0.33 | 0.81 | 0.33 | 0.81 | 0.30 | 0.75 |
| TSP | 5.51 | 25 | 0.95 | 3.8 | 0.95 | 3.8 | 0.95 | 3.8 | 0.80 | 3.2 |
| PM ₁₀ | 2.4 | 15 | 0.4 | 2.7 | 0.4 | 2.7 | 0.4 | 2.7 | 0.30 | 2.0 |
| CO | 86.9 | 100 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 5.4 | 4.9 | 4.9 |
| VOCs ^d | 70.23 ^e | 40 | 70 | 175 | 1.6 | 4.1 | 40 | 100 | 1.5 | 3.6 |
| NO _x | 232.8 | 40 | 21 | 53 | 21 | 53 | 21 | 53 | 19 | 48 |
| Lead | NA ^f | 0.6 | 4.0×10 ⁻⁴ | 0.067 | 4.0×10 ⁻⁴ | 0.067 | 4.0×10 ⁻⁴ | 0.067 | 3.5×10 ⁻⁴ | 0.058 |
| Beryllium | NA ^f | 4.0×10 ⁻⁴ | 1.0×10 ⁻⁴ | 25 | 1.0×10 ⁻⁴ | 25 | 1.0×10 ⁻⁴ | 25 | 5.0×10 ⁻⁵ | 13 |
| Mercury | 0.88 | 0.1 | 0.0026 | 2.6 | 0.0026 | 2.6 | 0.0026 | 2.6 | 0.0025 | 2.5 |
| Formic Acid ^g | 1.6 | NA ^h | 1.6 | - | None | - | None | - | None | - |
| Benzene | 50.48 | NA ^h | 53 | - | 0.0085 | - | 0.0085 | - | 0.0080 | - |
| Biphenyl ⁱ | NA ^j | NA ^h | 1.1 | - | None | - | None | - | None | - |
| Methanol ^k | NA ^j | NA ^h | 0.42 | - | 0.42 | - | 0.42 | - | 0.42 | - |
| n-Propanol ^l | NA ^j | NA ^h | 0.42 | - | 0.42 | - | 0.42 | - | 0.42 | - |
| Isopar [®] L ^m | NA ^j | NA ^h | 0.0 | - | 0.0 | - | 38 | - | 0.0 | - |

Source: Hunter (2000).

- For all scenarios under the No Action alternative, air emissions would be similar to those from the existing HLW Tank Farm operations. Therefore, No Action is represented by slight increases above the SRS baseline.
- SCDHEC Bureau of Air Quality Control Operating Permits for HLW management facilities.
- SCDHEC Regulation 61-62.5, Standard 7, "Prevention of Significant Deterioration".
- VOCs are subject to a PSD limit because they are a precursor to ozone. VOCs that may be emitted as a result of the proposed action include benzene, biphenyl, methanol, n-Propanol, and Isopar[®]L. NO_x also contributes to ozone formation.
- Value includes 50.48 tons per year of benzene and 19.75 tons per year of other VOCs.
- SRS lead and beryllium emissions originate from permit-exempted units, so no allowance has been established.
- Formic acid emissions would shift from DWPF to the Small Tank Precipitation facility, resulting in no net change in emissions.
- No PSD limit is defined for this pollutant.
- Also known as diphenyl.
- This pollutant is a VOC and the SRS air permits do not have a specific permit allowance for this pollutant.
- Also known as methyl alcohol.
- Also known as n-Propyl alcohol; OSHA-regulated pollutant.
- Isopar[®]L is a proprietary chemical; regulated as a VOC only.

NA = not applicable, SO₂ = sulfur dioxide, TSP = total suspended particulates, PM₁₀ = particulate matter with an aerodynamic diameter ≤ 10 μm, CO = carbon monoxide, NO_x = oxides of nitrogen, PSD = prevention of significant deterioration, VOC = volatile organic compound.

According to EPA AIRS databases (EPA 2001), Aiken and Barnwell Counties combined produced a total of more than 10,000 tons per year of NO_x in 1998 and anthropogenic VOC emissions were over 10,000 tons per year. According to the EPA TRENDS reports (EPA 2000), the biogenic VOC contribution for the Aiken-Barnwell region is around 9,000 tons per year. Estimated emissions from the alternative with the highest VOC emissions (i.e., Small Tank Precipitation) are 21 tons per year NO_x and 70 tons per year VOCs. Therefore, regional emissions of ozone precursors would be expected to increase by less than one percent for this alternative. From modeling results such as those presented in Carter (1994), percentage increases in ozone precursors are generally greater than the resulting changes in ozone. Therefore, ozone concentrations would be expected to increase by no more than one percent. The background level of ozone is 216 micrograms per cubic meter, and the ambient air quality standard for ozone is 235 micrograms per cubic meter. Therefore, a one percent increase in ozone, to about 218 micrograms per cubic meter, at the point of maximum impact would not exceed the ambient air quality standard.

As shown in Table 4-6, nonradionuclide emissions from routine salt processing operations would come from several sources. Using the emission rates from Table 4-7 for the listed sources, maximum concentrations of released regulated pollutants were determined using the ISC3 air dispersion model. Because the proposed sites for salt processing facilities in S and Z Areas are located in close proximity to DWPF and would be subject to the same meteorological conditions as DWPF, the stack for each process facility was assumed to be the same height as the DWPF stack (i.e., 46 meters). Emissions from the cold chemical feed area (see Section 2.7.4, Support Facilities) and from the emergency generators were assumed to occur at ground level. The process facilities and the cold chemical feed areas were assumed to emit pollutants continuously. The emergency generators were assumed to

operate 250 hours per year, primarily for testing.

The ICS3 short-term modeling results provided estimated maximum concentrations at the SRS boundary, where members of the public potentially would be exposed, and at the location of a hypothetical noninvolved site worker. For the location of the noninvolved worker, the analysis used a generic location 640 meters from the release point in the direction of the greatest concentration. This location is the distance for assessing consequences from facility accidents and, for consistency, is used here for normal operations. Concentrations at the noninvolved worker location were calculated at an elevation of 1.8 meters above ground to simulate the breathing height of a typical adult.

The maximum air concentrations (micrograms per cubic meter) at the SRS boundary that would be associated with the release of regulated nonradiological pollutants are presented in Table 4-8. For the action alternatives, the incremental increase in concentrations of SO₂, TSP, PM₁₀, CO, nitrogen dioxide (NO₂), and lead (SCDHEC Ambient Air Quality Standards [Standard 2] regulated pollutants) would be less than 1 percent of the baseline (i.e., No Action alternative). Incremental concentration increases of air toxic pollutants (NO₂, lead, beryllium, mercury, benzene, biphenyl, methanol, and formic acid) would be small under all alternatives; for most pollutants, there would be an incremental increase of less than 1 percent of the baseline (i.e., No Action alternative). The greatest increase (7.5 percent) would occur for biphenyl under the Small Tank Precipitation alternative, but ambient concentrations would remain far below the SCDHEC Toxic Air Pollutants (Standard 8) limit. Therefore, no salt processing alternative would exceed SCDHEC standards at the SRS boundary.

The air quality impacts at the location of a hypothetical noninvolved worker in the vicinity of the processing facilities are presented in

Table 4-8. Estimated maximum increases in air concentrations (micrograms per cubic meter) and percent of standard of SCDHEC-regulated non-radiological air pollutants at the SRS boundary from salt processing alternatives.

| Air pollutant | Averaging time | Maximum concentration | | | | | | | | | | |
|-------------------------------|---|---|---|----------------------------|--|-------------------------------|--|--|--|--|--|--|
| | | SCDHEC standard | | SRS baseline concentration | | Small Tank Precipitation | Ion Exchange | | Solvent Extraction | | Direct Disposal in Grout | |
| | | ($\mu\text{g}/\text{m}^3$) ^a | ($\mu\text{g}/\text{m}^3$) ^b | (% of standard) | Concentration ($\mu\text{g}/\text{m}^3$) | Concentration (% of standard) | Concentration ($\mu\text{g}/\text{m}^3$) | Baseline + Concentration (% of standard) | Concentration ($\mu\text{g}/\text{m}^3$) | Baseline + Concentration (% of standard) | Concentration ($\mu\text{g}/\text{m}^3$) | Baseline + Concentration (% of standard) |
| <i>Ambient air pollutants</i> | | | | | | | | | | | | |
| SO ₂ | 3-hr | 1,300 | 1,240 | 96 | 0.30 | 96 | 0.30 | 96 | 0.30 | 96 | 0.40 | 96 |
| | 24-hr | 365 | 350 | 96 | 0.040 | 96 | 0.040 | 96 | 0.040 | 96 | 0.050 | 96 |
| | Annual | 80 | 34 | 42 | 4.0×10 ⁻⁴ | 42 | 4.0×10 ⁻⁴ | 42 | 4.0×10 ⁻⁴ | 42 | 5.0×10 ⁻⁴ | 42 |
| TSP | Annual geo-metric mean | 75 | 67 | 89 | 0.0010 | 89 | 0.0010 | 89 | 0.0010 | 89 | 0.0010 | 89 |
| | 24-hr | 150 | 130 | 88 | 0.070 | 89 | 0.070 | 89 | 0.070 | 89 | 0.070 | 89 |
| PM ₁₀ ^c | Annual | 50 | 25 | 51 | 0.0010 | 51 | 0.0010 | 51 | 0.0010 | 51 | 0.0010 | 51 |
| | 1-hr | 40,000 | 10,350 | 26 | 15 | 26 | 15 | 26 | 15 | 26 | 18 | 26 |
| CO | 8-hr | 10,000 | 6,870 | 69 | 1.9 | 69 | 1.9 | 69 | 1.9 | 69 | 2.3 | 69 |
| | 1-hr | 235 | 216 | 92 | ND | ND | ND | ND | ND | ND | ND | ND |
| Ozone ^c | Annual | 100 | 26 | 26 | 0.030 | 26 | 0.030 | 26 | 0.030 | 26 | 0.030 | 26 |
| Lead | Max. calendar quarter | 1.5 | 0.03 | 2.0 | 4.0×10 ⁻⁷ | 2.0 | 4.0×10 ⁻⁷ | 2.0 | 4.0×10 ⁻⁷ | 2.0 | 4.0×10 ⁻⁷ | 2.0 |
| | <i>Air toxic pollutants^e</i> | | | | | | | | | | | |
| Benzene | 24-hr | 150 | 5 | 3.1 | 4.0 | 5.7 | 0.0010 | 26 | 0.0010 | 26 | 0.0010 | 26 |
| Mercury | 24-hr | 0.25 | 0.03 | 12 | 3.0×10 ⁻⁵ | 12 | 3.0×10 ⁻⁵ | 12 | 3.0×10 ⁻⁵ | 12 | 3.0×10 ⁻⁵ | 12 |
| Biphenyl ^f | 24-hr | 6 | 0.02 | 0.33 | 0.45 | 7.8 | None | 0.33 | None | 0.33 | None | 0.33 |
| Methanol ^g | 24-hr | 1,310 | 0.9 | 0.069 | 0.32 | 0.093 | 0.32 | 0.090 | 0.32 | 0.090 | 0.53 | 0.11 |
| Beryllium | 24-hr | 0.01 | 0.0090 | 90 | 1.0×10 ⁻⁵ | 90 | 1.0×10 ⁻⁵ | 90 | 1.0×10 ⁻⁵ | 90 | 1.0×10 ⁻⁵ | 90 |
| Formic Acid ^h | 24-hr | 225 | 0.15 | 0.067 | 0.01 | 0.067 | None | 0.067 | None | 0.067 | None | 0.067 |

Source: Hunter (2000). Concentrations are based on maximum potential emissions.

- SCDHEC Air Pollution Regulation 61-62.5, Standard 2, "Ambient Air Quality Standards", and Standard 8, "Toxic Air Pollutants".
- Sum of (1) estimated maximum site boundary concentration from modeling all SRS sources of the indicated pollutant not exempt from Clean Air Act Title V modeling requirements (maximum potential emissions from the 1998 Air Emissions Inventory data base) and (2) observed concentrations from nearby ambient air monitoring stations (Hunter 2000). For all scenarios under the No Action alternative, emissions would be similar to those from existing HLW Tank Farm operations and would be represented by slight increases over the SRS baseline.
- New standards for this pollutant may come into effect during the lifetime of this project.
- Source: SCDHEC (1998). Observed concentration of ozone at SCDHEC ambient monitoring station for Aiken County.
- n-Propanol is not included on this table because it is an OSHA-regulated pollutant, not an SCDHEC-regulated pollutant.
- Also known as diphenyl.
- Also known as methyl alcohol.
- Formic acid emissions would shift from DWPF to the Small Tank Precipitation Facility, resulting in no net change in emissions.

ND = Not determined, SO₂ = sulfur dioxide, TSP = total suspended particulates, PM₁₀ = particulate matter with an aerodynamic diameter ≤ 10 μm, CO = carbon monoxide, NO₂ = nitrogen dioxide.

the Worker and Public Health section (Section 4.1.4.1 – Nonradiological Health Effects). For all processing alternatives, ambient concentrations of NO₂ would reach 78 percent of the Occupational Safety and Health Administration (OSHA) ceiling limit of 9 milligrams per cubic meter (mg/m³). These NO₂ emissions would result from the periodic operation of the emergency generators. Since the estimated emissions are based on maximum potential emissions and all the emergency generators likely would not operate at the same time, the estimated emissions and resulting concentrations are conservative. All concentrations of OSHA-regulated pollutants would be below the established limits.

4.1.3.2 Radiological Emissions

Construction

No known radiological contamination exists at the proposed construction sites in S and Z Areas. DOE would use the approved siting process to ensure that any new HLW tanks constructed under the No Action alternative would be constructed in an area where no radiological contamination is known to exist. Therefore, regardless of the alternative chosen, no radiological air emissions are expected as a result of construction activities.

Operations

DOE estimated routine radionuclide air emissions for each salt alternative. Under each processing alternative, radionuclides would be emitted to the air via a stack. As discussed in Section 4.1.3.1, the stack for each process facility was assumed to be 46 meters high, the same height as the DWPF stack. For all the salt processing alternatives, the ventilation exhaust would be filtered through high-efficiency particulate air filters. The Direct Disposal in Grout alternative would have an additional emission point at each vault in operation because radioactive cesium would not be removed before grouting, requiring the vaults to have a

forced air ventilation system for temperature control while the saltstone cures. Because the other three action alternatives would remove more radionuclides (including radioactive cesium) from the low-activity salt fraction, the grout would have much lower activity levels and the vaults would not need to be ventilated. Therefore, the Small Tank Precipitation, Ion Exchange, and Solvent Extraction alternatives would have no measurable emissions from the associated saltstone vaults. Emissions from the vaults for Direct Disposal in Grout alternative were assumed to be at ground level. The estimated total radiological air emissions for each action alternative are shown in Table 4-9 (Pike 2000). Because there are no equivalent facilities at SRS, DOE's method for estimating emission rates from the alternative salt processing facilities is conservative and ensures that total emissions are not underestimated. All action alternatives are all treated with the same conservative basis. The Small Tank Precipitation, Ion Exchange, and Solvent Extraction processes all produce highly concentrated cesium-bearing process streams. The engineered systems designed for each facility would ensure that the cesium emissions are as low as reasonably achievable.

Air emissions under the No Action alternative would be similar to those from existing HLW Tank Farms operations for ongoing tank space management activities and all subsequent scenarios. Therefore, the No Action alternative is represented by slight increases above the baseline.

After determining routine emission rates for the action alternatives, DOE used the MAXIGASP and POPGASP computer codes to estimate radiological doses to the maximally exposed (off-site) individual (MEI), the hypothetical noninvolved worker, and the offsite population surrounding SRS. Both codes utilize the GASPAR (Eckerman et al. 1980) and XOQDOQ (Sagendorf et al. 1976, 1982) modules; GASPAR and XOQDOQ are based on U.S. Nuclear Regulatory Commission (NRC) Regulatory Guides 1.111 and 1.109 (NRC1977), respectively. Both GASPAR and XOQDOQ have

Table 4-9. Annual radionuclide emissions (curies/year) resulting from operations.^a

| | Annual emission rate | | | |
|--------------------------|--|-------------------------|-------------------------------|--|
| | Small Tank Precipitation (Ci/yr) | Ion Exchange (Ci/yr) | Solvent Extraction (Ci/yr) | Direct Disposal in Grout ^b (Ci/yr) |
| Tritium | 4.3 | 18 | 24 | 9.2 |
| Strontium-90 | 8.3×10^{-4} | 4.9×10^{-5} | 0.0019 | 0.0036 |
| Technetium-99 | 1.6×10^{-5} | 1.6×10^{-6} | 8.4×10^{-5} | 3.4×10^{-5} |
| Ruthenium-106 | 5.2×10^{-6} | 4.9×10^{-7} | 2.6×10^{-5} | 1.0×10^{-5} |
| Antimony-125 | 1.5×10^{-6} | 1.6×10^{-7} | 9.0×10^{-6} | 3.5×10^{-6} |
| Iodine-129 | 1.5×10^{-8} | 1.7×10^{-9} | 6.9×10^{-7} | 3.7×10^{-8} |
| Cesium-134 | 0.0035 | 0.0024 | 0.014 | 8.5×10^{-4} |
| Cesium-137 | 0.98 | 0.24 | 1.4 | 0.085 |
| Total Alpha ^c | 0.0010 | 1.5×10^{-4} | 0.0060 | 0.011 |
| Total | 5.3 | 18.2 | 25.4 | 9.3 |

Source: Pike (2000).

- Air emissions under the No Action alternative would be similar to those from existing HLW Tank Farm operations for continuing tank space management activities and all subsequent scenarios. Therefore, the No Action alternative is represented by slight increases over the SRS baseline. SRS baseline emissions are shown in Table 3-12.
- Includes emissions from vaults. Vaults for the other three action alternatives would have no measurable emissions because the saltstone produced by these action alternatives would have a much lower activity level and the vaults would not be ventilated.
- Assumed to be plutonium-239.

been adapted and verified for use at SRS (Hamby 1992 and Bauer 1991, respectively). MAXIGASP and POPGASP are both Site-specific computer programs that have SRS-specific meteorological parameters (e.g., wind speeds and directions) and population distribution parameters (e.g., number of people in sectors around the Site). The 1990 census population database was used to represent the population living within a 50-mile radius of the center of SRS.

Table 4-10 presents the calculated maximum radiological doses (as 50-year committed effective dose equivalents) associated with salt processing activities for all the analyzed alternatives. Based on the dispersion modeling for stack emissions from processing facilities for each alternative, the MEI (public) was identified as being located north-northeast at the SRS boundary. For ground-level releases (vault emission under the Direct Disposal in Grout alternative), the MEI would be located at the north SRS boundary (Simpkins 1999, 2000a,b). The maximum committed effective dose equivalent for the MEI would be 0.31 millirem per year for the Solvent Extraction alternative, which is

higher than the other alternatives, due to higher estimated radioactive cesium emissions. Ninety percent of the dose to the MEI is associated with the radio active cesium emissions and 9.5 percent of the dose would result from the total alpha emissions. The Small Tank Precipitation alternative has a maximum committed effective dose equivalent of 0.20 millirem per year, while the Ion Exchange and Direct Disposal alternatives have a lower maximum committed effective dose equivalent for the MEI of 0.049 and 0.086, respectively. The annual MEI dose under all the alternatives would still be well below the established annual dose limit of 10 millirem for SRS atmospheric releases (40 CFR 61.92).

The maximum estimated dose to the offsite population residing within a 50-mile (80-kilometer) radius (approximately 620,000 people) would be 18.1 person-rem per year, also as a result of the Solvent Extraction alternative. As with the MEI dose, offsite concentrations of radioactive cesium would compose most (93 percent) of the total population dose. The Small Tank Precipitation alternative has an offsite population dose of 12.0 person-rem per year. The Ion Exchange and Direct Disposal in Grout