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EPA Superfund
Record of Decision:

RSR CORPORATION
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OU 04
DALLAS, TX
02/28/1996

RECORD OF DECISION

RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT NO. 4 - SMELTER FACILITY
DALLAS, TEXAS

Prepared by:
U.S. Environmental Protection Agency
Region 6
Dallas, Texas

RECORD OF DECISION
CONCURRENCE DOCUMENTATION

FOR THE

RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT NO. 4 - SMELTER FACILITY

<IMG SRC 0696099>

DECLARATION FOR THE RECORD OF DECISION
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT NO. 4 - SMELTER FACILITY
DALLAS, TEXAS

Statutory Preference for Treatment as a Principal Element
is Met and Five-Year Review is Required

SITE NAME AND LOCATION

RSR Corporation Superfund Site, Operable Unit (OU) No. 4
Dallas, Dallas County, Texas

STATEMENT OF BASIS AND PURPOSE

The United States Environmental Protection Agency (EPA) presents its decision in this Record of Decision (ROD) for Operable Unit (OU) No. 4, the location of the former secondary lead smelter, of the RSR Corporation Superfund Site (RSR Site). EPA's decision is in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), 42 U.S.C. § 9601 et seq., and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. The decision is based on materials and documents EPA relied on or considered that are contained in the Administrative Record for OU No. 4. The Administrative Record for OU No. 4 is available for public review at three repositories, one of which is located in west Dallas within the RSR site and near OU No. 4. EPA bases this decision on the results of a remedial investigation, feasibility study, and human health risk assessment conducted at OU No. 4.

The State of Texas, through the Texas Natural Resource Conservation Commission (TNRCC), concurs with EPA's selected remedy for OU No. 4 of the RSR Site.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances, as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and further defined in Section 302.4 of the NCP, 40 C.F.R. § 302.4, from the RSR Site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE REMEDY

Operable Unit No. 4 is one of five operable units of the RSR Site. This OU includes the smelter facility property where the secondary lead smelting operations formerly were conducted. The ground water portion of OU No. 4 is deferred and will be addressed as part of OU No. 5 of the RSR site. The selected remedy for OU No. 4 will address contamination of the secondary lead smelter facility.

The major components of the selected remedy include:

- Demolition of site buildings and off-site disposal;
- Demolition of the smelter stack and off-site disposal;
- Excavation of the concrete foundations and contaminated soil and off-site disposal.

Arsenic, cadmium, antimony and lead, the primary contaminants of concern at OU No. 4, are hazardous substances, as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and further defined in Section 302.4 of the NCP, 40 C.F.R. § 302.4.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment, complies with federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Because future land use may be limited to industrial use, five-year reviews may be necessary at OU No. 4 of the RSR Site.

SIGNATURE AND AGENCY ACCEPTANCE OF THE REMEDY

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DECISION SUMMARY
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT NO. 4--SMELTER FACILITY
DALLAS, TEXAS

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RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT NO. 4 - SMELTER FACILITY
RECORD OF DECISION

I. SITE NAME, LOCATION, AND DESCRIPTION

The United States Environmental Protection Agency (EPA) is addressing the release or threat of release of hazardous substances at the former smelter facility, Operable Unit (OU) No. 4 of the RSR Corporation Superfund Site (RSR Site) under the authority provided in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq. (also known as Superfund) and consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. The RSR Site is located in west Dallas, Texas and encompasses an area approximately 13.6 square miles in size. The RSR site is very diverse and includes large single and multi-family residential neighborhoods, multi-family public housing areas and some industrial, commercial and retail establishments. The population in this area is approximately 17,000.

For approximately 50 years, a secondary lead smelting facility, located at the southeast corner of the intersection of North Westmoreland Rd. and Singleton Blvd., recycled used batteries and other lead-bearing materials into pure lead, lead alloys, and other lead products. This smelter property, known as OU No. 4, is approximately 6.5 acres in size and contains several inactive structures. Other industrial property related to the smelter, the former battery wrecking facility, referred to as OU No. 5, is located on the southwest corner of the Westmoreland Road and Singleton Boulevard intersection. The smelter operations ceased in 1984.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

EPA has obtained information indicating that OU No. 4 is the location at the RSR Site where secondary lead smelting operations were conducted from the early 1930s until 1984. The basic inputs into the smelting process were lead scrap and lead from used car batteries. In the first step of the smelting process the batteries were disassembled at the battery wrecking facility (OU No. 5), using hammer-mills to break the batteries into small pieces. The lead posts and grids were then sent across the street to smelter facility (OU No. 4) to produce soft pure lead or specialty alloys. In the refining process alloy elements, such as antimony, arsenic, and cadmium, were added as necessary to produce the desired product.

An extensive review of available historical information concerning the smelter's operation indicates that from approximately 1934 until 1971, the lead smelting facility was operated by Murph Metals, Inc. or its predecessors. In 1971, RSR Corporation acquired the lead smelting operation and operated under the name Murph Metals. The smelter continued to operate under the RSR Corporation until the acquisition of the smelter facility and the battery wrecking facility in May 1984 by the current owner, Murmur Corporation (Murmur). In 1984, the City of Dallas declined to renew the smelter's operating permit. This decision was based on the smelter's historic operational practices and changes in the City's zoning ordinance restrictions. As a result, the smelter closed in 1984 and has not been operated since that time.

During 1984 and 1985, TNRCC (formerly the Texas Water Commission) conducted inspections on the smelter and battery wrecking facilities and identified several violations that involved the treatment, storage or disposal of hazardous wastes. In 1986, TNRCC approved a closure plan to be implemented by Murmur for portions of the battery wrecking facility located at OU No. 5. However, Murmur was unable to obtain certification by TNRCC of final closure, due to a dispute between Murmur and its contractor. In June of 1991 the State of Texas referred the case regarding the closure to the Superfund program for assessment. Immediately following this

referral, TNRCC began receiving complaints from residents alleging that slag and battery chips were disposed of on their properties.

In 1991, EPA began soil sampling in west Dallas to determine the presence of soil lead contamination. The results indicated that contamination existed in some residential areas near the smelter (OU No. 1) where fallout of contamination from the smelter stack occurred and where battery chips or slag was used as fill in residential yards and driveways. Consequently, EPA initiated an emergency removal action in the residential areas consisting of removal and offsite disposal of contaminated soil and debris in excess of removal action cleanup levels. This removal action in the residential area (OU No. 1) was completed in June of 1994.

In 1993, EPA initiated remedial investigations of the smelter and related properties (OU Nos. 4 and 5) and alleged smelter waste disposal areas (OU No. 3). In addition, an investigation of and removal action at OU No. 2, the public housing residential area, was then initiated by the Dallas Housing Authority under EPA oversight pursuant to a CERCLA administrative order.

On May 10, 1993, EPA proposed the RSR Site to the National Priorities List (NPL) of Superfund sites (58 Fed. Reg. 27,507). The proposed listing was based on the soil exposure pathway.

A field investigation was conducted in the Spring of 1994 concurrently on OU Nos. 4 and 5. During this investigation three areas of immediate concern were identified. More than 500 waste drums, 73 uncontained residual waste/debris piles and approximately 50 laboratory containers were found on OU Nos. 4 and 5. In July 1994, EPA authorized the preparation of an Engineering Evaluation/Cost Analysis (EE/CA) report to support the conduct of a non-time-critical removal action to abate the immediate threat to human health and environment posed by the presence of these material at OU Nos. 4 and 5. A 30-day public comment period on the proposed removal action as described in the EE/CA report was initiated on September 16, 1994. The proposed removal entailed removal and offsite treatment and disposal of all drums, residual waste/debris piles and laboratory containers. On December 22, 1994, the Action Memorandum authorizing this removal action was signed. EPA commenced site activities for the non-time-critical removal action on May 30, 1995 and completed these activities by July 14, 1995.

On September 29, 1995, the RSR Corporation Superfund Site was finalized on the NPL (60 Fed. Reg. 50435).

EPA has notified parties who are potentially responsible (PRPs) for contamination at OU No. 4 and provided them the opportunity to perform or finance the RI/FS. Since the PRPs declined to perform or finance these response actions, EPA performed these activities with funding from the Hazardous Substance Superfund (Fund). As other PRPs are identified, EPA will provide them notice of their potential liability and the opportunity to perform or finance future response actions at the site, including the remedial action for OU No. 4.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

EPA has performed public participation activities for OU No. 4 as required in CERCLA Section 113(k), 42 U.S.C. § 9613(k), and Section 117, 42 U.S.C. § 9617. The Remedial Investigation Report, Feasibility Study, Baseline Human Health Risk Assessment Report and the Proposed Plan for OU No. 4 of the RSR Site were released to the public on May 10, 1995. On or before May 10, 1995, EPA made available to the public these documents as well as other documents and information EPA relied on or considered in selecting Alternative No. 4 - Decontaminate and Dismantle Buildings/Structures and Dispose Offsite; Excavate Soils and Dispose Offsite. These documents were contained in an Administrative Record File for OU NO. 4 (or draft Administrative Record) available for review at 3 locations; the West Dallas Public Library located at the RSR Site, the EPA Region 6 library in Dallas, and the TNRCC library in Austin, Texas. The notice of

the availability of the Proposed Plan and the Administrative Record File was published in The Dallas Morning News on May 9, 1995. The public comment period commenced on May 10, 1995 and ended on July 12, 1995. EPA conducted a public meeting on May 23, 1995 to receive public comments from the community. EPA's responses to all comments received during the public comment period are included in the Responsiveness Summary, which is included as Appendix A to this ROD.

This Record of Decision (ROD) presents EPA's selected remedial alternative for OU No. 4 of the RSR Site in Dallas, Texas that will provide protection of human health and the environment in accordance with CERCLA and consistent with the NCP. This decision is based on the Administrative Record for OU No. 4.

IV. SCOPE AND ROLE OF OPERABLE UNITS

There are five Operable Units (OUs) of the RSR site, which are distinct geographical areas that are illustrated in Figure 1 and described below:

OU No. 1 - Private residential areas potentially impacted by historical operations of the smelter;

OU No. 2 - The Dallas Housing Authority's public housing development located northeast of the smelter facility;

OU No. 3 - Former landfills and smelter waste disposal areas located at three different sites within west Dallas;

OU No. 4 - The smelter facility;

OU No. 5 - Former battery wrecking facility and other industrial tracts of land associated with the smelter and located across Westmoreland Road from the smelter facility.

This ROD addresses only OU No. 4, the location of the former smelter facility, which currently is owned by Murmur. This area consists of the smelter facility, stack, and a number of other buildings that served as warehouses, repair shops, a laboratory, offices, storage facilities, docks, and lunch and locker rooms for employees. OU No. 5 is the location of smelter-related activities, such as the battery breaking operation and several disposal areas. Because the nature of some of the former operations and wastes at OU Nos. 4 and 5 are similar, EPA conducted certain studies of the two OUs simultaneously.

Final Records of Decision for OU Nos. 1 and 2 were issued on May 9, 1995. EPA is currently completing a Remedial Investigation at OU No. 3. Proposed Plans outlining recommended Superfund response actions for OU No. 3 and OU No. 5 of the RSR Site will be released at a later date.

This ROD for OU No. 4, is EPA's final decision to address the contamination and associated with al of the onsite buildings, structures and equipment, soils, and sediments. Potential ingestion, dermal contact and inhalation of materials present on OU No. 4 contaminated with lead, arsenic, cadmium and antimony in excess of remedial goals (described fully in Section VII.) pose unacceptable risks to human health and the environment. The purpose of the selected response action is to prevent current or future exposure to the contaminated materials at OU No. 4.

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V. SITE CHARACTERISTICS

This section presents an overview of the characteristics of OU No. 4, the former smelter facility (also referred to herein as the site). First a summary of the site soils, geology, hydrogeology, ground water, topography, surface water, climate and land use is discussed. Following is a detailed description of the pertinent site features, such as all of the onsite buildings and structures. Finally, a discussion of the findings of the field investigation is included in the nature and extent section. Note, that all of this information can be found in greater detail in the Remedial Investigation Report and supporting Technical Memorandums, which are all part of the Administrative Record for Operable Unit No. 4.

A. Soils

The USDA Soil Conversation Service (SCS), identified the Trinity-Frio soils as the major soil type at OU No. 4. Trinity-Frio soils are floodplain soils, poorly drained, clayey, with low permeability (less than 0.06 in/hr) and high water capacity. Because they are primarily found in flat, low-lying areas, runoff and the potential for these soils to erode is minimal.

The specific soil complex on OU No. 4 is the Houston Black-Urban Complex. This complex consists of deep, moderately well drained, nearly level and gently sloping soils and areas of Urban Land. The Smelter Complex on OU No. 4 would fall under the classification of Urban Land typical of areas characterized by disturbed soil and fill material that have greatly altered the natural soil type.

B. Regional Geology

In the vicinity of the OU No. 4 site, the predominant geologic units are of the Upper Cretaceous Age. The formations consist of (in descending order) the Austin Chalk Formation, the Eagle Ford Shale Formation, the Woodbine Formation, and the Grayson Marl and Main Street Limestone Formation. The geologic units making up the Cretaceous system in north-central Texas form a southeastward-thickening wedge extending into the East Texas Embayment. This sedimentary wedge ranges in thickness from zero in the west to nearly 7500 feet in the southeast. Regional dip is to the east and southeast at 15 to 40 feet per mile but increases as much as 300 feet per mile on the flanks of the Preston anticline, located in Grayson County, north of Dallas.

Geologic maps of the surface soils indicate the OU No. 4 site is situated at the bottom of the surface expression of the contact between the top of the Eagle Ford Shale Formation and the overlying Austin Chalk. As documented by logs of deep wells in the area, the full thickness of the Eagle Ford Shale Formation, which overlies the Woodbine Formation, is present beneath the OU No. 4 site.

The Eagle Ford Shale Formation is composed primarily of dark shales with occasional thin stratas of sandstone, limestone, and bentonite. The Eagle Ford Shale Formation has two members, the Arcadia Park being the upper, and the Britton being the lower member. The upper beds of the Arcadia Park member are present in the surface soils at the OU No. 4 site. The Arcadia Park is described as a basal blue clay twenty (20) feet thick; overlain by one to three feet of thin limestone flags; overlain by an uppermost part of some seventy-five (75) feet of blue shale with calcareous concretions of various size, which is unconformable overlain by the Austin Chalk. The underlying Britton member is typically 250-300 feet thick and consists mostly of blue clay/shale. The Eagle Ford Shale Formation is commonly referred to as an aquitard overlying the Woodbine Formation.

C. Site Geology

Beneath the OU No. 4 site, Quaternary alluvial deposits vary in thickness from a few feet in the southeast corner to over 30 feet in the northwest corner.

The RI included drilling of soil and geoprobe borings in the fill and alluvial deposits beneath the site. The soil borings were drilled to a depth of up to 37 feet, to a point where the Eagle Ford shale was encountered, while the geoprobe borings generally encountered resistance in the deposits great enough to refuse the probe at 13 feet below ground surface (bgs) or less.

Each boring encountered clays or silty clays, with occasional silt or sand. The top of the Eagle Ford, sometimes seen as a weathered shale, was encountered at elevations ranging from 405 feet mean sea level (MSL) to 433 feet MSL across the site.

D. Hydrogeology

In north-central Texas, the two most important water-bearing stratigraphic units are the Woodbine Group, a minor aquifer, and the Trinity Group, a major aquifer. A major aquifer is defined as one which yields large quantities of water in comparatively large area of the State, and a minor aquifer is defined as one which yields large quantities of water in small areas, or relatively small quantities of water in large areas of the State. Both aquifers provide municipal, domestic, industrial, and some irrigation supplies to the north-central portion of the State. It should be noted that water for Dallas residents is provided by the City of Dallas water system, which draws its water from surface reservoirs many miles from the OU No. 4 site.

The Woodbine Aquifer is of Upper Cretaceous age and is composed of sand and sandstone. The nearest outcrop of the Woodbine Formation to the RSR site is in far northwestern Dallas County and eastern Tarrant County, a minimum of 10 miles from the OU No. 4 site. Groundwater flow within the Woodbine is generally to the east. In the vicinity of the RSR site, the depth to the Woodbine from the ground surface is approximately 200 to 250 feet.

The Trinity Group Aquifer is comprised of Lower Cretaceous age formations (the Paluxy, Glen Rose, Twin Mountains, and Antlers) which are older and encountered at greater depths than the Woodbine and other geologic units present within the RSR site. These geologic units were deposited in fluvial, deltaic, and shallow marine depositional environments, and are typically comprised of sands interbedded with clays, limestone, dolmite, gravel, conglomerates, and evaporates (the latter are present in the upper Glen Rose). Outcrops of Trinity Group formations are found in Parker County, approximately 60 miles west of Dallas County. Within the RSR site, the depth to the Trinity Aquifer from the ground surface is approximately 1,300 to 1,500 feet to the Paluxy formation and approximately 2,500 feet to the Twin Mountains Formation.

The Quaternary alluvial deposits also contain small amounts of water in this area, although they are not classified as a minor or major aquifer by the State. The shallow groundwater in the vicinity of OU No. 4 is not generally considered a water supply aquifer due to its overall low yield and slightly saline quality. According to a RCRA Facility Assessment completed by the TWC (now TNRCC) for the Smelter Facility in 1988, the alluvial system was not believed to be hydraulically connected to the deeper Woodbine aquifer due to the presence of the 300-foot-thick Eagle Ford shale beneath the site. Groundwater was generally encountered at depths of 5 to 10 feet below ground surface in the RI monitoring wells installed to depths of up to 24 feet (completed at the base of the alluvial materials overlaying the Eagle Ford).

E. Groundwater Quality

In the Dallas area, the general quality of groundwater from the Trinity Aquifer ranges from 500 to 3,000 mg/l total dissolved solids (TDS), which indicates fresh to slightly saline water. Sulfate and chloride concentrations do not exceed secondary drinking water standards of 300

mg/l. Increasingly poor quality (high TDS) water from this aquifer in parts of the Dallas-Ft. Worth area in recent years has been attributed to over-pumpage of the aquifer.

Only the lower part of the Woodbine Aquifer (i.e., the upper sand unit at a depth of 730 to 830 feet) is considered to be suitable for development due to high iron concentrations in the rest of the aquifer. In the Dallas area, groundwater from various units of the Woodbine Aquifer is in the 1,000 to 3,000 mg/l range for TDS (slightly saline), and sulfate concentrations generally exceed TNRCC's recommended drinking water limit of 300 mg/l (30 TAC § 290.113). Wells completed on or near the outcrop tend to produce groundwater of a higher quality. The primary uses of water derived from the Woodbine are for domestic livestock and public supply. However, due to (1) an increasing dependence on surface water for public supplies, (2) historically large withdrawals of water from the Woodbine, and (3) low permeabilities of the Woodbine's water-bearing zones, this aquifer is no longer used as a primary source of drinking water for Dallas County, and is not used by the City of Dallas.

The primary source of recharge for both the Trinity and Woodbine Aquifers is considered to be precipitation on outcrop surfaces. Recharge from streams flowing across the outcrop, and surface-water seepage from lakes, streams, and ponds are considered secondary sources. No primary recharge areas are located within five miles of OU No. 4. As stated previously, the outcrop surfaces for the Woodbine and Trinity Formations are located a minimum distance of 10 miles to the west of OU No. 4.

The water contained in the Quaternary alluvial deposits is a result of surface infiltration from runoff and likely interacts directly with surface water features in the area.

F. Topography

The RSR Site is located on the margin between the Blackland Prairie and the Eastern Cross Timbers physiographic provinces. The RSR Site topography is characterized by low, flat to gently undulating surfaces. A majority of the RSR Site is located on a floodplain terrace of the Trinity River. The northern and western edges of the RSR Site are bounded by the Trinity River levee. The OU No. 4 site slopes to the west with surface drainage mainly towards Westmoreland Road. A majority of the OU No. 4 site is paved, which promotes surface runoff. The topographic relief across the OU No. 4 site is approximately 15 feet with a dip to the northwest. See Figure 2.

G. Surface Water

The Trinity River and its tributaries, and Fishtrap Lake in the Dallas Housing Authority area (OU No. 2), are the only major surface water bodies in the vicinity of OU No. 4, as shown in Figure 3. The West Fork flows east-northeast from Grand Prairie (500 to 1,000 feet from the western edge of OU No. 1) before joining the Elm Fork to form the main channel. From the confluence of the West and Elm Forks, the Trinity River flows east and then south (approximately 4500 feet north of OU No. 4 at its closest point). A surface drainage channel (approximately 3500 feet northwest of OU No. 4) empties into the Old West Fork channel, which joins the Trinity River at a pumping station between Westmoreland and Hampton Roads.

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The Texas Water Code specifies all segments of the Trinity River Basin for recreational use. None of the river segments are specified for domestic water supply.

H. Climate

The climate in Dallas County is temperate to hot. During the winter, cold surges of air cause the moderate temperature to drop, thereby producing cool winters with occasional snow. Rainfall throughout the County is relatively consistent throughout the year, with a slight increase usually in the spring. Wind direction is primarily from the south-southeast. In the DFW area, the average annual windspeed for 1992 was 9.9 miles per hour (mph).

I. Land Use and Zoning

The smelter and its support facilities are all located on land designated as OU No. 4. Areas surrounding OU No. 4 comprise a mixture of residential, commercial, and industrial facilities. Based on the 1994 City of Dallas, zoning map, OU No. 4 is currently zoned as Industrial Manufacturing (IM). IM zoning for the City of Dallas includes, industrial, wholesale distribution and storage, and support office and retail uses. The surrounding land, which comprises OU No. 1 of the RSR site, is zoned primarily for single-family residential, multi-family residential, light and heavy industrial uses and, to a lesser extent, commercial and retail. The reasonably anticipated future land use of OU No. 4 is commercial/industrial based on the past and current zoning map for this area.

J. On-Site Buildings and Structures

OU No. 4 has numerous structures onsite as shown on Figure 2. Note that all of the buildings and the stack have concrete floors, assumed to be one foot thick. In addition all of OU No. 4 is covered by concrete pavement, with exception of approximately 1 acre in the northeast area, which is unpaved. Based on the field investigation observations there are numerous floor drains and sumps located throughout the smelter facility.

The structures present on OU No. 4 include the smelter facility, associated bag houses and stack, batch house, hog storage building and several other support buildings for such needs as office space, showers, storage areas, laboratory needs, and vehicle support. The following sections briefly describe the construction and present physical condition of each building based on a visual review of the structures by a structural engineer in March and April 1994 during the RI field activities. The structural survey Technical Memorandum, dated March 1995, is contained in the Administrative Record for OU No. 4.

1. Smelter Facility

The Smelter Facility building appears to have been constructed in stages over a period of many years. The exterior is clad with uninsulated metal siding and roofing. Large pieces of machinery and equipment support structures are found throughout the building interior and in some locations just outside the building. Several hazards associated with falling roof beams, panels and light fixtures, and inadequacy of overhead walkways, and the weakness of conveyor supports have been observed. Numerous small holes in the roof and large areas of damage caused by rust and corrosion on the underside of the roof are also present. It appears the roof beams were weakened and structural connections at or near the roof may have deteriorated, indicating that one or more of the roof beams could fail.

2. Smelter Stack

The Smelter Stack is approximately 300 feet tall. The stack consists of two cylindrical structures, one within the other. The outer structure is cast-in-place concrete and the inner structure is masonry that may contain asbestos. The two structures are connected by metal straps that encircle the masonry at intervals of 10 to 20 feet and are attached to the interior

side of the concrete structure. The straps are about 3 inches wide and 1/4-inch thick.

Based on visual observations during the RI, it appears that the straps between the concrete and the masonry cylinders have started to rust. If the straps continue to rust, the masonry will no longer be braced by the concrete. The structural engineer noted that if the masonry was not internally reinforced, it could sway and crack if subjected to sufficient lateral roads (for example, high winds).

3. Batch House

The Batch House is a pre-engineered metal building with concrete floors and concrete bin walls approximately 10 feet in height and is connected to the smelter facility. This building was used for storage of contaminated soil during EPA's soil removal activities for OU No. 1 of the RSR Site. No significant structural damage associated with this building has been observed; however, prevalent cosmetic damage is apparent. Some concrete walls were found to be gouged and some metal walls are bent, but the columns are intact and there is little evidence of rust in the building.

4. Hog Storage Building

The Hog Storage Building is a pre-engineered metal building that appears to have undergone expansion at some time. This building was used for storage of finished product from the smelter. this building shows signs of cosmetic damage but no significant structural damage. Based on a review of historical aerial photographs, the structure is more than 15 years old and is nearing the end of the usual 20- to 30-year design life for metal buildings.

5. Former Cafe Building

The exterior walls of the Former Cafe are constructed of masonry. There are steel columns and beams that support the steel truss joists on which the metal roof deck rests. This building is experiencing a number of structural problems. The fascia of the Former Cafe is separating from the masonry walls and falling to the ground. The steel connections for the fascia showed significant rust. There is ceiling damage that may contribute to the deterioration of the steel roof deck and the roofing material above it.

6. Office/Cafeteria/Laboratory Complex

This building is constructed of masonry and appears to be in reasonably sound condition except for rust on the roof deck surrounding an opening in the roof. This opening allows precipitation to enter the building and cause further deterioration.

7. Bath House

The Bath House is a masonry structure with a wooden roof deck. Observations made during the RI, indicate that the flat wooden roof deck has rotted and weakened due to water damage and parts of the roof have caved in.

8. Vehicle Maintenance Building

The Vehicle Maintenance Building is a partially-enclosed masonry structure partially covered with metal sheeting and a flat roof. This building is a former self-serve car wash with approximately eight bays. The masonry wall on the north side of the building shows evidence of significant structural distress. The fascia of this structure has deteriorated and parts of it have been removed or have fallen away.

9. Former Gas Station

The Former Gas Station is constructed of masonry. The fascia is beginning to pull away from the masonry wall and there are large stains and mildew on the plaster ceilings inside the building which indicate roof leaks. The east corner of the building has been seriously damaged. The fascia support structure associated with the building is exposed and deteriorating.

10. Underground Storage Tanks (USTs)

There are two 10,000 gallon USTs known to be present on OU No. 4. These USTs are located southeast of the Former Gas Station building. State tank registration forms indicate that no information is known about these two USTs, but also identifies a third UST to be present on the OU No. 4 site that was not found during the RI field work. The USTs were reported to have last been used in 1983 and the date of installation is not known. Reportedly all three tanks were emptied and purged in August 1989. During a file review, a separate UST was noted on a RSR Corporation construction map dated 1982. The location of this tank is between the Bath House and Hog Storage Building. This is the only site map to be located that indicates the presence of a fourth UST. There are no visible signs of an UST on the pavement surface in the area indicated on the construction map. It is not known if this fourth tank has been removed or was abandoned in-place.

K. Nature and Extent of Contamination

As part of the RI, all potential sources and areas of contamination were investigated. These areas included al of the surfaces and floors of the buildings, structures and equipment, residual and process piles, the surface and subsurface soils, the stormwater runoff and sediments located in the floor drains and sumps, the USTs and the ground water. Samples were collected and analyzed from each of these areas to evaluate the nature and extent of contamination. Migration to the subsurface soils and the ground water was also investigated through exploratory borings and the installation of ground water monitoring wells.

A summary of the findings of the RI and the non-time critical removal action is provided in the discussions below, however as stated previously, all of this information can be found in detail in the Remedial Investigation Report and supporting Technical Memorandums, which are all part of the Administrative Record for OU No. 4.

1. Buildings and Structures Results

One-hundred and eighty-five bulk samples of building materials were analyzed for the presence of asbestos. Nonfriable asbestos was detected in materials located in all of the onsite buildings and stack with the exception of the Former Gas Station where no asbestos containing materials was identified. The only detected friable asbestos was approximately one cubic yard of soil debris in the Smelter Stack, and three linear feet of pipe insulation and three mudded pipe joints in the Hog Storage Building. Under present conditions, mobilization of asbestos that is present within these structures could be caused by human activities, but is considered unlikely. However, should these structures fail due to structural instability, asbestos could be released.

Supplemental dust sampling was necessary to confirm contamination on all OU No.4 buildings, as described in the Proposed Plan. In May 1995, three dust samples from each process-related building (e.g., Smelter Facility, Batch House, Hog Storage Building) and two dust samples from each non-process-related buildings (all other buildings) were collected using a high-volume dust sampler and analyzed for the Total Analyte List (TAL) metals. In addition, during the field investigation in the spring of 1994, eighty-six X-ray Fluorescence (XRF) readings on building surfaces (e.g. walls and floors) were taken on the process-related buildings.

The dust samples collected as part of the supplemental sampling indicated, arsenic concentrations ranging from 17 parts per million (ppm) to 22,300 ppm, cadmium ranging from 12 ppm to 1,270 ppm and lead ranging from 1,170 ppm to 311,000 ppm. Antimony concentrations were as high as 11,400 ppm. Figure 4 shows the sampling locations and results for lead, cadmium and arsenic.

The XRF data from the process related buildings walls and concrete floors also indicated extensive contamination from lead, cadmium and arsenic. In the Smelter Facility maximum concentrations detected were 143,466 ppm, 6,310 ppm and 23,847 ppm of lead, cadmium and arsenic, respectively. The Batch House XRF data showed maximum concentrations of 90,133 ppm, and 4,612 ppm and 12,080 ppm of lead, cadmium and arsenic, respectively. The concentrations detected using XRF in the Hog Storage building for lead, cadmium and arsenic were as high as 60,165 ppm, 455 ppm, and 7,218 ppm, respectively.

One dust sample was collected from loose material from the floor of the inner stack and the concentration of lead, cadmium and arsenic was 29,000 ppm, 190 ppm and 39,000 ppm, respectively. Antimony was reported at an estimated concentration of 11,700 ppm in a dust sample near the stack. Two samples of the brick lining and residual material on that lining were also collected at a height of approximately 25 feet and 160 feet. At the 25 foot height in the stack, total lead, cadmium and arsenic was detected at 44,000 ppm, 870 ppm and 140,000 ppm, respectively. The concentrations detected at the 160 foot height were slightly less. The samples collected for Toxicity Characteristic Leaching Procedure (TCLP) analysis indicated both lead and arsenic concentrations exceeded the criteria for definition of a hazardous waste by the characteristic of toxicity (i.e. 5.0 ppm for both lead and arsenic).

Other samples of residual materials in and around the buildings and structures were also collected. These included samples of diatomaceous earth, refractory brick, and dust. The results of these samples were used to support the non-time critical removal action conducted in June and July 1995 (described fully in Section V.K.6). The lead concentrations present in these materials were as high as 287,000 ppm, while maximum arsenic and cadmium concentrations were 120,000 ppm and 43,000 ppm, respectively. The maximum antimony detected in the residual material was an estimated 60,000 ppm. Note, there are several areas within the equipment /piping located in the smelter facility that contain residual material that were not addressed as part of the non-time-critical removal action.

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As stated previously in Section V.J.2 all of the onsite buildings, structures and equipment are in advanced stages of disrepair and deterioration. This combined with the elevated concentrations of lead, cadmium and arsenic present on and within the buildings, structures and equipment surfaces give rise to potential releases or migration of contamination. Precipitation and/or high winds could cause re-suspension of the depositions on the buildings, structures and equipment surfaces as fugitive dust. Inadvertent human activities could also potentially cause the re-suspension of these depositions. Subsequent transfer of the contamination by air or stormwater runoff is also likely.

2. Stormwater and Sediment Results

Stormwater runoff samples were also collected from OU No. 4 to determine the nature and extent of affected stormwater. Figure 5 illustrates the surface drainage flow direction and the elevated concentrations of lead, cadmium and arsenic detected in the samples. Dissolved concentrations of detected metals were relatively low. However, the total metal concentration of lead, cadmium and arsenic were higher and were 2.09 ppm, 0.255 ppm and 0.067 ppm, respectively.

Although dissolved metal concentrations were lower than total concentrations, stormwater appears to be a potential transport medium for metals associated with surface soil, sediments, and residual materials on pavement and structure surfaces. Metals associated with these materials are likely entrained within stormwater runoff as suspended solids, transferred downgradient and redeposited as sediment at locations where stormwater is allowed to pond.

Eleven sediment samples from various locations were collected both inside and outside of OU No. 4 structures. Some of the samples were collected from manmade structures such as trench drains, spalled concrete, sumps and the smelter kettle basin. All samples exhibited elevated levels of lead, cadmium and arsenic levels were as high as 506 ppm and 4,450 ppm, respectively. See Figure 6.

The sediment results indicated a widespread distribution of site-related contaminants associated with affected sediments in runoff across the site. Sediments likely represent a continuous source for potential offsite migration via re-entraiment in stormwater runoff. Re-suspension of exposed, surface sediment depositions as fugitive dust could also occur due to high winds or inadvertent human activities.

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<IMG SRC 0696099G>

3. Surface Soils (0-2 feet) Results

Six surface soil samples were collected from the unpaved, exposed area in the northeast portion of OU No. 4. All the samples exhibited elevated concentrations of lead, cadmium and arsenic. Detected levels of lead were as high as 83,100 ppm, while cadmium and arsenic concentrations were as high as 760 ppm and 5,090 ppm,respectively.

These results indicate a widespread distribution of site-related contaminants associated with affected surface soils in the northeast unpaved area that was probably attributable to process waste staging/disposal activities. The surface soils likely represent a continuous source for potential offsite migration via re-entrainment in stormwater runoff. Re-suspension of soil as fugitive dust could also occur due to high winds or inadvertent human activities.

4. Subsurface Soils (greater than 2 feet) Results

Subsurface soil samples at various depths across OU No. 4 were collected and analyzed to determine the vertical extent of soils contamination from past smelting operations. The locations of soil and geoprobe borings from which subsurface samples were collected as well as the detected lead, cadmium and arsenic concentrations are presented in Figure 7. The highest concentrations of lead, cadmium and arsenic were detected in the shallowest subsurface soil horizon of 2 to 5 feet below ground surface (bgs). Maximum metal concentrations within this soil horizon are 26,700 ppm, 9.1 ppm, and 175 ppm for lead, cadmium and arsenic, respectively. However, the distribution within this soil horizon was highly variable, with the concentrations for lead ranging from 4.4 ppm to 26,700 ppm.

There was no apparent pattern to the observed areal distribution of metals contamination in the subsurface. This variability may be due to a combination of factors including the construction activities during the operational years of smelter facility that affected the original deposition of stack emissions.

Volatile organic compounds and some semi-volatile organic compounds were detected in the subsurface soils only in the northwest area of OU No. 4 and are thought to be associated with the Underground Storage Tanks in that area.

Subsurface soils potentially represent a source of contamination migration via entrainment or dissolution by infiltrated precipitation and subsequent vertical percolation to the shallow alluvial deposits.

<IMG SRC 0696099H>

5. Ground water Investigation Results

The Eagle Ford Group (shale with occasional thin stratum of sandstone, limestone and bentonite) overlies the Woodbine Aquifer, and outcrops in the vicinity of OU Nos. 4 and 5. These formations dip to the east and OU Nos. 4 and 5 are situated over the top of the Eagle Ford shale, near the unconformable boundary between the Eagle Ford and the overlying Austin Chalk. As a result the full thickness of the Eagle Ford Group (200 - 250) is expected to be present beneath OU Nos. 4 and 5.

The soil borings drilled on OU Nos. 4 and 5 generally encountered fill material and alluvial material consisting of clays, silts, or sands to a depth of 10 to 25 feet bgs, at which depth of the sometimes weathered Eagle Ford shale was encountered. During the RI investigation, shallow ground water monitoring wells were installed at seven locations across OU No. 4. These monitoring wells were completed to depths of 12.3 to 25.7 feet bgs. Ground water elevations and samples were collected from these monitoring wells at two separate events in May 1994 and in June 1994. A supplemental ground water investigation was also conducted to enhance the characterization of the shallow alluvial aquifer in June 1995 (after the issuance of the Proposed Plan). This investigation involved collecting another round of ground water samples from each monitoring well and performing slug tests on each well to estimate in-situ hydraulic conductivity of the water bearing strata.

The ground water elevations during the May 1994 sampling event indicated a northwest-trending gradient. Lead was detected in a range of 1.2 parts per billion (ppb) to 2,250 ppb, while concentrations of arsenic ranged from Non-Detect (ND) to 77 ppb. While the results from the second round of sampling in June 1994 indicated significantly lower lead concentrations, ranging from ND to 646 ppb. Cadmium was not detected in either round of sampling. The lower second round concentrations coincide with a lower level of Total Suspended Solids (TSS) compared to the previous round, suggesting that majority of the metals contamination is associated with particulate material. See Figure 8.

The results from supplemental ground water investigation in June/July of 1995 indicated lower lead and arsenic concentrations than previous sampling events. The results from the slug tests indicated that the monitoring wells demonstrated relatively low yield, with the majority of the wells bailed dry during purging activities. The yield estimated from the water level changes documented during the slug tests, and based on that data, the expected yield for the shallow alluvial aquifer appears to be significantly less than 1 gallon per minute at most locations. In addition, this yield could not be maintained at any one location for any period of time, since most wells were purged dry in a relatively short time period.

<IMG SRC 0696099I>

6. Non-time critical removal action

EPA commenced the removal action at OU Nos. 4 and 5 on May 30, 1995 and completed all work by July 14, 1995. Waste materials present at 90 residual/debris piles and drum locations were remediated during the removal. This included more than 600 drums of waste material, and more than 60 containers of waste laboratory chemicals. This resulted in a total of over 740 cubic yards of consolidated waste being manifested to a hazardous waste landfill for stabilization or

encapsulation; 1700 gallons of hazardous liquids manifested to an incineration facility; 20 cubic yards of debris sent to a class I nonhazardous landfill; more than 15,500 gallons of collected rainwater and drummed monitoring well water permitted for discharge into the sanitary sewer system; 22 lab packs of chemicals manifested to an incineration facility; one box of medical waste sent to a medical incineration facility; and 11 gas cylinders and 8 lead/acid batteries recycled. All of the materials were removed from OU Nos. 4 and 5 and disposed in accordance with the requirements specified in EPA's Action Memorandum, dated December 22, 1994.

As part of the removal action, testing of the surfaces once a residual waste/debris pile was removed was performed to document the concentration of the surfaces following removal. This testing was performed using a field portable Spectrace 9000 x-ray fluorescence (XRF) instrument. The lead concentrations on the OU No. 4 surfaces following removal ranged from 3050 ppm to 175,681 ppm, arsenic concentrations ranged from 801 ppm to 51,077 ppm and cadmium ranged from 84 ppm to 7,407 ppm. These results indicate elevated levels of lead, arsenic and cadmium are still present on the concrete floors of the buildings, structures and equipment.

VI. SUMMARY OF SITE RISKS

A. Risk Assessment Description

An evaluation of the potential risks to human health and the environment from OU No. 4 contaminants was conducted as part of the baseline risk assessment. The risk assessment was conducted as part of the RI. The baseline risk assessment is an analysis of the potential adverse human health effects (both current and future) resulting from exposures of humans to hazardous substances present on OU No. 4. By definition, a baseline risk assessment evaluates risks than may exist under the no-action alternative (that is, in the absence of any remedial actions to control or mitigate releases). The baseline risk assessment provides the basis for taking the remedial action and indicates the exposure pathways that need to be addressed by the remedial action.

The Summary of Site Risks section of the ROD summarizes the results of the baseline risk assessment. Calculations and a more detailed analysis may be found in the baseline Human Health Risk Assessment and Ecological Risk Assessment reports for OU No. 4, contained in the Administrative Record for OU No. 4.

B. Human Health Risks

The baseline risk assessment was divided into two parts: the human health evaluation and the ecological evaluation. The baseline risk assessment for the human health risks was based on Reasonable Maximum Exposure (RME). The human health evaluation considered all contaminated media, such as the buildings, structures and equipment surfaces (residual materials), sediments (located in the floor drains, sumps as part of the concrete pads) and the soils. The baseline risk assessment assumed that the reasonably anticipated future land use of OU No. 4 would be commercial/industrial, based on the City of Dallas current zoning map. Therefore, the potential risk to the following populations that most likely to be exposed at OU No. 4 are:

Current and Future onsite trespassers
Future Commercial/Industrial Worker

Note, there is visual evidence of trespass (e.g. graffiti, etc.) at OU No. 4, despite fences, and warning signs. Furthermore, the reasonably anticipated future use of the OU No. 4 site is commercial/industrial, based on the current zoning map for the City of Dallas. The risk assessment conducted at OU No. 4 of the RSR site was done in accordance with EPA guidance, specifically the Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation

Manual (Part A) (Interim Final, EPA/540/1-89/002, December 1989). The major components of the baseline risk assessment are: identification of contaminants of concern, exposure assessment, toxicity assessment, and risk characterization. Highlights of the findings for the major components of the risk assessment for the site are summarized below.

C. Identification of Chemicals of Potential Concern

The samples collected as part of the field investigation and analyzed through the Contract Laboratory Program (CLP) were used in the risk assessment to estimate risks to human receptors at OU No. 4. This includes data for soil, sediments and residual piles. Ground water results were not used quantitatively in the risk assessment (see rationale in Section D. Exposure Assessment).

Concentrations of metals detected in surface soil samples were compared to regional background soil concentrations. Metals were evaluated to determine potential chemicals of concern (COPCs) for use in the HHRA. The COPCs identified for the site are listed in Table 1.

D. Exposure Assessment

The objective of the exposure assessment is to estimate the type, magnitude, frequency, duration and route of exposure of the contaminants of concern. The contaminant sources are as a result of past operations are soil, sediment and residual materials in the buildings that contain COPCs. The COPCs are released through physical/chemical processes that include, leaching, precipitation-induced runoff, wind entrainment or direct contact.

Shallow ground water in the area of OU No. 4 is not being used as a potable water supply, nor is it expected to be used as a water supply, therefore, ingestion of ground water is not considered a complete pathway for purposes of this risk assessment. Drinking water is provided by the City of Dallas through a series of surface water reservoirs. The nearest public supply well is about 3,750 feet east of the intersection of Westmoreland Road and Singleton Boulevard. This City of Dallas well is capped and no longer used as a public water supply. The well is approximately 2,540 feet deep. The following exposure scenarios and pathways were quantitatively evaluated in the HHRA:

- Current and Future Onsite Trespassers (children and adults) - Incidental ingestion of soil and residual dust, inhalation of resuspended particulate, and dermal contact with soil and residual building materials.

- Future Commercial/Industrial Worker- Incidental ingestion of soil and residual dust, inhalation of resuspended particulate, and dermal contact with soil and residual building materials.

Exposure scenarios were evaluated using standard EPA default exposure parameters for average (typical) and Reasonable Maximum Exposure (RME) conditions. RME is defined as the "highest exposure that is reasonably expected to occur at a site. The intent of the RME is to estimate a conservative exposure case. Trespasser and commercial exposure scenarios evaluated in the HHRA used standard EPA default exposure parameters for average (typical) and RME scenarios. These parameters are presented in Table 2.

At the present time, EPA does not have an approved model for estimating blood-lead levels in adults that are exposed to environmental sources of lead. Consequently, for this HHRA, lead exposure to adults (trespasser and commercial/industrial worker scenarios) was estimated using a screening-level model developed by Bowers et. al. (1994). This model uses a biokinetic slope factor derived from the work of Pocock et. al. (1983), who measured blood-lead levels in over

7,000 middle-aged men in 24 British towns, to estimate blood-lead levels of adults exposed to environmental sources of lead. The study yielded a biokinetic slope factor of 0.375 µg/dL blood-lead per µg/day lead uptake. Blood-lead results from the Bowers model for the adult exposure scenarios were compared to the OSHA "permissible" blood-lead level of 40 µg/dL. OSHA specifies that lead-exposed workers with blood-lead levels above 40 µg/dL require further medical monitoring or workplace intervention. For the purposes of this HHRA, 40 µg/dL was used as a screening level permissible blood-level for adults.

Table 1
Chemicals of Potential Concern
RSR Corporation Superfund Site
Operable Unit No. 4

COPC	Medium: Surface Soil	Residual Piles	
Metals			
Aluminum		X	
Antimony	X	X	
Arsenic		X	X
Barium			X
Beryllium		X	
Cadmium		X	X
Chromium	X	X	
Cobalt		X	X
Copper		X	X
Lead	X	X	
Manganese	X	X	
Mercury		X	X
Nickel		X	X
Selenium	X	X	
Silver		X	X
Thallium	X	X	
Vanadium		X	
Zinc	X	X	

Table 2
Exposure Assumptions
RSR Corporation Superfund Site
Operable Unit No. 4

Exposure Parameter	Trespasser-Child		Trespasser-Adult		Commercial/Industrial-Adult	
	Reasonable Typical Exposure	Maximum Exposure	Reasonable Typical Exposure	Maximum Exposure	Reasonable Typical Exposure	Maximum Exposure
Daily Soil Ingestion Rate (mg/day)	50	100	50	100	25	50
Daily Inhalation Rate (m3/day)	20	20	20	20	20	20
Exposure Frequency (days/year)	52	52	52	52	250	250
Exposure Duration (years)	10	10	10	10	9	25
Body Weight (kg)	43	43	70	70	70	70
Averaging Time-Noncancer (years)	10	10	10	10	9	25
Averaging Time-Cancer (years)	70	70	70	70	70	70

Sources: EPA, 1989a; EPA, 1989b; EPA, 1991a; and EPA, 1992a.

E. Toxicity Assessment

The toxicity assessment involves identifying the COPCs which may cause adverse health effects in exposed individuals. The toxicity assessment seeks to develop a reasonable appraisal of the associations between the degree of exposure to a chemical and the possibility of adverse health effects. Whether or not a toxic response occurs depends on the chemical and physical properties of the toxic agent, the degree of exposure to the agent, and the susceptibility of an individual to the particular effect. To characterize the toxicity of a particular chemical, the type of effect it can produce and how much is needed to produce that effect must be known.

For purposes of the risk assessment, health effects are divided into two categories; noncancer and cancer effects. Noncancer health effects include a variety of toxicological end points and may include effects on specific organs or systems, such as the kidney, liver, nervous system and lungs. There are two categories of noncancer health effects, acute or subchronic, which are short-term, and chronic, which are long-term. Some chemical exposures that result in, or are suspected in the development of cancer and are referred to as carcinogens. EPA's carcinogen classification scheme, using a weight of evidence approach to determine the likelihood of a chemical's carcinogenic potential in humans, is described below.

Category	Meaning	Basis
A	Known human carcinogen	Sufficient evidence of increased cancer incidence in exposed humans.
B1	Probable human carcinogen	Sufficient evidence of increased cancer incidence in animals, with suggestive evidence from studies of exposed humans.
B2	Probable human +-carcinogen	Sufficient evidence of increased cancer incidence in animals, but lack of data or insufficient data from humans.
C	Possible human carcinogen	Suggestive evidence of carcinogenicity in animals.
D	Cannot be evaluated	No evidence or inadequate evidence of cancer in animals to humans.
E	Noncarcinogen	Evidence of noncarcinogenicity or humans.

Toxicity values are quantitative expressions of the dose-response relationship for a chemical and are expressed as cancer slope factors and noncancer reference doses, both of which are specific to the route of exposure. The chronic reference doses (RfDs), which are expressed in terms of mg/kg-day are presented in Table 3 for the chemicals of concern for the OU No. 4 site. The dose-response relationship for cancer effects is expressed as a cancer slope factor (SF), which is the upper-bound estimate of the probability of a response per unit intake of a chemical over a lifetime. The SFs for the chemicals of concern at the OU No. 4 site are described in Table 4 and are expressed as the inverse of mg/kg-day.

F. Human Health Risk Characterization

The risk of cancer from exposure to a chemical is described in terms of the probability that an individual exposed for his or her entire lifetime will develop cancer by age 70. For carcinogens, risks are estimated as the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

where:

risk = a unit less probability (e.g., 2 X 10-5) of an individual developing cancer;

Table 3
Toxicity Values-Noncancer Health Effects
RSR Corporation Superfund Site
Operable Unit No. 4

Chemical	Critical Effect	Systemic Toxicity (mg/kg/day) Chronic Reference Dose (RfD) Oral	Source	Inhalation (b)	Source
Inorganics					
Aluminum	--	2.9	ECAO	--	--
Antimony	Blood glucose, cholesterol	0.0004	IRIS	--	--
Arsenic	Keratosis, hyperpigmentation	0.0003	IRIS	--	--
Barium	Increased blood pressure	0.07	IRIS	0.00014	HEAST
Beryllium	Organ changes, decreased body weight	0.005	IRIS	--	--
Cadmium (food)	Proteinuira	0.001	IRIS	--	--
Cadmium (water)	Proteinuira	0.0005	IRIS	--	--
Chromium III	None observed	1	IRIS	--	--
Chromium IV	Increase in tissue chromium connection	0.005	IRIS	--	--
Cobalt	--	--	--	--	--
Copper	Gastrointestinal irritation	0.037	HEAST	--	--
Lead	--	(c)	--	--	--
Manganese (food)	CNS	0.14	IRIS	0.000014	IRIS
Manganese (water)	CNS	0.005	IRIS	0.000014	IRIS
Mercury	CNS, kidney	0.0003	HEAST	0.000086	HEAST
Nickel (soluble salts)	Decreased body/organ weight	0.02	IRIS	--	--
Selenium	Hair/nail loss, dermatitis	0.005	IRIS	--	--
Silver	Argyria	0.005	IRIS	--	--
Thallium (e)	Increased SGOT (liver), increased serum LDH (blood), alopecia (hair)	0.00008	IRIS	--	--
Vanadium	Renal	0.007	HEAST	--	--
Zinc	Anemia	0.3	IRIS	--	–

HEAST = Health Effects Assessment Summary Tables (1994).
IRIS = Integrated Risk Information System (1994).
-- = Information not available.
CNS = Central Nervous System.
(a) Derived from subchronic inhalation reference concentration (RfC).
(b) Derived from chronic inhalation reference concentration (RfC).
(c) EPA work group considered it inappropriate to develop an RfD for inorganic lead.
(d) Toxicity values correspond to nitrite.
(e) Toxicity values correspond to thallium chloride.

Table 4
Toxicity Values-Cancer Health Effects
RSR Corporation Superfund Site
Operable Unit No. 4

Chemical	Weight of Tumor Site	Evidence	Carcinogenic Potency (mg/kg/day)-1 Oral Slope Source	Oral Slope Factor	Inhalation Slope Source	Inhalation Slope Factor	Inhalation Slope Source
Inorganics							
Aluminum	--	--	--	--	--	--	
Antimony	--	D	DWHA	--	--	--	
Arsenic	Lung	A	IRIS	1.75	EPAd	15	IRIS
Barium	--	D	DWHA	--	--	--	--
Beryllium	Lung, Bone	B2	IRIS	4.3	IRIS	8.4	IRIS
Cadmium	Lung	B1	IRIS	--	--	6.3	IRIS
Chromium III	D	DWHA	--	--	--	--	
Chromium VI	Lung	A	IRIS	--	--	42	IRIS
Cobalt	--	--	--	--	--	--	--
Copper	--	D	IRIS	--	--	--	--
Lead	Kidney	B2	IRIS	--	--	--	--
Manganese	--	D	IRIS	--	--	--	--
Mercury	--	D	IRIS	--	--	--	--
Nickel (refinery dust)	Respiratory System	A	IRIS	--	--	0.84	IRIS
Selenium	--	D	IRIS	--	--	--	--
Silver	--	D	IRIS	--	--	--	--
Thallium	--	D	DWHA	--	--	--	--

Table 4
Toxicity Values-Cancer Health Effects
RSR Corporation Superfund Site
Operable Unit No. 4

Chemical	Carcinogenic Potency (mg/kg/day)-1						
	Weight of Tumor Site	Evidence	Oral Slope Factor Source	Oral Slope Factor	Oral Slope Factor Source	Inhalation Slope Factor	Inhalation Slope Factor Source
Vanadium	--	--	--	--	--	--	--
Zinc	--	D	IRIS	--	--	--	--

HEAST = Health Effects Assessment Summary Tables.
IRIS = Integrated Risk Information System.
-- = Information not available.

aWeight of Evidence Groups: A is Human Carcinogen; B is Probable Human Carcinogen (B1-limited evidence of carcinogenicity in humans, B2-sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans); C is Possible human Carcinogen; D is not Classifiable as to Human Carcinogenicity.

bDerived from unit risk factor assuming an inhalation rate of 20 m3/day and a 70 kg bodyweight.

cDrinking water Health Advisory. USEPA Office of Drinking Water. April 1992.

dArsenic oral slope factor from: Special Report on Ingested Inorganic Arsenic, July 1988, EPA/625/3-87/013.

eDrinking Water Health Advisory. USEPA Office of Drinking Water. January 1987.

CDI = chronic daily intake averaged over 70 years (mg/kg-day); and

SF = slope-factor, expressed as (mg/kg-day)-1

These risks are probabilities that are generally expressed in scientific notation (e.g., 1 x 10-6). An excess lifetime cancer risk of 1 x 10-6 indicates that, as a reasonable maximum estimate, an individual has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions at a site.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., lifetime) with a reference dose derived for a similar exposure period. The ratio of exposure to toxicity is called the hazard quotient. By adding the hazard quotients for all contaminants of concern which affect the same target organ (e.g., liver) within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated.

The HQ is calculated as follows:

Non-cancer HQ = E/RfD
where:

E = Daily Intake (either chronic or sub-chronic)

RfD = reference dose; and

E and RfD are expressed in the same units and represent the same exposure period (e.g., chronic, subchronic, or short-term).

A summary of risks across all exposure pathways and exposure scenarios evaluated in the OU No. 4 risk assessment is included in Table 5. According to the assumptions used in this evaluation, most of the total cancer risks and noncancer risks exceed EPA's acceptable risk range of 1 x 10-4 to 1 x 10-6 for carcinogens and a HI greater than one for noncarcinogens. These criteria are the "points of departure" for risk management decisions as described in the NCP.

In the OU No. 4 risk assessment, among all receptor groups, incidental ingestion of soil and residual material contributes the greatest percentage of the overall risk (90 percent on average) compared to the other pathways. Ninety-nine percent of the cancer risk from this pathway may be attributable to arsenic. Similarly, for noncancer risks, ingestion of arsenic is the greatest contributor to the total HI (67 percent), however, antimony and cadmium also had HI's greater than one.

Risk from exposure to lead in soil within OU No. 4 was evaluated for adult trespassers and workers. Children who trespass were not quantitatively evaluated for exposure to lead, due to the lack of an appropriate model.

Table 5
Summary of Risks
RSR Corporation Superfund Site
Operable Unit No. 4

Exposure Scenario	Adult (Typical) Riska	HIb	Adult (RME) Riska	HIb	Child (Typical) Riska	HIb	Child (RME) Riska	HIb
Trespasser	3 X 10-3	63	6 X 10-3	130	5 X 10-3	100	1 X 10-2	210
Worker (Process)	8 X 10-3	150	4 X 10-2	340	NA	NA	NA	NA
Worker (Nonprocess)	5 X 10-5	1.7	3 X 10-4	3.4	NA	NA	NA	NA

NA = Not applicable for this scenario.

aValues shown have been adjusted to show one significant figure.
bValues shown have been adjusted to show two significant figures.

An EPA-derived or accepted procedure for modeling adult exposure to lead is currently unavailable; however, models have been proposed for evaluating adult lead risks. For this risk assessment, adult lead exposure was evaluated by calculating a blood-level for trespassers, and both future process- and nonprocess-related workers using a model developed by Bowers, et al. (1994). The results of the model predict that the blood-lead levels for these receptors range from 6 µg/dL (trespasser) to 78 µg/dL (future nonprocess-related worker) based on geometric mean concentrations of lead for each exposure area. The predicted blood-lead levels for the future process-related worker is 56 µg/dL. Predicted the OSHA "permissible" blood-level level is 40 µg/dL. Predicted blood-lead levels for workers exceed the OSHA benchmark.

G. Uncertainties Associated with Human Health Risk Calculations

Within the Superfund process, baseline quantitative risk assessments are performed in order to provide risk managers with a numerical representation of the severity of contamination present at a site, as well as to provide an indication of the potential for adverse public health effects. There are many inherent and imposed uncertainties in the risk assessment methodologies. Table 6 summarizes the uncertainty and the potential bias in the risk estimates.

H. Ecological Risks

An ecological risk assessment (ERA), was also conducted for OU No. 4 environment to quantitatively determine the actual or potential effects to plants and animals onsite. The ERA was conducted as a part of the RI in order to evaluate if the COPCs from the smelter facility pose a risk to the environment in the absence of remedial action. A summary is provided in the following paragraphs.

OU No. 4 includes a very small (less than 1.2 acre) terrestrial habitat in the northeast corner of the facility. The remaining area of OU NO. 4 is covered by asphalt and occupied by various structures. An investigation was first conducted to determine the occurring ecological receptor populations. It was noted that opportunistic mammals (rats and house mice) occupied the buildings, along with pigeons. The terrestrial ecology habitat was occupied by hispid cotton rats, house mice, robins, grass species and several cottonwood trees. A quantitative assessment of the terrestrial habitat area risk was then conducted. The exposure and risk to plants, soil invertebrates, mice and robins was determined by a toxicity evaluation approach. This approach entailed the evaluation of site exposure conditions by comparison of exposure point concentrations to literature-derived toxicity values. This is a conservative screening approach which serves to identify the predominant COPCs contributing to site ecological risk.

Table 6
Uncertainties Associated With Human Health Risk Estimations
RSR Corporation Superfund Site
Operable Unit No. 4

Uncertainty Factor	Effects of Uncertainty	Comment
I. Exposure Assessment		
Exposure assumptions	May under- or overestimate risk	Assumptions regarding media intake, population characteristics, and exposure patterns may not characterize exposures.
Use of applied dose to estimate risks	May over- or underestimate risks	Assumes that the absorption of the chemical is the same as it was in the study that derived the toxicity value. Assumes that absorption is equivalent across species (animal to humans). Absorption may vary with age and species.
Population characteristics	May over- or underestimate risks	Assumes weight, lifespan, ingestion rate, etc., are potentially representative for a potentially exposed population.
Intake	May underestimate risks	Assumes all intake of COPC is from the exposure medium being evaluated (no relative source contribution).

II. Toxicity Assessment

Slope factor	May overestimate risks	Slope factors are upper 95th percent confidence limits derived from a linearized model. Considered unlikely to underestimate risk.
Toxicity values derived from animal studies	May over- or underestimate risks	Extrapolation from animal to humans may induce error because of differences in pharmacokinetics, target organs, and population variability.
Toxicity values derived primarily from high doses; most exposures are at low doses	May over- or underestimate risks	Assumes linear at low doses. Tends to have conservative exposure assumptions.

Table 6
Uncertainties Associated With Human Health Risk Estimations
RSR Corporation Superfund Site
Operable Unit No. 4

Uncertainty Factor	Effects of Uncertainty	Comment
II. Toxicity Assessment (Continued)		
Toxicity values	May over- or underestimate risks	Not all values represent the same degree of certainty. All are subject to change as new evidence becomes available.
Toxicity values derived from homogeneous animal populations	May over- or underestimate risks	Human populations may have a wide range of sensitiveness to a chemical.
Not all chemicals at the site have toxicity values	May underestimate risks	These chemicals are not addressed quantitatively.
III. Risk Estimation		
Estimation of risks across exposure routes	May under- or overestimate risk	Some exposure routes have greater uncertainty associated with their risk estimates than others.
Cancer risk estimates-no threshold assumed	May overestimates risks	Possibility that some thresholds do exist.
Cancer risk estimate-low dose linearity	May overestimate risks	Response at low doses is not known.
Adult lead exposure quantified using Bower, et al. (1994)	May under- or overestimate risk	Model used has not been formally adopted for use by EPA to assess adult lead exposure. Until the model is validated, the results should be viewed as uncertain.

COPCs for the terrestrial habitat area were selected by a frequency of detection and background concentration screen. All analytes detected (>1%) were retained for further analysis. The maximum-observed concentration was then compared to appropriate area-wide background concentrations for COPC determination. Results of the background comparison indicated that the occurrence of aluminum, barium, beryllium, silver and vanadium were below background and were therefore excluded from further evaluation within the ERA. In addition, common elements of calcium, iron, magnesium, potassium and sodium were also excluded from the analysis.

A reasonable maximum exposure (RME) point concentration was derived from the results of the surface soils analysis of the terrestrial habitat area. The derived 95% upper confidence limit (95% UCL) of the chemical analysis results was used as the exposure point concentration for all potential COPCs with the exception of selenium, in which the maximum observed concentration was more appropriate (since the maximum was below the 95% UCL).

For the determination of risk to plants and invertebrates, the soil RME values were compared directly to literature-derived toxicity values. For the determination of risk to mammals and birds, the RME values were first evaluated to determine exposure dose. This was achieved by a quantitative, conservative evaluation of dose received by the organism through the direct uptake of COPCs through incidental soil ingestion, added to the dose received by the ingestion of contaminated food sources (ie. plants and invertebrates). These dose calculations were based upon conservative bioaccumulation assumptions. The derived cumulative dose received by the target receptor (small mammal and bird) was then compared to literature derived dietary no observed adverse effect levels (NOAELS) and lowest adverse effect levels (LOAELs) for the determination of a risk range.

The quantitative evaluation of risk was conducted by a hazard quotient method. The derived dose (for small mammals and birds) was divided by the appropriate the NOAEL and the LOAEL, while the RME soils concentration was divided by the appropriate literature-derived protective level for plants and soil invertebrates. If the resulting quotient was greater than 5, the analyte was considered a final COPC for that receptor.

Results indicate that numerous inorganic chemicals are present that can cause risk to the birds, mammals and plants. Risk to invertebrates was minimal. The RME concentration of lead (61,671 ppm), for example, was well above risk-based levels for bird, mammal and plant receptors. The OU No. 4 site itself is severely disturbed, and the occurring ecology is possibly more affected by physical site disturbances which have created the occurring ecological structure. These physical factors in conjunction with the site COPC occurrence pose pose a risk to the onsite ecology.

I. Risk Assessment Conclusions

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. REMEDIAL ACTION GOALS

The results of the field investigation and engineering analyses have identified the following contaminant source areas on OU No. 4 of the RSR site and the associated affected media:

Area of Concern	Media
Onsite Building/Structures Smelter Stack/Equipment	Dust, residual materials, sediments, stormwater runoff
Soils	
- Northeast unpaved area	Surface soils (0-2 feet)
- Other soils beneath pavement	Subsurface soils (1 foot beneath pavement)

Principal threat wastes are those source materials considered to be highly toxic of highly mobile that generally cannot be reliably controlled and that present a significant risk to human health or the environment should exposure occur. The principal threats at OU No. 4 of the RSR site are the arsenic, cadmium and lead contaminated dust and residual materials present on and within the buildings, structures, and equipment, including the smelter stack. These areas present the most significant risk at the site, due the potential for exposure through direct contact, inhalation and incidental ingestion of arsenic, cadmium, antimony and lead contaminated materials. There is also a potential for increased risk due to the migration of these contaminants, as evidenced by the elevated concentrations of arsenic, cadmium and lead in the sediment and stormwater.

Low level threats are those source materials that generally can be reliably managed with little likelihood of migration and present a low risk in the event of exposure. The low level threats at the site are the contaminated soils in the unpaved northeast area and the subsurface soils beneath the paved area. The arsenic, cadmium and lead contamination present in these areas are less mobile and have a reduced migration potential due to the chemical and physical properties of the soils.

As stated previously, due to lack of additional ground water data at the time EPA issued the Proposed Plan for OU No. 4 the ground water was not addressed in the proposal and therefore is not included as part of this decision for OU No. 4. The ground water portion of OU No. 4 will be evaluated and addressed concurrently with OU No. 5, which is located across the street from OU No. 4.

As discussed in the Section VI. SUMMARY OF SITE RISKS, the arsenic contributed most significantly to the carcinogenic risk at the site and cadmium and antimony contributed greatly to the noncarcinogenic risk. Furthermore, lead concentrations are present at unacceptable levels based on the modeling done in the risk assessment.

The remedial action objectives for OU No. 4 of the RSR site are to minimize exposure to the arsenic, cadmium and lead present in the buildings, structures, smelter stack and equipment and soils by direct contact, inhalation and ingestion, and to reduce the potential for migration of these contaminants. In order to meet these remedial objectives, remedial action goals for arsenic, cadmium, antimony and lead in the buildings, structures and equipment and lead and arsenic present in the soils have been established. For the purposes of this document, the remedial action goals are the same as action levels. These action levels are used as a "trigger" to initiate an action. The remedial action goals are outlined below and again as cleanup goals in the Selected Remedy Section of this document.

Remedial Action Goals or Cleanup Levels:

Buildings, Structures, Smelter Stack & Equipment

> Eliminate the potential for incidental ingestion, and/or dermal contact with contamination with arsenic in excess of 32.7 ppm, antimony in excess of 818 ppm, cadmium in excess of 2,044 ppm and/or lead in excess of 2,000 ppm by onsite and offsite receptors.

Area Soils (Up to 2 feet)

> Eliminate the potential for incidental ingestion, and/or dermal contact with contamination with arsenic in excess of 32.7 ppm and/or lead in excess of 2,000 ppm by onsite and offsite receptors.

The action level for arsenic is based on the 1X10-5 risk, since the 1X10-6 level corresponds to a level lower than background. The action levels for antimony and cadmium are based on reducing the risk to 1X10-6. The action level for lead is based on input of site specific data into the Adult Lead Exposure Model (See Appendix B), which is the latest available model for estimating non-residential lead exposure. The Adult Lead Exposure Model uses site specific exposure parameters consistent with the risk assessment. Since the time EPA issued the Proposed Plan for OU No. 4, this model has been refined and utilized by EPA as the most current accepted method for evaluating adult exposures. Although the remedial action level for lead is different than that included in the Proposed Plan, this change will have a negligible impact on the volume of soil to be remediated, since arsenic drives the majority of the risk. Since the soils are co-contaminated with lead and arsenic and the action level for arsenic is more restrictive than the action level for lead, excavating the soils to achieve the arsenic action level will likely result in lead concentrations below the lead action level. Any visible battery chips and slag encountered during soil excavation will be included as part of the soil remediation.

By addressing the contamination associated with the buildings, structures, equipment and soils, the associated OU No. 4 site specific risks will be eliminated.

VIII. DESCRIPTION OF ALTERNATIVES

A Feasibility Study was conducted to develop and evaluate remedial alternatives for OU No. 4 of the RSR site. This report is included in the Administrative Record for OU No. 4. Remedial alternatives were assembled from applicable technologies/process options and were evaluated for effectiveness, implementability, and cost based on best professional judgment. The alternatives selected for detailed analysis were compared to the nine criteria required by the NCP. As required by the NCP, the no action alternative was also evaluated to serve as a point of comparison for the other alternatives.

The remedial action goals or cleanup levels set forth above in Section VII., are the concentration levels below which contaminated media can be left onsite and managed for a future industrial land use. The remedial alternatives described herein address the contamination associated with the buildings, structures, equipment, including the smelter stack and the soils.

1. Remedial Action Alternatives

The remedial action alternatives for OU No. 4 of RSR site are presented below followed by a description of the common elements of each alternative.

Alternative 1a: No Action

Alternative 1b: Limited Action

Alternative 2: In-place Decontamination of
Buildings/Structures
Cap contaminated soils in northeast area

Alternative 3: Decontaminate/Dismantle Buildings/Structures
Dispose Offsite
Cap contaminated soils (areal extent)

Alternative 4: Decontaminate/Dismantle Buildings/Structures
Dispose debris offsite
Excavate contaminated soils
Dispose soils offsite

2. Common Elements

All of the alternatives with the exception of Alternative 1b have the following common elements: (1) all general requirements associated with contractor mobilization and demobilization, bonds and insurance, decontamination facilities, a health and safety program, and a community relations program; (2) all general site work such as repair of existing perimeter fence and sampling of surface water. Alternative 2, 3, and 4 also include a provision for air monitoring during remediation. All of the alternatives with the exception of Alternatives 1a and 1b involve decontamination of the buildings, structures and equipment with standard cleaning methods, such as steam cleaning or vacuum dusting.

All costs and implementation times are estimates. The costs have a degree of accuracy of +50% to -30% pursuant to the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA - Interim Final, OSWER Directive 9955.3-01, October 1988.

A brief description of the alternatives evaluated to address the contaminated media on OU No. 4 of the RSR site follows.

Alternative 1a - No Action

Major Components of Alternative 1a:
Evaluation of the No Action alternative is required by the NCP, 40 C.F.R. §300.430(e)(3)(ii)(6), and is used as a baseline against which other alternatives are evaluated. Under this alternative, no remedial action would be undertaken to treat, contain, or remove contaminated media at OU No. 4. No institutional or operational controls would be implemented to restrict access to OU No. 4 or to restrict exposure to contaminants. Monitoring would not be a component of this alternative. Under the No Action alternative, remaining waste not remediated by the removal action would be left in place in an uncontrolled state and potentially endanger human health and the environment.

Treatment Components:
There are no treatment components under Alternative 1a.

Containment Components:
There are no containment components under Alternative 1a.

General Components:
There is no time needed to implement Alternative 1a, since no remedial action is undertaken. And the costs are provided below:

Capital Costs:	$0
Annual Operation & Maintenance:	$0
Present Worth:	$0

Alternative 1b - Limited Action

Major Components of Alternative 1b:
This alternative includes taking steps to have deed notices or a land use restriction placed in the deed records of the OU No. 4 properties to warn potential buyers and lenders of the presence of contamination. Such deed notices and land use restrictions may be difficult to obtain and enforce and may meet with substantial opposition from many different sources. In addition, this alternative includes the repair of approximately 2,500 linear feet of fencing, posting warning signs, and providing 24-hour-a-day guard services. Stormwater samples would also be collected and analyzed three times annually at four locations under this alternative.

Treatment Components:
There are no treatment components for the contaminated media under this Alternative 1b.

Containment Components:
There are also no containment components under Alternative 1b.

General Components:
The estimated time needed to implement Alternative 1b, is less than 1 year. The estimated costs for implementing of this alternative are provided below:

Capital Costs:	$ 62,147
Annual Operation & Maintenance:	$ 193,320
Present Worth:	$ 3,033,949

Alternative 2 - In Place treatment of Buildings/Structures; Capping of Soils

Major Components of Alternative 2:
This alternative includes in-situ (in place) decontamination of the contaminated buildings and structures; removal, treatment, and disposal of residual material (not addressed previously by the non-time-critical removal action); removal and disposal of asbestos materials (in accordance with 30 TAC § 330.136); containment of soils in the northeast area; monitoring of stormwater; and leaving the buildings and structures and concrete pavements in place.

Decontamination of all masonry and non-metal roofing material has limited effectiveness, since the contamination is most likely embedded and difficult to remove. Therefore, under this alternative it is assumed that only the Smelter Facility, the Batch House and the Hog Storage buildings can be effectively decontaminated because they are metal and that the remaining buildings and the smelter stack cannot be effectively decontaminated.

Prior to performing any work, a complete structural investigation would need to be conducted on

the buildings and structures. For the purpose of estimating costs, it was assumed that shoring and bracing would be necessary. This is due to the poor condition of the buildings and structures. Without maintenance and rehabilitation, it is considered that these buildings would be a safety hazard during remediation activities.

Treatment Components:
The water generated as a result of decontamination activities (such as steam cleaning) or dust suppression must be collected, sampled and pretreated, if necessary, prior to discharge to the City of Dallas' Publicly Owned Treatment Works (POTW). See Table 7. In addition, any dust collected as part of decontamination activities would be sampled prior to disposal to determine if hazardous. Collected dust that does not pass TCLP requirements would then be treated according prior to disposal.

The collected residual material (debris and dust) and sediment would be containerized and transported offsite for solidification /stabilization and disposal at a RCRA Subtitle C landfill, as necessary. The results from the RI indicated that the residual materials and sediments are RCRA characteristic wastes (See Table 8) and as such would require treatment prior to disposal.

Containment Components:
Under Alternative 2 the metals contaminated soils in the unpaved northeast area would be capped with 2 feet of clean backfill or soil.

General Components:
The estimated time needed to implement Alternative 2, is less than 1 year. The estimated costs for implementation of this alternative are provided below:

Capital Costs:	$ 3,092,997
Annual Operation & Maintenance:	$ 240,630
Present Worth:	$ 6,782,070

Table 7
OU No. 4 POTW Pretreatment Standard Exceedance Analysis
RSR Corporation Superfund Site
Dallas, Texas

Metal	OU No. 4 Surface Water Dataa (ppm)	POTW Pretreatment Standardsb (ppm)	Exceeds Standard (Yes/No)
Arsenic	0.612	0.5	Yes
Cadmium	0.073	1	No
Chromium	0.013	5	No
Copper	0.038	4	No
Lead	1.496	1.6	No
Mercury	0.0004	0.01	No
Nickel	0.020	9.0	No
Selenium	0.002	0.2	No
Silver	ND	4.0	--
Zinc	0.225	5.0	No

aTotal metals analysis.
bDallas City Code, Chapter 49 "Water and Wastewater", Section 49-42(a)(11).

ND = not detected.

Table 8
OU No. 4 TCLP Exceedance Analysis for
Residual Material, Sediment, and Soil
RSR Corporation Superfund Site
Dallas, Texas

Sample Number, Type and Location	TCLP Metal	OU No. 4 TCLP Data (ppm)	TCLP Criteriaa (ppm)
4-R004 DH01 Dust (Residual Material) Smelter Facility	Cadmium	39.1	1
	Lead	92.2	5
4-R102 DH01 Dust (Residual Material) Outside Smelter-Near Stack	Cadmium	640.0	1
	Lead	4,000.0	5
4-R103 DH01 Dust (Residual Material) Outside Smelter-Near Bag House	Cadmium	2.3	1
	Lead	11.0	5
4-R104 DH01 Dust (Residual Material) Hog Storage	Lead	200.0	5
4-R105 FH01 Filter Bags (Residual Material) Hog Storage	Arsenic	12.0	5
	Cadmium	37.0	1
	Lead	350.0	5
4-T101 DH01 Dust (Residual Material) Inner Stack Brick 160'	Arsenic	47.0	5
	Lead	24.0	5
4-T101 DH02 Dust (Residual Material) Inner Stack Residue and Brick 25'	Arsenic	3,900.0	5
	Cadmium	3.9	1
	Lead	8.6	5
	Mercury	0.35	0.2
4-P001 SD01 (Sediment)	Lead	39.2	5

Notes:

OU No. 4 diatomaceous earth (filter aid), subsurface soil boring, and subsurface test pit (soil data) TCLP sample data do not exceed TCLP criteria.

aToxicity Characteristics Leaching Procedure (TCLP) Criteria.
40 C.F.R. Part 261.

Alternative 3 - Decontaminate and Dismantle Buildings/Structures and Dispose Offsite; Capping of soils.

Major Components of Alternative 3
This alternative includes removal, treatment, and disposal of residual material; removal and disposal of asbestos materials (in accordance with 30 TAC §330.136); demolition and removal of the buildings, structures, equipment, smelter stack and pavement foundations, and decontamination (where possible) of demolition debris; capping the areal extent of OU No. 4 with clean backfill or soil; and periodic monitoring of the cap.

All of the buildings, structures and equipment would be sampled to classify waste type for disposal. If the samples indicate that portions are hazardous (i.e. TCLP characteristic), then appropriate parts of the buildings, structures and equipment will undergone controlled dismantling. Based on the RI results, the smelter stack would require controlled dismantling. See Table 8. Controlled dismantling includes using sawing, drilling, backhoes, and piece-by-piece dismantling and then decontamination. For those parts of the buildings, structures and equipment that are not hazardous (i.e. do not fail TCLP), conventional demolition may be utilized. Debris would then be disposed of in accordance with waste classification results and requirements. Standards dust suppression methods would also be utilized during all dismantling and the demolition. The dismantling of the stack should be conducted only during favorable weather conditions.

Treatment Components:
The water generated as a result of contamination activities (such as steam cleaning) or dust suppression would be collected, sampled and pretreated as necessary prior to discharge to the City of Dallas' POTW. In addition, any dust collected as part of decontamination or dust suppression activities would be sampled prior disposal (i.e. TCLP characteristic). Collected dust that does not pass TCLP requirements would then be treated accordingly prior to disposal offsite.

Any collected residual material (debris and dust) and sediment that is RCRA characteristic (i.e. fails TCLP) would require treatment, such as, solidification /stabilization prior to disposal. The results from the RI indicated that the residual material and sediment are RCRA characteristic wastes (See Table 8) and as such would require treatment prior to disposal offsite at a landfill.

Containment Components:
Under Alternative 3 the areal extent of OU No. 4 would be capped with 2 feet of clean backfill (estimated 6,800 cubic yards), following removal of all buildings and structures, including pavement foundations.

General Components:
The estimated time needed to implement Alternative 3, is less than 1 year. The estimated costs for implementation of this alternative are provided below:

Capital Costs:	$ 9,298,547
Annual Operation & Maintenance:	$ 31,200
Present Worth:	$ 9,778,168

Alternative 4 - Decontaminate and Dismantle Buildings/Structures and Dispose Offsite; Excavate soils and Dispose Offsite.

Major Components of Alternative 4

This alternative includes removal, treatment, and disposal of residual material; removal and disposal of asbestos materials (in accordance with 30 TAC §330.136); demolition and removal of the buildings, structures, equipment, smelter stack and pavement foundations; and decontamination (where possible) and disposal offsite of demolition debris; excavation of up to 1 foot of soil beneath the pavement foundations that exceeds remedial goals; excavation of up to 2 feet of soil in the northeast unpaved area that exceeds remedial goals; disposal of soils offsite; and capping and/or backfilling the areal extent of OU No. 4 with clean soil.

All of the buildings, structures, equipment, smelter stack and pavement foundations would be sampled to classify waste type for disposal. In addition, if the samples indicate that portions are hazardous (i.e. TCLP characteristic), then appropriate parts of the buildings, structures and equipment will undergo controlled dismantling. Based on the RI results, the smelter stack would require controlled dismantling (See Table 8). Controlled dismantling includes using sawing, drilling, backhoes, and piece-by-piece dismantling and then decontamination. For those parts of the buildings, structures and equipment that are not hazardous (i.e. do not fail TCLP), conventional demolition may be utilized. Debris would then be disposed of in accordance with waste classification results and requirements. Standard dust suppression methods would also be utilized during the dismantling and demolition. The dismantling of the stack should be conducted only during favorable weather conditions. Demolition debris would then be characterized and disposed of offsite, accordingly as a hazardous or nonhazardous waste.

This alternative includes the excavation the concrete pavements, associated floor drains and sumps, and up to one foot of soil beneath the pavement, that exceeds remedial goals defined in Section VII. An estimated 10,100 cubic yards of soils underneath the pavements would be excavated. Note, the depth of excavation is a change from what was described in the Proposed Plan for OU No. 4. The basis for this change is discussed in Section XII.

DOCUMENTATION OF SIGNIFICANT CHANGES. In addition, an estimated 3,400 cubic yards of soil in the northeast area (up to 2 feet of soil that exceeds Remedial Action Goals) would be excavated and disposed of in an appropriate landfill.

Treatment Components:
The results of the TCLP sampling of the inner stack (See Table 8) indicate that the inner bricks are RCRA characteristic and therefore the inner stack must be handled, treated and disposed of accordingly.

The water generated as a result of decontamination activities (such as steam cleaning) or dust suppression must be collected, sampled and treated as necessary prior to discharge to the City of Dallas' POTW. In addition, any dust collected as part of decontamination activities would be sampled prior to disposal (i.e. TCLP characteristic). Collected dust that does not pass TCLP requirements would require treatment, such as stabilization/solidification prior to offsite disposal at a landfill.

Any collected residual material (debris and dust) and sediment that is RCRA characteristic (i.e. fails TCLP) would require treatment, such as, solidification/stabilization prior to disposal. The results from the RI indicated that the residual material and sediment are RCRA characteristic wastes (See Table 8) and as such would require treatment prior to disposal offsite at a landfill.

Containment Components:
Under Alternative 4 the areal extent of OU No. 4 would be capped with 2 feet of clean backfill (estimated 13,500 cubic yards), following removal of all buildings, structures, equipment, smelter stack and pavement foundations.

General Components:
The estimated time needed to implement Alternative 4, is less than 1 year. The estimated costs for implementation of this alternative are provided below:

Capital Costs:	$ 11,490,795
Annual Operation & Maintenance:	$ 0
Present Worth:	$ 11,490,795

Alternate component:
Under the alternate component, all of the non-hazardous debris and soil from OU No. 4 would be disposed of in the landfill located on the southern portion of OU No. 5 of the RSR site. This alternate component does not affect disposal of any hazardous wastes. Note, that implementation of this component is subject to public comment and would have to be included and accepted as part of the Proposed Plan for OU No. 5, when issued. If after reviewing public comments EPA decides to accept this component as part of the remedy for OU No. 5, EPA will then include this component in the Record of Decision for OU No. 5. The revised estimated cost incorporating this alternate component for OU No. 4 would be as follows:

Capital Costs:	$ 9,229,883
Annual Operation & Maintenance:	$ 0 **
Present Worth:	$ 9,229,883

** The annual operation and maintenance costs associated with the landfill, would be included in the cost estimate for OU No. 5.

IX. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

The EPA uses nine criteria to evaluate alternatives for addressing a Superfund site. These nine criteria are specified in the NCP, 40 C.F.R. § 300.430(e)(9) and (f)(1). The criteria are categorized into three groups: threshold, primary balancing, and modifying. The threshold criteria must be met in order for an alternative to be eligible for selection. The primary balancing criteria are used to weigh major tradeoffs among alternatives. The modifying criteria are taken into account after state and public comments are received on a Proposed Plan.

Nine Criteria
The nine criteria that EPA uses in evaluating the remedial alternatives are as follows:

Threshold Criteria
Overall Protection of Human Health and the Environment addresses the way in which an alternative would reduce, eliminate, or control the risks posed by the site to human health and the environment. The methods used to achieve an adequate level of protection vary but may include treatment and engineering controls. Total elimination of risk is often impossible to achieve. However, a remedy must minimize risks to assure that human health and the environment are protected.

Compliance with "applicable or relevant and appropriate requirements (ARARs)" assures that an alternative will meet all related Federal, State, and local requirements.

Balancing Criteria
Long-term Effectiveness and Permanence addresses the ability of an alternative to reliably provide long-term protection for human health and the environment after the remediation goals have been accomplished.

Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment assesses how effectively an alternative will address the contamination at a site. Factors considered include the nature of the treatment process; the amount of hazardous materials that will ne destroyed by the treatment process; how effectively the process reduces the toxicity, mobility, or volume of waste; and the type and quantity of contamination that will remain after treatment.

Short-term Effectiveness addresses the time it takes for remedy implementation. Remedies often require several years for implementation. A potential remedy is evaluated for the length of time required for implementation and the potential impact on human health and the environment during implementation.

Implementability addresses the ease with which an alternative can be accomplished. Factors such as availability of materials and services are considered.

Cost (including capital costs and projected long-term operation and maintenance costs) is considered and compared to the benefit that will result from implementing the alternative.

Modifying Criteria
State Acceptance allows the state where the site is located to review the proposed plan and offer comments to the EPA. A state may agree with, oppose, or have no comment on the proposed remedy.

Community Acceptance allows for a public comment period for interested persons or organizations to comment on the proposed remedy. EPA considers these comments in making its final remedy selection. EPA addresses the public comments in a Responsiveness Summary, which is included as part of the ROD.

Comparative Analysis
The following discussion provides the comparative analysis for each remedial alternative for OU No. 4 against the nine criteria:

1. Overall Protection of Human Health and the Environment

Alternatives 1a and 1b do not protect human health and the environment and do not achieve the remedial action goals defined for OU No. 4. Alternative 1b is only marginally more protective than 1a because it potentially reduces access to contamination, but likewise does nothing to reduce contamination. These alternatives do not reduce exposure of the public and environment to the contaminated materials at OU No. 4. Exposure may actually increase if the buildings, structures and equipment are left in place and continue to deteriorate and collapse, resulting in further releases of contamination into the environment.

Alternative 2 provides moderate protection of human health and the environment. Some of the remedial action goals are achieved by reducing the exposure to contamination associated with the buildings, structures and equipment. However, there are limitations to eliminating some of contamination due to the poor condition of the buildings and the limitations of the cleaning methods (i.e. steam cleaning or vacuum dusting) on the masonry buildings. Residual contamination is likely to remain in inaccessible areas in the buildings, structures and equipment after cleaning. This may result in releases of contamination through stormwater runoff or as the buildings further deteriorate and/or collapse. Contamination associated with the smelter stack would remain in an uncontrolled state. Contaminants left onsite under this alternative may be released causing unacceptable risk to human health and the environment.

Alternative 3 provides a greater degree of protectiveness than Alternative 2, since contamination in and on the buildings, structures and equipment is eliminated by removal and

offsite disposal of the debris. As an added benefit, physical and safety hazards associated with the buildings also are eliminated. Remedial action goals are more fully achieved and exposure to the contaminated soils is reduced, but not eliminated.

Alternative 4 provides the greatest degree of protectiveness, since contaminated soil also is removed from the site thereby eliminating the most sources of contamination on OU No. 4. Furthermore, future industrial development and use of the property is possible after implementation of this alternative. Remedial action goals for the buildings, structures, equipment, and soils are achieved.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Alternatives 1a and 1b do not meet any of the ARARs that have been identified for OU No. 4, such as federal and RCRA closure requirements, specifically; 40 C.F.R. Part 264, Subparts B,C and D, which establish minimum standards defining acceptable management of hazardous wastes, State of Texas closure and remediation requirements in the Texas Administrative Code (T.A.C.) (30 T.A.C. §335.8), Risk Reduction Standard No. 3 (30 T.A.C. §335.562), and 40 C.F.R. Parts 122 and 125, which describe management practices of stormwater runoff requirements and State risk reduction rules.

For Alternative 2, the following ARARs would generally be achieved; however, some residual material may be left in place in an uncontrolled state in inaccessible areas (i.e. smelter stack, building roofs, etc.): state closure and remediation requirements (30 T.A.C. §335.8) and Risk Reduction Standard No. 3 (30 T.A.C. §335.8); and 40 C.F.R. Parts 122 and 125, which describe management practices of stormwater runoff. However, potential releases from residual contamination from the buildings, structures and equipment may prevent compliance with certain ARARs like federal stormwater management requirements, due to the limited effectiveness of in-site decontamination. Disposal of asbestos containing materials would meet 30 T.A.C. 330.136. This alternative would comply with RCRA handling, transportation, treatment and disposal requirements (30 T.A.C. §335.11, §335.508). State and federal chemical-specific ARARs for air quality (30 T.A.C. Section 118.1, 30 T.A.C. Section 111.115, 40 C.F.R., §50.3 and 51.160) during remedial action would also be met. Furthermore, all offsite disposal would be at facilities in compliane with EPA's Offsite Policy, specifically all hazardous substances, pollutants or contaminants removed offsite pursuant to this action for treatment, storage, or disposal shall be treated, stored, or disposed of at a facility in compliance with RCRA, as determined by EPA, pursuant to CERCLA Section 121(d)(3), 42 U.S.C. § 9621 (d)(3), and the following rule: "Amendment to the National Oil and Hazardous Substances Pollution Contingency Plan; Procedures for Planning and Implementing Off-Site Response Action: Final Rule." 58 Fed. Reg. 49200 (September 22, 1993), and codified at 40 C.F.R. § 300.440.

All of the components of Alternatives 3 and 4 will meet all of the ARARs identified for OU No. 4, including: State closure and remediation requirements (30 T.A.C. §335.8) and Risk Reduction Standard No. 3 (30 T.A.C. §335.8); and 40 C.F.R. Parts 122 and 125, which describe management practices for stormwater runoff; disposal of asbestos containing materials would meet 30 T.A.C. 330.137; RCRA handling, transportation, treatment and disposal requirements (30 T.A.C. §335.11, §335.91, §335.508); State and federal chemical-specific ARARs for air quality (30 T.A.C. Section 118.1, 30 T.A.C. Section 111.115, 40 C.F.R., 50.3 and 51.160). Furthermore, all disposal offsite would be at facilities in compliance with EPA's Offsite Policy.

3. Long-term Effectiveness and Permanence

Since none of the contamination (remaining after the non-time critical removal action) at OU No. 4 will be treated or removed, long-term effectiveness and permanence will not be achieved under Alternatives 1a and 1b.

Alternative 2 does not completely achieve long-term effectiveness and permanence. Residual amounts of contamination associated with inaccessible areas of the buildings, structures and equipment may remain. Contamination associated with the smelter stack remains in an uncontrolled state. Moderate long-term effectiveness and permanence is achieved for the contaminated soils, since residual risk is low. The cap will require long-term monitoring and maintenance to be effective.

Alternative 3 has a higher degree of long-term effectiveness and permanence than Alternative 2, since contamination associated with the buildings, structures, and equipment is removed, decontaminated as appropriate, and disposed of offsite. Moderate long-term effectiveness and permanence is achieved for the contaminated soils, since residual risk is low. The cap will require long-term monitoring and maintenance to be effective.

Alternative 4 provides the greatest degree of long-term effectiveness and permanence since the activities will result in the permanent elimination of the most sources of contamination at OU No. 4, through removal, treatment as appropriate, and offsite disposal of contaminant sources.

4. Reduction of Toxicity, Mobility or Volume Through Treatment

Alternatives 1a and 1b provide no reduction in toxicity, mobility or volume of contaminants through treatment.

Alternative 2 provides a reduction in the toxicity, mobility, and volume of some of the contamination associated with buildings, structures and equipment through cleaning and decontamination process. This reduction will be achieved through the collection of the decontamination process water or vacuum dust and subsequent treatment, discharge or disposal. However, residual contamination will remain in the buildings, structures and equipment. There is also a reduction of toxicity and mobility from the removal of the residual materials contained in the buildings, structures and equipment; however, there may be an increase in volume, through the treatment process (solidification/stabilization). The mobility of contaminants in the soil is reduced, but the containment action will not reduce the toxicity or volume.

Alternative 3 provides a slightly greater reduction of toxicity, mobility, and volume than Alternative 2 by eliminating all of the onsite contamination associated with the buildings, structures and equipment.

Alternative 4 provides a similar level of reduction as Alternative 3.

5. Short-Term Effectiveness

Alternatives 1a and 1b have no minimal short term effectiveness for the community since no removal of contaminated media occurs under this alternative. Short-term effectiveness is not achieved for trespassers.

Under Alternative 2 short-term risk to the community may increase during implementation. There is also a potential for exposures to workers during the remedial action. However, all appropriate regulations and safety measures will be instituted and strictly followed.

Alternatives 3 and 4 also involve an increase of short-term risk to the community during implementation as well as risk to remedial action workers during demolition activities. However, dust control and other safety measures will be implemented to protect the community and the workers.

6. Implementability

There is no action to implement under Alternatives 1a. Implementation of some aspects of Alternatives 1b, such as posting warning signs and fencing are readily implementable. However, land use and deed notification or restrictions may be difficult or impossible to obtain and enforce.

Alternative 2 is implementable. The technical feasibility of cleaning methods such as, steam cleaning or vacuum dusting, landfilling, and soil containment is proven, and equipment, personnel and resources generally are available. However, implementability of the steam cleaning of the buildings is a major concern due to the safety hazards associated with the poor condition of the structures that may not be resolved through the preliminary shoring and bracing efforts. Also, the condition of structures may ultimately prevent the removal of contaminants to safe levels.

Alternative 3 is also readily implementable. The technical feasibility of demolition of the structures, surface cleaning of certain demolition debris, soil containment, landfilling, and covering is proven, and equipment, personnel and other resources generally are available. The physical conditions of the buildings and structures would require the implementation of certain safety measures during demolition.

The implementability of Alternative 4 is nearly identical to that of Alternate 3. The technical feasibility of conducting the excavation and disposal of the soils is also well understood and readily available.

7. Cost

Alternative 1a is the least expensive of all the alternatives evaluated, but does not meet any of the other evaluation criteria. Alternative 1b has a relative low cost, but like Alternative 1b, does not meet any of the other evaluation criteria. Alternative 2 is in the mid range compared to the other alternatives and meets some of the other criteria. The cost of Alternative 3 is high, relative to Alternatives 1a, 1b and 2, but meets most of the other evaluation criteria. Alternative 4 is the most expensive, but meets all of the other criteria.

8. State Acceptance

The TNRCC has reviewed copies of the RI, Risk Assessment, FS and this Record of Decision and has provided technical support on all EPA efforts at OU No. 4. The TNRCC on behalf of the State of Texas concurs with EPA's selected remedial action for the smelter facility, OU No. 4, of the RSR site.

9. Community Acceptance

Comments were received from the community during the public comment period which opened May 10, 1995, and closed July 12, 1995. Generally, the public favored EPA's recommendation for OU No. 4. All comments submitted have been addressed, and responses are included in the Responsiveness Summary (Appendix A) to this ROD. EPA carefully considered all comments in making the final decision on the selected remedial action for OU No. 4. Although the ground water portion was deferred, new information was received during the public comment period regarding the ground water that resulted in minor changes to the alternative 4, as described in the Proposed Plan for OU No. 4. These changes are described in Section XII.

DOCUMENTATION OF SIGNIFICANT CHANGES.

X. THE SELECTED REMEDY

Based upon consideration of the requirements of CERCLA, the detailed analysis using the nine criteria, and the public comments, EPA has determined that Alternative 4 - Decontaminate and Dismantle Buildings/Structures and Dispose Offsite; Excavate soils and Dispose Offsite is the most appropriate remedy for OU No. 4 of the RSR site.

The major components of this remedy include:

- Removal, treatment and disposal of residual material (estimated 540 cubic yards)
- Demolition and decontamination of approximately 190,000 square feet of buildings/structures and equipment, including concrete pavement floors and connected drains and sumps (and associated sediments), plug and properly abandon remaining open conduits not removed
- Disposal of all building debris (estimated 8,900 cubic yards) offsite at appropriate landfill facilities
- Demolition of the smelter stack and disposal offsite at a RCRA Subtitle C landfill (estimated 1300 cubic yards)
- Excavation of 13,500 cubic yards of contaminated soil and/or battery chips and lead slag and disposal offsite (up to 1 foot beneath pavements and up to 2 feet in unpaved northeast area in excess of Remedial Action Goals)
- Cap and/or backfill the areal extent of the site with 2 feet of clean soil

All activities will be in compliance with federal and State ARARs, specifically those for RCRA closure and remediation, RCRA handling, transportation, treatment and disposal requirements, asbestos disposal requirements, and State and federal chemical specific ARARs for air quality during remediation. In addition, all offsite disposal of material must in compliance with EPA's Offsite Policy at the time of disposal.

The estimated time for completion of this remedy is less than one year and the estimated costs for this alternative are:

Capital Costs:	$ 11,490,795
Annual Operation & Maintenance:	$ 0
Present Worth:	$ 11,490,795

The alternate component of Alternative 4, is preferred; however, implementation of this component depends on public comment of the OU No. 5 Proposed Plan. Under the alternate component, all of the nonhazardous debris and soil resulting from the remedial action would be sent to the landfill located on the southern portion of OU No. 5 of the RSR site. If after considering public comment EPA decides to accept this component, EPA will include it in the Record of Decision for OU No. 5.

Remedial Action Goals

The purpose of this remedial action is to control risks posed by direct contact, ingestion, and inhalation of the contaminated buildings, structures, equipment (residual materials and dust) and the contaminated soils. The results of the baseline risk assessment indicate that existing conditions at the site pose an excess lifetime cancer risk of 1X10-2 from ingestion of contaminated residual materials and soil (by a child trespasser). This risk relates primarily to arsenic, cadmium, antimony onsite. Lead onsite was also determined to be present at unacceptable levels. A model used to predict adult blood levels estimated blood-lead levels for

a future worker onsite in excess of those limits established by OSHA. This remedy will address arsenic in excess of 32.7, antimony in excess of 818 ppm, cadmium in excess of 2,044 ppm and lead in excess of 2,000 ppm present in or as part the buildings, structures, equipment, including pavement floors, drains and sumps, and the smelter stack. This remedy will also address contaminated soils with arsenic in excess of 32.7 ppm and lead in excess of 2,000 ppm up to a depth of 0 to 2 feet in the unpaved northeast area and 0 to 1 foot in the area beneath the pavement and foundations. The 2,000 ppm corresponds to the acceptable level, as predicted by the Adult Lead Model (see Appendix B), the 32.7 ppm corresponds to an excess cancer risk of the 1X10-5, and the levels for antimony and cadmium correspond to an excess cancer risk of 1X10-6.

XI. STATUTORY AUTHORITY FINDINGS AND CONCLUSIONS OF LAW

Pursuant to CERCLA, studies are conducted at NPL sites to characterize the nature and extent of contamination associated with a particular source of contamination and to determine the most feasible cleanup approaches. At OU No. 4, EPA conducted a remedial investigation, feasibility study, and risk assessment to determine the nature and extent of site contamination.

The statutory determinations that are required for remedy selection are in Section 121 of CERCLA, 42 U.S.C. § 9621. Under CERCLA, EPA must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduce the volume, toxicity, or mobility of hazardous wastes as their principle element. The following sections discuss how the selected remedy meets these statutory requirements.

Protection of Human Health and the Environment

The selected remedy protects human health and the environment by addressing releases or threats of releases of hazardous substances through demolition, decontamination, treatment, as necessary, and disposal of all of the contaminated buildings, structures and equipment, pavements and smelter stack and excavation and disposal of the contaminated soils. The entire OU No. 4 are would then be capped with 2 feet of clean soil.

The selected remedy would eliminate the threat of exposure to the lead, cadmium, arsenic and antimony present onsite through ingestion, inhalation, and direct contact. The excess cancer risk associated with these pathways is 1X10-2. By decontaminating and removing all of the buildings, structures, equipment, pavements and smelter stack and excavating the contaminated soil, the cancer risks from exposure would be reduced to less than 1X10-6. This level falls within the EPA's acceptable risk range of 10-4 to 10-6. There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse-cross media impacts are expected from the activities.

Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy would comply with ARARs. The complete ARARs analysis, determinations and justification for ARARs for OU No. 4 of the RSR site are presented in Appendix C.

The following ARAR was omitted in the list in the Appendix, but is applicable and must be compiled with as part of the selected remedy; All disposal offsite would be at facilities in compliance with EPA's Offsite Policy, specifically all hazardous substances, pollutants or contaminants removed offsite pursuant to this action for treatment, storage, or disposal shall be treated, stored, or disposed of at a facility in compliance with RCRA, as determined by EPA, pursuant to CERCLA Section 121(d)(3), 42 U.S.C. §9621 (d)(3), and the following rule:

"Amendment to the National Oil and Hazardous Substances Pollution Contingency Plan; Procedures for Planning and Implementing Off-Site Response Action: Final Rule." 58 FR 49200 (September 22, 1993), and codified at 40 C.F.R. § 300.440.

Cost-Effectiveness

EPA believes that this remedy would provide the greatest reduction of the risks to human health and the environment at an estimated cost of $11,490,795. Therefore, the selected remedy provides an overall effectiveness proportionate to its costs, such that it represents a reasonable value for the money that will be spent.

Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

EPA believes the selected remedy represents the maximum extent to which permanent solutions and treatment/resource recovery technologies can be utilized in a cost-effective manner for the types of materials and contaminants at OU No. 4 of the RSR site. Of those alternatives that are protective of human health and the environment and comply with ARARs, EPA has determined that the selected remedy provides the best balance in considering long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost; as well as considering the statutory preference for treatment as a principal element, and considering State and community acceptance.

Preference for Treatment as a Principal Element

The selected remedy satisfies the statutory preference for treatment as a principal element. Wherever possible, the selected remedy utilizes treatment, such as steam cleaning, vacuum dusting and stabilization/solidification as treatment methods.

Additionally, because hazardous substances may remain onsite above health-based levels, five year reviews may be necessary at OU No. 4 of the RSR site.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

EPA issued the Proposed Plan for the RSR Corporation Superfund site, Operable Unit No. 4 for public review and comments on May 10, 1995. In the Proposed Plan, EPA recommended the remedial action under Alternative no. 4 as the remedy that would best meet all nine criteria and provides protection to human health and the environment. EPA evaluated verbal comments, reviewed all written comments and information submitted during the public comment period. In addition, EPA has obtained additional data since May 1995 regarding the ground water and the contamination levels on the support buildings at OU No. 4. Based on this review and evaluation, EPA has determined that the following changes to the alternative no. 4 proposal, as originally identified in the Proposed Plan, are necessary:

1.) Change of maximum depth of excavation of contaminated soil from 3 feet to 2 feet in the unpaved northeast area and 1 foot underneath the pavement and foundations. The basis for this change is the new information that was received through the supplemental ground water sampling that was conducted in June and July of 1995. The results of the slug tests indicated that the shallow alluvial deposits beneath the site are not a continuous aquifer, and therefore do not meet the State of Texas classification as a potential drinking water source. Therefore, since the ground water does not present a pathway for exposure to contaminants, excavation of up to a maximum of 2 feet in the unpaved northeast area and 1 foot of soils beneath the pavements will minimize, if not eliminate, potential for human health or environmental exposure in the commercial or industrial setting. Two feet of clean soil will then be placed over the entire site.

2.) Eliminate the Underground Storage Tanks from the selected remedy. EPA has eliminated this portion of Alternative that was included in the Proposed Plan. EPA will refer all information regarding the USTs to the State of Texas to be handled under the State UST program.

3.) Revise cost estimates for each alternative. The revised cost estimates that incorporate the above changes for each alternative are included in Appendix D. Note, the cost estimate labeled Alternative 4a in the Appendix is for Alternative 4, but incorporates the Alternate Component, described above.

RESPONSIVENESS SUMMARY
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT No. 4
APPENDIX A

RESPONSIVENESS SUMMARY
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT No. 4
DALLAS, DALLAS COUNTY, TEXAS

INTRODUCTION

This Responsiveness Summary for the RSR Corporation Superfund Site (RSR Site), Operable Unit (OU) No. 4, documents for the Administrative Record public comments and issues raised during the public comment period on the proposed plan for the smelter facility. Pursuant to Section 117 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund), 42 U.S.C. § 9617, EPA considered all comments received during the public comment period making the final decision contained in the Record of Decision (ROD) for OU No. 4.

OVERVIEW OF PUBLIC COMMENT PERIOD

The United States Environmental Protection Agency (EPA) issued the proposed plan for OU No. 4 for public review and comments on May 10, 1995. The initial thirty-day public comment period for the proposed plan ended on June 12, 1995. At the request of a citizen, EPA extended the public comment period to July 12, 1995. EPA conducted a public meeting on May 23, 1995, at the West Dallas, Multipurpose Center located at 2828 Fish Trap Road, in west Dallas, Texas to provide information and answer questions about the proposed plan and to receive public comments. A transcript of the meeting was prepared and is available in the Administrative Record for OU No. 4 located at the information repositories for the RSR Site. This Responsiveness Summary contains EPA's responses to verbal comments received during the public meeting and written comments received during the comment period.

COMMENTS AND ISSUES RAISED DURING THE COMMENT PERIOD

1. Public Meeting, May 23, 1995, West Dallas Multipurpose Center

Comment: Will the EPA use the best and the safest methods available to take down the stack? Specifically, will the EPA study and learn from the steel industry's experience in taking down large stacks? Will EPA hire specialized contractors to take down the stack rather than give the job to a general purpose contractor? Will EPA make a commitment in the records of decision to give the community, specifically Westmoreland Heights Neighborhood Association, a chance to review and comment on the qualification that would be required of the contractors who demolish the stack before it's approved? Will EPA monitor dust levels during demolition? Will EPA make sure that work is done only during proper weather conditions? Is the stack built in two parts?

Response: Based on the information that EPA currently has available, the smelter stack is approximately 300 feet tall and consists of two cylindrical structures, one instead of the other. The outer structure is case in place concrete, while the inner structure is masonry. EPA will require that the best and safest available methods are used to take down the stack. Prior to conducting any work, EPA will research and gather information from other industries' experience on taking down large stacks. In addition, EPA will ensure that the plans for the removal of the stack require that it be done by qualified contractors who have experienced in this area. In selecting a contractor EPA is required to follow specific rules and regulations. These rules and regulations do not allow for public review or comment regarding the hiring

decisions. However, EPA will make a commitment to the community to keep them informed of the progress of the project, including how and by whom the stack will be removed. Air Monitoring will be conducted during all demolition activities and work on the stack will only occur during favorable weather conditions.

Comment: Is there anything that the community should do to protect themselves when the stack is being torn down? Are there specific instructions that the community should follow? Will this be done during peak hours, or while we're sleeping? Will the area be blocked off where no traffic and the residents are walking around? Should we keep the children indoors? Should we wear masks and protective clothing? Are we allowed to roam about?

Response: There are no specific instructions that the community should follow during the demolition and removal of buildings and the stack from the smelter facility. People will not need to wear protective clothing or masks and can go about their normal business. EPA will ensure that the remedial activities will occur in a manner that is safe and protective of the public. For example, during the remedial action, dust suppression activities, such as wetting down surfaces prior to demolition will be implemented, as well as air monitoring to protect against offsite migration of contamination.

Comment: After you tear down the smokestack, will it be hauled off immediately, or will it be allowed to lay around? Because you say you're going to wet it down and sooner or later it's going to dry. After it's torn down, if it's left there, then we're in more danger that we would be if it was left standing.

Response: EPA will require that the stack be removed from the site for disposal as soon as possible. OU No. 4 is not a large enough area to stockpile demolition debris, including stack debris, for any significant period of time. Therefore, construction sequences will require that demolition debris be removed from the site as soon as possible to prevent obstruction of other construction tasks. While debris is left onsite awaiting removal and disposal, EPA will require that protective measures be implemented to prevent migration of contaminants.

Comment: How many barrels are in the smelter properties? How do you plan on removing the barrels and keep anything from leaking out of the corroded barrels?

Response: From May to July 1995, EPA conducted a non-time critical removal action at OU Nos. 4 and 5 to remove contaminants of more immediate concern. As part of the removal action, EPA removed from the smelter properties over 600 drums and barrels. Materials inside the drums that were compatible were consolidated in a tank truck prior to disposal at an offsite facility. This procedure ensured that drums in poor condition were not used for transportation. EPA also implemented other procedures during the removal action to prevent and contain spills during staging and consolidation activities to minimize offsite migration. No drums remain on the smelter property.

Comment: I know you are forging to demolish the smelter, but, it seem that the community is being overlooked and EPA is focusing on a building.

Response: EPA's initial cleanup activities were conducted in the residential areas in west Dallas in order to resolve smelter-related contamination problems in the areas where people live. EPA collected thousands of samples and cleaned up hundreds of private residences and high risk public areas in west Dallas. Now that cleanup activities in the residential area are complete, EPA will focus on smelter properties (OU Nos. 4 and 5). EPA's extensive investigations show that the buildings at OU No. 4 are highly contaminated and in poor condition causing releases or potential releases of hazardous substances harmful to human health. To prevent such releases, EPA has determined to demolish the buildings as part of the remedial

action for OU No. 4.

Comment: After you demolish that plant, two blocks from the plant or one block from the plant, you've got as much contamination on that side as we have at the plant. So the question has to be why are you doing it? If you're doing it for the same reason that the cleanup was done, it wasn't in our behalf. The cleanup wasn't done in our safety. The cleanup was done for money, see, because you didn't do nothing for us. Our houses is just as contaminated as they ever were before it happened. And millions and millions have been brought out of this neighborhood and have been spent on this neighborhood. How much is it going to cost to clean the smelter?

Response: Protection of human health and the environment is EPA's main goal in addressing smelter-related contamination at the RSR Site. EPA's first focus was to address smelter contamination in the residential areas of west Dallas. EPA collected thousands of samples in the residential areas of west Dallas. In addition, extensive research and sampling was performed to determine the safe level of lead for residential areas, and 420 residential properties were cleaned up to the safe level. The approximate total cost of all of these activities in the residential areas was $15 million. As in the residential areas of west Dallas, at OU No. 4, the smelter property, EPA performed an extensive site-specific investigation and assessment of risks to human health and the environment from contaminants currently present at the smelter property. EPA bases its decision as to how to cleanup OU No. 4 on the results of this investigation. EPA will now concentrate its efforts on ensuring that the appropriate cleanup is performed at OU No. 4 so that contamination from this area will not pose a future risk to the community and the land can be put to productive use. The estimated cost of the cleanup at OU No. 4 is $11 million.

Comment: I'm going to want to find out who's getting the contract, how the contract come about, how it was bidded on, how they receive the contract.

Response: If EPA conducts the cleanup of the smelter facility, the awarding of the construction contract will follow current federal contract award laws and regulations. Generally, this consists of soliciting requests for proposals submitted as sealed bids, which are all opened at a specified time and date. The contract is then awarded to the lowest bidder who provides the most technically and financially feasible plan for conducting the work. All aspects of awarding the construction contract are open to the public. If the parties who are responsible for the contamination perform the work, all non-confidential information submitted to EPA for approval will be available to the public.

Comment: How did EPA distribute information about this meeting tonight, and why is it that so many people didn't know about it?

Response: Approximately two weeks in advance of the meeting, EPA began notifying the public through various media of the issuance of the proposed plan for OU No. 4 and of the date and time of the public meeting. EPA published a notice regarding this meeting in the Dallas Morning News and mailed a post card with the information to approximately 1,000 individuals and companies on EPA's RSR Site mailing list. The mailing list contains the names of all persons who have provided EPA their names and addresses, and the list is constantly updated as new names and addresses are provided. Anyone who wishes to be added to the mailing list need only provide their address to EPA so that they can receive future mailings. In addition, following standard procedure, EPA provided notice to the Technical Advisory Group (TAG) Technical Advisor, Dr. George Njoku. EPA intends to follow similar procedures for distributing information to and notifying the public of important RSR Site events, proposals and decisions.

Comment: I'm concerned about the damage and the risk and the exposures and what's really going to happen to us as a result of this being done? Also, what is the future compensation for any

damages done to the people that's working up there to remove or tear down that? What type of compensation is going to be set for them?

Response: Many safety measures will be implemented and monitoring will be conducted during all cleanup and demolition activities to ensure that the work is conducted in a safe manner and that contamination does not migrate offsite and cause exposure to citizens of west Dallas. The contractors and site workers will also be required to follow rigid procedures to protect themselves from contamination and injury. Contractors will provide insurance that covers accidents and injuries to the workers.

Comment: In the Superfund law or rule is no compensation whatsoever given to anyone, moving someone that needs to be moved out of their home, none of that is available to them if the need arises?

Response: In certain limited circumstances EPA can temporarily relocate persons or buy property. Such extreme measures are only necessary when a site cannot be adequately cleaned up without relocating the resident or destroying the home. In the residential areas of the RSR Site temporary relocation during the cleanup of residential yards was not necessary since the work activities could be conducted in a safe manner without causing a risk to the residents. In addition, due to the nature and type of contamination in the residential areas, it was not necessary to destroy homes to achieve the cleanup goals established to protect human health.

Comment: If you decide to tear that smokestack down and that stuff gets to flying, I think those people within a mile radius of that smelter should be moved out, just in case.

Response: At this time, we do not see a need for temporary relocation during demolition activities. As previously mentioned, all necessary measures will be used to ensure that no contamination leaves OU No. 4, the smelter site, during demolition and cleanup activities.

Comment: While they are doing the work over there, are you going to be testing that air, monitoring that air, to see how high it goes, or if it is getting outside? At what level would you consider a risk?

Response: Air monitoring will be conducted to ensure that demolition and other cleanup activities at OU No. 4 comply with all State and Federal laws and regulations. Air monitors will be installed onsite to detect whether any contaminants leave the site. In addition, the City of Dallas has air monitors at the Boys and Girls Club and Ameila Earhart Elementary School where continuous air sampling has been and will continue to be conducted independent if the onsite air monitoring. For example, during the demolition and cleanup activities at the Dallas Housing Authority property (OU No. 2), measures to prevent air dispersion of contaminants were implemented and the onsite air monitors as well as the City air monitors did not detect unsafe levels of contaminants during the activities. Likewise, during the demolition and cleanup activities at the smelter property, measures to prevent air contamination will be implemented and the air quality regularly measured.

Comment: In awarding of the contract for this work to be done, where will the contractors come from? How many people in west Dallas will be able to go up there and get work? We've got a lot of unemployment over here. Who can come up there or go about getting signed up to be trained to help make some of the $17 million that you're going to give this contractor?

Response: Many aspects of cleaning up hazardous substances require specialized skills, training and certification. Generally, a contractor is hired that has experience with the particular type of cleanup and who has hired employees or provided employees with appropriate training. Awarding of the cleanup contract for OU No. 4 will depend on who conducts the remedial action.

If the responsible parties conduct the cleanup, they can choose any contractor they want as long as the contractor is capable of doing the work in accordance with EPA approved workplans. If EPA conducts the cleanup, the contract would be advertised and awarded to the lowest bidder that is capable of conducting the cleanup. As with other work conducted in west Dallas, local people are being hired when possible. In the past EPA contractors have worked with the West Dallas Neighborhood Development Corporation (WDNDC) to hire minority subcontractors and local workers. EPA will continue to work with WDNDC and the contractors to hire as many local workers and subcontractors as possible.

Comment: I would like to know if you are going to use dynamite to demolish the smelter? How are you going to get that tall chimney?

Response: EPA generally intends not use explosives to demolish the smelter buildings or to bring down the stack. The stack most likely will be demolished section by section using a large crane. However, small amounts of explosives may have to be used to break up the stack concrete so that it can be removed in pieces. If small amounts of explosives are used, it will be done in a controlled manner and in such a way that contaminated dust will not migrate offsite.

Comment: How much dirt from the removal action is still stored in the smelter?

Response: No dirt from the residential (OU No. 1) removal action remains inside the building at OU No. 4. Soil from the OU No. 1 removal action was temporarily stored in the smelter building only until the classification of the soil was determined allowing for offsite disposal. All residential removal actions were completed and soils removed and disposed if in approved landfills by June 1994.

Comment: Did anybody contact the insurance to see if there was any money for the damage, if there were any for the citizens and the neighborhood of this community?

Response: The Superfund statute gives EPA the authority and funding to address environmental contamination. Superfund does not allow EPA to provide compensation to individuals for personal injury or health problems. EPA intends to use its Superfund authority to the greatest extent possible to address contamination related to the smelter facility. However, any damage that may have been caused to citizens or the community as a result of the smelter operation would have to be pursued by the individual or community through different avenues.

Comment: How long will it take to bring the smokestack down in your estimation?

Response: The remedial action will take approximately six months to one year. This period is from the time the remedial action starts to the time all demolition and removal activities are completed at the site. Before the remedial action can begin, EPA has certain legal and technical obligations to complete. For example, EPA must provide parties who are potentially responsible for the contamination the opportunity to finance or perform the action. In addition, a remedial design must be conducted in order to more specifically determine the details associated with each aspect of the cleanup, including safety measures and measures to prevent contamination from spreading during the activities. These activities may take a significant period of time to complete. However, EPA is committed to expediting these necessary steps to ensure that the remedial action is underway as soon as possible.

Comment: I noticed the barrels sitting on slat -- on pallets. Are those pallets deteriorated, too? So then you cannot put a forklift under that to lift it to put it in another container.

Response: Some of the pallets at the smelter property were deteriorated. However, those pallets were successfully and safely removed from the smelter property during the non-time

critical removal action completed in July 1995.

Comment: Are you going to be as concerned about the asbestos removal from the smelter building as you are about the lead?

Response: Asbestos will be removed from the smelter building in accordance with all federal and state environmental and safety rules before demolition activities begin.

Comment: Is the land going to be turned back to the owner? Did EPA say cleared? We a long time ago asked that land at that smelter be paved over, be paved completely with a five-inch cement based covered, that there could not be and leakage from under there ever to come up.

Response: The smelter property is currently owned by the Murmur Corporation. EPA does not own any rights to the property, and when the remedial action is complete, Murmur will continue to own the property. The remedial action outlined in the ROD for OU No. 4 specifies that the existing buildings and pavements will be removed from the site, that soils in excess of health-based cleanup levels will be removed and that the entire site will be covered with two feet of clean soil. Once the remedial action is completed, there will not be a need to pave the site with five inches of cement to prevent leakage of contamination. The cleanup activities in the ROD will ensure adequate protection to human health and the environment.

Comment: I believe that the roofing made from asphalt and paper and just like tar that was found on top of the projects that was believed to be contaminated. And I believe that it will hold the dust that comes through the air. So why not cleanup or replace our roofs?

Response: Only 11 of 167 roofs in the DHA public housing area (OU No. 2) were found to be contaminated to the extent that they were classified as hazardous requiring cleanup. During EPA's extensive sampling effort in the private residential areas (OU No. 1) EPA tested lead levels from the drip line of roofs. The results showed that even if contaminated dust was trapped in the tar of residential roofs, the contamination was not being released. In other words, the results would indicate that lead dust is not falling from the roofs and contaminating the soil or providing a pathway of exposure to humans.

Comment: We like to request an extension of the public comment period to around the end of June. We have several neighborhood associations that we need to go to, to get their input.

Response: The 30-day public comment was extended an additional 30 days to July 12, 1995.

Comment: Where are materials and the soil going to go? Because citizens and communities are keeping a very keen eye on this project right here. When will it be known where the materials are going?

Response: All materials removed from the site will be disposed of at appropriate permitted facilities designed to handle the specific types of waste. Disposal facilities will be selected by the contractor and approved by EPA. These decisions will be made prior to the start of the remedial action and will be available to the public.

Comment: EPA did insufficient testing on the antimony and antimony is the marker that tells us if the lead come from the lead smelter.

Response: EPA has tested for antimony as part of the extensive home sampling (OU Nos. 1 and 2) conducted throughout west Dallas and in the confirmation sampling conducted during the removal action at the DHA site. However, EPA's sampling in the residential areas was in accordance with proven technical and scientific protocol, which concentrated on detection of lead.

Comment: The county has built a $17 million detention facility and emergency shelter as the crow flies with a half mile radius of the RSR vented lead smelter, on a hill. My concern is that the kids that are in this detention facility, the majority of the children at this emergency shelter are children of color. Now, I'm not blaming the EPA for what the county did. But I've also worked for the federal government; and I don't trust the federal government, because I know they lie. Okay? And I currently work for government now.

Response: There is no indication from EPA's and TNRCC's extensive investigations in west Dallas, that persons located at the detention facility are in danger of being exposed to harmful events of RSR smelter-related contamination. The detention facility is located upwind of the former RSR smelter and was built many years after the smelter permanently ceased operations. Previous testing indicates that the lead levels in the area of the detention facility are well below the residential cleanup level of 500 ppm lead. Since smelter operations permanently ceased in 1984 and the detention facility is located upwind of the former shelter, there is very little likelihood that smelter contamination will contaminate the area in the future.

Comment: I know that the EPA wants to redevelop this area. An I'm very much aware they're doing it because it's a drain on the economy. So we're window dressing for all the world to see on I-30. You know, you people don't care. We do.

Response: EPA does not have control of redevelopment of the smelter property. The property owner, Murmur, and potentially the City of Dallas through zoning and other measures can influence future development of the smelter property. EPA has selected the remedial action set forth in the ROD for OU No. 4 based on nine criteria that primarily focus on protection of human health and the environment. An added benefit to the selected remedial action is that the property can be put to future productive use.

EPA's role in west Dallas is to address environmental contamination in order to protect human health and the environment and to keep the public aware of and involved in the decision making. EPA has spent many years and many millions of dollars fulfilling these responsibilities and intends to continue its efforts to the full extent of its authority.

Comment: Are any of you familiar with a little town called Anderson Mill West in Cedar Park northwest of Austin? In 1990 they had a water tower that had been sandblasted which had leaded paint in it. The question that I have is, why was that neighborhood, which is predominantly white -- lowered to 100 parts per million when they only had a water tower that had been sandblasted? Why is it that we have to live under 500 parts per million, when the city council have asked the EPA to lower it to 250?

Response: EPA did not conduct the cleanup in Anderson Mill West. The cleanup was conducted by the contractor who had sandblasted the water tower and caused the contamination. The contractor proposed a cleanup level of 100 ppm lead. The Texas Air Control Board (predecessor to TNRCC) indicated that a 500 ppm cleanup level was sufficient. However, the contractor chose to cleanup to a lower level than 500 ppm. Likewise, the Dallas City Council based the cleanup level of 250 ppm on a level used at another cleanup site where the responsible parties decided to use a lower cleanup level than was necessary.

EPA's cleanup level of 550 ppm is based on the extensive sampling and investigation performed in the residential areas of west Dallas. In addition, EPA performed a human health risk assessment which examined site-specific conditions to determine a safe lead level specific to persons living in west Dallas. More information about the cleanup level in the residential areas is available to the public in the Administrative Record for OU No. 1 and the Administrative Record for OU No. 2 located in the RSR Site information repositories. Specifically, the RODs for OU Nos. 1 and 2 contain a summary of EPA's findings.

Comments: I heard you say a while ago that -- I think you used the word "confiscate" some of the money that you had spent. And some of the people in the area have been trying for years to receive money for their children. And you all do everything you can do to keep from giving us any money.

Response: In order to perform the investigation and cleanup activities at the RSR Site, EPA has spent money from the Hazardous Substance Superfund, a fund made up in part by tax dollars. The Superfund statute allows EPA to seek reimbursement of funds it spends from parties that are responsible for the contamination. EPA intends to pursue responsible parties for reimbursement, and in addition, will seek to have the responsible parties pay for or conduct the cleanup at the smelter property. The Superfund statute does not allow EPA to compensate individuals for personal injury or health problems. However, citizens may have recourse for such harms under other laws.

Comment: We feel that the community as a whole got a bad deal and we still feel like we're getting shafted. And where is RSR? Why isn't the City of Dallas responsible. They knew they were there from day one. The city was aware that smelter was there. They are, to me, just as responsible as RSR. At the next meeting, we would like to have someone from the city present.

Response: EPA has been keeping the City of Dallas informed of all activities at the RSR Site. EPA has many times attended City Council meetings and other advisory group meetings to provide the City information about the site and cleanup activities. The City provided comments to the proposed remedial action for OU No. 4. Those comments and EPA's responses are below. In addition, EPA has notified the City that it is potentially liable for two disposal areas (former City landfills) where RSR smelter wastes were allegedly disposed. EPA has invited the City of Dallas and specifically notified certain City officials of public meetings including this meeting. EPA will continue to invite City officials and council members to participate in meetings with the public. In addition, EPA has notified the RSR Corporation and a related company, Quemetco Metals Limited, Inc., of their potential liability at the RSR Site. EPA will continue to pursue these companies as well as others potentially liable for the contamination.

Comment: If the level of lead was really high, you as an agency of -- EPA, would you really, honestly, and truly tell the people that there is danger?

Response: Yes, we would make this information available to the public. EPA is obligated to provide as much information as possible to the public and seek public input before making final decisions. EPA has finalized the decision for OU No. 4 and will soon propose actions for the other areas. All of our studies were made available to the public for review once they were finalized.

Comment: How are you going to get back to the community on the responses to the comments made tonight? Will it be in one of those little booklets? I'd like to know, what is your plans for future notification.

Response: This Responsiveness Summary containing EPA's responses to questions and comments received during the public comment period will be included in the ROD for OU No. 4. The ROD is part of the Administrative Record for OU No. 4 and can be reviewed at the RSR Site information repositories. The comments and responses will also be attached to a summary of the ROD for OU No. 4 called a Fact Sheet. Fact Sheets will be mailed to all persons on the RSR Site mailing list and extra copies will be available at the West Dallas Public Library and at EPA's library. Prior to the start of the remedial action at OU No. 4, the public will receive more specific information about the cleanup. Additional public meetings may be held.

2. City of Dallas Department of Environmental and Health Services, letter dated June 12, 1995.

Comment: The City of Dallas Department of Environmental and Health Services recommends that the EPA adopt Alternative 4 as described in EPA's Proposed Plan for the site. We agree this is the preferred remedial action alternative of those presented to address contamination at the former RSR smelter and concur that this alternative provides the most overall protection to human health and the environment.

Responses: As stated in the Proposed Plan, Alternative 4 is EPA's recommended alternative. After evaluating all written and public comments, EPA has selected Alternative 4 with some slight modifications to address the contamination at OU No. 4.

Comment: While this plan is designed to address the remediation of the RSR site itself, we are still concerned with the EPA's decision to terminate the soil clean-up and removal activities in residential and public areas. This action implies that the source of contamination has been eliminated. However, elevated blood lead levels continue to plague children in the RSR area. While the source of the contamination has not been clearly identified, it still remains a continuing problem. We solicit your assistance in identifying and eliminating all potential sources of lead contamination affecting the health and safety of the residents of West Dallas.

Responses: EPA's decision that no further action is necessary in the residential areas of west Dallas is supported by many reports and studies contained in the Administrative Records for OU Nos. 1 and 2 located in the information repositories. EPA realizes that other sources of lead, such as lead paint, remain in west Dallas and that, as in every large city in the country, a small percentage of children in west Dallas continue to have elevated blood lead levels. However, EPA's authority under Superfund is limited to addressing lead contamination associated with the former RSR smelter facility. Studies conducted by EPA, the City and the State show that removing more soil from residential properties will not solve the lead problem if the lead contamination is associated with other sources. Other local, State and federal authorities may have jurisdiction to address these residual lead problems. The ROD for OU No. 4 will allow EPA to address contamination at the smelter. EPA is currently investigation other non-residential areas that are potential sources of smelter contamination (OU Nos. 3 and 5).

While elevated blood lead levels have declined in the past decade, EPA is concerned that elevated blood lead levels continue to affect Dallas area children. The studies already completed show where joint actions, rather than more studies, between Federal, State, and local authorities can further reduce lead as a health threat. EPA stands ready to do all in its authority to work with the City and other agencies to eliminate lead as public health threat.

3. From the Department of Health, Safety, and Environment of the United Steelworkers of America, letter dated June 19, 1995.

Comment: We strongly support the proposal to demolish the stack. While this procedure is not without risk, experience in the steel industry demonstrates that the risk can be controlled. Leaving the stack in place would leave the residents of West Dallas subject to an ongoing risk. Our experience is that demolition of large stacks can be accomplished with reasonable protection of workers and the public if proper precautions are taken. The USA's Department of Health, Safety, and Environment will be happy to share its experience with EPA and the community as the date of demolition approaches.

Response: The selected remedial action will include dismantling of the smelter stack. Details and procedures will be included in the Remedial Design plans and specification documents with input from experts in the field of stack demolition. EPA welcomes input from all interested

groups or persons.

Comment: In the Records of Decision for Operable Units 1 and 2, USEPA declared that it will "seek reimbursement of the money it spent from responsible parties for the site and not from the citizens that were affected by RSR contamination." The same principle must apply at OU 4. Clean-up costs should be paid, to the extent possible, by those who caused the contamination and not by the taxpayers.

Response: EPA will use all of its CERCLA authorities to recover costs associated with cleanup of the RSR Site from all liable parties.

Comment: We are disappointed that EPA has chosen to defer selection of an appropriate method of ground-water contamination until an unspecified time in the future. We believe that this postponement is acceptable only in the context of soil removal under Alternative 4. The other alternatives would leave lead-contaminated soil in place as a potential source of continuing ground-water contamination, and therefore could not be adopted until the study of ground-water has been completed. EPA should complete the investigation of the threat to ground water and surface water posed by the RSR Corporation site as rapidly as possible. Because of this gap, any remedial action taken under this proposed plan cannot be considered the complete remedy for OU No. 4. EPA's future decision regarding ground-water remediation comes within the definition of "remedial action" and will require full public participation pursuant to CERCLA §117(a). Thus, public participation must be provided under any ground-water decision scenario, even if EPA ultimately decides to take no remedial action with respect to ground-water contamination.

Response: Since the date of the proposed plan for OU No. 4, EPA has obtained adequate information regarding ground water to form a basis for the selected remedial action in the ROD for OU No. 4. Residents in the community are provided drinking water from the City of Dallas water system and no residential wells are located within a three-mile radius nor is the shallow water used for any residential or commercial needs. The State has concurred that the alluvial deposits located under OU Nos. 4 and 5 are not potential drinking water sources because of their extremely low yield. The ground water issue will be presented to the public for comment in the proposed plan for OU No. 5 scheduled to be issued in early 1996.

Comment: USEPA should finalize the listing of the RSR Corporation site on the National Priorities List (NPL) as quickly as possible.

Response: The RSR Corporation site was officially listed on the National Priorities List and published in the Federal Register on September 29, 1995. (60 Fed. reg. 50435)

Comment: USEPA should evaluate the option of reclaiming metals (lead, arsenic, cadmium) from contaminated soils and other materials. The high (percent) levels of metals found in some areas of soil and in some other materials (e.g., dust) at the site should make resource recovery feasible. In addition, removal of metals from the contaminated materials offers a more complete and permanent solution than merely disposing of them in a RCRA Subtitle C or D landfill. Likewise, USEPA] should consider the reclamation of steel from the many steel buildings and process equipment of site.

Response: Process options, such as salvage or reuse of building debris were considered in the Feasibility Study but determined to not be feasible. These options were considered in the initial development of alternatives and screened for effectiveness, implementability and cost, as required by the NCP. Options that did not meet the above criteria were screened out and not carried through in the four alternatives that went through detailed analysis. Based on the materials present at the site and problems encountered at other sites with reclamation, it was determined that reclamation of site materials would not be feasible.

Comment: We disagree with EPA's conclusion that both "Alternatives 3 and 4 will meet all of the ARARs identified for OU No. 4." RCRA closure requirements, which EPA agrees are ARARs at OU 4, mandate total removal of all contaminated materials, including soils, or post-closure care (here, probably long-term ground-water monitoring). Neither alternative fully meets these RCRA closure requirements.

Response: EPA disagrees. RCRA closure requirements are ARARs, but only to the extent that they are applicable or relevant and appropriate for this site. This does not mean that all RCRA closure subparts are applicable. A complete evaluation of potential ARARs for OU No. 4 of the RSR site is contained in Appendix C of the ROD for OU No. 4. This evaluation includes the list of ARARs potentially affected media, and their justification.

4. From United Steel Workers of America, Local 9121, District 36, letter dated July 6, 1995.

Comment: We strongly support the proposal to demolish the stack. If the stack is left in place, our main concern is that the smelter property may be redeveloped after the site has been cleaned up. We recommend that the stack is demolished in a safe and qualified manner in which no risk will be brought upon residents of their property.

Response: In the selected remedial action, the stack will be demolished as part of the cleanup of the site. Precautions will be followed to ensure the safety of site workers and the general public and to ensure that stack contamination does not migrate offsite during demolition activities.

Comment: We strongly feel that the clean up cost should be covered by not only RSR Corporation, but also by RSR's parent company, Quexco, Inc., of which Howard M. Meyers is the CEO. Mr. Meyers is also the controlling shareholder and therefore, a Potentially Responsible Party.

Response: EPA intends to pursue all potentially responsible parties that contributed to the contamination associated with the RSR smelter. EPA will attempt to recover all costs associated with past, and future site activities, including the remedial action for OU No. 4.

Comment: We do not agree with EPA's decision to defer selection of an appropriate method of ground-water contamination until a future date. EPA should make an immediate investigation of the threat to ground-water and surface water posed by the RSR Corporation site as soon as possible.

Response: Since the date of the proposed plan for OU No. 4, EPA has obtained adequate information regarding ground water to form a basis for the selected action in the ROD for OU No. 4. Residents in the community are provided drinking water from the City of Dallas water system and no residential wells are located within a three-mile radius nor is the shallow water used for any residential or commercial needs. The State has concurred that alluvial deposits located under OU Nos. 4 and 5 are not potential drinking water sources because of their extremely low yield. The ground water issue will be presented to the public for comment in the proposed plan for OU No. 5 scheduled to be issued in early 1996.

Comment: We strongly recommend that the EPA seriously consider the option of reclaiming metals from contaminated soils and other materials at the RSR site. Removal of the contaminated materials would ensure a more complete and permanent solution rather that disposing them into a landfill. We do not believe that the EPA should consider treatment of the soils with phosphate-based additives, with on-site disposal.

Response: The lead concentrations in the soils are not high enough for reclamation. Too much soil would remain as a by product that would still need to be disposed of at a permitted landfill. Therefore, it is not feasible to reclaim the remaining lead from the site soils.

Comment: We strongly urge the EPA to quickly finalize the listing of the West Dallas site on the National Priorities List, and to hold RSR, Quexco, and Mr. Howard M. Meyers responsible. It is time that the EPA stop protecting Corporations such as these that show no concern for the environment or the citizens in areas which their facilities reside for the sake of greed. The EPA should demonstrate a sincere concern and put forth a serious plan of action to protect people's health and well-being, specifically in West Dallas.

Response: The RSR Site was listed as final on the National Priorities List on September 29, 1995 (60 Fed. Reg. 50435). EPA has been concentrating its resources on addressing RSR smelter-related contamination in the residential areas where people live and the potential for exposure is greatest. EPA is now focusing on completing the decision making for the remaining operable units and on pursuing potentially responsible parties. EPA intends to vigorously pursue all potentially liable parties for which it is has a legitimate legal basis to pursue.

5. From RSR Corporation, letter dated July 12, 1995

Comment: The Baseline Human Health Risk Assessment mischaracterizes the Risks Associated with OU No. 4.

The NCP requires EPA to conduct a "site specific baseline risk assessment" to develop "reasonable maximum estimates of exposure for both current land use conditions and potential future land use conditions at each site." Thus, the assessment must "characterize the current and potential threats to human health and the environment that may be posed by contaminants migrating to ground water on surface water, releasing to air, leaching through soil, remaining in the soil, and bio-accumulating in the food chain," in order to "help establish acceptable exposure levels for use in developing remedial alternatives in the FS (Feasibility Study)."

EPA's Baseline Human Health Risk Assessment for the RSR Site (hereinafter "Risk Assessment") purportedly shows that the existing soils at OU No. 4 present unacceptable risks for exposure to lead, cadmium, antimony, and arsenic to incidental trespassers and to process and non-process workers. However, as explained in the attached memorandum from Environ Corporation, the Risk Assessment significantly overstate the risks associated with these metals.

The central flaw in EPA's risk assessment is that it is derived from inappropriate sampling data. The samples analyzed were taken solely from the unpaved northeastern corner of the Site (only seven soil samples) and the residual waste/debris piles (only thirteen samples). No samples were taken from paved areas of the Site. Moreover, the residual waste/debris piles have either been, or will be, removed pursuant to EPA's non-time-critical removal action. Thus, the samples used to calculate EPA's Risk Assessment for actual Site soil conditions unjustifiably overstates the risk presented.

If EPA based its assessment only on the data from the available soil samples, the risks associated with the Site would have been found to be well within the NCP's acceptable exposure levels for systemic toxicants and known or suspected carcinogens at Superfund sites. Had this been done, the remedial analyses would focus on the only area of the Site–- its northeast corner--where actual soil risks are documented.

EPA's use of the sampling data from the residual waste/debris piles subject to non-time-critical removal action to develop its Risk Assessment does not properly characterize current and future site conditions, and thus is inconsistent with the NCP. As such, it cannot be used to support

excavation of all Site surficial soils as recommended in EPA's preferred Alternative No. 4. The risk assessment should be revised to rely solely on relevant -- i.e., soil sampling -- data, and the chosen remedy revised accordingly.

Response: EPA conducted a site specific Human Health Risk Assessment for OU No. 4 based on the results from the remedial investigation. The risk from exposure to the very high concentrations of lead, cadmium, antimony, and arsenic as they existed at the time of the remedial investigation are indeed unacceptable to current site trespassers and potential future site workers if no action is taken. As the title states, this is a "Baseline Human Health Risk Assessment" and is based on the information gathered during the remedial investigation. Although a recently completed non-time critical removal action addressed waste/debris piles, extremely high levels of contaminated dust and debris remain in the buildings, and within site surfaces. Please refer to the After Action Report, dated October 24, 1995, included in the Administrative Record for OU No. 4. In addition, highly contaminated process waste materials remain inside pipes, equipment and other areas inside the secondary process buildings that were not addressed as part of the non-time critical removal action. These buildings are in serious states of deterioration causing releases or potential releases of the contaminated materials. Subsurface soil samples were collected from the paved areas from nine locations during the installation of the site monitoring wells. Concentrations from these samples were as high as from the soil samples collected from the unpaved area. In addition, the pavements themselves are contaminated, and releases and potential releases of hazardous substances are occurring from deterioration of the pavements and through the drainage systems associated with the pavements.

Comment: EPA failed to consider containment of soils and the reclamation of contaminated dusts and other materials in its preferred remedial alternative.

EPA also erred in failing to consider, in developing its proposed remedial alternative, the options of (a) containing soils in the northeast corner of the Site (through a cap) and (b) recycling lead contaminated soil and several other types of recyclable materials. These failures were inconsistent with the NCP and makes selection of Alternative No. 4 inappropriate and unlawful.

These alternative must "protect human health and the environment by recycling waste, . . . and/or controlling risks posed through each pathway by a site."

The NCP further requires EPA to "develop one or more innovative treatment technologies for further consideration if those technologies offer the potential for comparable or superior performance or implementability; fewer or lesser adverse impacts than other available approaches; or lower costs for similar levels or performance than a demonstrated treatment technologies."

Nowhere in the Feasibility Study has EPA undertaken an evaluation of whether the risks posed by exposure to soils can be adequately eliminated by containing (capping) exposed soils in the northeast corner of the Site, or whether the materials subject to the remedial action could appropriately be recycled at less cost. To the contrary, EPA's alternatives do not evaluate the viability of capping exposed Site soils and all include disposal of reclaimable material.

For example, Alternative No. 3 would require the demolition of the existing concrete pavement, transportation of the debris to a RCRA Subtitle D landfill, and the capping of the Site with two feet of clean soil at a cost of $493,581. Alternative No. 4 would essentially require all this plus the excavation of all Site soils, their disposal in a class I facility, and the capping of the Site with three feet of clean soil at a cost of $4,063,081.

With regard to recycling, both Alternatives Nos. 3 and 4 provide for the cleanup, transport,

solidification/stabilization, and disposal in a Subtitle C facility of lead contaminated dusts and demolition debris collected from the existing structures at the Site at a cost of approximately $929,031. They further require the steam cleaning, transport and disposal of sheet metal debris from the vehicle maintenance building at a cost of approximately $429.959.

EPA's failure to address capping is particularly inexcusable in light of the data discussed at Number 1 (first comment from RSR) above. Not only does that data not support disturbing the already-capped areas, it is not even sufficient to support excavation of the uncapped northeast corner.

EPA's failure to address the option of recycling also is inconsistent with the NCP requirements that EPA use innovative technologies that provide comparable (if not superior) performance at lesser costs. A report recently prepared by EPA specifically recommends the use of secondary lead smelters to recycle a wide range of contaminated materials and debris such as soils, demolition wastes, slag and dross, battery case debris, lead paint, and dusts, and touts this innovative technology as providing a "viable alternative to stabilization and disposal for the treatment of wastes" at Superfund sites.

EPA faces a very high, probably insurmountable, burden in justifying its failure to address these issues. Without far more attention than these issues have deserved, the Agency's selection of Alternative 4, as presently described, is inconsistent with the NCP.

Response: Consistent with the NCP, EPA developed a full range of technologies and process options to address contamination and risks posed at OU No. 4 of the RSR site. (See the Feasibility Study for OU No. 4 included in the Administrative Record for OU No. 4). These options, which included many innovative technologies, were screened against the criteria established by the NCP, effectiveness, implementability and cost. Only those options that met the above criteria were carried forward for detailed analysis. Alternatives considered for this site were also consistent with the alternatives selected at other smelter sites throughout the country. After reviewing alternatives evaluated at other sites, alternatives relevant to the RSR smelter facility and future land use considerations were evaluated to determine which alternatives would be considered for this site. Based on the materials present at the site and problems encountered at other sites with reclamation and recycling, it was determined that reclamation and/or recycling of site materials would not be feasible. (See prior Responses to Comments concerning reclamation and recycling). However, if materials are encountered during the implementation of the remedial action at OU No. 4 that are conducive to reclamation or recycling (ie. whole batteries or battery parts), EPA will consider recycling or reclamation as an offsite disposal option.

EPA did not consider various capping options for OU No. 4, including the option in Alternative 3 where site contaminants would be capped with two feet of clean fill. As discussed in the Proposed Plan and Record of Decision for OU No. 4, Alternative 3 did not meet as many of the goals and NCP criteria as Alternative 4 for protection of human health and the environment and was therefore not selected as the remedial alternative for OU NO. 4.

The suggestion that the concrete pads be left in place to serve as a cap to site contaminants is also not feasible or protective of human health and the environment. The concrete pavements themselves are contaminated with very high concentrations of hazardous substances that cannot be adequately decontaminated. Please refer to the After Action Report, dated October 24, 1995, which is included in the Administrative Record. Additionally, several areas of the concrete slab have deteriorated, particularly in the smelter building, and are cracked or nonexistent. Based on the high concentrations of contaminants and the current condition of the pavements, EPA does not consider that any type of decontamination, repair and long-term maintenance would ensure that the pavements would serve as an adequate cap of site contaminants. Furthermore, the

concrete slab contains numerous floor drains, sumps and other associated drainage systems that contain and transport sediments contaminated with high levels of lead, cadmium and arsenic. If left in place, these floor drains and sumps could continue to serve as a conduit for migration of contamination.

EPA can fully justify the selection in the ROD for OU No. 4 of a modified Alternative 4 as the remedial alternative that is most protective of human health and the environment while being cost effective. The selected remedy is consistent with the NCP and meets all nine criteria that have to be evaluated in the selection of a remedial action at Superfund sites. Therefore, the selection of Alternative No. 4 to address the site contamination is appropriate, lawful, and consistent with the NCP.

Potentially responsible parties ("PRPs") will be given the opportunity to perform the remedial action for OU No. 4 so long as their activities meet the requirements of the ROD and the cleanup goals established for OU No. 4. There may be many acceptable methods or combination of methods for the final disposal of the contaminated site materials from OU No. 4 that meet these requirements and goals. Therefore, whether EPA or the PRPs perform the remedial action at OU No. 4, EPA will consider available, lawful and acceptable methods, including reclamation and recycling, for final disposal of OU No. 4 materials.

Comment: EPA's failure to list the RSR Site on the National Priorities List precludes further response actions.

EPA proposed to list the Site on the NPL on May 10, 1993. In the remaining two years, it has taken no further action.

RSR suspects this delay reflects the substantiality of the concerns described in its comments on that proposed listing. Instead of responding to those comments, EPA has chosen to proceed through a series of its "non-time-critical removal actions." On its face, this approach is unlawful since removal actions only are to be used to mitigate circumstances posing or threatening immediate harm, and none is presented here.

It is hard to understand how a so-called non-time-critical removal action in which the Agency evaluated various alternatives to remove waste materials from the Site over a several month time period and then began removal actions on a non-critical time basis, is intended to mitigate circumstances posing or threatening immediate harm. The Agency's reliance on its purported authorities under CERCLA Section 104(a) to implement its removal action appears simply to be intended to placate the surrounding community.

EPA's failure unlawfully denies RSR meaningful opportunities to challenge EPA's actions through a final rule listing the Site on the NPL. Whatever the Agency's authority with regard to the non-time-critical removal action, it is clear that EPA's failure to list the RSR Site on the NPL prevents the Agency from taking further action to implement a permanent remedy at the RSR Site. The NCP expressly provides that "only those releases included on the NPL shall be considered eligible for Fund-financed remedial action" No further action to implement response actions at this Site –- even after the RI/FS is properly revised and an appropriate remedial option identified -- is permissible prior to a final listing decision.

Response: The final NPL listing of the RSR Corporation Superfund site was published in the Federal Register on September 29, 1995. 60 Fed. Reg. 50435. The NPL listing is based on an Administrative Record (sometimes referred to as the NPL Docket) for the RSR Corp. Superfund Site. The record contains responses to all public comments received on the proposed listing.

Information EPA relied on or considered in making its decision for the non-time-critical removal action for OU Nos. 4 and 5 is contained in the Administrative Record Non-Time critical Removal Action Operable Unit Nos. 4 and 5 available for review at the RSR Site information repositories. EPA's decision is set forth in an Action Memorandum dated December 22, 1994 and is supported by this Administrative Record.

Based in part on the human health risk assessment and the remedial investigation for OU No. 4, EPA issued the Action Memorandum for the non-time-critical removal action to address the highly contaminated residual piles and the contaminated liquids from several hundred barrels, some of which were leaking and in very poor condition. In addition, EPA has documented visible signs of trespass onto the OU No. 4 property, including graffiti, evidencing the real risk of direct exposure by humans to dangerous site conditions. Since the comprehensive remedial action for OU No. 4 would most likely take several years to implement, EPA determined that the non-time-critical removal action was appropriate to address the highly contaminated materials.

EPA intends to use its full CERCLA authorities to ensure that additional appropriate response actions are implemented at OU No. 4.

ADULT LEAD CLEANUP MODEL
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT No. 4
APPENDIX B

Draft Region 6 Superfund Guidance

Adult Lead Cleanup Level

Basic Equations:

$$Cs = \frac{(PbBGMtarget - PbBo)}{BKSF \times (IRs \times EFs \times AFs + Ksd \times IRd \times EFd \times AFd}$$

$$PbBGMtarget = PbB95thmaternal/GSDi1.645$$

$$PbB95thmaternal = PbB95thfetal/R$$

Input Parameters to the Model:

1. 95th Percentile PbB in fetus (PbB95thfetal)

The EPA and CDC recommended that no more than 5% likelihood that a child would exceed 10 µg/dL. For an industrial/commercial setting, the exposed population could include pregnant women. The recommended PbB95thfetal is 10 µg/dL.

2. Mean ration of fetal to maternal PbB (R)

The relationship between fetal and maternal blood lead is estimated to be 0.9 (Goyer 1990). The recommended "R value" is 0.9.

3. Individual geometric standard deviation (GSDi)

A "typical" GSDi is 1.8.

4. Baseline blood lead value (PbBo)

The demographic composition of the site should be considered. The geometric mean PbB values reported for women aged 20 - 49 years for African Americans was 2.2 µg/dL, for Hispanics was 2.0 µg/dL, and for whites was 1.7 µg/dL.

5. Biokinetic slope factor (BKSF)

The recommended BKSF is 0.4 µg/dL per µg/day.

6. Soil ingestion rate (IRs)

The recommended IRs is 0.025 g/day. This assumes that one-half the "default" soil/dust ingestion rate of 0.05 g/day is from soil.

7. Dust ingestion rate (IRd)

The recommended IRd is 0.025 g/day. This assumes that one-half the "default" soil/dust ingestion rate of 0.05 g/day is from dust.

8. Ration of concentration in dust to that in soil (Ksd)

The Ksd can range from 0.2 to 1.0 with a "typical" value of 0.7.

9. Soil exposure frequency (EFs)

The "default" exposure frequency for an industrial setting is 250 days/year. This exposure frequency is based upon a 5 work days per week for 50 weeks/year. The recommended EFs is 250 days/year.

10. Dust exposure frequency (EFd)

The "default" exposure frequency for an industrial setting is 250 days/year. This exposure frequency is based upon a 5 work days per week for 50 weeks/year. The recommended EFd is 250 days/year.

11. Absolute absorption fraction of lead in soil (AFs)

The absorption fractions for adults range from 0.06 to 0.2. The recommended AFs for most sites is 0.1. The source of lead contamination should be considered in selecting the AFs value.

12. Absolute absorption fraction of lead in dust (AFd)

The absorption fractions for adults range from 0.06 to 0.2. The recommended AFs for most sites is 0.1. The source of lead contamination should be considered in selecting the AFs value.

Model Parameter	Plausible Range	"Typical" Value
95th Percentile PbB in fetus (µg/dL)	5 - 15	10
R (Mean ratio of fetal to materal PbB)	0.8 - 1.0	0.9
Individual geometric standard deviation (GSDi)	1.6 - 2.0	1.8
Baseline blood lead value (PbBo) (µg/dL)	1.6 - 2.2	1.9
Biokinetic slope factor (BKSF) (µg/dL per µg/day)	0.3 - 0.5	0.4
Soil ingestion rate (IRs) (mg/day)	10 - 25	25
Dust ingestion rate (IRd) (mg/day)	10 - 25	25
Ratio of concentration in dust to that in soil (Ksd)	0.2 - 1.0	0.7
Soil ingestion frequency (EFs) (days/year)	100 - 350	250
Dust ingestion frequency (EFd) (days/year)	100 - 350	250
Absolute absorption fraction of lead in soil (AFs)	0.06 - 0.2	0.1
Absolute absorption fraction of lead in dust (AFd)	0.06 - 0.2	0.1
Resulting soil concentration (mg/kg)		2,000

Screening Level for Lead Program v1.00

1.0 Starting the Program

To start the "Screening Level for Lead Program" (PRG), enter PRG at the DOS prompt of the subdirectory containing the executable file (PRG.EXE).

2.0 Data Entry

Figure 1 illustrates an example Data Entry Screen for PRG.

Screening Level for Lead Program v1.00

Values Selected

95th Percentile PbB in fetus (PbB95 fetal) (ug/dL)	:	10
Mean ratio of fetal to maternal PbB (R)	:	0.9
Individual geometric standard deviation (GSDi)	:	1.7
Baseline blood lead value (PbB0) (ug/dL)	:	1.9
Biokinetic slope factor (BKSF) (ug/dL per ug/day)	:	0.4
Soil ingestion rate (IRs) (g/day)	:	0.01
Dust ingestion rate (IRd) (g/day)	:	0.01
Ratio of concentration in dust to that in soil (Ksd)	:	0.2
Soil exposure frequency (EFs) (days/yr)	:	250
Dust Exposure frequency (EFd) (days/yr)	:	250
Absolute absorption fraction of lead in soil (AFs)	:	0.06
Absolute absorption fraction of lead in dust (AFd)	:	0.06

INSTRUCTIONS

(1) Enter all values above.
(2) To Calculate Screening Level for Lead: Press PgDn or F5 key.
(3) To Exit: Press Esc key.

Figure 1. Example Data Entry Screen

When started initially, all data entry fields are zero. Some fields (such as GSD, BKSF, and R) can not be left as zero because division by zero is prohibited. Also, this program does not allow entry of negative numbers in any field. After all values are entered, press either the PgDn key or the F5 key to calculate the Screening Level for Lead (in ug/g).

3.0 Results

Figure 2 illustrates an example Results Screen,.

Results - Screening Level for Lead Program v1.00

95th Percentile PbB in fetus (PbB95 fetal) (ug/dL)	10
Mean ratio of fetal to maternal PbB (R)	0.9
Individual geometric standard deviation (GSDi	1.7
Baseline blood lead value (PbB0) (ug/dL)	1.9
Biokinetic slope factor (BKSF) (ug/dL per ug/day)	0.4
Soil ingestion rate (IRs) (g/d	0.01
Dust ingestion rate (IRd) (g/day)	0.01
Ratio concentration in dust to that in soil (Ksd)	0.2
Soil Exposure frequency (EFs) (days/yr)	250
Dust Exposure frequency (EFd) (days/yr)	250
Absolute absorption fraction of lead in soil (AFs)	0.06
Absolute absorption fraction of lead in dust (AFd)	0.06

Screening Level for Lead (PRG) (ug/g): 13898

Select ---> Esc: Return to Data Entry F4: Save F7: Print

Figure 2. Example Results Screen

The Results Screen can be printed or saved to a file. All data entry values are retained when returning to the Data Entry Screen.

4.0 Equation Used for Calculation

The following equation is used to calculate The Screening Level for Lead:

$$\text{Screening Level for Lead (PRG) (ug/g)} = \frac{(PbB95fetal/(R \cdot (GSDi)1.645)) - PbBO}{BKSF \cdot ((IRs \cdot AFs \cdot EFs/365) + (Ksd \cdot IRd \cdot AFd \cdot EFd/365))}$$

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
1. Contaminant-Specific ARARs					
Federal					
Risk-based preliminary remediation goals (PRGs) [Risk Assessment Guidance for Superfund (RAGS), Part B]	X			TBC	Risk-based PRGs calculated using RAGS Part B are TBC for OU No. 4 and OU No. 5.
National Contingency Plan 40 C.F.R. Part 300.430(d) Baseline Human Health Risk Assessment	X	X	X	Yes	Applicable to OU No. 4 and OU No. 5. Evaluates baseline human health risk due to current and potential future site exposures, and establishes contaminant levels in environmental media at the OUs for protection of public health.
Office of Solid Waste and Emergency Response (OSWER) Directive 9355.4-12 July 14, 1994	X			TBC	The directive establishes soil cleanup levels for lead abatement for residential areas. These levels are TBCs for OU No. 4 and OU No. 5.
EPA-Strategy for Reducing Lead Exposures, October 3, 1990	X	X	X	TBC	TBC for OU No. 4 and OU No. 5. The strategy was developed to reduce lead exposures to the greatest extent possible. Goals of the strategy are to: (1) significantly reduce blood lead incidences above 10 µg/dL in children and (2) reduce the amount of lead introduced into the environment.
2. Action-Specific ARARs					
Federal					
40 CFR 268 Universal Treatment Standards (UTS)			X	Yes	40 CFR Part 268 establishes restrictions on land disposal unless treatment standards are met. Relevant and appropriate to both OU No. 4 and OU No. 5, if the wastes are removed from the sites for subsequent disposal. Metals wastes in soil that are hazardous by toxicity characteristic are exempt from this rule. The UTS establish a concentration limit for 300 regulated constituents in soil regardless of waste type.
40 C.F.R. Part 264 Subparts B, C, D and G	X	X	X	Yes	Subparts B, C, and D establish minimum standards which define the acceptable management of hazardous waste for owners and operators of facilities that treat, store, or dispose of hazardous waste. Subpart G establishes standards for closure and post-closure care for site design and operation. These requirements are relevant and appropriate for wastes identified as RCRA hazardous wastes.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
Federal (Continued)					
Subparts I and J	X	X	X	Yes	Subpart I sets operating and performance standards for container storage of hazardous waste. Subpart J outlines similar standards, but applies to tanks rather than containers. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if containers are used for onsite storage of liquids, soil, or other wastes as part of the remedial action.
Subparts L and N	X	X	X	Yes	Subpart L sets design and operating requirements for the storage or treatment of wastes in piles. If the waste piles are closed with wastes left in place, Subpart L requirements are applicable and must be met. Subpart N establishes construction, design, performance, closure, and operation requirements pertaining to Subtitle C landfills. Subpart L and/or N are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if onsite treatment, storage, or disposal in piles or Subtitle C landfills is included as part of the remedial action.
Subpart S	X	X	X	Yes	The promulgated portion of Subpart S addresses the corrective action management unit (CAMU) and temporary unit (TU) aspects of RCRA corrective action. A CAMU is a contiguous area within a facility in which remedial wastes generated during corrective action are managed. A CAMU may include uncontaminated areas where necessary to achieve overall remedial goals. Wastes may be moved from one CAMU to another within the facility without triggering land disposal restrictions (LDRs). Wastes can also be removed from the CAMU, treated in a unit, and returned to the CAMU without triggering LDRs. A TU can be used to manage wastes for up to 1 year. TUs are not subject to the full permitting requirements of a fully regulated RCRA unit and waste piles are not eligible for TUs. Subpart S requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if the remedial action requires wastes to be managed in an onsite CAMU or TU.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
Federal (Continued)					
Subpart X (Miscellaneous Units)	X	X	X	Yes	Relates to "miscellaneous" units that treat, store, or dispose, hazardous wastes. Provides general performance standards for location, design, construction, operation, monitoring, and closure/post-closure. This requirement is relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if the remedial action includes onsite treatment, storage, or disposal of waste in a miscellaneous unit.
40 C.F.R. § 761.60 (PCB Disposal)	X			Yes	Serves as ARAR for disposal of affected materials containing concentrations of PCBs, if affected materials are identified at OU No. 4 or OU No. 5. This requirement is relevant and appropriate.
40 C.F.R. § 761.65(c)(7) (PCB Storage)		X		No	Serves as an ARAR only to extent that it authorizes storage of liquid PCBs in containers meeting 29 C.F.R. § 1910.106 (OSHA Standards for Flammable and Combustible Liquids); requires preparation and implementation of Spill Prevention Control and Countermeasures plan. Not an ARAR since liquid PCBs were identified at either OU No. 4 or OU No. 5.
OSHA Worker Protection 40 C.F.R. § 300.38	X	X	X	Yes	Applicable to OU No. 4 and OU No. 5 regarding protection of workers at site. (29 C.F.R. 1910.120)

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
Federal (Continued)					
Surface Mining Control and Reclamation Act of 1977 25 GSC §§1201 et. seg.; 30 C.F.R. Parts 816.11, .95, .100, and .102	X		X	Yes	The requirements include provisions for: ! .11-Posting signs and markers for reclamation, including top soil markers and perimeter markers. ! .95-Stabilization of all exposed surface areas to effectively control erosion and air pollution attendant to erosion. ! .97-Use of best technology currently available to minimize disturbances and adverse impacts on fish, wildlife, and related environmental values and achieve enhancement of such if possible. ! .100-Contemporaneous reclamation including, but not limited to backfilling, regrading, topsoil replacements and revegetation. ! .102-Achieve a post action slope not exceeding angle of repose or such lesser slope as is necessary to achieve a minimum long-term static safety factor 1.3 and to prevent slides. These requirements are relevant and appropriate to OU No. 4 and OU No. 5.
State					
General Prohibitions 30 TAC § 330.5			X	No	The regulation prohibits disposal of lead acid storage batteries at municipal solid waste landfills. This requirement is not an ARAR for OU No. 4 but is relevant and appropriate for battery casings identified on OU No. 5.
Disposal of Special Wastes 30 TAC § 330.136		X		Yes	Specifies that regulated asbestos-containing material (RACM) may be accepted at a Type 1 or Type I-AE municipal solid waste landfill (MSWLF) provided that the MSWLF facility has been authorized to accept RACM and complies with the provisions of § 330.136. This requirement is applicable for OU No. 4 and OU No. 5.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Closure and Remediation Subchapter A 30 TAC § 335.8	X	X	X	Yes	These provisions apply to closure and remediation of facilities associated with contamination resulting from unauthorized discharges, either as part of closure or at any time before or after closure. The regulations also apply to remediation of areas that are not otherwise designated as a facility but that contain unauthorized discharges of industrial waste or municipal hazardous waste. Section (a)(2) of this citation specifies that, for remediations performed under the State Superfund program, media cleanup levels should be based on future residential land use unless it is demonstrated that an alternative land use is more appropriate. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4.
Subpart S, Risk Reduction Standards 30 TAC § 335.551	X			Yes	Establishes procedures to demonstrate compliance with the risk reduction standards for different types of contaminated media such as air, surface water, groundwater, and soil, and for cross-media contamination pathways such as soil-to-groundwater and soil-to-air. Requirements apply to closure and remediation undertaken according to 30 TAC § 335.8. Numeric cleanup values are based on which of the three risk reduction rules are appropriate. These requirements are relevant and appropriate for surface soil on OU No. 4 and OU No. 5.
Subpart S, Risk Reduction Standard No. 3 30 TAC § 335.562	X			Yes	Risk Reduction Standard No. 3 specifies that persons shall propose media cleanup levels in accordance with the conditions stated. These requirements are relevant and appropriate for OU No. 4 and OU No. 5 to perform closure or remediation activities. Cleanup levels will be based on the CERCLA risk assessments developed for OU No. 4 and OU No. 5.

Shipping and Reporting Procedures Applicable to Generators of Hazardous Waste or Class I Waste and Primary Exporters of Hazardous Waste Subchapter A 30 TAC § 335.10	X	X	X	Yes	Establishes requirements for manifesting shipments of hazardous waste to off-site facilities. This requirement is relevant and appropriate to both OU No. 4 and OU No. 5 if hazardous or Class I wastes are shipped off-site to a disposal/treatment facility.
Shipping Requirements for Transporters of Hazardous Waste or Class I Waste Subchapter A 30 TAC § 335.11	X	X	X	Yes	Requirements specific to transporters of hazardous or class I wastes regarding manifesting waste shipments. These requirements are relevant and appropriate to any transporter who transports hazardous or class I wastes offsite from OU No. 4 or OU No. 5.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Shipping Requirements Applicable to Owners or Operators of Storage, Processing, or Disposal Facilities Subchapter A, 30 TAC § 335.12	X	X	X	No	Requires owners or operators of storage, processing or disposal facilities to comply with manifest requirements upon receipt of waste shipment. This requirement is not an ARAR for OU No. 4 or OU No. 5 because waste shipments will not be received at the RSR Site.
Special Definitions for Recyclable Materials and Nonhazardous Recyclable Materials Subchapter A, 30 TAC § 335.17		X		Yes	Specifies definition of recyclable materials including "scrap metal." This requirement is applicable to OU No. 4 and OU No. 5 if materials (building components, etc.) are to be recycled.
Requirements for Recyclable Materials and Nonhazardous Recyclable Materials Subchapter A 30 TAC § 335.24 (c) and (h)		X		Yes	Specifies that scrap metal is not subject to regulation under Subchapter B-I and O of Chapter 335. Under § 335.24(h), the rule specifies that scrap metal, as defined in Section (c) remains subject to the requirements of § 335.4 (relating to General Prohibitions) and § 335.6 (relating to Notification Requirements). Such waste may also be subject to the requirements of § 335.10 through § 335.15 of Title 30. These requirements are relevant and appropriate to OU No. 4 and OU No. 5 if materials are recycled.

Adoption of Appendices by Reference Subchapter A 30 TAC § 335.29	X	X	X	Yes	Adopts appendices contained in 40 C.F.R. Part 261 by reference; this includes Appendix I-III, VII-X. I - Representative Sampling Methods II - Method 1311 Toxicity Characteristic Leaching Procedure III - Chemical Analysis Test Methods VII - Basis for Listing Hazardous Waste VIII- Hazardous Constituents IX - Wastes Excluded under § 260.20 and § 260.22 X - Method of Analysis for Chlorinated Dibenzo-p-dioxins and Dibenzofurans. These requirements are relevant and appropriate for OU No. 4 and OU No. 5 to determine which, if any, media are RCRA hazardous wastes. These requirements are not applicable since much of the contaminated media was disposed of prior to 1980.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Hazardous Waste Management General Provisions Subchapter B 30 TAC § 335.41		X	X	Yes	This subchapter implements a state hazardous waste program which controls from point of generation to ultimate disposal those wastes listed in 40 C.F.R. Part 261. These standards are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5.
Standards Applicable to Generators of Hazardous Wastes Subchapter C 30 TAC § 335.61, §§ 335.65-335.70		X	X	Yes	This subchapter establishes standards for generators of hazardous waste. These standards include: packaging, labeling, marking, placarding, accumulation time, and record-keeping. Requirements for packaging, labeling, marking, and placarding are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5.
Standards Applicable to Transporters of Hazardous Waste Subchapter D 3o TAC § 335.91		X	X	Yes	This subchapter establishes standards for transporters transporting hazardous waste to offsite storage, processing, or disposal facilities. This subchapter does not apply to onsite transportation of hazardous waste by generators or by owners or operators of storage, processing, or disposal facilities. Requirements of this subchapter are relevant and appropriate for RCRA hazardous wastes on OU No. 4 or OU No. 5 that are sent offsite for disposal.
Applicability of Groundwater Monitoring and Response Subchapter F 30 TAC § 335.156		X	X	Yes	This section outlines the rules pertaining to groundwater monitoring and response, which apply to owners and operators of facilities that process, store, or dispose of hazardous waste. The owner or operator must satisfy the requirements of § 335.156 (a)(2) for all wastes (or constituents thereof) contained in any such waste management unit at the facility, regardless of the time at which waste was placed in the units. These requirements are relevant and appropriate for RCRA hazardous wastes left in place or disposed on OU No. 4 and OU No. 5.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Buildings and Soils	Residual Structures	Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Required programs Subchapter F 30 TAC § 335.157	X		X	Yes	Requires owners and operators subject to 30 TAC § 335.156 to conduct a monitoring and response program as follows: (1) Whenever hazardous constituents from a regulated unit are detected at the compliance point, the owner or operator must institute a compliance monitoring program. (2) Whenever the groundwater protection standard is exceeded, the owner of operator must institute a corrective action program. (3) Whenever hazardous constituents from a regulated unit exceed concentration limits under § 335.160 in groundwater between the compliance point and the downgradient facility boundary, the owner or operator must institute a corrective action program, and (4) In all other cases, the owner or operator must institute a detection monitoring program. These requirements are relevant and appropriate for RCRA hazardous wastes left onsite at OU No. 4 and OU No. 5.
Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities Subchapter E 30 TAC § 335.111	X		X	Yes	This subchapter establishes minimum requirements that define the acceptable management of hazardous waste prior to the issuance or denial of a hazardous waste permit and until certification of final closure or, if the facility is subject to post-closure requirements, until post-closure responsibilities are fulfilled. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if wastes are left onsite.
Interim Standards for Owners and Operators of Hazardous Waste Storage, Processing, or Disposal Facilities-Standards Subchapter E 30 TAC § 335.112	X		X	Yes	Adopts 40 C.F.R. Part 265, except as noted, by reference. This includes Subparts B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, W, AA, and BB. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if wastes are left onsite.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Containment for Wastes Piles Subchapter E 30 TAC § 335.120			X	Yes	Establishes requirements for hazardous leachate or run-off from a pile: 1) the pile must be placed on an impermeable base, must include a run-on control system and a run-off management system and 20 the pile must be managed such that it must be protected from precipitation and run-on and no liquids or wastes containing free liquids may be placed in the pile. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if waste piles are created during remediation.
Permitting Standards for Owners and Operators of Hazardous Waste Storage Processing or Disposal Facilities Subchapter F 30 TAC § 335.151	X		X	Yes	Subchapter F includes the minimum standards of operation for all aspects of the management and control of municipal hazardous waste and industrial solid waste, including rules relating to the siting of hazardous waste facilities. These standards are relevant appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5.
Standards Subchapter F 30 TAC § 335.152	X		X	Yes	Adopts by reference the regulations contained in 40 C.F.R. Part 264, except as noted in this section. These standards are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5.
Corrective Action for Solid Waste Management Units Subchapter F 30 TAC § 335.167(b) and (c)	X		X	Yes	Outline requirements for corrective action at solid waste management units. No solid waste management units have been identified at OU No. 4 or OU No. 5. These standards are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 that undergo a corrective action.

Design and Operating Requirements (Waste Piles) Subchapter F 30 TAC § 335.170	X	X	Yes	Establishes requirements for waste piles including: 1) a liner designed, constructed, and installed to prevent any migration of wastes out of the pile and 2) a leachate collection and removal system immediately above the liner that is designed, constructed, maintained, and operated to collect and remove leachate from the pile. These requirements are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5 if waste piles are created during remediation.
Location Standards for Hazardous Waste Storage, Processing, or Disposal Subchapter G 30 TAC §335.201 (a)(3)	X	X	Yes	This subchapter establishes minimum standards for the location of facilities used for the storage, processing, and disposal of hazardous waste. The requirements are relevant and appropriate for any facility built onsite to store, process, or dispose of RCRA hazardous wastes.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Buildings and Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Prohibition on Open Dumps Subchapter I 30 TAC § 335.302	X		X	No	Prohibits open dumping of industrial solid waste. Not an ARAR for OU No. 4 or OU No. 5, as all wastes will be handled according to ARARs.
Hazardous Waste Generation, Facility, and Disposal Fees System Subchapter J 30 TAC § 335.321	X		X	No	Establishes an industrial solid waste and hazardous waste fee program which is an administrative requirement. Administrative requirements are not ARARs.
Hazardous Substance Facilities Assessment and Remediation Subchapter K 30 TAC § 335.341 (b)(4)	X		X	Yes	Outlines the scope and requirements associated with the State Superfund program, including: ranking of facilities (§ 335.343), delisting and modifications (§ 335.344), removal actions and preliminary site investigations (§ 335.346), general requirements for a remedial investigation/feasibility study (§ 335.348), and general requirements for a remedial action (§ 335.349). The requirements set forth in the rule are relevant and appropriate. However, because the RSR Site is proposed for listing on EPA's National Priorities List and is an EPA-lead Superfund site, the requirements are being met through the CERCLA RI/FS process.
Specific Air Emission Requirements for Hazardous or Solid Waste Management Facilities Subchapter L 30 TAC § 335.367	X		X	Yes	Requires hazardous or solid waste management facilities to use the best available control technology to control emission of air contaminants, considering technical practicability and economic factors. Requires the owner/operator to demonstrate that the facility or unit will not cause or contribute to air pollution. These requirements are relevant and appropriate to RCRA facilities constructed onsite at OU No. 4 and OU No. 5.
Pre-Application Review and Permit Procedures Subchapter M 30 TAC § 335.391-335.393	X		X	No	These requirements are administrative requirements. Administrative requirements are not ARARs.
Warning Signs for Contaminated Areas Subchapter P 30 TAC § 335.441	X	X	X	Yes	Provides standards and procedures for the placement of warning signs on property contaminated with hazardous substances when such contamination presents a danger to public health and safety. The requirements in Subchapter P are relevant and appropriate for RCRA hazardous wastes on OU No. 4 and OU No. 5.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Buildings and Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
Pollution Prevention Source Reduction and Waste Minimization Subchapter Q 30 TAC § 335.473	X	X	X	No	Applies to all large quantity generators, all generators other than large quantity and conditionally exempt generators, and all persons subject to reporting requirements under SARA 313 Title III. The RSR Site is not a large-quantity generator. Therefore, these requirements are not ARARs for OU NO. 4 or OU No. 5.
Waste Classification and Waste Coding Required Subchapter R 30 TAC § 335.503	X	X	X	Yes	These requirements specify the classification scheme and coding for all industrial solid and municipal hazardous waste generated, stored, processed, transported, or disposed of in the site. These requirements are relevant and appropriate for all waste at OU No. 4 and OU No. 5.
Hazardous Waste Determination Subchapter R 30 TAC § 335.504	X	X	X	Yes	Requires waste generator to determine if the waste is hazardous either as a listed or characteristic waste according to 40 C.F.R. Part 261, Subpart D or 40 C.F.R. Part 261 Subpart C. These requirements are relevant and appropriate for identifying RCRA hazardous waste OU No. 4 and OU No. 5.
Class 1 Waste Determination Subchapter R 30 TAC § 335.505	X	X	X	Yes	Specifies the chemical/physical properties associated with a Class 1 non-hazardous industrial solid waste. This requirement is relevant and appropriate for OU No. 4 and OU No. 5 relative to waste determination procedures.
Class 2 Waste Determination Subchapter R 30 TAC § 335.506	X	X	X	Yes	Requires determination of a Class 2 waste classification for industrial solid waste that is neither a hazardous waste, a Class 1 waste, nor a Class 3 waste. This requirement is relevant and appropriate for both OU No. 4 and OU No. 5.
Class 3 Waste Determination Subchapter R 30 TAC § 335.507	X	X	X	Yes	Specifies that industrial solid waste is a Class 3 waste if it is inert, essentially insoluble, neither a Class 1 nor hazardous waste, and poses no threat to human health and/or the environment. This requirement is relevant and appropriate for OU No. 4 and OU No. 5.
Classification of Specific Industrial Solid Wastes Subchapter R 30 TAC § 335.508(1)		X		Yes	Requires that industrial solid waste containing asbestos material identified as Regulated Asbestos Containing Material (RACM), as defined in 40 C.F.R. Part 61, shall be classified as Class 1 Waste. Applicable to both OU No. 4 and OU No. 5 due to the presence of asbestos containing material.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
TNRCC Demolition Debris Waste February 23, 1994		X		TBC	In an interoffice memorandum, the TNRCC defines "demolition debris" and establishes sampling recommendations based on 30 TAC § 335.509. The TNRCC recommends that, prior to beginning demolition or dismantling operations, generators of demolition debris waste take appropriate steps to: 1. Identify the individual components/phases of the waste which have a significant and potential to be hazardous wastes (and, in the case of industrial generators, Class 1 wastes); 2. Segregate, to the extent practical, those components/phases from the remainder of the waste. 3. Perform any necessary sampling and analytical testing on those components/phases to determine whether they are characteristically hazardous as defined in 40 C.F.R. §§ 261.21 through 24 (and in the case of generators of industrial waste, Class 1 as defined in 30 TAC § 335.505). 4. Manage those components/phases, as well as the remainder of the wastes, according to standards appropriate to their classification. If during the process of segregating hazardous or Class 1 components/phases from the remainder of the waste, it is determined that the action may pose a significant threat to human health and the environment, generators should use appropriate discretion when deciding whether segregation is in the best interest of protecting human health and the environment. As nonpromulgated guidelines, these requirements are TBCs for OU No. 4 and OU No. 5 if demolition is selected as part of the remedy.

Table A-1
ARARs Evaluation for Soils, Buildings and Structures, and Residual Material - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	Potentially Pertinent Mediaa: Buildings and Soils	Buildings and Structures	Residual Material	ARAR?	Justification
2. Action-Specific ARARs (Continued)					
State (Continued)					
TNRCC Historically Contaminated Sites: Industrial Versus Municipal Solid Waste July 12, 1994	X	X	X	TBC	In an interoffice memorandum, TNRCC established requirements that, before the final deposition of a waste is carried out, the site owner or operator must accomplish at least the following: 1. Waste type determination (municipal or industrial) and 2. Hazardous waste determination in accordance with 30 TAC § 335.62 Wastes from a presently inactive facility (generator) where previous industrial activities occurred or industrial waste was generated, would be classified as industrial waste. As nonpromulgated guidelines, these requirements are TBCs for OU No. 4 and OU No. 5.
3. Location-Specific ARARs					
Federal					
Coastal Zone Management Act 16 U.S.C. § 1451 et seq. 40 C.F.R. § 6.302(d)	X	X	X	TBC	Requires assessment of the impacts of activities on a coastal zone and the conduct of activities in connection with a coastal zone in accordance with a state approved Coastal Zone Management Plan. Activities at OU No. 4 or OU No. 5 will not impact a coastal zone; therefore this requirement is not an ARAR.
40 C.F.R. § 264.18 (Location Standards)	X	X	X	No	Relates to hazardous waste treatment, storage, or disposal facilities subject to permitting. Requires that new units where treatment, storage, or disposal of hazardous waste will be conducted be located greater than 200 feet from a fault with a displacement in Holocene time and that facilities located in 100-year floodplains will be designed, constructed, and operated to prevent washout of hazardous waste from active portions of the facility. Since the site is not in a 100-year floodplain, this regulation is not an ARAR. The site is not within 200 feet of a fault, thus the provisions pertaining to faults are not ARARs.

aPotentially Pertinent Media - In some cases, the evaluation of analytical results from these media is needed to determine whether a potential ARAR is applicable or relevant and appropriate (see Appendix D for these evaluations). For example, many of the RCRA requirements are relevant and appropriate for RCRA hazardous waste. A potentially pertinent medium may or may not be a RCRA characteristic hazardous waste, depending on its TCLP results.

Table A-2
Numeric Contaminant-Specific ARARs/TBCs for Soils,
Buildings and Structures,
and Residual Material OU No.4
RSR Corporation Superfund Site
Dallas, Texas

Chemical	(1) TBC Industrial (mg/kg)
Inorganics	
Aluminum	
Antimony	818
Arsenic	32.7a
Barium	142,476
Beryllium	
Cadmium	2,044
Chromium	1,577
Cobalt	
Copper	75,628
Lead	1,000b
Manganese	258,711
Mercury	613
Nickel	40,880
Selenium	10,220
Silver	10,220
Thallium	164
Vanadium	14,308
Zinc	613,200

Notes:
(1) Preliminary Remediation Goals (PRG). Calculated based on Human Health Evaluation Manual, Part B: Development of Risk-Based Preliminary Remediation Goals. OSWER Directive 9285.7-01B.

TBC = To be considered.

aThe acceptable risk level for arsenic is set at 1x10-5 since a risk level of 1x10-6 results in a PRG that is at or below background levels of arsenic.

bEPA OSWER Directive 9355.4-12.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific ARARs		
Federal		
Safe Drinking Water Act 40 U.S.C. 399 Primary Drinking Water Standards (MCL) 40 C.F.R. Part 141	No	There is no direct contact between the source of contaminants and surface water at the site. Surface waters around site are not designated for public and private water supply. MCLs are not ARARs for surface water at OU No. 4 or OU No. 5.
Secondary Drinking Water Standards 40 C.F.R. Part 143	No	Secondary standards are aesthetic rather than health based and therefore are not ARARs as surface water is unlikely to be utilized as a source of drinking water.
Maximum Contaminant Level Goals (MCLG) 40 C.F.R. § 141.50	No	Not presently considered an ARAR as MCLGs are set at levels that do not take into account cost or feasibility and MCL's are fully protective of human health. See 52 Fed. Reg. 32499. Further, surface waters are not utilized as a source of drinking water.
Federal Clean Water Act Water Quality Criteria 40 C.F.R. Part 131 U.S. EPA Quality Criteria for Water, 1976, 1980, and 1986	No	These criteria (ambient water quality criteria) apply to water classified as a fisheries resource. The intermittent streams on OU No. 5 are not classified as such and there are no streams on OU No. 4. Therefore, not an ARAR or TBC for OU No. 4 or OU No. 5.
Toxic Pollutant Effluent Standards 40 C.F.R. Part 129	No	Standards are applicable to point source discharges to navigable waters from specified facilities that discharge aldrin/dieldrin, DDT, endrin, toxaphene, benzidine, PCB's. No point source discharges to navigable waters are associated with OU No. 4 or OU No. 5.
Hazardous Substances 40 C.F.R. § 116.3 and 116.4	No	Establishes reporting requirements for certain discharges of reportable quantities of hazardous substances. Creates no substantive clean up requirement. Not an ARAR.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific ARARs (Continued)		
State		
Pollution Prohibition Texas Water Code § 26.121	No	Prohibits the discharge of wastes into or adjacent to any natural or artificial bodies of surface water, inland or coastal, which in itself or in conjunction with any other discharge or activity, causes or will cause pollution of the surface water. Not an ARAR for OU No. 4 since discharges to surface water do not occur. May be relevant and appropriate for OU No. 5 due to discharges to onsite drainages.
Texas Surface Water Quality Standards Aesthetics 30 TAC § 307.4(b)(1)	No	General prohibition of concentrations in surface water of taste and odor producing substances which impart unpalatable flavor to food fish including shellfish, or otherwise interfere with the reasonable use of the water in the state. Not an ARAR for OU No. 4 as no discharges to surface water occur; relevant and appropriate for OU No. 5 due to discharges to onsite drainages.
General Toxicity 30 TAC § 307.4(d)	No	Surface waters must not be toxic to man or to terrestrial or aquatic life. Not an ARAR for OU No. 4 as no discharges to surface water occur; relevant and appropriate for OU No. 5 due to discharges to onsite drainages.
Antidegradation 30 TAC § 307.5	No	Requires maintenance and protection of existing uses (baseline November 28, 1975) when discharging wastewater. Not an ARAR for OU No. 4 as no discharges to surface water occur; relevant and appropriate for OU No. 5 due to discharges to onsite drainages.
Acute Toxicity 30 TAC § 307.6(b)(1)	No	Surface water must not be acutely toxic to aquatic life (except in small zones of initial dilution at discharge points). This criteria applies to water classified as a fisheries resource. The intermittent streams on OU No. 5 are not classified as such and there are no streams on OU No. 4. Therefore, not an ARAR for OU No. 4 or OU No. 5.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific ARARs (Continued)		
State (Continued)		
Chronic Toxicity 30 TAC § 307.6(b)(2)	No	Surface water with designated or existing aquatic life uses shall not be chronically toxic to aquatic life (except in mixing zones and below critical low-flow conditions). No surface water bodies impacted by OU No. 4 or OU No. 5 have a designated or aquatic life use; therefore the requirement is not an ARAR.
Human Toxicity 30 TAC § 307.6(b)(3)	No	Surface water must be maintained to preclude adverse toxic effects on human health resulting from contact recreation, consumption of aquatic organisms, or consumption of drinking water after reasonable treatment. This regulation is not an ARAR to the extent that it pertains to drinking water, as surface water in the area is not a potential source of drinking water.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific ARARs (Continued)		
State (Continued)		
Numerical Criteria for Toxics 30 TAC § 307.6(c)	Yes	Numerical criteria are established for certain toxic materials. These criteria are TBC for OU No. 4 and relevant and appropriate for OU No. 5. Notes: (1) These numerical criteria are based on ambient water quality criteria documents published by EPA. For some chemicals, EPA criteria have been recalculated (in accordance with procedures in the EPA guidance document entitled "Guideline for Deriving Site-Specific Water Quality Criteria") to eliminate the effects of toxicity data for aquatic organisms which are not known to occur in Texas. 31 TAC § 307.6(c)(2). (2) Numerical Acute Criteria to all surface water (except in small zones of initial dilution at discharge points). Numerical chronic criteria apply to surface water with designated or existing aquatic life uses (except inside mixing zones and below critical low-flow conditions. (3) Numerical Acute Criteria are applied as 24-hour averages. Numerical Chronic criteria are applied as seven day averages.
LC50 Toxicity Criteria 30 TAC § 307.6(c)(8)	No	Concentrations of toxic materials for which no numerical criteria have been satisfied must not exceed values which are chronically toxic to representative, sensitive aquatic organisms, as determined from appropriate chronic toxicity data or calculated as 0.1 of the median lethal concentration (LC50) for nonpersistent toxics (i.e., readily degrades, half-life less than 96 hours), 0.05 of LC50 for nonbioaccumulative, persistent toxics, and 0.01 of the completion of remediation. Not an ARAR for OU No. 4 since no surface water sources are present or directly impacted; relevant and appropriate for OU No. 5 due to discharges to onsite drainages.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific ARARs (Continued)		
State (Continued)		
Site-Specific Uses and Criteria 30 TAC § 307.7(b)(5)	No	Basic uses such as navigation, agricultural water supply, and industrial water must be maintained and protected for all surface water in which these uses can be achieved. Not and ARAR for OU No. 4 since no surface water sources are present or directly impacted; relevant and appropriate for OU No. 5 due to discharges to onsite drainages.
Oyster Waters 30 TAC § 307.7(b)(3)(B)(iii)	No	Oyster waters should be maintained so that concentrations of toxic materials do not cause edible species of clams, oysters, and mussels to exceed accepted guidelines for the protection of public health, including the U.S. Food and Drug Administration action levels for molluscan shellfish. These criteria are not ARARs since no discharges to oyster water occurs.
Standards of Chemical Quality 30 TAC § 290.103(1),(3)	No	Specifies the maximum contaminant levels for inorganic and organic compounds that apply to community and non-transient, non-community water systems. These values are not ARARs for OU No. 4 and OU No. 5.
Secondary Constituent Levels 30 TAC § 290.113	No	These secondary constituent level limits, based on aesthetic and organoleptic considerations, are applicable to all public water systems. These levels are TBC for OU No. 4 and OU No. 5.
Surface Water Media Specific Concentration, Risk Reduction Standard No. 2 30 TAC § 335.558	No	To be applied after evaluation of 30 TAC § 307 and primary drinking water MCLs. Relevant and appropriate for OU No. 5 due to discharges to onsite drainages; not an ARAR for OU No. 4 since no discharges to surface water occur.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific ARARs		
Federal		
Federal Clean Water Act National Pollutant Discharge Elimination System, Section 402	No	A permit is not required for onsite CERCLA response actions. Provision establishes no substantive cleanup requirement.
Stormwater Regulations 40 C.F.R. Parts 122, 125	Yes	NPDES permits are addressed relative to stormwater discharges associated with industrial activity. These regulations require the development and implementation of a stormwater pollution prevention plan or a stormwater best management plan. Monitoring and reporting requirements for a variety of facilities are outlined. Runoff from construction activities is an ARAR depending on the nature of the remedial action selected. Relevant and appropriate if stormwater discharge occurs as a result of the remedial action.
Pretreatment Standards 40 C.F.R. § 403.5	Yes	Prohibits discharge to a POTW of pollutants that "pass-through" (exit the POTW in quantities of concentrations that violate the POTW's NPDES permit) or cause "interference" (inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal, thereby causing a violation of the POTW's NPDES permit). Also prohibits introduction into a POTW of: (1) pollutants which create a fire or explosion hazard, (2) pollutants which will cause corrosive structural damage, (3) solid or viscous pollutants that will obstruct flow, (4) pollutants discharged at a flow rate and/or concentration that will cause interference, and (5) heat that will inhibit biological activity (never over 104°C). No point source discharges have been documented. However, if a remedial action results in a point source discharge to a POTW, then the requirements will be applicable to OU No. 4 or OU No. 5.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific ARARs (Continued)		
State		
Consolidated Permits Standard Permit Conditions 30 TAC § 305.125	No	Specifies conditions applicable to all permits. A permit is not required for onsite CERCLA response actions. The provisions establish no substantive cleanup requirements.
Consolidated Permits Subchapter O, Additional Conditions and Procedures for Wastewater Discharge Permits and Sewage Sludge Permits	No	Adopts by reference 40 CFR Part 122, Subpart C, Permit Conditions and Part 124, Subpart D, Specific Procedures Applicable to NPDES Permits. A permit is not required for onsite CERCLA response actions. The provisions establish no substantive cleanup requirement.
Texas Water Quality Act, TCA, Water Code, Title 2 - State Water Commission	Yes	Places reporting requirements on remedial activities which may cause an accidental spill and discharge into the state waters. Whenever an accidental discharge or spill occurs at or from any activity or facility which causes or may cause pollution, the individual operating, in charge of, or responsible for the activity or facility shall notify the TNRCC as soon as possible and not later than 24 hours after the occurrence. Activities which are inherently or potentially capable of causing or resulting in the spillage or accidental discharge of waste or other substances and which pose serious or significant threats of pollution are subject to reasonable rules establishing safety and preventing measures which the commission may adopt or issue. The safety and preventative measures which may be required shall be commensurate with the potential harm which could result from the escape of the waste or other substances. Applicable to OU No. 4 and OU No. 5 during remediation.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific ARARSs (Continued)		
State (Continued)		
General Provisions 30 TAC § 335.4	Yes	Regulates the collection, handling, storage, disposal, and processing of hazardous or deleterious materials in the vicinity of, or adjacent to, state waters. Remedial actions must be designed with adequate measures and controls to ensure that no person may cause, suffer, allow, or permit the collection, handling, storage, processing, or disposal of industrial solid waste or municipal hazardous waste in such a manner to cause: ! The discharge or imminent threat of discharge of industrial solid waste or municipal hazardous waste into or adjacent to the waters in the state without obtaining specific authorization for such a discharge from the TNRCC. ! The creation and maintenance or a nuisance; or ! The endangerment of the public health and welfare. Relevant and appropriate to actions taken at OU No. 4 or OU No. 5.
3. Location-Specific ARARs		
Federal		
Fish and Wildlife Coordination Act 16 U.S.C. § 661 et seq. 16 U.S.C. § 742 a 16 U.S.C. § 2901	No	Requires consultation when a modification of a stream or other water body is proposed or authorized and requires adequate provision for protection of fish and wildlife resources. Not an ARAR for OU No. 4 as no surface water bodies are impacted. Relevant and appropriate for OU No. 5 due to onsite drainages.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
3. Location-Specific ARARs (Continued)		
Federal (Continued)		
Marine Protection, Research and Sanctuaries Act 33 U.S.C. § 1401 (Title I) 40 C.F.R. Part 220 16 U.S.C. § 1431 et seq. (Title III) 15 C.F.R. Parts 922-941	No	Title I requires for dumping of wastes in U.S. ocean waters which have been transported from U.S. or from outside U.S. Activities at site will not include dumping of wastes into the ocean; therefore, title I is not an ARAR. Title III requires conservation and management of areas designated as National Marine Sanctuaries. Since there is no National Marine Sanctuary in or near the site, Title III is not an ARAR.
Clean Water Act § 404 33 U.S.C. § 1344 40 C.F.R. Parts 230, 231	No	Requires permit for the discharge of dredge or fill material into waters of the United States including wetlands (see 33 C.F.R. § 328.3). Not an ARAR since no discharge of dredge or fill material into waters of the U.S. is anticipated.
Rivers and Harbors Act of 1899 33 U.S.C. § 403 33 C.F.R. Parts 320-322	No	Prohibits the creation of any unauthorized obstruction or work in navigable waters that affects such navigable waters without a permit. Even if navigable waters were present at the site, a nationwide permit is available for CERCLA site activities[see 33 C.F.R. § 330.5(a)(20)]. Since there are no navigable waters at the RSR Site, this requirement is not an ARAR.
Protection of Wetlands Executive Order No. 11990 40 C.F.R. § 6.302(a) and Appendix A	No	Requires federal agencies to avoid, to the extent possible, the adverse impacts associated with the destruction or loss of wetlands and to avoid support of new construction in wetlands if a practical alternative exists. Wetlands have not been identified at the RSR site; this provision is not an ARAR.

Table A-3
ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
3. Location-Specific ARARs (Continued)		
Federal (Continued)		
Floodplain Management Executive Order No. 11988 40 C.F.R. § 6.302(b)	No	Requires federal agencies to evaluate the potential effects of actions taken in a floodplain and to avoid or minimize impacts associated with direct and indirect development of a floodplain. Since the site is not within a 100-year floodplain, this Order is not an ARAR.
Wild and Scenic Rivers Act 16 U.S.C. § 1271 et seq. 40 C.F.R. 6.302(e)	No	Prohibits adverse effects on a scenic river. Since the site does not affect a scenic river, this Act is not an ARAR.
Coastal Zone Management Act 16 U.S.C. § 1451 et seq. 40 C.F.R. § 6.302(d)	No	Requires assessment of the impacts of activities on a coastal zone and the conducting of activities in connection with a coastal zone in accordance with a state approved Coastal Zone Management Plan. The Act is not applicable or relevant and appropriate as OU No. 4 and OU No. 5 have no impact on coastal areas.

Table A-4
Numeric Contaminant-Specific ARARs for Surface Water - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Chemical	(1) NA/R&A (mg/L)	(2) NA/R&A (mg/L)	(3) NA/TBC (mg/L)
Inorganics			
Aluminum			
Antimony			0.014
Arsenic		0.05a	0.000018
Barium		1.a	
Beryllium			
Cadmium		0.01a	
Chromium		0.05a	
Cobalt			
Copper			
Lead		0.005a	0.025
Manganese			
Mercury	0.0000122b	0.0000122	0.000144
Nickel			0.61
Selenium		0.01a	
Silver		0.05a	
Thallium			0.0017
Vanadium			
Zinc			
Di-n-butyl phthalate			2.7
Di-n-octyl phthalate			

Notes:

NA/R&A = Not an ARAR or TBC for OU No. 4; Relevant and appropriate to OU No. 5.
TBC = To be considered.
(1) = Criteria in Water for Specific Toxic Materials-Human Health Protection. Category A-Water and Fish. 30 TAC Section 307-6 Toxic Materials.
(2) = Criteria in Water for Specific Toxic Materials-Human Health Protection. Category B-Fresh Water Fish Only. 30 TAC Section 307-6 Toxic Materials.
(3) = Ambient Water Quality Criteria for the protection of human health. 57 FR 60847. December 22, 1992.

aIndicates that the criteria for a specific parameter are for the dissolved portion in water. All other criteria are for total recoverable concentrations.

bCalculations are based on USFDA Action Levels for fish tissue concentrations.

Please Note: There are no contaminant-specific ARARs for OU No. 4 surface water.

Table A-6
ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific		
Federal		
National (Primary and Secondary) Ambient Air Quality Standards (NAAQS) 40 C.F.R. Part 50	Yes	The NAAQS specify the maximum concentration of a federally regulated air pollutant (i.e., SO2, particulate matter (PM10), NO2, CO, ozone, and lead) in an area resulting from all sources of that pollutant. No new construction or modification of a facility, structure or installation man emit an amount of any criteria pollutant that will interfere with the attainment or maintenance of a NAAQS (see 40 C.F.R. § 51.160). For the federal NAAQS standards, all measurements of air quality are corrected to a reference temperature of 25°C and to a reference pressure of 760mm Hg (1,013.2 millibars). 40 C.F.R. § 50.3.
National Emission Standards for Hazardous Air Pollutants (NESHAPs) 40 C.F.R. Part 61 Subpart A	No	These provisions regulate the emissions of specified "hazardous air pollutants" [listed in 40 C.F.R. § 61.01(1)] that are emitted from particular sources or processes [listed in 40 C.F.R. Part 61].
Fugitive Emissions Source Standards 40 C.F.R. Part 61 Subpart V	No	Regulates specified equipment which are potential sources of fugitive emissions because they contain or contact fluid which is at least 10% by weight a volatile hazardous air pollutant ("VHAP"-including benzene and vinyl chloride). This requirement is not an ARAR as no fluid containing at least 10% by weight of a VHAP is present at the site.
Mercury Standards 40 C.F.R. Part 61 Subpart E	No	These provisions apply to stationary sources that process mercury ore, and incinerate or dry wastewater treatment plant sludge. The requirement is not an ARAR as no processing of mercury ore and/or no incineration of wastewater treatment plant sludge will occur at the site.

Table A-6
ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Contaminant-Specific (Continued)		
State		
Asbestos Notification Fees 30 TAC § 101.28	No	The owner/operator of a demolition or renovation activity shall remit to the TACB a fee that is based on the amount of asbestos subject to the NESHAPS. Based on the amount of asbestos identified may not be an ARAR. However, if during demolition additional sources of asbestos are identified, may become an ARAR.
Particulates-Net Ground Level 30 TAC § 111.155	Yes	Establishes the net ground level concentration (downwind at the property boundary minus upwind measurements) of particulate emissions from any source that must not be exceeded.
SO2 Ground Level Concentration 30 TAC § 112.7	No	SO2 emissions from any source must not exceed a net ground level concentration (downwind at property boundary minus upwind). Not in ARAR since no SO2 emissions are expected during or after remediation.
Hydrogen Sulfide 30 TAC § 112.31 & § 112.32	No	Sets net ground level concentration limits for hydrogen sulfide. Not an ARAR since no hydrogen sulfide emissions are expected during or after remediation.
Sulfuric Acid 30 TAC § 112.41	No	Sets net ground level concentration limits for sulfuric acid. Not an ARAR since no sulfuric acid emissions are expected during or after remediation.
Inorganic Fluoride 30 TAC § 113.3(a)(2) and (a)(3)	No	Sets atmospheric and net ground level concentration limits for inorganic fluoride (as HF). Not an ARAR since no HF emissions are expected during or after remediation.
Beryllium 30 TAC § 113.3(b)	Yes	Sets atmospheric and net ground level concentration limits for beryllium. Beryllium emissions may be generated during or after remediation.
Lead Emissions from smelting facilities	No	Rules relate to lead emissions from stationary sources in Dallas County. Sets standards for the control of lead emissions in Dallas County. Not an ARAR because smelter emissions as a result of an operating facility do not exist.

Table A-6
ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific		
Federal		
Prevention of Significant Deterioration of Air Quality 42 U.S.C. § 7475 40 C.F.R. § 52.21	No	These provisions impose various requirements (e.g. use of best available control technology) on any new major stationary source of a federally regulated air pollutant in an area which has been designated attainment or unclassified for that pollutant. A "major stationary source" is a source listed in 40 C.F.R. § 52.21 which emits, or has the potential to emit, 100 tons per year of a federally regulated air pollutant or any non-listed source that emits, or has the potential to emit, 250 tons per year of a federally regulated air pollutant. Activities at OU4 or OU5 are not expected to constitute a major stationary source of any federally regulated air pollutant. The requirement is not an ARAR.
Nonattainment Areas-LAER 42 U.S.C. § 172(b)(6) and § 173	No	A state's permit program under the federal Clean Air Act must require permits for the construction and operation of new major stationary sources in NAAQS nonattainment areas. Such a permit may be issued only if the proposed sources complies with "lowest achievable emission rate" requirements. Not an ARAR since activities at OU No. 4 or OU No. 5 do not constitute new major stationary sources.
New Source Performance Standard for Incinerators 40 C.F.R. Part 60 Subpart E	No	Sets a limit for particulate emissions of 0.18g/dscm (0.08gr/dscf) corrected to 12% CO2. Not an ARAR since the rule applies to furnaces burning municipal waste.
Hazardous Waste Incinerators 40 C.F.R. Part 264, Subpart O	No	Not an ARAR since hazardous waste incinerator is unlikely to be used at OU4 or OU5.

Table A-6
ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific (Continued)		
State		
Control of Air Pollution by Permits for New Construction or Modification 30 TAC § 116	Yes	New non-exempt facilities which may emit air pollutants must obtain a construction permit or special permit. To obtain such a permit, the owner or operator of the proposed facility must provide for measuring emissions of significant air contaminants, and must demonstrate, among other things, that the facility will utilize the "best available control technology, with consideration given to the technical practicability and economic reasonableness of reducing or eliminating the emissions from the facility." Applies during building decontamination or demolition activities. May be relevant and appropriate.
Requirements for Specified Sources 30 TAC § 111.111	Yes	Visible emissions shall not be permitted to exceed an opacity of 30% for any six-minute period from any building, enclosed facility, or other structure. Applies during demolition or decontamination of buildings, or any other activity that may generate visible emissions. Relevant and appropriate for construction/demolition activities at OU No. 4 or OU No. 5.
Storage of Lead Containing Materials 30 TAC § 113.82(a) and (b)	Yes	No unenclosed storage of material containing more than 1% lead by weight. All particulate matter containing more than 1% lead by weight collected by air pollution control equipment shall be stored in closed containers or in a structure under significant negative pressure to prevent emissions to the atmosphere. Applies if lead content exceeds 1% by weight. Applicable to both OU No. 4 and OU No. 5.
Transport of Materials 30 TAC § 113.84(1) and (2)	Yes	All transport vehicles carrying materials containing more than 1% lead by weight must have covered cargo compartments at all times on plant property except during loading and unloading, when being washed, or inside a building. Each time a vehicle leaves a structure, all material containing more than 1% lead by weight shall be removed from the wheels; if water is used, this requirement is suspended during freezing weather. Applies if lead content exceeds 1% by weight. Applicable to both OU No. 4 and OU No. 5.

Table A-6

ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Action-Specific (Continued)		
State (Continued)		
Control of Fugitive Dust 30 TAC § 113.91 (a), (b), (c)	Yes	All plant roads shall be paved; parking areas and storage areas for materials containing more than 1% lead by weight shall be paved. Open unpaved areas must be vegetated or covered with rock or crushed aggregate at least three inches deep. Applies if lead content exceeds 1% by weight. Applicable to OU No. 4 and OU No. 5.
Additional Measures to Reduce Lead Emissions 30 TAC § 113.92(1)	Yes	If they occur outside buildings, spills of dust containing more than 1% lead by weight shall be dampened and cleaned up immediately. Applies if lead content exceeds 1% by weight. Applicable to both OU No. 4 and OU No. 5.
Control Requirements for Surfaces with Coatings Containing Lead 30 TAC § 111.135	Yes	Applies specifically to abrasive blasting of water storage tanks with coatings containing ≥ 1% lead. Specifies emission control requirements. Applies if abrasive blasting is used to decontaminate structures. Relevant and appropriate for OU No. 4 and OU No. 5.
Construction and Demolition 30 TAC § 111.145	Yes	Applies to properties greater than one acre in size. No person may cause, suffer, allow, or permit a structure, road, street, alley, or parking area to be constructed, altered, repaired or demolished without taking the following precautions: (1) Use of water or suitable oil or chemicals for control of dust during structure demolition (2) Use of adequate methods such as wet sandblasting and enclosure of work areas during sandblasting of structures or other similar operations. Applies to activities associated with building demolition; applicable to OU No. 4 and OU No. 5 if demolition activities occur.

Table A-6
ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
2. Location-Specific		
State		
General Application; Proximity of New Construction to Schools 30 TAC § 116.111	No	Requires the TACB to consider, in issuing a permit for construction of a facility, any adverse short-term or long-term side effects than an air contaminant or nuisance odor from the facility may have on the individuals attending an elementary, junior high, or senior high school within 3,000 feet of the facility. May be TBC since a school is located within 3,000 feet of OU No. 4 facility.

Table A-7
Numeric Contaminant-Specific ARARs for Air - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

	State(1)				Federal(2)			
	Level 1a		Level 2b		Primary		Secondary	
	(µg/m3)	(ppm)	(µg/m3)	(ppm)	(µg/m3)	(ppm)	(µg/m3)	(ppm)
PM10								
Annual arithmetic mean					50		50	
24-hour maximum	420		500					
24-hour average					150c		150c	
3-hour net average concentration	2003							
1-hour net average concentration	4003							
Lead								
3-month					1.5		1.5	
Beryllium								
30-day average					0.01		0.01	
24-hour average	0.01		0.01					

Notes:

(1)Control of Air Pollution Episodes. 30 TAC Section 118.1 (PM10, beryllium).
(2)National Ambient Air Quality Standards. 40 CFR § 50.3 and 51.160 (PM10, lead and beryllium).
(3)Ground level Concentrations. 30 TAC Section 111.155.

aThe concentration of any air contaminants is equal to or greater than the levels specified for Level 1 and in case of all air contaminants except ozone, meteorological conditions conducive ot high air contamination are predicted to continue for at least 12 hours.

bLevel 2 exists if the executive director determines that an emergency reduction of emissions must be initiated to prevent the presence in the atmosphere of any of the air contaminants in the concentrations specified. These levels could cause significant harm to human health.

cMay not be exceeded more than once per year, all other NAAQS may never be exceeded.

Table A-8
Miscellaneous Location Standards - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Location-Specific		
Federal		
National Historic Preservation Act 16 U.S.C. § 470 40 C.F.R. § 6.301(b) 36 C.F.R. Part 800	No	Requires federal agencies to take into account the effect of any federally-assisted undertaking or licensing on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register of Historical Places. There is no such district, site, building, structure, or object in or near the RSR Site; therefore, the Act is not an ARAR.
Archeological and Historic Preservation Act 16 U.S.C. § 469 40 C.F.R. § 6.301(c)	No	Establishes procedures to provide for preservation of scientific, historical, and archeological data which might be destroyed through alteration of terrain as a result of a federal construction project or a federally licensed activity or program. If scientific, historical, or archaeological artifacts are discovered at the Site, work in the area of the Site affected by such discovery will be halted pending the completion of any data recovery and preservation activities required pursuant to the Act and its implementing regulations. No archeological or historical landmark is documented to be present at the Site; therefore, this requirement is not an ARAR.
Historic Sites, Buildings, and Antiquities Act 15 U.S.C. § 461 et seq. 40 C.F.R. § 6.301(a)	No	Requires federal agencies to consider the existence and location of landmarks on the National Registry of Natural Landmarks to avoid undesirable impacts on such landmarks. There is no such landmark that will be affected by the proposed remedy; therefore, the Act is not an ARAR.
Endangered Species Act 16 U.S.C. § 1531 et. seq. 50 C.F.R. Part 402	No	Requires that proposed action minimize impacts on endangered species within critical habitats upon which endangered species depend, including consultation with Department of Interior. No plant or animal endangered species of "critical habitat" will be impacted by the proposed remedy at the Site; therefore, the Act is not an ARAR.
Wilderness Act 16 U.S.C. § 1131 et seq. 50 C.F.R. Part 35	No	Requires the Administration of federally owned wilderness areas to leave them unimpacted. There is no federally owned wilderness area that will be impacted by the proposed remedy; therefore, the Act is not an ARAR.

Table A-8
Miscellaneous Location Standards - OU No. 4
RSR Corporation Superfund Site
Dallas, Texas

Requirement	ARAR?	Justification
1. Location-Specific (Continued)		
Federal (Continued)		
National Wildlife Refuge System 16 U.S.C. §§ 668dd, 668ee 50 C.F.R. Part 27	No	Restricts activities within a National Wildlife Refuge. The proposed remedy will not affect a National Wildlife Refuge; therefore, these provisions are not ARARs.
State		
Antiques Code of Texas TEX. NAT. RES. COD. ANN., CH. 191	No	Prohibits the taking, altering, damaging, destroying, or excavating of a state archeological landmark without a contract or permit. No state archeological landmark is documented to be present at the Site; therefore, the Code is not an ARAR.

REVISED COST ESTIMATES
RSR CORPORATION SUPERFUND SITE
OPERABLE UNIT No. 4
APPENDIX D

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT	TOTAL COST	REFERENCE
ALTERNATIVE 1b: Institutional Controls; Long-Term Monitoring					
CAPITAL COSTS:					
GENERAL REQUIREMENTS:	10%		$43,889	$4,389	
General Sitework:					
Institutional Controls					
Fix Existing Perimeter Fence	2,500	LF	$15.00	$37,500	Assumes 100% of existing fence needs repair
Long-Term Monitoring:					
Survey Monitoring Wells & Surface Water Sampling Locations	1	LS	$2,000.00	$2,000	
SUBTOTAL				$43,889	
CONTINGENCY	20%		$43,889	$8,778	
SUBTOTAL - CONSTRUCTION COST				$52,667	
PERMITTING & LEGAL	5%		$52,666.67	$2,633	
SERVICES DURING CONSTRUCTION	7%		$52,666.67	$3,687	
SUBTOTAL - IMPLEMENTATION COST				$58,987	
ENGINEERING & DESIGN COST	6%		$52,667.67	$3,160	
TOTAL - Capital Cost - Alternative 1b				$62,147	
ANNUAL O & M COSTS:					
Guard Service (24 Hours/Day, 7 Days/Week)	12	MONTHS	$10,800.00	$129,600	
Long Term Monitoring Sampling Events	3	EA	$10,500.00	$31,500	
SUBTOTAL				$161,100	
CONTINGENCY	20%		$161,000	$32,220	
TOTAL - Annual O & M Costs - Alternative 1b				$193,320	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT	TOTAL COST	REFERENCE
NET PRESENT VALUE:					
Year 0				$62,147	
Year 1				$193,320	
Year 2				$193,320	Year 3
Year 4				$193,320	
Year 5				$193,320	
Year 6				$193,320	
Year 7				$193,320	
Year 8				$193,320	
Year 9				$193,320	
Year 10				$193,320	
Year 11				$193,320	
Year 12				$193,320	
Year 13				$193,320	
Year 14				$193,320	
Year 15				$193,320	
Year 16				$193,320	
Year 17				$193,320	
Year 18				$193,320	
Year 19				$193,320	
Year 20				$193,320	
Year 21				$193,320	
Year 22				$193,320	
Year 23				$193,320	
Year 24				$193,320	
Year 25				$193,320	
Year 26				$193,320	
Year 27				$193,320	
Year 28				$193,320	
Year 29				$193,320	
Year 30				$193,320	
NET PRESENT VALUE (I=5%) - Alternative 1b				$3,033,949	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT	TOTAL COST	REFERENCE
Alternative 2: In-situ Treatment of Bldgs & Structures. Offsite Treatment & Disposal of Residual Mtls. Removal & Disposal of Asbestos Mtls. Containment of Metals-Contam Soils in Unpaved Areas. LT Monitoring					
CAPITAL COSTS:					
GENERAL REQUIREMENTS:	10%		$2,047,395	$204,739	
General Sitework:					
Perimeter Fence	2,500	LF	$15.00	$37,500	
Air Monitoring During Site Work	1	LS	$100,000.00	$100,000	
Gather Residual Materials from Hog Storage Building & Equipment, and Steam Clean Building & Equipment (11,990 SF):					
Structural Inspection	32	HRS	$100.00	$3,200	
Plug Sumps	1	LS	$1,000.00	$1,000	
Structural Modifications (Heavy Duty)	11,990	SF	$8.80	$105,530	Based on AccuVak 1(800)852-9252
Gather Residuals Mtls from Bldg by Hand & place in 55 Gal Drums	11,990	SF	$0.15	$1,799	Assumes Level C Protection
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	5	CY	$100.00	$474	
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Transport Drummed Mtls to RCRA Subtitle C Landfill	9	CY	$79.42	$735	ECHOS 33-19-0204 pg. 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	9	CY	$225.00	$2,083	Based on costs from Jones & Neuse
Steam Clean Building & Equipment 2 Times	11,990	SF	$0.60	$7,194	ECHOS 33-17-0812 Pg. 374
Gather Residual Materials from Smelter Facility & Adjacent Bag Houses & Equipment, and Steam Clean Building & Equipment (37,259 SF):					
Structural Inspection	64	HRS	$100.00	$6,400	
Plug Sumps	1	LS	$1,000.00	$1,000	
Structural Modifications (Heavy Duty)	37,259	SF	$8.80	$327,936	Based on AccuVal 1(800)852-9252
Gather Residuals Mtls from Bldg by Hand & Place in 55 Gal Drums	37,259	SF	$0.15	$5,589	Assumes Level C Protection
55 Gallon Drums for Lead Dust	53	DRUMS	$200.00	$10,600	

Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	508	CY	$100.00	$50,792	
55 Gallon Drums for Lead Dust	1,865	DRUMS	$200.00	$373,000	
Transport Drummed Mtls to RCRA Subtitle C Landfill	522	CY	$79.42	$41,477	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	522	CY	$225.00	$117,511	Based on costs from Jones & Neuse
Steam Clean Building & Equipment 2 Times	37,259	SF	$0.60	$22,355	ECHOS 33-17-0812 Pg. 374
Gather Residual Materials from Batch House & Equipment, and Steam Clean Building & Equipment (21,749 SF):					
Structural Inspection	48	HRS	$100.00	$4,800	
Plug Sumps	1	LS	$1,000.00	$1,000	
Structural Modifications (Heavy Duty)	21,749	SF	$8.80	$191,424	Based on AccuVal 1(800)852-9252
Gather Residuals Mtls from Equip by Hand & Place in 55 Gal Drums	21,749	SF	$0.15	$3,262	Assumes Level C Protection
55 Gallon Drums for Lead Dust	31	DRUMS	$200.00	$6,200	
Transport Drummed Mtls to RCRA Subtitle C Landfill	8	CY	$79.42	$670	ECHOS 33-19-0204 pg. 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	8	CY	$225.00	$1,899	Based on costs from Jones & Neuse
Steam Clean Structure 2 Times	21,749	SF	$0.60	$13,049	ECHOS 33-17-0812 Pg. 374
Pump Water to Frac Tank, Test & Discharge:					
Frac Tanks	100	EA	$1,140.00	$114,000	
Pumping	1	LS	$10,000.00	$10,000	
Sampling	100	EA	$70.00	$7,000	
Analysis	100	EA	$200.00	$20,000	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Asbestos Abatement:					
Site Preparation	1	LS	$10,000.00	$10,000	Asbestos containing material
Cafe Building:					quantities were obtained from
1'x 1' Floor Tile	300	SF	$10.60	$3,180	CH2M HILL report dated July 12, 1994.
Vehicle Maintenance Building					Quantities came from survey
1'x 1' Floor Tile	250	SF	$10.60	$2,650	conducted by Nobis Engineering, Inc.
Bath House Building:					
Floor Tile Mastic	100	SF	$5.00	$500	
Cafeteria Building					
Drywall Joint Compound	500	SF	$5.00	$2,500	
Floor Tile Mastic	1,000	SF	$5.00	$5,000	
Laboratory Complex Building:					
Drywall Joint Compound	8,000	SF	$5.00	$40,000	
1'x 1' Floor Tile	3,000	SF	$10.60	$31,800	
Floor Tile Mastic	2,500	SF	$5.00	$12,500	
Hog Storage Building:					
Pipe Insulation	3	LF	$125.00	$375	
Mudded Pipe Fitting	3	EA	50.00	$150	
Smelter Facility Building:					
1'x 1' Floor Tile	200	SF	$10.60	$2,120	
Floor Tile Mastic	200	SF	$5.00	$1,000	
Tar Backing on Insulation	2,000	SF	$5.00	$10,000	
Vibration Joint Cloth	20	SF	$5.00	$100	
Packaging & Handling	500	CY	$50.00	$25,000	
Transportation to Hazardous Landfill & Disposal	500	CY	$79.00	$39,500	Based on costs from Jones & Neuse
Metals Contaminated Soils:					
Cap NE Area with 2' Thick Clean Material	4,000	CY	$15.00	$60,000	Assumes only capping NE portion of property Unit price includes cost of grading top soil

SUBTOTAL			$2,047,395		
CONTINGENCY		30%	$2,047,395	$614,218	
SUBTOTAL - CONSTRUCTION COST			$2,661,613		
PERMITTING & LEGAL		5%	$2,396,575	$119,829	Based on cost of all on-site activities
SERVICES DURING CONSTRUCTION		7%	$2,396,575	$167,760	Based on cost of all on-site activities
SUBTOTAL - IMPLEMENTATION COST			$2,949,022		
ENGINEERING & DESIGN COST		6%	$2,396,575	$143,794	Based on cost of all on-site activities
TOTAL - Capital Costs - Alternative 2			$3,092,997		
ANNUAL O & M COSTS:					
Guard Service (24 Hours/Day, 7 Days/Week)	12	MONTHS	$10,800.00	$129,600	
Long Term Monitoring: Sampling Events	3	EA	$10,500.00	$31,500	
Site Inspection	12	MONTHS	$2,000.00	$24,000	
SUBTOTAL			$185,100		
CONTINGENCY	30%		$185,100	$55,530	
TOTAL - Annual O & M Costs - Alternative 2			$240,630		

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
NET PRESENT VALUE:					
YEAR 0				$3,092,997	
YEAR 1				$240,630	
YEAR 2				$240,630	
YEAR 3				$240,630	
YEAR 4				$240,630	
YEAR 5				$240,630	
YEAR 6				$240,630	
YEAR 7				$240,630	
YEAR 8				$240,630	
YEAR 9				$240,630	
YEAR 10				$240,630	
YEAR 11				$240,630	
YEAR 12				$240,630	
YEAR 13				$240,630	
YEAR 14				$240,630	
YEAR 15				$240,630	
YEAR 16				$240,630	
YEAR 17				$240,630	
YEAR 18				$240,630	
YEAR 19				$240,630	
YEAR 20				$240,630	
YEAR 21				$240,630	
YEAR 22				$240,630	
YEAR 23				$240,630	
YEAR 24				$240,630	
YEAR 25				$240,630	
YEAR 26				$240,630	
YEAR 27				$240,630	
YEAR 28				$240,630	
YEAR 29				$240,630	
YEAR 30				$240,630	
NET PRESENT VALUE (I=5%) - Alternative 2				$6,792,070	

10/26/95
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

Revised Table B-1

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
ALTERNATIVE 3: All Components of Alternative2 & Includes Demolition & Removal of All Buildings & Structures. Disposal of Building Materials. Containment of Metals-Contaminated Soils.					
CAPITAL COSTS:					
GENERAL REQUIREMENTS:	10%		$6,244,150	$624,415	
General Sitework:					
Air Monitoring During Site Work	1	LS	$100,000.00	$100,000	
Gather Residual Materials from Hog Storage Building & Equipment (11,990 SF):					
Structural Inspection	32	HRS	$100.00	$3,200	
Structural Modifications	11,990	SF	$5.87	$70,353	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	11,900	SF	$0.15	$1,799	Assumes Level C Protection
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	5	CY	$100.00	$474	
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Transport Drummed Mtls to RCRA Subtitle C Landfill	9	CY	$79.42	$735	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	9	CY	$225.00	$2,083	Based on costs from Jones & Neuse
Gather Residual Materials from Smelter Facility & Adjacent Bag Houses & Equipment (37,259 SF):					
Structural Inspection	64	HRS	$100.00	$6,400	
Structural Modifications	37,259	SF	$5.87	$218,624	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	37,259	SF	$0.15	$5,589	Assumes Level C Protection
55 Gallon Drums for Lead Dust	53	DRUMS	$200.00	$10,600	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	508	CY	$100.00	$50,792	
55 Gallon Drums for Lead Dust	1,865	DRUMS	$200.00	$373,000	
Transport Drummed Mtls to RCRA Subtitle C Landfill	552	CY	$79.42	$41,477	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	552	CY	$225.00	$117,511	Based on costs from Jones & Neuse

Gather Residual Materials from Batch House & Equipment (21,749 SF):					
Structural Inspection	48	HRS	$100.00	$4,800	
Structural Modifications	21,749	SF	$5.87	$127,616	Based on AccuVal 1(800)852-9252
Gather Residuals Mtls from Equip by Hand & Place in 55 Gal Drums	21,749	SF	$0.15	$3,262	Assume Level C Protection
55 Gallon Drums for Lead Dust	31	DRUMS	$200.00	$6,200	
Transport Drummed Mtls to RCRA Subtitle C Landfill	8	CY	$79.42	$670	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	8	CY	$225.00	$1,899	Based on costs from Jones & Neuse
Dismantle Non-Supporting Equipment in Hog Storage Building Steam Clean at VMB & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	10	TONS	$610.00	$6,100	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	5,000	SF	$0.60	$3,000	ECHOS 33-17-0812 Pg. 374
Transport & Dispose of Equipment at Class II Waste Facility	10	TONS	$100.00	$1,000	
Gate Fee for Truck at Class II Waste Facility	1	Truck Loads	$14.00	$14	Based on costs from Jones & Neuse
Dismantle Non-Supporting Equipment in Smelter Facility, Steam Clean at VMB & Adjacent Bag Houses & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	1,000	TONS	$610.00	$610,000	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	60,000	SF	$0.60	$36,000	ECHOS 33-17-0812 Pg. 374
Transport & Dispose of Equipment at Class II Waste Facility	1,000	TONS	$100.00	$100,000	Based on costs from Jones & Neuse
Gate Fee for Truck at Class II Waste Facility	50	Truck Loads	$14.00	$700	Based on costs from Jones & Neuse

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Asbestos Abatement:					
Site Preparation	1	LS	$10,000.00	$10,000	Asbestos containing material quantities were obtained from CH2M HILL report dated July 12, 1994. Quantities came from survey conducted by Nobis Engineering, Inc.
Cafe Building:					
1'x 1' Floor Tile	300	SF	$10.60	$3,180	
Vehicle Maintenance Building:					
1'x 1' Floor Tile	250	SF	$10.60	$2,650	
Bath House Building:					
Floor Tile Mastic	100	SF	$5.00	$500	
Cafeteria Building					
Drywall Joint Compound	500	SF	$5.00	$2,500	
Floor Tile Mastic	1,000	SF	$5.00	$5,000	
Laboratory Complex Building:					
Drywall Joint Compound	8,000	SF	$5.00	$40,000	
1'x 1' Floor Tile	3,000	SF	$10.60	$31,800	
Floor Tile Mastic	2,500	SF	$5.00	$12,500	
Hog Storage Building:					
Pipe Insulation	3	LF	$125.00	$375	
Mudded Pipe Fitting	3	EA	$50.00	$150	
Smelter Facility Building:					
1'x 1' Floor Tile	200	SF	$10.60	$2,120	
Floor Tile Mastic	200	SF	$5.00	$1,000	
Tar Backing on Insulation	2,000	SF	$5.00	$10,000	
Vibration Joint Cloth	20	SF	$5.00	$100	
Packaging & Handling	500	CY	$50.00	$25,000	
Transportation to Hazardous Landfill & Disposal	500	CY	$79.00	$39,500	Based on costs from Jones & Neuse

Remove Hog Storage Building, Smelter Facility & Batch House:					
Samples for Smelter Facility	100	EA	$70.00	$7,000	
Samples for Hog Storage Building	20	EA	$70.00	$1,400	
Samples for Batch House	20	EA	$70.00	$1,400	
TCLP Analysis	140	EA	$300.00	$42,000	
Controlled Dismantle of Hog Storage Building	11,990	SF	$20.00	$239,800	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Smelter Facility & Adjacent Bag Houses	37,259	SF	$20.00	$745,180	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Batch House	21,749	SF	$20.00	$434,980	Based on AccuVal 1(800)852-9252
Steam Clean Sheet Metal Debris at Vehicle Maintenance Bldg	124,949	SF	$0.60	$74,969	
Transport Sheet Metal to Class I Waste Facility & Tipping Fee	3,944	CY	$90.00	$354,990	Based on costs from Jones & Neuse
Transport & Dispose of Equipment at Class II Waste Facility	3,944	CY	$29.00	$114,386	Based on costs from Jones & Neuse
Gate Fee for Truck at Class II Waste Facility	197	Truck Loads	$14.00	$2,761	Based on costs from Jones & Neuse
Pump Water to Frac Tank, Test & Discharge:					
Frac Tanks	100	EA	$1,140.00	$114,000	
Pumping	1	LS	$10,000.00	$10,000	
Sampling	100	EA	$70.00	$7,000	
Analysis	100	EA	$200.00	$20,000	
Demolish Smelter Stack and Transport to RCRA Subtitle C Landfill:					
Smelter Stack (300' High)	1	LS	$400,000	$400,000	Based on AccuVal 1(800)852-9252
Transport Drummed Debris to RCRA Subtitle C Landfill	1,256	CY	$79.42	$99,747	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	1,256	CY	$125.00	$157,000	Based on costs from Jones & Neuse
Demolish Remaining Structures and Transport Debris to Appropriate Facility:					
Samples for Buildings (5 Buildings, 20 Samples Each)	100	EA	$70.00	$7,000	
TCLP Analysis	100	EA	$300.00	$30,000	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Controlled Dismantling of Roofs and Transport to RCRA C Facility					
Vehicle Maintenance Building	3,717	SF	$1.00	$3,717	Based on ECHOS 16-01-0308 pg 28
Bath House	2,200	SF	$1.00	$2,200	Based on ECHOS 16-01-0308 pg 28
Cafeteria	1,302	SF	$1.00	$1,302	Based on ECHOS 16-01-0308 pg 28
Laboratory	5,619	SF	$1.00	$5,619	Based on ECHOS 16-01-0308 pg 28
Gas Station	525	SF	$1.00	$525	Based on ECHOS 16-01-0308 pg 28
Transport Roof Debris to RCRA Subtitle C Landfill	495	CY	$79.42	$39,305	ECHOS 33-19-0204 pg. 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	495	CY	$125.00	$61,866	Based on costs from Jones & Neuse
Demolish Remainder of Buildings and Dispose of Debris in Appropriate Facilities:					
Vehicle Maintenance Building	3,717	SF	$14.00	$52,038	Based on AccuVal 1(800)852-9252
Bath House	2,200	SF	$18.00	$39,600	Based on AccuVal 1(800)852-9252
Cafeteria	1,302	SF	$18.00	$23,436	Based on AccuVal 1(800)852-9252
Laboratory	5,619	SF	$18.00	$101,142	Based on AccuVal 1(800)852-9252
Gas Station	525	SF	$18.00	$9,450	Based on AccuVal 1(800)852-9252
Transport Debris to Class I Waste Facility & Tipping Fee	247	CY	$90.00	$22,272	Based on costs from Jones & Neuse
Transport & Dispose of Equipment at Class II Waste Facility	198	CY	$29.00	$5,741	Based on costs from Jones & Neuse
Gate Fee for Truck at Class II Waste Facility	10	Truck Loads	$14.00	$139	Based on costs from Jones & Neuse
Transport Debris to RCRA Subtitle C Facility	49	CY	$79.42	$3,931	ECHOS 33-19-0204 pg 382, Assume 500 miles
Tipping Fee at RCRA Subtitle C Facility	49	CY	$125.00	$6,187	Based on costs from Jones & Neuse

Metals Contaminated Soils:					
Demolish Concrete Pavements	7,900	SY	$15.00	$118,500	Based on 95 MEANS 020-554-1900
Transport Debris to RCRA Subtitle D Landfill	1,317	CY	$10.00	$13,167	
RCRA Subtitle C Landfill Tipping Fee	66	Truck Loads	$143,000	$9,414	Dallas Municipal Landfill (214)670-0977
Cap NE Area & Formerly Paved Areas with 2' Thick Clean Material	9,300	CY	$15.00	$139,500	Includes NE area and all areas that were paved
SUBTOTAL				$6,244,150	
CONTINGENCY	30%		$6,244,150	$1,873,245	
SUBTOTAL - CONSTRUCTION COST				$8,117,396	
PERMITTING & LEGAL	5%		$6,561,954	$328,098	Based on cost of all on-site activities
SERVICES DURING CONSTRUCTION	7%		$6,561,954	$459,337	Based on cost of all on-site activities
SUBTOTAL - IMPLEMENTATION COST				$8,904,830	
ENGINEERING & DESIGN COST	6%		$6,561,954	$393,717	Based on cost of all on-site activities
TOTAL - Capital Costs - Alternative 3				$9,298,547	
ANNUAL O & M COSTS					
Site Inspection	12	MONTHS	$2,000.00	$24,000	
SUBTOTAL			$24,000		
CONTINGENCY	30%		$24,000	$7,200	
TOTAL - Annual O & M Costs - Alternative 3				$31,200	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
NET PRESENT VALUE:					
YEAR 0				$9,298,547	
YEAR 1				$31,200	
YEAR 2				$31,200	
YEAR 3				$31,200	
YEAR 4				$31,200	
YEAR 5				$31,200	
YEAR 6				$31,200	
YEAR 7				$31,200	
YEAR 8				$31,200	
YEAR 9				$31,200	
YEAR 10				$31,200	
YEAR 11				$31,200	
YEAR 12				$31,200	
YEAR 13				$31,200	
YEAR 14				$31,200	
YEAR 15				$31,200	
YEAR 16				$31,200	
YEAR 17				$31,200	
YEAR 18				$31,200	
YEAR 19				$31,200	
YEAR 20				$31,200	
YEAR 21				$31,200	
YEAR 22				$31,200	
YEAR 23				$31,200	
YEAR 24				$31,200	
YEAR 25				$31,200	
YEAR 26				$31,200	
YEAR 27				$31,200	
YEAR 28				$31,200	
YEAR 29				$31,200	
YEAR 30				$31,200	
NET PRESENT VALUE (I=5%) - Alternative 3				$9,778,168	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
ALTERNATIVE 4: Same as Alternative 3 and Includes Excavation & Disposal of Metals-Contaminated Soils.					
CAPITAL COSTS:					
GENERAL REQUIREMENTS:	10%		$7,858,595	$785,859	
General Sitework:					
Air Monitoring During Site Work	1	LS	$100,000.00	$100,000	
Gather Residual Materials from Hog Storage Building & Equipment (11,990 SF):					
Structural Inspection	32	HRS	$100.00	$3,200	
Structural Modifications	11,990	SF	$5.87	$70,353	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	11,990	SF	$0.15	$1,799	Assumes Level C Protection
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	5	CY	$100.00	$474	
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Transport Drummed Mtls to RCRA Subtitle C Landfill	9	CY	$79.42	$735	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	9	CY	$225.00	$2,083	Based on costs from Jones & Neuse

Gather Residual Materials from Smelter Facility & Adjacent Bag Houses & Equipment (37,259 SF):					
Structural Inspection	64	HRS	$100.00	$6,400	
Structural Modifications	37,259	SF	$5.87	$218,624	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	37,259	SF	$0.15	$5,589	Assumes Level C Protection
55 Gallon Drums for Lead Dust	53	DRUMS	$200.00	$10,600	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	508	CY	$100.00	$50,792	
55 Gallon Drums for Lead Dust	1,865	DRUMS	$200.00	$373,000	
Transport Drummed Mtls to RCRA Subtitle C Landfill	522	CY	$79.42	$41,477	ECHOS 33-19-0204 pg. 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	522	CY	$225.00	$117,511	Based on costs from Jones & Neuse
Gather Residual Materials from Batch House & Equipment (21,749 SF):					
Structural Inspection	48	HRS	$100.00	$4,800	
Structural Modifications	21,749	SF	$5.87	$127,616	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	21,749	SF	$0.15	$3,262	Assumes Level C Protection
55 Gallon Drums for Lead Dust	31	DRUMS	$200.00	$6,200	
Transport Drummed Mtls to RCRA Subtitle C Landfill	8	CY	$79.42	$670	ECHOS 33-19-0204 p 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	8	CY	$225.00	$1,899	Based on costs from Jones & Neuse
Dismantle Non-Supporting Equipment in Hog Storage Building, Steam Clean at VMB & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	10	TONS	$610.00	$6,100	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	5,000	SF	$0.60	$3,000	ECHOs 33-17-0812 Pg. 374
Transport & Dispose of Equipment at Class II Waste Facility	10	TONS	$100.00	$1,000	
Gate Fee for Ticket at Class II Waste Facility	1	Truck Loads	$14.00	$14	Based on costs from Jones & Neuse
Dismantle Non-Supporting Equipment in Smelter Facility, Steam Clean at VMB & Adjacent Bag Houses & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	1,000	TONS	$610.00	$610,000	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	60,000	SF	$0.60	$36,000	ECHOS 33-17-0812 Pg. 374
Transport & Dispose of Equipment at Class II Waste Facility	1,000	TONS	$100.00	$100,000	
Gate Fee for Truck at Class II Waste Facility	50	Truck Loads	$14.00	$700	Based on costs from Jones & Neuse
Asbestos Abatement:					
Site Preparation	1	LS	$10,000.00	$10,000	Asbestos containing material
Cafe Building:					quantities were obtained from
1'x 1' Floor Tile	300	SF	$10.60	$3,180	CH2M HILL report dated July 12, 1994.
Vehicle Maintenance Building:					Quantities came from survey
1'x 1' Floor Tile	250	SF	$10.60	$2,650	conducted by Nobis Engineering, Inc.
Bath House Building:					
Floor Tile Mastic	100	SF	$5.00	$500	
Cafeteria Building					
Drywall Joint Compound	500	SF	$5.00	$2,500	

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Floor Tile Mastic	1,000	SF	$5.00	$5,000	
Laboratory Complex Building:					
Drywall Joint Compound	8,000	SF	$5.00	$40,000	
1'x 1' Floor Tile	3,000	SF	$10.60	$31,800	
Floor Tile Mastic	2,500	SF	$5.00	$12,500	
Hog Storage Building:					
Pipe Insulation	3	LF	$125.00	$375	
Mudded Pipe Fitting	3	EA	$50.00	$150	
Smelter Facility Building:					
1'x 1' Floor Tile	200	SF	$10.60	$2,120	
Floor Tile Mastic	200	SF	$5.00	$1,000	
Tar Backing on Insulation	2,000	SF	$5.00	$10,000	
Vibration Joint Cloth	20	SF	$5.00	$100	
Packaging & Handling	500	CY	$50.00	$25,000	
Transportation to Hazardous Landfill & Disposal	500	CY	$79.00	$39,500	Based on costs from Jones & Neuse
Remove Hog Storage Building, Smelter Facility & Batch House:					
Samples for Smelter Facility	100	EA	$70.00	$7,000	
Samples for Hog Storage Building	20	EA	$70.00	$1,400	
Samples for Batch House	20	EA	$70.00	$1,400	
TCLP Analysis	140	EA	$300.00	$42,000	
Controlled Dismantle of Hog Storage Building	11,190	SF	$20.00	$239,800	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Smelter Facility & Adjacent Bag Houses	37,259	SF	$20.00	$745,180	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Batch House	21,749	SF	$20.00	$434,980	Based on AccuVal 1(800)852-9252
Steam Clean Sheet Metal Debris at Vehicle Maintenance Bldg	124,949	SF	$0.60	$74,969	
Transport Sheet Metal to Class I Waste Facility & Tipping Fee	3,944	CY	$90.00	$354,990	Based on costs from Jones & Neuse
Transport & Dispose of Equipment at Class II Waste Facility	3,944	CY	$29.00	$114,386	Based on costs from Jones & Neuse
Gate Fee for Truck at Class II Waste Facility	197	Truck Loads	$14.00	$2,761	Based on costs from Jones & Neuse

Pump Water to Frac Tank, Test & Discharge:					
Frac Tanks	100	EA	$1,140.00	$114,000	
Pumping	1	LS	$10,000.00	$10,000	
Sampling	100	EA	$70.00	$7,000	
Analysis	100	EA	$200.00	$20,000	
Demolish Smelter Stack and Transport to RCRA Subtitle C Landfill:					
Smelter Stack (300' High)	1	LS	$400,000	$400,000	Based on AccuVal 1(800)852-9252
Transport Drummed Debris to RCRA Subtitle C Landfill	1,256	CY	$79.42	$99,747	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	1,256	CY	4125.00	$157,000	Based on costs from Jones & Neuse
Demolish Remaining Structures and Transport Debris to Appropriate Facility:					
Samples for Buildings (5 Buildings, 20 Samples Each)	100	EA	$70.00	$7,000	
TCLP Analysis	100	EA	$300.00	$30,000	
Controlled Dismantling of Roofs and Transport to RCRA Facility:					
Vehicle Maintenance Building	3,717	SF	$1.00	$3,717	Based on ECHOS 16-01-0308 pg 28
Bath House	2,200	SF	$1.00	$2,200	Based on ECHOS 16-01-0308 pg 28
Cafeteria	1,302	SF	$1.00	$1,302	Based on ECHOS 16-01-0308 pg 28
Laboratory	5,619	SF	$1.00	$5,619	Based on ECHOS 16-01-0308 pg 28
Gas Station	525	SF	$1.00	$525	Based on ECHOS 16-01-0308 pg 28
Transport Roof Debris to RCRA Subtitle C Landfill	495	CY	$79.42	$39,305	ECHOS 33-19-0204 pg. 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	495	CY	$125.00	$61,866	Based on costs from Jones & Neuse
Demolish Remainder of Buildings and Dispose of Debris in Appropriate Facilities:					
Vehicle Maintenance Building	3,717	SF	$14.00	$52,038	Based on AccuVal 1(800)852-9252
Bath House	2,200	SF	$18.00	$39,600	Based on AccuVal 1(800)852-9252
Cafeteria	1,302	SF	$18.00	$23,436	Based on AccuVal 1(800)852-9252
Laboratory	5,619	SF	$18.00	$101,142	Based on AccuVal 1(800)852-9252
Gas Station	525	SF	$18.00	$9,450	Based on AccuVal 1(800)852-9252
Transport Debris to Class I Waste Facility & Tipping Fee	247	CY	$90.00	$22,272	Based on costs from Jones & Neuse

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Transport & Dispose of Equipment at Class II Waste Facility	198	CY	$29.00	$5,741	Based on costs from Jones & Neuse
Gate Fee for Truck at Class II Waste Facility	10	Truck Loads	$14.00	$139	Based on costs from Jones & Neuse
Transport Debris to RCRA Subtitle C Facility	49	CY	$79.42	$3,931	ECHOS 33-19-0204 pg 382, Assume 500 miles
Tipping Fee at RCRA Subtitle C Facility	49	CY	$125.00	$6,187	Based on costs from Jones & Neuse
Metals Contaminated Soils:					
Demolish Concrete Pavements	7,900	SY	$15.00	$118,500	Based on 95 MEANS 020-554-1900
Transport Debris to RCRA Subtitle D Landfill	1,317	CY	$10.00	$13,167	
RCRA Subtitle C Landfill Tipping Fee	66	Truck Loads	$143.00	$9,414	Dallas Municipal Landfill (214)670-0977
Excavate Metals Contaminated Soils 1' Deep in All Areas Except NE Corner	10,100	CY	$5.00	$50,500	
Excavate Metals Contaminated Soils 2' Deep in NE Corner	3,400	CY	$5.00	$17,000	
Sample Excavated Materials	100	EA	$70.00	$7,000	
TCLP Analysis	100	EA	$300.00	$30,000	
TAL Metals Analysis	100	EA	$300.00	$30,000	
Transport Soils to Class I Waste Facility & Tipping Fee	13,500	CY	$90.00	$1,215,000	Based on costs from Jones & Neuse
Backfill All Areas Except NE Corner with 1' Thick Clean Material	12,120	CY	$15.00	$181,800	Assumes backfill quantity is 20% greater than excavated quantity.
Backfill NE Corner with 2' Thick Clean Material	4,080	CY	$15.00	$61,200	Assumes backfill quantity is 20% greater than excavated quantity.
SUBTOTAL				$7,858,595	
CONTINGENCY	30%		$7,858,595	$2,357,578	
SUBTOTAL - CONSTRUCTION COST				$10,216,173	
PERMITTING & LEGAL	5%		$7,081,232	$354,062	Based on cost of all on-site activities
SERVICES DURING CONSTRUCTION	7%		$7,081,232	$495,686	Based on cost of all on-site activities
SUBTOTAL - IMPLEMENTATION COST				$11,065,921	
ENGINEERING & DESIGN COST	6%		$7,081,232	$424,874	Based on cost of all on-site activities
TOTAL - Capital Costs - Alternative 4				$11,490,795	

ANNUAL O & M COSTS:				
Site Control Cost	1	LS	$0.00	$0
Site Monitoring Cost	1	LS	$0.00	$0
SUBTOTAL			$0	
CONTINGENCY	30%		$0	$0
TOTAL- Annual O & M Costs - Alternative 4				$0

10/26/95 Revised Table B-1
Cost Estimate
Operable Unit No. 4
RSR Corporation Superfund Site
Dallas, Texas

RSR CORPORATION SUPERFUND SITE-REMEDIATION OF OU4
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
NET PRESENT VALUE					
YEAR 0				$11,490,795	
YEAR 1				$0	
YEAR 2				$0	
YEAR 3				$0	
YEAR 4				$0	
YEAR 5				$0	
YEAR 6				$0	
YEAR 7				$0	
YEAR 8				$0	
YEAR 9				$0	
YEAR 10				$0	
YEAR 11				$0	
YEAR 12				$0	
YEAR 13				$0	
YEAR 14				$0	
YEAR 15				$0	
YEAR 16				$0	
YEAR 17				$0	
YEAR 18				$0	
YEAR 19				$0	
YEAR 20				$0	
YEAR 21				$0	
YEAR 22				$0	
YEAR 23				$0	
YEAR 24				$0	
YEAR 25				$0	
YEAR 26				$0	
YEAR 27				$0	
YEAR 28				$0	
YEAR 29				$0	
YEAR 30				$0	
NET PRESENT VALUE (I=5%) - Alternative 4				$11,490,795	

CH2M HILL
RSR Corportation Superfund Site
PROJECT NO: 111431.FS.R4
PREPARED BY E.R.MEYER

RSR CORPORATION SUPERFUND SITE - REMEDIATION OF OU 4 (CONTINGENCY ALTERNATIVE 4A)
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Alternative 4A: Same as Alternative No. 4 Except Includes Disposal of Non-Hazardous Wastes at OU5 Landfill.					
CAPITAL COSTS:					
GENERAL REQUIREMENTS:	10%		$6,022,048	$602,205	
General Sitework:					
Air Monitoring During Site Work	1	LS	$100,000.00	$100,000	
Gather Residual Materials from Hog Storage Building & Equipment (11,990 SF):					
Structural Inspection	32	HRS	$100.00	$3,200	
Structural Modifications	11,990	SF	$5.87	$70,353	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	11,990	SF	$0.15	$1,799	Assumes Level C Protection
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	5	CY	$100.00	$474	
55 Gallon Drums for Lead Dust	17	DRUMS	$200.00	$3,400	
Transport Drummed Mtls to RCRA Subtitle C Landfill	9	CY	$79.42	$735	ECHOS 33-19-0204 pg 382, Assumes 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	9	CY	$225.00	$2,083	Based on costs from Jones & Neuse
Gather Residual Materials from Smelter Facility & Adjacent Bag Houses & Equipment (37,259 SF):					
Structural Inspection	64	HRS	$100.00	$6,400	
Structural Modifications	37,259	SF	$5.87	$218,624	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Bldg by Hand & Place in 55 Gal Drums	37,259	SF	$0.15	$5,589	Assumes Level C Protection
55 Gallon Drums for Lead Dust	53	DRUMS	$200.00	$10,600	
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	508	CY	$100.00	$50,792	
55 Gallon Drums for Lead Dust	1,865	DRUMS	$200.00	$373,000	

Transport Drummed Mtls to RCRA Subtitle C Landfill	522	CY	$79.42	$41,477	ECHOS 33-19-0204 pg 382, Assumes 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	522	CY	$225.00	$117,511	Based on costs from Jones & Neuse
Gather Residual Materials from Batch House & Equipment (21,749 SF):					
Structural Inspection	48	HRS	$100.00	$4,800	
Structural Modifications	21,749	SF	$5.87	$127,616	Based on AccuVal 1(800)852-9252
Gather Residual Mtls from Equip by Hand & Place in 55 Gal Drums	21,749	SF	$0.15	$3,262	Assumes Level C Protection
55 Gallon Drums for Lead Dust	31	DRUMS	$200.00	$6,200	
Transport Drummed Mtls to RCRA Subtitle C Landfill	8	CY	$79.42	$670	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	8	CY	$225.00	$1,899	Based on costs from Jones & Neuse
Dismantle Non-Supporting Equipment in Hog Storage Building, Steam Clean at VMB & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	10	TONS	$610.00	$6,100	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	5,000	SF	$0.60	$3,000	ECHOS 33-17-0812 Pg. 374
Load Equipment onto Truck for Transport to OU5 Landfill	10	TONS	$6.21	$62	Based on MEANS Crew B-22
Transport Equipment Over to OU5 Landfill (1 mi round trip)	10	TONS	$5.08	$51	Based on MEANS Crew B-34D
Unload Equipment on Truck & Place in OU5 Landfill	10	TONS	$6.21	$62	Based on MEANS Crew B-22
Dismantle Non-Supporting Equipment in Smelter Facility, Steam Clean at VMB & Adjacent Bag Houses & Haul to Class II Waste Facility:					
Dismantle Non-Supporting Equipment	1,000	TONS	$610.00	$610,000	Based on 95 MEANS 020-718-3600
Steam Clean Equipment 2 Times	60,000	SF	$0.60	$36,000	ECHOS 33-17-0812 Pg. 374
Load Equipment onto Truck for Transport to OU5 Landfill	1,000	TONS	$6.21	$6,209	Based on MEANS Crew B-22
Transport Equipment Over to OU5 Landfill (1 mi round trip)	1,000	TONS	$5.08	$5,084	Based on MEANS Crew B-34D
Unload Equipment on Truck & Place in OU5 Landfill	1,000	TONS	$6.21	$6,209	Based on MEANS Crew B-22

CH2M HILL
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RSR CORPORATION SUPERFUND SITE - REMEDIATION OF OU 4 (CONTINGENCY ALTERNATIVE 4A)
(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Asbestos Abatement:					
Site Preparation	1	LS	$10,000.00	$10,000	Asbestos containing material
Cafe Building:					quantities were obtained from
1'x 1' Floor Tile	300	SF	$10.60	$3,180	CH2M HILL report dated July 12, 1994.
Vehicle Maintenance Building:					Quantities came from survey
1'x 1' Floor Tile	250	SF	$10.60	$2,650	conducted by Nobis Engineering, Inc.
Bath House Building:					
Floor Tile Mastic	100	SF	$5.00	$500	
Cafeteria Building					
Drywall Joint Compound	500	SF	$5.00	$2,500	
Floor Tile Mastic	1,000	SF	$5.00	$5,000	
Laboratory Complex Building:					
Drywall Joint Compound	8,000	SF	$5.00	$40,000	
1'x 1' Floor Tile	3,000	SF	$10.60	$31,800	
Floor Tile Mastic	2,500	SF	$5.00	$12,500	
Hog Storage Building:					
Pipe Insulation	3	LF	$125.00	$375	
Mudded Pipe Fitting	3	EA	$50.00	$155	
Smelter Facility Building:					
1'x 1' Floor Tile	200	SF	$10.60	$2,120	
Floor Tile Mastic	200	SF	$5.00	$1,000	
Tar Backing on Insulation	2,000	SF	$5.00	$10,000	
Vibration Joint Cloth	20	SF	$5.00	$100	
Packaging & Handling	500	CY	$50.00	$25,000	
Transportation to Hazardous Landfill & Disposal	500	CY	$79.00	$39,500	Based on costs from Jones & Neuse
Remove Hog Storage Building, Smelter Facility & Batch House:					
Samples for Smelter Facility	100	EA	$70.00	$7,000	
Samples for Hog Storage Building	20	EA	$70.00	$1,400	
Samples for Batch House	20	EA	$70.00	$1,400	
TCLP Analysis	140	EA	$300.00	$42,000	

Controlled Dismantle of Hog Storage Building	11,900	SF	$20.00	$239,800	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Smelter Facility & Adjacent Bag Houses	37,259	SF	$20.00	$745,180	Based on AccuVal 1(800)852-9252
Controlled Dismantle of Batch House	21,749	SF	$20.00	$434,980	Based on AccuVal 1(800)852-9252
Steam Clean Sheet Metal Debris at Vehicle Maintenance Bldg	124,949	SF	$0.60	$74,969	
Load Sheet Metal onto Truck for Transport to OU5 Landfill	7,889	CY	$3.03	$23,901	Based on MEANS Crew B-100
Transport Sheet Metal Over to OU5 Landfill (1 mi round trip)	197	Truck Loads	$50.84	$10,027	Based on MEANS Crew B-34D
Unload Sheet Metal on Truck & Place in OU5 Landfill	7,889	CY	$4.86	$33,598	Based on MEANS Crew B-15
Pump Water to Frac Tank Test & Discharge:					
Frac Tanks	100	EA	$1,140.00	$114,000	
Pumping	1	LS	$10,000.00	$10,000	
Sampling	100	EA	$70.00	$7,000	
Analysis	100	EA	$200.00	$20,000	
Demolish Smelter Stack and Transport to RCRA Subtitle C Landfill:					
Smelter Stack (300' High)	1	LS	$400,000	$400,000	Based on AccuVal 1(800)852-9252
Transport Drummed Debris to RCRA Subtitle C Landfill	1,256	CY	$79.42	$99,747	ECHOS 33-19-0204 pg 382 Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	1,256	CY	$125.00	$157,000	Based on costs from Jones & Neuse
Demolish Remaining Structures and Transport Debris to Appropriate Facility:					
Samples for Buildings (5 Buildings, 20 Samples Each)	100	EA	$70.00	$7,000	
TCLP Analysis	100	EA	$300.00	$30,000	

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(Accuracy Range: +50%/-30%)

DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Controlled Dismantling of Roofs and Transport to RCRA C Facility:					
Vehicle Maintenance Building	3,717	SF	$1.00	$3,717	Based on ECHOS 16-01-0308 pg 28
Bath House	2,200	SF	$1.00	$2,200	Based on ECHOS 16-01-0308 pg 28
Cafeteria	1,302	SF	$1.00	$1,302	Based on ECHOS 16-01-0308 pg 28
Laboratory	5,619	SF	$1.00	$5,619	Based on ECHOS 16-01-0308 pg 28
Gas Station	525	SF	$1.00	525	Based on ECHOS 16-01-0308 pg 28
Transport Roof Debris to RCRA Subtitle C Landfill	495	CY	$79.42	$39,305	ECHOS 33-19-0204 pg 382, Assume 500 miles
RCRA Subtitle C Landfill Stabilization & Tipping Fee	495	CY	$125.00	$61,866	Based on costs from Jones & Neuse
Demolish Remainder of Buildings and Dispose of Debris in Appropriate Facilities:					
Vehicle Maintenance Building	3,717	SF	$14.00	$52,038	Based on AccuVal 1(800)852-9252
Bath House	2,200	SF	$18.00	$39,600	Based on AccuVal 1(800)852-9252
Cafeteria	1,302	SF	$18.00	$23,436	Based on AccuVal 1(800)852-9252
Laboratory	5,619	SF	$18.00	$101,142	Based on AccuVal 1(800)852-9252
Gas Station	525	SF	$18.00	$9,450	Based on AccuVal 1(800)852-9252
Load Debris onto Truck for Transport to OU5 Landfill	445	CY	$3.03	$3,150	Based on MEANS Crew B-100
Transport Debris Over to OU5 Landfill (1 mi round trip)	22	Truck Loads	$50.84	$1,132	Based on MEANS Crew B-34D
Unload Debris on Truck & Place in OU5 Landfill	445	CY	$4.26	$1,897	Based on MEANS Crew B-15
Transport Debris to RCRA Subtitle C Facility	49	CY	$79.42	$3,931	ECHOS 33-19-0204 pg 382. Assume 500 miles
Tipping Fee at RCRA Subtitle C Facility	49	CY	$125.00	$6,187	Based on costs from Jones & Neuse

Metals Contaminated Soils:					
Demolish Concrete Pavements	7,900	SY	$15.00	$118,500	Based on 95 MEANS 020-554-1900
Load Concrete Pavement onto Truck for Transportation to OU5 Landfill	1,317	CY	$2.02	$2,660	Based on MEANS Crew B-100
Transport Concrete Pavements Over to OU5 Landfill (1 mi round trip)	66	Truck Loads	$33.89	$2,231	Based on MEANS Crew B-34D
Unload Concrete Pavements on Truck & Place in OU5 Landfill	1,317	CY	$2.84	$3,739	Based on MEANS Crew B-15
Excavate Metals Contaminated Soils 1' Deep in All Areas Except NE Corner	10,100	CY	$5.00	$50,500	
Excavate Metals Contaminated Soils 2' Deep in NE Corner	3,400	CY	$5.00	$17,000	
Sample Excavated Materials	100	EA	$70.00	$7,000	
TCLP Analysis	100	EA	$300.00	$30,000	
TAL Metals Analysis	100	EA	$300.00	$30,000	
Load Metals Contaminated Soils onto Truck for Transport to OU5 Landfill	13,500	CY	$2.02	$27,269	Based on MEANS Crew B-100
Transport Metals Contaminated Soils Over to OU5 Landfill (1 mi round trip)	675	Truck Loads	$33.89	$22,878	Based on MEANS Crew B-34D
Unload Metals Contaminated Soils on Truck & Place in OU5 Landfill	13,500	CY	$2.84	$38,332	Based on MEANS Crew B-15
Backfill All Areas Except NE Corner with 1' Thick Clean Material	12,120	CY	$15.00	$181,000	Assumes backfill quantity is 20% greater than excavated quantity.
Backfill NE Corner with 2' Thick Clean Material	4,080	CY	$15.00	$61,200	Assumes backfill quantity is 20% greater than excavated quantity.
SUBTOTAL				$6,022,048	
CONTINGENCY	30%		$6,022,048	$1,806,615	
SUBTOTAL - CONSTRUCTION COST				$7,828,663	
PERMITTING & LEGAL	5%		$7,784,556	$389,228	Based on cost of all on-site activities
SERVICES DURING CONSTRUCTION	7%		$7,784,556	$544,919	Based on cost of all on-site activities
SUBTOTAL - IMPLEMENTATION COST				$8,762,810	
ENGINEERING & DESIGN COST	6%		$7,784,556	$467,073	Based on cost of all on-site activities
TOTAL - Capital Costs - Alternative 4A				$9,229,883	
ANNUAL O & M COSTS:					
Site Control Cost	1	LS	$0.00	$0	

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DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
Site Monitoring Cost	1	LS	$0.00	$0	
SUBTOTAL				$0	
CONTINGENCY	30%		$0	$0	
TOTAL - Annual O & M Costs - Alternative 4A				$0	

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DESCRIPTION	QUANTITY	UNIT	$/UNIT COST	TOTAL	REFERENCE
NET PRESENT VALUE:					
YEAR 0			$9,220,883		
YEAR 1				$0	
YEAR 2				$0	
YEAR 3				$0	
YEAR 4				$0	
YEAR 5				$0	
YEAR 6				$0	
YEAR 7				$0	
YEAR 8				$0	
YEAR 9				$0	
YEAR 10				$0	
YEAR 11				$0	
YEAR 12				$0	
YEAR 13				$0	
YEAR 14				$0	
YEAR 15				$0	
YEAR 16				$0	
YEAR 17				$0	
YEAR 18				$0	
YEAR 19				$0	
YEAR 20				$0	
YEAR 21				$0	
YEAR 22				$0	
YEAR 23				$0	
YEAR 24				$0	
YEAR 25				$0	
YEAR 26				$0	
YEAR 27				$0	
YEAR 28				$0	
YEAR 29				$0	
YEAR 30				$0	
NET PRESENT VALUE (i=5%) - Alternative 4A				$9,229,883	