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EPA Superfund
Record of Decision:

CAROLINA TRANSFORMER CO.
EPA ID: NCD003188844
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FAYETTEVILLE, NC
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8/29/91
EPA REGIONAL ADMINISTRATOR

#INT

1.0 INTRODUCTION

THE CAROLINA TRANSFORMER SITE WAS PROPOSED FOR INCLUSION ON THE NATIONAL PRIORITIES LIST (NPL) IN JULY 1987. THE SITE HAS BEEN THE SUBJECT OF A REMEDIAL INVESTIGATION (RI) AND FEASIBILITY STUDY (FS) PERFORMED BY THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA). THE RI, WHICH WAS COMPLETED IN SEPTEMBER 1990, CONSISTED OF A FOUR PHASE INVESTIGATION THAT FULLY CHARACTERIZED THE PRESENCE AND EXTENT OF CONTAMINATION ON AND OFF SITE BY EVALUATING THE SEDIMENTS, SURFACE WATER, GROUNDWATER, SURFACE AND SUBSURFACE SOILS. THE FEASIBILITY STUDY (FS) DEVELOPS AND ANALYZES POTENTIAL ALTERNATIVES FOR REMEDIATION AT THE SITE AND WAS ISSUED TO THE PUBLIC IN DRAFT FORM IN MARCH 1990.

1.1 SITE LOCATION AND DESCRIPTION

THE CAROLINA TRANSFORMER SITE IS LOCATED IN CUMBERLAND COUNTY, NORTH CAROLINA, APPROXIMATELY ONE MILE NORTHEAST OF FAYETTEVILLE AND NORTH OF THE INTERSECTION OF US HIGHWAY 301 AND RIVER ROAD (FIGURE 1.0). THE APPROXIMATE MAP COORDINATES ARE LATITUDE 35 03' 08" N AND LONGITUDE 78 50' 07" W.

THE SITE CONSISTS OF APPROXIMATELY 4.8 ACRES OF RELATIVELY FLAT TERRAIN AND IS BOUNDED ON THE NORTH BY A WOODED/SWAMP-LIKE AREA WHICH IS ADJACENT TO AN AGRICULTURAL FIELD AND NUMEROUS HOMES; ON THE WEST BY A DIRT ROAD WHICH PROVIDES ACCESS TO TWO HOMES; TO THE SOUTH BY MIDDLE ROAD, LARRY'S SAUSAGE COMPANY AND LUNDY PACKING COMPANY; AND TO THE EAST BY AN ABANDONED HOME SITE AND AN AGRICULTURAL FIELD.

LOCATED ON THE SITE ARE A FOUNDATION AND A VARIETY OF BUILDINGS OF VARYING SIZES. THESE ARE SITUATED PREDOMINANTLY TOWARDS THE FRONT AND NORTHEAST PORTION OF THE PROPERTY FIGURE 1.1 SHOWS THE LOCATIONS OF THESE BUILDINGS. THE WESTERN PORTION OF THE SITE IS RELATIVELY OPEN. MUCH OF THE AREA AROUND THE FOUNDATION AND BUILDINGS HAS BEEN PAVED WITH CONCRETE.

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2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

2.1 SITE HISTORY

CAROLINA TRANSFORMER COMPANY (CTC) CONDUCTED AN ELECTRICAL TRANSFORMER REBUILDING AND REPAIR BUSINESS FROM 1967 TO 1982 (BUSSEY, 1985). THE FIRST INDICATION OF BUSINESS OPERATIONS ON THE SITE WAS THE PRESENCE OF TWO LARGE BUILDINGS DEPICTED IN THE 1957 QUADRANGLE MAP. ACCORDING TO A FEBRUARY 1985, DUN AND BRADSTREET PRINTOUT, CTC WAS FOUNDED IN 1958. THE FIRST PARCEL OF THE SITE WAS DEEDED TO CTC FROM LIZZIE TALBOT MCDANIEL ON FEBRUARY 7, 1959. CTC WAS INCORPORATED MAY 6, 1959; HOWEVER, 1965 WAS THE FIRST YEAR THE CUMBERLAND COUNTY TAX OFFICE RECORDS INDICATE PROPERTY OF THE BUSINESS WAS IDENTIFIED FOR TAX PURPOSES. IN 1967, CTC SOLD 4.75 ACRES OF THEIR PROPERTY TO R. L. HONBARRIER.

DURING AN INTERVIEW ON MAY 23, 1985, MR. THOMAS STEVENS, NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (NCDEM), INDICATED THAT AT ONE TIME CTC WAS ONE OF THE LARGEST FIRMS OF ITS TYPE IN THE US, HAVING CLIENTS THROUGHOUT THE SOUTHEASTERN US AND ALONG THE EAST COAST. AT NO TIME DURING THAT PERIOD DID CTC APPARENTLY OPERATE AS A PCB STORAGE AND DISPOSAL SITE FOR OWNERS OF PCB TRANSFORMERS OR PCB ARTICLES. HOWEVER, IT APPEARS THAT AS PART OF THEIR TRANSFORMER REPAIR AND REBUILDING OPERATIONS, PCB FLUIDS WERE DRAINED FROM TRANSFORMERS AND NOT PROPERLY STORED AND MANAGED.

IN 1979, EPA CONDUCTED SOIL SAMPLING AT THE SITE. TESTING REVEALED THAT ABOUT ONE AND A HALF ACRES OF THE SITE WERE CONTAMINATED WITH PCBS(HATCHER, 1984). ACCORDING TO THE NORTH CAROLINA SECRETARY OF STATE'S CORPORATE DIVISION RECORDS, IN 1979, MR. KENNETH STROTHERS STARTED A NEW TRANSFORMER COMPANY CALLED FAYTRANCO, WHICH WAS LOCATED IN FAYETTEVILLE, NORTH CAROLINA. IN 1985 FAYTRANCO WAS SHUT DOWN AND DISSOLVED.

ACCORDING TO EPA RECORDS, CTC RELOCATED AND CHANGED ITS NAME TO FAYTRANCO, INC. IN APRIL 1982. ON AUGUST 13, 1984, EPA STARTED CLEANUP OPERATIONS AT THE SITE, AND APPROXIMATELY 1,000 TONS OF CONTAMINATED SOIL WERE REMOVED. CONTAMINATION OVER 50 PPM OF PCBS, HOWEVER, STILL EXISTS AT THE SITE (HATCHER, 1984).

ACCORDING TO A DEED DATED NOVEMBER 29, 1984, THE ENTIRE SITE WAS SOLD TO CUMBERLAND ELECTRICAL REPAIR, INC. BY CTC THROUGH MR. PEARSON AND MR. MILLER. A DEED, DATED APRIL 15, 1985, INDICATES THAT CUMBERLAND ELECTRICAL REPAIR, INC. OPERATED AT THE SITE FOR ONLY ABOUT FOUR AND ONE HALF MONTHS BEFORE BEING ORDERED BY THE COURTS TO RETURN THE PROPERTY TO CTC.

2.2 ENFORCEMENT ACTIVITIES

AFTER A HIGHLY PUBLICIZED CASE IN NORTH CAROLINA CONCERNING ROADSIDE DUMPING OF PCB OIL IN JULY 1978, RESIDENTS LIVING NEAR CAROLINA TRANSFORMER BECAME CONCERNED ABOUT POSSIBLE GROUND WATER CONTAMINATION FROM SPILLS AT THE SITE. SAMPLES TAKEN BY EPA IN 1978 AND 1979 REVEALED CONTAMINATION OF SOIL ON THE SITE BY PCBS AND CHLOROBENZENE (A PCB CARRIER COMPOUND). PCB CARRIER COMPOUNDS WERE ALSO FOUND IN A SHALLOW RESIDENTIAL DRINKING WATER WELL ABOUT 250 FEET WEST OF THE SITE; THIS RESIDENCE WAS LATER PLACED ON THE FAYETTEVILLE WATER SYSTEM. SAMPLING ALSO REVEALED TRACE CONTAMINATION IN CAROLINA TRANSFORMER'S DEEP INDUSTRIAL WELL. THE STATE ATTEMPTED TO HAVE CAROLINA TRANSFORMER CORRECT THE CONTAMINATED SOIL PROBLEM AT THE SITE, TO NO AVAIL.

IN MARCH 1982, SAMPLING BY THE STATE DETERMINED THAT RUN-OFF FROM THE SITE VIOLATED SURFACE-WATER QUALITY STANDARDS FOR PCBS. IN 1984, EPA MADE EFFORTS TO HAVE CAROLINA TRANSFORMER CLEAN UP THE SITE. WHEN THE EFFORTS FAILED, EPA ISSUED A CERCLA SECTION 106 ADMINISTRATIVE ORDER REQUIRING THE COMPANY TO REMOVE AND PROPERLY DISPOSE OF THE CONTAMINATED SOIL. AFTER THE COMPANY REFUSED, EPA, USING CERCLA EMERGENCY FUNDS, BEGAN TO CLEAN UP THE SITE IN AUGUST 1984. DURING THE REMOVAL ACTION, EPA EXCAVATED 975 TONS OF CONTAMINATED SOIL AND TRANSPORTED IT TO A HAZARDOUS WASTE LANDFILL PERMITTED UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT.

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3.0 HIGHLIGHT OF COMMUNITY PARTICIPATION

3.1 SUMMARY OF COMMUNITY PARTICIPATION

A COMMUNITY RELATIONS PLAN FOR THE CAROLINA TRANSFORMER SITE WAS FINALIZED IN JUNE 1989. A RI/FS FACT SHEET WAS ALSO PREPARED AT THAT TIME. THE REMEDIAL INVESTIGATION (RI) AND FEASIBILITY STUDY (FS) REPORTS ALONG WITH THE PROPOSED PLAN WERE RELEASED TO THE PUBLIC ON MARCH 29, 1991. ALL OF THESE DOCUMENTS AS WELL AS THE ADMINISTRATIVE RECORD WERE MADE AVAILABLE TO THE PUBLIC VIA THE CUMBERLAND COUNTY LIBRARY.

THE US ENVIRONMENTAL PROTECTION AGENCY HELD A PUBLIC COMMENT PERIOD FROM MARCH 29, 1991 THROUGH APRIL 30, 1991 FOR PARTIES INTERESTED IN COMMENTING ON THE PROPOSED PLAN AND RI/FS REPORTS. THE PUBLIC MEETING PROVIDING THE RESULTS OF THE RI/FS AND PRESENTATION OF THE PROPOSED PLAN WAS HELD ON APRIL 17, 1991.

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4.0 SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

4.1 THE REMEDY SELECTED BY EPA FOR THE CAROLINA TRANSFORMER SITE WILL BE THE FIRST AND FINAL ACTION PROPOSED FOR THIS SITE. THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION. THIS ACTION UTILIZES A PERMANENT SOLUTION AND WILL ADDRESS ALL CONTAMINATION PRESENT AT THE SITE.

THE ACTION SELECTED WILL ADDRESS THE REMEDIATION OF THE CONTAMINATED GROUNDWATER, SOIL, AND SEDIMENTS ON AND OFF SITE THE REMEDY WILL ADDRESS THE REMAINING DEBRIS LOCATED IN THE ON SITE BUILDINGS. THE MAJOR COMPONENTS OF THE SELECTED REMEDY INCLUDE:

EXCAVATION OF THE CONTAMINATED SOIL/SEDIMENT, WHICH WILL BE TREATED USING A SOLVENT EXTRACTION PROCESS TO SEPARATE ORGANIC CONTAMINANTS SUCH AS PCB, DIOXIN/FURANS, VOLATILE ORGANICS, AND POLYNUCLEAR AROMATIC COMPOUNDS FROM THE SOIL AND SEDIMENTS. THE PROCESS WILL CONVERT INORGANIC CONTAMINANTS SUCH AS LEAD AND COPPER TO LOWER SOLUBILITY HYDROXIDES THEREBY REDUCING THEIR MOBILITY. TCLP WILL BE RUN ON THE TREATED SOIL AND SEDIMENT PRIOR TO ITS RETURN TO ITS ORIGINAL LOCATION TO DETERMINE IF IT MEETS THE RCRA TOXICITY CHARACTERISTIC RULE. SOIL AND SEDIMENTS NOT MEETING THE TOXICITY RULE WILL BE SOLIDIFIED. THE CONTAMINANT RICH WASTE STREAM WILL BE TRANSPORTED OFF-SITE FOR TREATMENT.

DEMOLITION OF THE ROOFS AND WALLS OF THE THREE ON-SITE BUILDINGS. THE DEBRIS WILL BE CRUSHED AND TRANSPORTED TO AN OFF-SITE LANDFILL. IF THE REMAINING SLABS ARE FOUND TO BE CONTAMINATED THEY WILL BE TREATED WITH A SOLVENT WASHING SYSTEM TO EXTRACT THE PCBS.

REMOVAL OF THE DEBRIS AND SOLID WASTE FROM THE SITE, WHICH WILL BE TRANSPORTED TO AN OFF-SITE LANDFILL FOR DISPOSAL AND/OR TREATMENT IN ACCORDANCE WITH RCRA 40 CFR 264 SUBPART O AND 40CFR 761(A)(4).

INSTALLATION OF GROUNDWATER EXTRACTION WELLS IN CONJUNCTION WITH A TWO COMPONENT TREATMENT SYSTEM TO REMOVE THE METALS AND ORGANIC CONTAMINANTS. ADDITIONAL MONITORING WELLS WILL BE INSTALLED INTO THE LOWER AQUIFER TO CONFIRM ITS STATUS. IF IT IS FOUND TO BE CONTAMINATED, THE GROUNDWATER TREATMENT SYSTEM MENTION ABOVE WILL BE EXPANDED TO ADDRESS THE CONTAMINATION OF THE LOWER AQUIFER.

THE TREATED GROUNDWATER TO THE FAYETTEVILLE PUBLICLY OWNED TREATMENT WORKS (POTW), OR THE UNNAMED TRIBUTARY TO THE CAPE FEAR RIVER.

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5.0 SUMMARY OF SITE CHARACTERISTICS

5.1 TOPOGRAPHY AND SURFACE DRAINAGE

THE SITE CONSISTS OF APPROXIMATELY 4.8 ACRES OF RELATIVELY FLAT TERRAIN. THE AREA SURROUNDING THE SITE IS GENERALLY LOW-LYING AND SWAMP-LIKE IN CHARACTER. THE SITE ITSELF IS SITUATED AT THE HEADWATERS OF AN UNNAMED TRIBUTARY WHICH FLOWS FROM THE WEST CORNER OF THE SITE LESS THAN TWO MILES TO THE CAPE PEAR RIVER. OTHER DRAINAGE DITCHES FLOW ALONG MIDDLE ROAD, WEST TO THE CAPE FEAR RIVER AND EAST TO LOCKS CREEK. (FIG. 5.1)

5.2 SITE GEOLOGY

THE SITE IS LOCATED IN THE COASTAL PLAIN PHYSIOGRAPHIC PROVINCE OF NORTH CAROLINA. THE MAIN STRATIGRAPHIC UNIT IN THE VICINITY OF THE SITE IS THE TUSCOLOOSA FORMATION WHICH IS OF ALLUVIAL

ORIGIN AND UPPER CRETACEOUS IN AGE. THE MATERIALS COMPRISING THE TUSCOLOOSA FORMATION WERE DERIVED FROM CRYSTALLINE ROCKS SUCH AS GRANITES, GNEISSES, AND SCHISTS WHICH COMPOSE THE ADJACENT PIEDMONT PHYSIOGRAPHIC PROVINCE. THE SOILS FORMED FROM THESE CRYSTALLINE MATERIALS CONSIST OF BROWN TO TAN, FINE TO COARSE-GRAINED SANDS; TAN, SILTY CLAYEY SANDS; SANDY CLAYS; AND GREY TO BLUE SANDY CLAYS.

THE SURFICIAL SOILS AT THE SITE CONSIST OF THE WICKHAM SERIES AND THE ROANOKE SERIES. WICKHAM SERIES SOILS COVER MOST OF THE FORMER FACILITY AREA. THESE ARE WELL-DRAINED SOILS THAT FORMED IN LOAMY LUVIAL SEDIMENTS ON TERRACES OF THE CAPE FEAR RIVER AND ITS MAJOR TRIBUTARIES. THE LOAMY HORIZON IS TOPICALLY 40 TO 60 INCHES THICK AND IS UNDERLAIN BY SANDY ALLUVIAL SEDIMENTS. THESE ARE POORLY DRAINED SOILS THAT FORMED IN STRATIFIED; CLAYEY SEDIMENTS ON TERRACES OF THE CAPE FEAR RIVER AND ITS MAJOR TRIBUTARIES. THE LOAMY AND CLAYEY HORIZONS ARE GENERALLY 40 TO 60 INCHES THICK AND OVERLIE THE STRATIFIED SEDIMENTS DEPOSITED BY THE RIVER.

5.3 SITE HYDROLOGY

THE CAROLINA TRANSFORMER SITE MAY BE UNDERLAIN BY AS MANY AS THREE AQUIFERS. THE ALLUVIAL DEPOSITS WHERE SAND AND GRAVEL ARE PRESENT COULD PROVIDE LARGE YIELDS TO WELLS. AVAILABLE INFORMATION INDICATES THAT THE ALLUVIAL AQUIFERS ARE NOT PRESENTLY USED FOR WATER SUPPLY IN THE AREA. THE SANDS AND CLAYS OF THE CAPE FEAR AND MIDDENDORF FORMATION SERVE AS AQUIFERS IN THE FAYETTEVILLE AREA. WELLS COMPLETED WITHIN THESE FORMATIONS CAN BE SCREENED OVER A LARGE INTERVAL WHICH COULD COVER SANDS AND INTERVENING CLAYS. THE SANDS PROVIDE MUCH HIGHER YIELD AND ARE THE MOST PRODUCTIVE AQUIFERS IN THE REGION. THE BEDROCK POSSESSES FRACTURE PERMEABILITY AND IS UTILIZED FOR INDUSTRIAL SUPPLIES. A SIMILAR SUCH WELL WAS USED BY LARRY'S SAUSAGE COMPANY, LOCATED ADJACENT TO THE SITE. THIS WELL IS 303 FEET DEEP AND IS COMPLETED BEDROCK FROM 12 FEET TO THE TOTAL DEPTH. MR. J.0. PARKER, PRESIDENT OF THE CAROLINA SAND AND GRAVEL COMPANY- INC., INDICATED, DURING A CONVERSATION ON JUNE 22, 1989, THAT EXPLORATION BORINGS NEAR THE SITE, TO THE SOUTH AND NORTHWEST, SHOWED A THICK CLAY LENS STARTING AT APPROXIMATELY 20 FEET BELOW LAND SURFACE (BLS) AND EXTENDING DOWN TO AT LEAST 50 FEET BLS. COPIES OF THE EXPLORATION BORING LOGS WERE LATER PROVIDED TO EPA.

THE SHALLOW AQUIFER, LOCATED AT A DEPTH OF FIVE TO EIGHT FEET BELOW GROUND SURFACE, IS FLOWING THROUGH A FINE TO COARSE SANDY LAYER WHICH VARIES IN THICKNESS FROM SIX TO 33 FEET. THE SHALLOW GROUND WATER APPEARS TO FLOW IN A NORTHEASTERLY DIRECTION. THE GREY TO BLUE-GREY CLAY LOCATED UNDER THE UPPER SAND LAYER IS VERY TOUGH AND DRY (OBSERVED FROM SAMPLES), INDICATING THAT THE CLAY IS A VERY GOOD CONFINING LAYER SEPARATING THE SHALLOW AQUIFER FROM THE DEEPER AQUIFERS.

5.4 SUMMARY OF NATURE AND EXTENT OF CONTAMINATION

THIS SECTION PROVIDES A SUMMARY OF CONTAMINATION FOUND AT THE CAROLINA TRANSFORMER SITE BY MEDIA. THIS SECTIONS ALSO OUTLINES THE APPROXIMATE LOCATIONS OF THE CONTAMINATION FOUND. THE REMEDIAL INVESTIGATION REPORT (AUGUST 1990) GIVES A MORE DETAIL ACCOUNT OF CONTAMINATION FOUND AT THE SITE. (TABLE 5.4 LISTS THE CONTAMINANTS AND MEDIA OF CONCERN).

5.4.1 GROUNDWATER

THE RESULTS OF THE EPA FIELD INVESTIGATIONS AT THE CAROLINA TRANSFORMER SITE INDICATES THAT CONTAMINATION HAS OCCURRED WITHIN THE SHALLOW AQUIFER BENEATH THE SITE AND THAT THE CONTAMINATION IS CONTAINED WITHIN THE SITE BOUNDARIES. THE INVESTIGATION INCLUDED INSTALLATION AND SAMPLING 11 TEMPORARY ("SAND POINT") AND FIVE PERMANENT MONITORING WELLS IN THE SURFICIAL AQUIFER IN AND AROUND THE SITE. FIVE POTABLE WATER WELLS LOCATED TO THE NORTH AND EAST OF THE SITE WERE ALSO SAMPLED.

PCB 1260 WAS DETECTED IN GROUNDWATER SAMPLES THAT WERE OBTAINED FROM TEMPORARY WELLS LOCATED IN

THE CENTER AND SOUTH WESTERN SECTIONS OF THE SITE. PCB CONCENTRATIONS DETECTED WERE 52 UG/L AND 25 UG/L. PCBS WERE NOT DETECTED AROUND THE PERIMETER OF THE SITE OR LN THE POTABLE WATER WELLS.

PURGEABLE ORGANIC COMPOUNDS WERE DETECTED AT LOW CONCENTRATIONS (10 UG/L) IN SAMPLES OBTAINED FROM TEMPORARY WELLS LOCATED IN THE CENTER, SOUTHWESTERN, AND NORTHEASTERN SECTIONS OF THE SITE. DETECTED WERE BENZENE, CHLOROBENZENE, CARBON DISULFIDE, METHYL ETHYL KETONE AND TOLUENE. AGAIN, PURGEABLE ORGANIC COMPOUNDS WERE NOT DETECTED BEYOND THE PERIMETER OF THE SITE. THE GROUNDWATER SAMPLE FROM MONITORING WELL MW-04 CONTAINED 10.0J UG/L 1,1,1-TRICHLOROETHANE AND OTHER CHLORINATED SOLVENTS AT CONCENTRATIONS OF 2, 4J TO 42 UG/L. (THE NUMERICAL VALUE OF ACCOMPANIED BY A "J" INDICATES THE QUANTITATIVE VALUE OF THE COMPOUND IS AN ESTIMATE.) BIS(2-ETHYLHEXYL)PHTHALATE WAS DETECTED AT RELATIVELY HIGH CONCENTRATIONS 920J UG/L) IN A SAMPLE FROM A WELL LOCATED IN THE CENTER OF THE SITE. THIS EXTRACTABLE ORGANIC COMPOUND WAS ALSO DETECTED AT LOW LEVELS IN A WELL LOCATED IN THE NORTHEASTERN SECTION OF THE SITE. THE DOWN GRADIENT MONITORING WELL INDICATED HIGHER EXTRACTABLE ORGANIC CONTENT THAN THE UPGRADIENT WELL BUT THE TOTAL VALUE OF EXTRACTABLES WAS LESS THAN 26J UG/L. THE SOURCES OF THESE EXTRACTABLES WERE PROBABLY INDUSTRIAL CHEMICALS USED DURING THE ACTIVE PHASE OF THE SITE. WITH THE CESSATION OF OPERATIONS AND THE REMOVAL OF ACCUMULATED PETROLEUM PRODUCTS FROM THE SITE, EXTRACTABLE ORGANIC SOURCES ARE EXTREMELY LIMITED. PHENOL WAS DETECTED IN LOW CONCENTRATIONS (3.7J UG/L) IN A TEMPORARY WELL ON THE NORTH WESTERN PERIMETER OF THE SITE. THIS WAS THE ONLY COMPOUND DETECTED AT ELEVATED CONCENTRATIONS IN THE GROUNDWATER BEYOND THE PERIMETER OF THE SITE.

HIGH CONCENTRATIONS OF BARIUM, CHROMIUM, COPPER AND NICKEL HERE DETECTED IN THE GROUNDWATER FROM WELLS IN THE CENTER OF THE SITE. PESTICIDES WERE NOT DETECTED IN GROUNDWATER FROM ANY OF THE WELLS SAMPLED.

THE DATA FOR LEAD LEVELS IN THE SHALLOW AQUIFER WERE INSUFFICIENT TO DETERMINE THE SOURCE OF LEAD OR WHETHER THE LEVEL IS ELEVATED OVER BACKGROUND. THE RESULTS FROM THE 11 TEMPORARY WELLS INDICATED LEAD LEVELS WERE BELOW DETECTION LIMITS. THE RESULTS FROM THE FIVE PERMANENT MONITORING WELLS INDICATED LEAD LEVEL RANGING FROM 18 UG/L TO 190 UG/L. THIS LATTER SET OF DATA INDICATED APPROXIMATELY EQUAL LEAD LEVELS IN UPGRADIENT AND DOWNGRADIENT WELLS. BASED ON THIS BODY OF DATA, IT IS UNCERTAIN WHETHER LEAD LEVELS IN GROUNDWATER ARE ASSOCIATED WITH CURRENT OR PREVIOUS CONDITIONS AT THE SITE.

5.4.2 SURFACE WATER

THE INVESTIGATION CONDUCTED BY EPA HAS ALSO REVEALED PCB CONTAMINATION IN THE SURFACE WATER CONTAINED IN THE DRAINAGE DITCH WHICH RUNS THROUGH THE SITE AND INTO A WOODED AREA SOUTHWEST OF THE SITE. PCB WAS ALSO FOUND TO BE PRESENT IN THE SURFACE WATER CONTAINED IN,THE LOW-LYING MARSH LOCATED TO THE NORTH AND WEST OF THE SITE. PCB 1260 CONTAMINATION RANGE FROM 2.8 UG/L TO 12 UG/L. CONCENTRATIONS OF COPPER WERE ELEVATED IN THESE SAMPLES AND A SINGLE EXTRACTABLE ORGANIC COMPOUND, BIS(2-ETHYLHEXYL) PHTHALATE, WAS ALSO FOUND.

SAMPLES COLLECTED FROM LOCKS CREEK, UP- AND DOWN-GRADIENT CONTAINED NO DETECTABLE CONCENTRATIONS OF PCBS, PESTICIDES, EXTRACTABLE ORGANIC COMPOUNDS, OR VOLATILE ORGANIC COMPOUNDS. SAMPLES TAKEN CONTAINED SIMILAR METALS AT EQUIVALENT CONCENTRATIONS.

FOR EXTENDED PERIODS OF TIME THERE IS NO STANDING SURFACE WATER ON SITE OR IN THE INTERMITTENT STREAM. THIS MINIMIZES THE EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT FROM THIS MEDIA. CONSIDERING THAT SURFACE WATER CONTAMINATION IS THE RESULT OF CONTACT WITH CONTAMINATED SOILS, STRUCTURES, AND DEBRIS THE REMEDIATION OF THESE OTHER MEDIA WILL ELIMINATE THE NECESSITY FOR A SEPARATE REMEDIATION OF SURFACE WATERS.

5.4.3 SOIL/SEDIMENT

THE SITE INVESTIGATIONS CONDUCTED BY THE EPA HAVE DOCUMENTED THAT THE SOILS AND SEDIMENTS THROUGHOUT THE WESTERN AND SOUTHERN PORTIONS OF THE SITE CONTAIN MODERATE TO HIGH LEVELS OF PCB COMPOUNDS. IN FIGURE 5.4 THE EXTENT OF CONTAMINATION IS ILLUSTRATED GRAPHICALLY. SINCE ALL ELECTRICAL TRANSFORMERS, CONDENSERS, AND STORAGE TANKS HAVE EITHER BEEN REMOVED FROM THE SITE OR DRAINED, THE CURRENT AND PRIMARY SOURCE OF THIS CONTAMINATION IS THE ON-SITE SOIL. COMPOSITE SOIL/DEBRIS SAMPLES TAKEN FROM THE MAIN BUILDING, MAINTENANCE BUILDING, AND BURN BUILDING HAVE BEEN DETERMINED TO CONTAIN PCB COMPOUNDS AT LEVELS AS HIGH AS 2200 MILLIGRAMS PER KILOGRAM (MG/KG). THEREFORE, RESIDUAL SOLIDS IN THESE BUILDINGS MUST ALSO BE CONSIDERED AS SOURCES OF PCBS. WIPE SAMPLES TAKEN FROM THE INTERIOR WALLS OF THE MAIN BUILDING AND BURN BUILDING DETECTED PCB AT CONCENTRATIONS RANGING FROM LT 1 UG/100 CM2 TO 5.6 UG/100 CM2. HOWEVER ALL SAMPLES TAKEN ARE WITHIN TOXIC SUBSTANCE CONTROL ACT (TSCA, PCB SPILL POLICY LIMITS.

LIMITED SAMPLING FOR DIOXINS/FURANS CONFIRMED THESE CONTAMINANTS TO BE PRESENT IN THE ON-SITE SOIL, OFF-SITE SOIL, SEDIMENTS, AND BUILDING SOIL/DEBRIS. THE HIGHEST SOIL LEVELS {470 TO 550 NANOGRAM PER KILOGRAM (NG/KG) TOXIC EQUIVALENT (TEQ)) WERE FOUND IN THE ON-SITE SOIL WEST OF THE MAIN BUILDING AND EAST OF THE RAISED FOUNDATION. CONCENTRATIONS AS HIGH AS 220J NG/KG TEQ WERE FOUND IN THE SEDIMENTS ALONG THE DRAINAGE DITCH WHICH RECEIVES RUNOFF FROM THIS AREA. HOWEVER, THE HIGHEST LEVELS MEASURED, UP TO 19,000J NG/KG TEQ, WERE FOUND IN SOIL/DEBRIS SAMPLES TAKEN FROM THE BUILDINGS ON SITE. PESTICIDES WERE FOUND IN ONLY OCCASIONAL SAMPLES AT MEASURABLE LEVELS. THESE MAY BE RESIDUALS FROM PEST CONTROL EFFORTS WHEN THE FACILITY WAS ACTIVE.

EXTRACTABLE ORGANIC COMPOUNDS WERE DETECTED IN A NUMBER OF ON-SITE AND OFF-SITE SOIL AND SEDIMENT SAMPLES, HOWEVER, FEW SPECIFIC COMPOUNDS WERE CONSISTENTLY DETECTED AROUND THE SITE.

AGAIN THE SOURCES OF THESE EXTRACTABLES WERE PROBABLY INDUSTRIAL CHEMICALS USED DURING THE ACTIVE PHASE OF THE SITE. WITH THE CESSATION OF OPERATIONS AND THE REMOVAL OF ACCUMULATED PETROLEUM PRODUCTS FROM THE SITE, EXTRACTABLE ORGANIC SOURCES ARE EXTREMELY LIMITED.

THE MOST FREQUENTLY DETECTED PURGEABLE ORGANIC COMPOUND AT THE SITE WAS TOLUENE. TOLUENE WAS DETECTED IN ON-SITE AND OFF-SITE SOIL SAMPLES GENERALLY AT LEVELS OF 5 TO 10 UG/KG. TOLUENE WAS ALSO DETECTED IN SEDIMENT SAMPLES AT LEVELS OF 1200J AND 2400 UG/KG AND IN A SOIL/DEBRIS SAMPLE AT A LEVEL OF 230 UG/KG. TOLUENE WAS PROBABLY USED AT THE ACTIVE FACILITY AS A SOLVENT WITH THE CONTAMINATION RESULTING FROM SPILLS OR WASTE DISPOSAL PRACTICES.

CHLOROBENZENE AND DICHLOROBENZENE WERE DETECTED IN ON-SITE AND OFF-SITE SOIL AND SEDIMENT SAMPLES. CONCENTRATIONS WERE GENERALLY LESS THAN 50 UG/KG BUT ONE SEDIMENT SAMPLE CONTAINED OVER 750J UG/KG OF DICHLOROBENZENE AND 48J UG/KG CHLOROBENZENE. THE HIGHER SOIL SAMPLE CONCENTRATIONS WERE FOUND OFF-SITE ALONG THE DRAINAGE DITCH WHICH CARRIES SURFACE RUNOFF FROM THE SOUTHERN PORTION OF THE SITE. THE SOURCES OF CHLOROBENZENE AND DICHLOROBENZENE WERE PROBABLE SPILLS OF TRANSFORMER OIL WHICH OCCURRED DURING THE ACTIVE PHASE OF THE FACILITY SINCE CHLOROBENZENE COMPOUNDS ARE FREQUENTLY USED AS PCB CARRIERS IN TRANSFORMER OIL.

THE SOLVENT TRICHLOROETHYLENE AND TETRACHLOROETHYLENE WERE FOUND IN A FEW ON-SITE SOIL SAMPLES AT 1J TO 4J UG/KG AND IN A FEW OFF-SITE SOIL SAMPLES AT 5.2 UG/KG TO 18J UG/KG. THESE CONTAMINANTS PROBABLY RESULTED FROM OPERATION OF THE SITE SINCE THEY ARE NOT PRESENT IN THE SURROUNDING UPGRADIENT WELLS.

CONCENTRATIONS OF INORGANICS, WITH THE EXCEPTIONS OF COPPER, WERE GENERALLY CONSISTENT WITH BACKGROUND VALUES. THE BACKGROUND LEVEL OF COPPER IN THE SOIL TYPICALLY RANGED FROM LESS THAN 1 MG/KG TO SLIGHTLY ABOVE 3 MG/KG. THE LEVELS OF COPPER FOUND IN ON-SITE SOIL WERE AS HIGH AS 2800 MG/KG NEAR THE BURN BUILDING. THE COPPER LEVEL IN THE SOIL/DEBRIS SAMPLE FROM THIS BUILDING WAS 130,000J MG/KG. THE BURNING OF WIRE AND ELECTRICAL EQUIPMENT MAY HAVE SPREAD COPPER. HIGH LEVELS OF COPPER CONTAINING PARTICULATES COVER MUCH OF THE SIDE. HIGH LEVELS OF COPPER WERE FOUND IN THE SOIL/DEBRIS SAMPLES TAKEN IN ALL OF THE ON-SITE BUILDINGS. OTHER

INORGANICS SUCH AS MERCURY AND ARSENIC WERE DETECTED AT ELEVATED LEVELS IN A FEW SOIL AND SEDIMENT SAMPLES.

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6.0 SUMMARY OF SITE RISKS

6.1 CONTAMINANTS OF CONCERN

A BASELINE RISK ASSESSMENT WAS PERFORMED TO EVALUATE THE POTENTIAL RISKS TO HUMAN HEALTH AND THE ENVIRONMENT FROM EXPOSURE TO THE SITE CONTAMINANTS OF CONCERN. THE CONTAMINATED MEDIA OF CONCERN ARE: ONSITE AND OFFSITE SOILS, SEDIMENTS, GROUNDWATER AND SURFACE WATER. ONSITE BUILDING DEBRIS AND SOLID WASTE IS ALSO A MEDIA OF CONCERN. TABLE 6-1 PROVIDES THE SITE CONTAMINANTS OF CONCERN ALONG WITH THE EXPOSURE POINT CONCENTRATIONS. THIS CONCENTRATION REPRESENTS THE UPPER 95 PERCENT CONFIDENCE LIMIT OF THE ARITHMETIC MEAN.

6.2 EXPOSURE ASSESSMENT

THE FOLLOWING POTENTIAL EXPOSURE SCENARIOS WERE EVALUATED IN THE RISK ASSESSMENT:

- CURRENT EXPOSURE OF ONSITE TRESPASSERS TO CONTAMINANTS IN SOIL THROUGH INCIDENTAL INGESTION AND DERMAL CONTACT, AND IN SURFACE WATER AND SEDIMENT THROUGH DERMAL CONTACT.

- CURRENT EXPOSURE OF OFFSITE RESIDENTS TO CONTAMINANTS IN SOIL THROUGH INCIDENTAL INGESTION AND DERMAL CONTACT, AND IN SURFACE WATER AND SEDIMENT THROUGH DERMAL CONTACT. EXPOSURE THROUGH INGESTION OF GARDEN PRODUCE GROWN IN CONTAMINATED SOIL WAS ALSO EVALUATED.

- FUTURE EXPOSURE OF ONSITE RESIDENTS TO CONTAMINANTS IN GROUNDWATER THROUGH INGESTION, DIRECT CONTACT, AND INHALATION; AND TO CONTAMINANTS IN SOIL THROUGH INCIDENTAL INGESTION AND DERMAL CONTACT.

- FUTURE EXPOSURE OF ONSITE RESIDENTS TO CONTAMINANTS IN GARDEN PRODUCE THROUGH INGESTION OF PRODUCE GROWN IN CONTAMINATED SOIL.

IN ADDITION TO THE ABOVE SCENARIOS, THREE ADDITIONAL ASSESSMENTS WERE CONDUCTED TO ASSESS HIGHLY CONTAMINATED AREAS.

- CURRENT EXPOSURE OF OFFSITE RESIDENTS TO AN OFFSITE AREA WITH HIGH LEVELS OF CONTAMINATED SOIL ON EITHER SIDE OF THE DRAINAGE WAY IMMEDIATELY SOUTH OF THE SITE.

- CURRENT EXPOSURE OF ONSITE TRESPASSERS TO HIGHLY CONTAMINATED DEBRIS IN ONE OF THE SITE BUILDINGS.

- FUTURE EXPOSURE BY ONSITE RESIDENTS TO GROUNDWATER FROM ONSITE WELL NUMBER 44.

THE POTENTIALLY EXPOSED POPULATIONS FOR CURRENT SCENARIOS WERE CONSIDERED TO BE CURRENT OFFSITE RESIDENTS, BOTH CHILDREN AND ADULTS AND CURRENT TEENAGE TRESPASSERS. THE POTENTIAL FUTURE POPULATIONS THAT WERE EVALUATED WERE CHILDREN AND ADULT ONSITE RESIDENTS.

THE EXPOSURE FREQUENCY FOR THE RESIDENTIAL SCENARIOS WAS DAILY EXPOSURE OR 365 DAYS PER YEAR. THE TRESPASSER EXPOSURE FREQUENCY WAS ASSUMED TO BE ONE DAY PER WEEK OR 52 DAYS PER YEAR. THE EXPOSURE DURATION FOR THE ADULT AND CHILD RESIDENT WAS 30 AND 5 YEARS RESPECTIVELY. THE EXPOSURE DURATION FOR THE TRESPASSER WAS FOR 30 YEARS.

THE SOIL INGESTION RATE WAS ASSUMED TO BE 200 MG/DAY FOR CHILDREN SIX YEARS AND UNDER AND 100 MG/DAY FOR INDIVIDUALS OVER SIX YEARS. THE SKIN SURFACE AREA FOR DERMAL CONTACT WAS 8620 CM2, 7000 CM2 AND 3160 CM2 FOR ADULTS, TEENAGERS AND CHILDREN, RESPECTIVELY. THE GROUNDWATER CONSUMPTION RATE WAS 2 L/DAY FOR ADULTS AND 1.4 L/DAY FOR CHILDREN. THE INHALATION RATE WAS ASSUMED TO BE 0.6 M3/HR FOR ALL GROUPS. THE VEGETABLE CONSUMPTION RATE WAS ASSUMED TO BE 0.201 KG/DAY.

6.3 TOXICITY ASSESSMENT

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG-DAY)-1, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN MG/KG-DAY, TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISK CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CANCER POTENCY FACTORS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED. THE CPFS FOR THE SITE CONTAMINANTS OF CONCERN ARE CONTAINED IN TABLE 6-2.

REFERENCE DOSES (RFDS) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDS, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDS ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G., TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDS WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR. THE RFDS FOR THE SITE CONTAMINANTS OF CONCERN ARE CONTAINED IN TABLE 6-2.

IN ADDITION, THE DERMAL EXPOSURES AT THE SITE REQUIRE CPFS AND RFDS WHICH HAVE BEEN CONVERTED TO REFLECT ADSORBED DOSES RATHER THAN ADMINISTERED DOSES. THE TOXICITY VALUES WHICH HAVE BEEN EXTRAPOLATED TO REPRESENT ADSORBED DOSES ARE CONTAINED IN TABLE 6-3.

6.4 RISK CHARACTERIZATION

EXCESS LIFETIME CANCER RISKS ARE DETERMINED BY MULTIPLYING THE INTAKE LEVEL WITH THE CANCER POTENCY FACTOR. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION (E.G., 1 X (10-6) OR 1E-6). AN EXCESS LIFETIME CANCER RISK OF 1 X (10-6) INDICATES THAT, AS A PLAUSIBLE UPPER BOUND, AN INDIVIDUAL HAS A ONE IN A MILLION 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 AGENCY CONSIDERS INDIVIDUAL EXCESS CANCER RISK IN THE RANGE OF (10-4) TO (10-6) AS PROTECTIVE; HOWEVER THE (10-6) RISK LEVEL IS GENERALLY USED AS THE POINT OF DEPARTURE FOR SETTING CLEANUP LEVELS OF SUPERFUND SITES.

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (OR THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATION IN A GIVEN MEDIUM TO THE CONTAMINANT'S REFERENCE DOSE). BY ADDING THE HQS FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA.

THE CARCINOGENIC RISK LEVEL FOR ALL POPULATIONS EXCEEDS THE UPPER LEVEL (10-4) OF THE EPA ACCEPTABLE RISK RANGE. FOR CURRENT ONSITE TRESPASSERS, THE LIFETIME EXCESS CANCER RISK IS 8.6 X (10-4) PRIMARILY FROM CONTACT WITH PCBS IN SITE SOILS, SURFACE WATER AND SEDIMENTS. A HOT SPOT SCENARIO FOR TRESPASSER CONTACT WITH SITE DEBRIS PRODUCED AN UNACCEPTABLE RISK LEVEL OF 1.8 X (10-3), PRIMARILY FROM INGESTION AND DERMAL CONTACT WITH PCBS AND DIOXIN/FURANS. FOR CURRENT ADULT OFFSITE RESIDENTS, THE LIFETIME EXCESS CANCER RISK IS 1.6 X (10-2), WHILE CURRENT OFFSITE CHILD RESIDENTS HAVE A RISK OF 5.7 X (10-3), PRIMARILY FROM DERMAL CONTACT WITH PCBS IN SEDIMENT.

FOR HYPOTHETICAL FUTURE SCENARIOS THE CUMULATIVE LIFETIME EXCESS CANCER RISK IS 2.6 X (10-2) FOR ADULT ONSITE RESIDENTS AND 1.4 X (10-2) FOR CHILD ONSITE RESIDENTS. THE RISKS ARE PRIMARILY RELATED TO EXPOSURE TO PCBS IN GROUNDWATER, SURFACE SOIL, SEDIMENTS AND PRODUCE GROWN IN CONTAMINATED SOIL. THE RISKS ASSOCIATED WITH EXPOSURE TO GROUNDWATER FROM WELL NUMBER 44 ARE 2.3 X (10-2) FOR ADULTS AND 1.3 X (10-2) FOR CHILDREN. THESE RISK LEVELS REFLECT EXPOSURE VIA INGESTION AND DERMAL CONTACT WITH PCBS AND INHALATION OF BENZENE.

THE HIS FOR ALL CURRENT SCENARIOS ARE BELOW THE LEVEL OF CONCERN (1.0). THE HIS FOR ALL FUTURE SCENARIOS ARE ALL ABOVE 1.0. FUTURE ADULT AND CHILD ONSITE RESIDENTS HAVE HIS OF 60 AND 200 RESPECTIVELY. THE MAIN HI CONTRIBUTORS ARE METALS (BARIUM, CHROMIUM, NICKEL, VANADIUM, MANGANESE) AND BIS(2-ETHYLHEXYL)PHTHALATE. EXPOSURE TO GROUNDWATER FROM WELL NUMBER 44 RESULTS IN A NONCARCINOGENIC HI OF 200 FOR ADULTS AND 700 FOR CHILDREN, AGAIN DUE TO METALS AND A SIGNIFICANT CONTRIBUTION TO RISK FROM CHLOROBENZENE BEING INHALED IN THE SHOWERING SCENARIO.

LEAD WAS EVALUATED USING THE LEAD UPTAKE/BIOKINETIC (UBK) MODEL DEVELOPED BY EPA. THE MODEL PREDICTS THAT 68 PERCENT OF THE CHILDREN (AGE 0-7 YEARS) EXPOSED TO LEAD AT THE SITE EXPOSURE POINT CONCENTRATIONS WOULD HAVE BLOOD LEAD LEVELS ABOVE THE EPA BENCHMARK LEVEL OF 10 UG PB/DL. THE MAJOR CONTRIBUTOR TO THIS PREDICTED PERCENTAGE IS THE GROUNDWATER LEAD EXPOSURE POINT CONCENTRATION OF 170 UG/L. THIS CONCENTRATION ALSO EXCEEDS THE EPA ACTION LEVEL OF 15 UG/L. THERE IS SOME DISCREPANCY CONCERNING THE GROUNDWATER LEAD CONCENTRATIONS SINCE LEAD WAS NOT DETECTED IN ANY OF THE ONSITE PHASE 1 TEMPORARY WELLS BUT WAS DETECTED IN THE ONSITE PHASE 3 PERMANENT MONITOR WELLS.

UNCERTAINTIES ASSOCIATED WITH THE RISK CHARACTERIZATION INCLUDE DERIVATION OF EXPOSURE POINT CONCENTRATIONS, INTAKE UNCERTAINTIES AND THE TOXICITY VALUES WHICH WERE USED TO EVALUATE THE RISK. ANOTHER IMPORTANT UNCERTAINTY STEMS FROM THE FACT THAT THE RISK CALCULATIONS FOR DERMAL EXPOSURE ASSUME A DIRECT AND CONSISTENT RELATIONSHIP BETWEEN THE ORAL TOXICITY VALUES AND THE EXTRAPOLATED DERMAL VALUE. A FINAL UNCERTAINTY INVOLVES THE DISCREPANCY OF THE ONSITE GROUNDWATER DATA FOR LEAD BETWEEN PHASES 1 AND 3 OF THE RI.

6.5 ENVIRONMENTAL RISKS

THE SITE HABITAT CONSISTS OF FOUR TYPES: WOODED AREA, WETLANDS, AGRICULTURAL AND GRASSY AREA. NO SPECIAL MANAGEMENT, PRESERVE AREAS OR PARKS ARE LOCATED AT THE SITE AND THREATENED OR ENDANGERED SPECIES HAVE NOT BEEN DOCUMENTED AT THE SITE. MANY AREAS ONSITE AND IN THE DRAINAGE DITCH ALONG THE NORTH BOUNDARY OF THE SITE EITHER LACK VEGETATION OR HAD LESS GROWTH THAN ADJACENT AREAS.

SURFACE WATER CONCENTRATIONS OF SEVERAL CHEMICALS (COPPER, ZINC, TOLUENE, PCB) WERE ABOVE AMBIENT WATER QUALITY CRITERIA. HOWEVER, THESE CHEMICALS WERE DETECTED IN SURFACE WATER SAMPLES FROM LOCATIONS WHICH DID NOT RETAIN WATER THROUGHOUT THE YEAR. FOR THIS REASON, THESE AREAS MAY NOT BE ABLE TO SUSTAIN AQUATIC ECOSYSTEMS.

SEVERAL CHEMICALS OF CONCERN (LEAD, BENZENE, CHLOROBENZENE, PCBS) IN SOIL, SEDIMENT AND SURFACE WATER AT THE SITE HAVE THE POTENTIAL FOR TOXIC EFFECTS AND BIOACCUMULATION WHICH MAY CAUSE

ADVERSE EFFECTS TO SOME SPECIES VIA THE FOOD CHAIN. THIS IS A MAJOR CONCERN FOR PCBS WHICH MAY HAVE ADVERSE EFFECTS ON AQUATIC SPECIES, TERRESTRIAL ANIMALS, BIRDS, PLANTS, AMPHIBIANS AND REPTILES WHICH FREQUENT THE SITE.

#DA

7.0 DESCRIPTION OF ALTERNATIVES

THIS SECTION OUTLINES THE ALTERNATIVES THAT WERE CONSIDERED TO REMEDIATE THE FOLLOWING MEDIA: GROUNDWATER, SOIL/SEDIMENT, STRUCTURES, AND DEBRIS/SOLID WASTE. THE ALTERNATIVES ARE PRESENTED AND ORGANIZED BY MEDIA AND ARE DESCRIBED SEPARATELY, HOWEVER THE FINAL REMEDY WILL BE A COMBINATION OF THE ALTERNATIVES LISTED. THE ALTERNATIVES DESCRIBED IN THIS SECTION ARE LISTED BELOW:

GROUNDWATER ALTERNATIVE

G-1 NO ACTION
G2 DEED RESTRICTION
G-3 METALS REMOVAL/AIR STRIPPING/
ADSORPTION/DISCHARGE
G-4 METALS REMOVAL
ADSORPTION/DISCHARGE
G-5 ADSORPTION/DISCHARGE
G-6 METALS REMOVAL/UV
OXIDATION/DISCHARGE

SOIL/SEDIMENT ALTERNATIVES

S/S-1 NO ACTION
S/S-2 FENCE/DEED
RESTRICTION

S/S-3 EXCAVATION FOR OFF SITE LANDFILL
S/S-4 EXCAVATION FOR ONSITE INCINERATION
S/S-5 EXCAVATION FOR ONSITE CHEMICAL
DECHLORINATION
S/S-6 EXCAVATION FOR ONSITE SOLVENT EXTRACTION

STRUCTURES ALTERNATIVES

S-1 NO ACTION
S-2 FENCING
S-3 PARTIAL DEMOLITION
S-4 COMPLETE DEMOLITION

SOIL/SEDIMENT ALTERNATIVES

S/S-1 NO ACTION
S/S-2 FENCE/DEED
RESTRICTION
S/S-3 EXCAVATION FOR OFFSITE LANDFILL
S/S-4 EXCAVATION FOR ONSITE INCINERATION
S/S-5 EXCAVATION FOR ONSITE CHEMICAL DECHLORINATION
S/S-6 EXCAVATION FOR ONSITE SOLVENT EXTRACTION

DEBRIS/SOLID WASTES ALTERNATIVES

D-1 NO ACTION
D-2 FENCING
D-3 OFF SITE DISPOSAL

7.1 GROUNDWATER

ALTERNATIVE G-1: NO ACTION

THE "NO ACTION" ALTERNATIVE WOULD NOT INVOLVE ANY REMEDIAL ACTION, AND THE SITE WOULD BE LEFT IN ITS PRESENT CONDITION. FUNDS WOULD NOT BE EXPENDED FOR MONITORING, CONTROL, OR CLEANUP OF THE CONTAMINATION STRUCTURES. THIS ALTERNATIVE, WHICH IS REQUIRED BY THE NCP AND SARA, IS A BASELINE TO WHICH THE EFFECTIVENESS OF OTHER ALTERNATIVES IS COMPARED.

ALTERNATIVE G-2: DEED RESTRICTIONS

THIS ALTERNATIVE WOULD CONSIST OF PLACING RESTRICTIONS ON THE DEEDS OF THE SITE AND ADJACENT PROPERTIES WHICH WOULD PROHIBIT THE USE OF WATER FROM THE SHALLOW AQUIFER AND THE CONSTRUCTION OF ANY NEW WELLS INTO THE SHALLOW AQUIFER. MONITORING OF THE EXISTING GROUNDWATER WELLS SHOULD BE CONTINUED ON A QUARTERLY BASIS. THE SOLE EFFECT OF THIS ALTERNATIVE IS TO ELIMINATE ALL DIRECT CONTACT WITH GROUNDWATER FROM THE SHALLOW AQUIFER. THE PROHIBITION AGAINST ALL USE OF GROUNDWATER FROM THIS WOULD BE IMPLEMENTED TO ELIMINATE EXPOSURE TO FISH, WATER FOWL, AND OTHER ENVIRONMENTAL POPULATIONS. ACCEPTANCE OF DEED RESTRICTIONS BY OFFSITE PROPERTY OWNERS WOULD BE VOLUNTARY. STATE AND LOCAL GOVERNMENTAL AGENCIES WOULD BE RESPONSIBLE FOR ENFORCEMENT OF ANY DEED RESTRICTIONS.

ALTERNATIVE G-3: METALS REMOVAL/AIR STRIPPING/ADSORPTION

THIS ALTERNATIVE INVOLVES GROUNDWATER EXTRACTION USING WELLS FOLLOWED BY TREATMENT TO REMOVE BOTH METAL CONTAMINANTS AND ORGANIC CONTAMINANTS. THIS ALTERNATIVE WOULD CONSIST OF A GROUNDWATER EXTRACTION SYSTEM AND THREE TREATMENT COMPONENTS. THE GROUNDWATER EXTRACTION SYSTEM INCLUDED FOR THIS ALTERNATIVE IS COMMON FOR ALL ALTERNATIVES THAT WITHDRAW GROUNDWATER FOR TREATMENT.

THE GROUNDWATER EXTRACTION TECHNIQUE CHOSEN FOR DETAILED EVALUATION IS THE MULTIPLE WELL POINT SYSTEM. THIS SYSTEM WOULD CONSIST OF APPROXIMATELY 23 TO 25 WELL POINTS LOCATED IN A LINE ALONG THE WESTERN AND NORTHERN SITE BOUNDARIES. THE RI INDICATED THE HYDRAULIC GRADIENT OF THE SURFICIAL AQUIFER SLOPES TO THE NORTHWEST. A LINE OF EXTRACTION WELL POINTS ON THESE BOUNDARIES WOULD INTERCEPT GROUNDWATER MIGRATING FROM THE SITE.

THE WELL POINTS WOULD BE CONSTRUCTED OF 2-INCH PVC CASINGS WHICH WOULD BE SCREENED ONLY IN THEIR LOWER ONE TO TWO FEET. THE WELL POINTS WOULD BE INSTALLED TO THE TOP OF THE CLAY LAYER WHICH UNDERLIES THE SITE AT AN ASSUMED AVERAGE DEPTH OF 9.5 FEET BELOW GRADE.

THE INDIVIDUAL WELLS WOULD BE CONNECTED BY INSULATED PVC HEADERS INSTALLED ABOVE GROUND ON BLOCKS. A REGULATION VALVE MUST BE INSTALLED ON EACH WELL'S CONNECTION TO THE HEADER TO CONTROL FLOW FROM THE WELL. THIS PREVENTS SOME WELLS FROM EXPERIENCING EXCESSIVE DRAWDOWN OF THE GROUNDWATER LEVEL COMPARED TO OTHER WELLS ON THE HEADER. A MINIMUM OF TWO HEADERS WOULD BE USED; ONE SERVING THE WELL POINTS ALONG THE NORTHERN SITE BOUNDARY, THE OTHER SERVING WELL POINTS ALONG THE WESTERN BOUNDARY. MORE THAN ONE HEADER MIGHT BE USED ALONG EACH BOUNDARY IF REQUIRED BY THE HYDRAULICS OF THE SYSTEM.

THE HEADERS WOULD BE CONNECTED TO A SINGLE, ABOVE-GRADE PUMP WHICH WOULD PUMP THE GROUNDWATER TO THE TREATMENT COMPONENTS.

THE FIRST TREATMENT COMPONENT WOULD CONSIST OF A SKID MOUNTED, PACKAGED, ELECTROCHEMICAL METAL REMOVAL SYSTEM. THIS SYSTEM WOULD CONSIST OF A REACTION TANK, CLARIFIER, SLUDGE THICKENING AND DEWATERING EQUIPMENT, MULTI-MEDIA FILTER, CHEMICAL STORAGE AND FEED EQUIPMENT, AND CONTROLS. THE FILTER WOULD ENSURE THAT PRECIPITANT FINES DO NOT LEAVE THIS PROCESS. THE SLUDGE, WHICH CONTAINS THE METAL IONS REMOVED FROM THE GROUNDWATER, WOULD BE DEWATERED BY A IS CU.FT. CAPACITY FILTER PRESS. THE FILLER BACKWASH AND RECOVERED WATER WOULD BE RETURNED TO THE HEAD OF THE PRECIPITATION SYSTEM. THE DEWATERED SLUDGE,. ESTIMATED TO BE 30 PERCENT SOLIDS, WOULD BE DISPOSED OF IN AN OFFSITE RCRA LANDFILL.

FOLLOWING THE METALS REMOVAL SYSTEM, THE GROUNDWATER WOULD ENTER A PACKED-BED AIR STRIPPING UNIT. VOLATILE ORGANICS (E.G., BENZENE, CHLOROBENZENE, TOLUENE, AND CARBON DISULFIDE) WOULD BE STRIPPED FROM THE AQUEOUS STREAM AND CAPTURED IN ACTIVATED CARBON FILTERS ON THE VENT. WHEN THE ACTIVATED CARBON IS SPENT, IT IS REPLACED WITH FRESH SORBANT AND THE SPENT MATERIAL IS SENT TO AN OFFSITE RECOVERY FACILITY. THE ORGANICS ARE ULTIMATELY INCINERATED DURING SORBANT RECOVERY.

THE FINAL COMPONENT IS AN ACTIVATED CARBON ABSORPTION SYSTEM TO REMOVE NON-VOLATILE AND SEMI-VOLATILE ORGANICS INCLUDING DICHLOROBENZENE, 1,2,4-TRICHLOROBENZENE, AND BIS(2-ETHYLHEXYL)PHTHALATE. WHEN THE ACTIVATED CARBON IS SPENT, IT IS REPLACED AND THE SPENT MATERIAL IS SENT OFFSITE FOR RECOVERY OR DISPOSAL. IF THE ACTIVATED CARBON IS RECOVERED, THE ORGANICS ARE ULTIMATELY INCINERATED. IF THE CARBON IS NOT RECOVERED, THE ORGANICS ARE ULTIMATELY DISPOSED OF IN A LANDFILL ALONG WITH THE CARBON.

TWO DISCHARGE OPTIONS HAVE BEEN DEVELOPED FOR THIS ALTERNATIVE, VARYING ON THE DISCHARGE POINT FOR THE TREATED GROUNDWATER. ALTERNATIVE G-3A IS BASED ON DISCHARGE TO THE UNNAMED TRIBUTARY TO THE CAPE FEAR RIVER. ALTERNATIVE G-3B IS BASED ON DISCHARGE TO THE POTW.

ALTERNATIVE G-4: METALS REMOVAL/ADSORPTION

THIS ALTERNATIVE IS THE SAME AS G-3 EXCEPT AIR STRIPPING IS NOT USED TO REMOVE VOLATILES. THE ACTIVATED CARBON USAGE RATE WILL BE HIGHER FOR THIS ALTERNATIVE. ALTERNATIVE G-4A IS BASED ON DISCHARGE TO SURFACE WATERS; ALTERNATIVE G-4B ON DISCHARGE TO THE POTW.

ALTERNATIVE G-5: ADSORPTION

THIS ALTERNATIVE (FIGURE 4-5) INVOLVES GROUNDWATER EXTRACTION USING THE WELL POINT SYSTEM FOLLOWED BY TREATMENT TO REMOVE ORGANIC CONTAMINANTS. SOME METAL CONCENTRATIONS WOULD BE REDUCED BY ACTIVATED CARBON ADSORPTION. TREATED WATER WOULD BE DISCHARGED TO THE CAPE FEAR RIVER TRIBUTARY. ONLY SPENT CARBON IS GENERATED FOR DISPOSAL OFFSITE.

DISCHARGE TO THE POTW WAS NOT CONSIDERED IN CONJUNCTION WITH THIS ALTERNATIVE FOR TWO PRINCIPAL REASONS. FIRST, THE FAYETTEVILLE POTW IS A BIOLOGICAL TREATMENT FACILITY AND WOULD NOT PROVIDE SIGNIFICANT REMOVAL OF INORGANICS FROM THE WASTESTREAM. SECONDLY, THE CITY OF FAYETTEVILLE IS ENGAGED IN AN EXTENSIVE LANDFARM PROGRAM FOR DISPOSAL OF THE POTW SLUDGES. FOR THIS REASON, THE CITY HAS STATED IT COULD NOT ACCEPT THE DISCHARGE FROM THE CAROLINA TRANSFORMER GROUNDWATER REMEDIATION SYSTEM UNLESS METAL REMOVAL WAS PROVIDED.

ALTERNATIVE G-6: METALS REMOVAL/UV OXIDATION

ALTERNATIVE IS SIMILAR TO G-4 EXCEPT UV OXIDATION INSTEAD OF ACTIVATED CARBON ADSORPTION IS USED TO REMOVE ORGANIC CONTAMINANTS. METAL SLUDGE REQUIRES DISPOSAL OFFSITE. ALTERNATIVES G-6A AND G-6B ARE BASED ON THE SAME DISCHARGE OPTIONS AS DEVELOPED FOR ALTERNATIVES G-3 AND G-4

ALTERNATIVE G-7: OXIDATION

THIS ALTERNATIVE IS SIMILAR TO G-5 EXCEPT UV OXIDATION IS USED TO REMOVE ORGANICS. NO RESIDUAL WASTE REQUIRES DISPOSAL OFFSITE.

AS IN ALTERNATIVE G-5, THE ONLY DISCHARGE CONSIDERED IS TO THE TRIBUTARY OF THE CAPE FEAR RIVER. THE REASONS FOR THIS DECISION WERE PRESENTED IN SECTION 4.2.1.5.

7.2 SOIL/SEDIMENT

ALTERNATIVE S/S-1: NO ACTION

THE "NO ACTION" ALTERNATIVE WOULD NOT INVOLVE ANY REMEDIAL ACTION, AND THE SITE WOULD BE LEFT IN ITS PRESENT CONDITION. FUNDS WOULD NOT BE EXPENDED FOR MONITORING, CONTROL, OR CLEANUP OF THE CONTAMINATED SOIL/SEDIMENT. THIS ALTERNATIVE, WHICH IS REQUIRED BY THE NCP AND SARA, IS A BASELINE TO WHICH THE EFFECTIVENESS OF OTHER ALTERNATIVES IS COMPARED.

ALTERNATIVE S/S-2: FENCE/DEED RESTRICTIONS

THIS ALTERNATIVE WOULD INVOLVE THE CONSTRUCTION OF A CHAIN-LINK FENCE, APPROXIMATELY 6 FEET HIGH TO SURROUND THE CONTAMINATED AREAS ON SITE THAT ARE NOT CURRENTLY FENCED. THE SITE IS CURRENTLY PARTIALLY FENCED. APPROXIMATELY 1,100 FEET OF ADDITIONAL FENCING WOULD BE REQUIRED TO COMPLETELY SURROUND THE SITE. WARNING SIGNS WOULD BE DISPLAYED ON THE FENCES TO ALERT THE PUBLIC OF POTENTIAL HAZARDS. THE FENCE WOULD BE EFFECTIVE IN RESTRICTING ACCESS AND PREVENTING EXPOSURE TO THE CONTAMINATED SOIL/SEDIMENT ON SITE. THE FENCE AND DEED RESTRICTIONS WOULD NOT BE EFFECTIVE AT RESTRICTING ACCESS OR PREVENTING EXPOSURE TO OFFSITE SOIL/SEDIMENT SUCH AS THAT PRESENT IN THE OFFSITE PORTION OF THE WATERSHED. IT WOULD NOT REDUCE THE VOLUME OF CONTAMINATED SOIL/SEDIMENT ON SITE.

FUTURE USES OF THE PROPERTY WOULD ALSO BE RESTRICTED BY THE APPLICATION OF DEED RESTRICTIONS. STATE AND LOCAL AGENCIES WOULD BE RESPONSIBLE FOR THE IMPLEMENTATION AND ENFORCEMENT OF SUCH RESTRICTIONS.

THIS ALTERNATIVE, THOUGH LACKING IN EFFECTIVENESS, SERVES AS A MINIMAL ACTION ALTERNATIVE FOR COMPARISON AGAINST OTHER ALTERNATIVES.

ALTERNATIVE S/S-3: EXCAVATION FOR OFFSITE LANDFILL

THIS ALTERNATIVE INVOLVES THE EXCAVATION OF CONTAMINATED SOIL FOR DISPOSAL IN AN OFFSITE LANDFILL. SOIL WITH A PCB CONCENTRATION OF LESS THAN 50 PPM (MG/KG) COULD BE DISPOSED OF IN A RCRA LANDFILL SUCH AS THE ONE LOCATED AT PINEWOOD, SOUTH CAROLINA. SOIL WITH A PCB CONCENTRATION GREATER THAN 50 PPM MUST BE DISPOSED OF IN A TSCA LANDFILL SUCH AS THE ONE LOCATED AT EMELLE, ALABAMA. WHERE NECESSARY, NATIVE SOIL WILL BE USED TO RETURN THE SURFACE CONTOURS TO APPROXIMATELY THE EXISTING ELEVATIONS TO ENSURE ADEQUATE SITE DRAINAGE. NO BACKFILL WOULD BE PLACED IN DRAINAGE WAYS IF ADEQUATE DRAINAGE COULD BE MAINTAINED WITHOUT IT. ALL FILL SOIL AND DISTURBED AREAS WOULD BE REVEGETATED WITH NATIVE GRASSES TO CONTROL SOIL EROSION. BECAUSE THE SOIL WOULD DE REMEDIATED TO THE EXTENT THAT ONSITE ACTIVITIES WOULD POSE NO HEALTH RISK, ADDITIONAL FENCING WOULD NOT BE REQUIRED.

TWO OPTIONS HAVE BEEN DEVELOPED FOR THIS ALTERNATIVE, VARYING ON THE PCB CONCENTRATION USED TO DETERMINE THE EXTENT OF EXCAVATION.

ALTERNATIVE S/S-3A INVOLVES THE EXCAVATION OF ALL ONSITE AND OFFSITE SOIL/SEDIMENT WITH A PCB CONCENTRATION OF GREATER THAN 1 PPM. IT IS ESTIMATED THAT ALTERNATIVE S/S-3A WOULD REQUIRE

EXCAVATION OF 15,345 CUBIC YARDS (CY) OF CONTAMINATED SOIL/SEDIMENT WITH A PCB CONTENT OF GREATER THAN 1 PPM. OF THIS TOTAL APPROXIMATELY ONE-HALF (7630 CY) HAVE A PCB CONTENT OF LESS THAN 50 PPM AND COULD BE DISPOSED OF IN A RCRA LANDFILL. THE REMAINDER (7715 CY) HAVE A PCS CONTENT OF 50 PPM OR GREATER AND MUST BE TRANSPORTED TO A TSCA CERTIFIED LANDFILL. RETURNING THE NON-DRAINAGE WAY AREAS TO THE EXISTING ELEVATIONS WOULD REQUIRE 5780 CY OF FILL MATERIAL.

ALTERNATIVE S/S-3B IS SIMILAR TO THE FIRST ALTERNATIVE WITH THE EXCEPTION THAT ONSITE EXCAVATION WOULD BE LIMITED TO SOIL/SEDIMENT WITH A PCB CONCENTRATION GREATER THAN 10 PPM. ALL ONSITE SOIL/SEDIMENT WITH A PCB CONCENTRATION OF GREATER THAN 1 PPM (INCLUDING THE UNEXCAVATED AREAS) WOULD BE COVERED WITH A MINIMUM OF 10 INCHES OF CLEAN SOIL. MORE COVER MATERIAL MAY BE REQUIRED FOR SOME AREAS TO MAINTAIN ADEQUATE SITE DRAINAGE. OFFSITE CONTAMINATED SOIL/SEDIMENT OCCURS PRIMARILY IN THE STORM WATER DRAINAGE WAYS WHERE IT WOULD BE DIFFICULT TO ENSURE THE MAINTENANCE OF 10 INCHES OF COVER OVER SOIL/SEDIMENT EXCEEDING 1 PPM. THEREFORE, OFFSITE SOIL/SEDIMENT WOULD BE REMEDIATED TO A LEVEL OF 1 PPM AS IN ALTERNATIVE S/S-3A. THIS ALTERNATIVE WOULD REQUIRE APPROXIMATELY 1575 CY LESS EXCAVATION THAN ALTERNATIVE S/S-3A. APPROXIMATELY 6055 CY WOULD BE TRANSPORTED TO A RCRA LANDFILL AND 7715 CY WOULD BE TRANSPORTED TO A TSCA LANDFILL.

ALTERNATIVE S/S-4: EXCAVATION FOR ONSITE INCINERATION. THIS ALTERNATIVE INVOLVES THE EXCAVATION OF CONTAMINATED SOIL/SEDIMENT FOLLOWED BY ONSITE INCINERATION AND REDEPOSITION IN THE ORIGINAL LOCATIONS. THE ONSITE INCINERATOR WOULD BE A MOBILE TYPE CAPABLE OF ACHIEVING 99.9999 PERCENT PCB DESTRUCTION. AT THIS LEVEL OF DESTRUCTION IT MAY BE POSSIBLE TO RETURN THE TREATED SOIL/SEDIMENT TO ITS ORIGINAL LOCATION. HOWEVER, WHILE INCINERATION WILL RESULT IN A HIGH DEGREE OF ORGANIC DESTRUCTION, DISPOSAL OF INCINERATION RESIDUALS IN A SECURE LANDFILL MAY BE NECESSARY BECAUSE OF THE ELEVATED CONCENTRATION OF COPPER AND LEAD IN THE ONSITE AND OFFSITE SOIL/SEDIMENTS. A PILOT TEST ,F THE INCINERATOR AND ADDITIONAL SOIL TESTING TO DETERMINE THE EXTENT OF ONSITE COPPER AND 'LEAD CONTAMINATION WOULD BE REQUIRED TO DETERMINE WHETHER THE TREATED SOIL/SEDIMENT COULD DE RETURNED TO ITS ORIGINAL LOCATION OR WOULD REQUIRE DISPOSAL IN A LANDFILL MEETING RCRA STANDARDS OR NONHAZARDOUS DESIGN -STANDARDS. FOR PURPOSES OF THIS PS, IT IS ASSUMED THAT THE TREATED SOIL/SEDIMENT WOULD BE NON-HAZARDOUS AND COULD DE DISPOSED OF BY RETURNING THE SOIL TO ITS ORIGINAL LOCATION.

THE SAME TWO OPTIONS DEVELOPED FOR ALTERNATIVE S/S-3 WILL BE CONSIDERED FOR THE ONSITE INCINERATION ALTERNATIVE. ALTERNATIVE S/S-4A WOULD EXCAVATE AND INCINERATE ALL ONSITE AND OFFSITE SOIL/SEDIMENT WHICH HAS A PCB CONTENT OF GREATER THAN 1 PPM. THE TREATED SOIL/SEDIMENT WOULD THEN BE RETURNED TO ITS ORIGINAL LOCATION. THE TREATED AREAS WOULD BE GRADED, COMPACTED AND SEEDED TO CONTROL EROSION. NO ADDITIONAL ACCESS CONTROLS WOULD BE REQUIRED EITHER ON SITE OR OFF SITE.

ALTERNATIVE S/S-4B WOULD EXCAVATE AND TREAT THE SAME VOLUME OF OFFSITE SOIL/SEDIMENT BUT WOULD EXCAVATE ONLY THE PORTION OF ONSITE SOIL/SEDIMENT WHICH EXCEEDS 10 PPM. THE TREATED SOIL/SEDIMENT WOULD BE RETURNED TO ITS ORIGINAL LOCATION. ONSITE SOIL/SEDIMENT WITH A PCB CONTENT BETWEEN 1 PPM AND 10 PPM WOULD BE COVERED WITH 10 INCHES OF CLEAN SOIL. THIS SOIL COULD BE EITHER TREATED SOIL/SEDIMENT FROM THE INCINERATION UNIT OR SOIL FROM AN OFFSITE SOURCE. ALTERNATIVE S/S-4A WOULD REQUIRE 15,345 CY OF EXCAVATION AND NO ADDITIONAL BACKFILL MATERIAL. ALTERNATIVE S/S-4B WOULD REQUIRE 13,770 CY OF EXCAVATION. IT IS ASSUMED THAT THE 5780 CY OF COVER MATERIAL REQUIRED WOULD BE SUPPLIED BY THE TREATED SOIL/SEDIMENT.

ALTERNATIVE S/S-5: ONSITE CHEMICAL DECHLORINATION

THIS ALTERNATIVE IS VERY SIMILAR TO ALTERNATIVE S/S-4 EXCEPT THAT THE EXCAVATED SOIL WOULD BE CHEMICALLY TREATED TO DECHLORINATE CHLORINATED HYDROCARBONS SUCH AS PCBS TO PRODUCE A NONHAZARDOUS MATERIAL. IN THE CHEMICAL DECHLORINATION PROCESS, CONTAMINATED SOIL/SEDIMENT AND AN ALKALINE CHEMICAL REAGENT SOLUTION WOULD BE MIXED IN A BATCH REACTOR TO FORM A SLURRY.

THE SLURRY IS THEN HEATED AND THE REAGENT REACTS WITH CHLORINATED HYDROCARBONS IN THE SOIL/SEDIMENT TO REMOVE THE CHLORINE ATOMS AND CONVERT THEM TO INORGANIC CHLORIDES. THE SOIL/SEDIMENT AND REAGENT SOLUTION ARE SEPARATED IN A CENTRIFUGE OR FILTER. ADDITIONAL REAGENT IS ADDED TO THE RECOVERED SOLUTION AND THE SOLUTION IS RECYCLED. THE TREATED SOIL/SEDIMENT IS DEWATERED AND WASHED TO REMOVE THE RESIDUAL REAGENT SOLUTION. THE WASH WATER IS ALSO RECYCLED.

THE DECHLORINATION SYSTEM DOES NOT REMOVE INORGANIC CONTAMINANTS SUCH AS COPPER AND LEAD; HOWEVER, SOME AMOUNT OF REMOVAL OF SOLUBLE COMPOUNDS WOULD BE ACHIEVED IN THE SOIL WASHING PROCESS.

PILOT TESTING OF THE DECHLORINATION PROCESS WOULD BE REQUIRED TO DETERMINE THE REAGENT CHEMICAL CONSUMPTION RATES, OPTIMUM PROCESS PARAMETERS, AND EFFECT ON INORGANIC CONTAMINANTS. ST IS ASSUMED BASED ON PREVIOUS TESTS ON SIMILAR MEDIA AND ORGANIC CONTAMINANTS THAT THE TREATED SOIL/SEDIMENT WOULD BE NONHAZARDOUS AND COULD EITHER BE RETURNED TO ITS ORIGINAL LOCATION OR DISPOSED OF IN A NON-HAZARDOUS MATERIAL LANDFILL. DISPOSAL IN A RCRA LANDFILL WOULD BE REQUIRED ONLY IF THE TREATED SOIL/SEDIMENT REMAINED HAZARDOUS DUE TO LEACHATE FROM INORGANIC CONTAMINANTS. THIS WOULD BE ESTABLISHED BY CONDUCTING TCLP ANALYSES ON THE TREATED SOIL/SEDIMENT. FOR COMPARISON WITH THE OTHER SOIL/SEDIMENT REMEDIATION ALTERNATIVES, IT IS ASSUMED THAT THE TREATED SOIL/SEDIMENT WALL BE RETURNED TO ITS ORIGINAL LOCATION.

AS IN THE TWO PREVIOUS SOIL/SEDIMENT REMEDIATION ALTERNATIVES, TWO OPTIONS WILL BE CONSIDERED FOR ALTERNATIVE S/S-5. ALTERNATIVE S/S-5A WOULD EXCAVATE AND CHEMICALLY DECHLORINATE ALL SOIL/SEDIMENT WHICH HAS A PCB CONTENT OF GREATER THAN 1 PPM; ALTERNATIVE S/S-5B A SOIL/SEDIMENT WITH A PCB CONTENT GREATER THAN 10 PPM. THE QUANTITIES OF SOIL/SEDIMENT TO BE EXCAVATED AND DECHLORINATED WOULD BE THE SAME AS IN THE PARALLEL OPTIONS IN THE ONSITE INCINERATION ALTERNATIVE.

ALTERNATIVE S/S-6: ONSITE SOLVENT EXTRACTION.

ALTERNATIVE S/S-6 USES A SOLVENT EXTRACTION PROCESS TO SEPARATE ORGANIC CONTAMINANTS SUCH AS PCB, DIOXIN/FURANS, VOLATILE ORGANICS, AND POLYNUCLEAR AROMATIC COMPOUNDS FROM SOIL AND SEDIMENT. THE PROCESS PRODUCES A TREATED SOIL/SEDIMENT AND A CONTAMINANT-RICH WASTE STREAM WHICH WOULD BE INCINERATED OFF SITE. THIS ALTERNATIVE IS SIMILAR TO ALTERNATIVE S/S-5 IN THAT THE CONTAMINATED SOIL/SEDIMENT IS EXCAVATED AND CHEMICALLY TREATED ON SITE. IN THIS ALTERNATIVE, HOWEVER, THE ORGANIC CONTAMINATION IN THE MEDIA IS CONCENTRATED IN A SEPARATE WASTE STREAM RATHER THAN DETOXIFIED BY DECHLORINATION.

IN A TYPICAL SOLVENT EXTRACTION SYSTEMS APPLICABLE CONTAMINATED SOIL/SEDIMENT, THE SOIL/SEDIMENT IS FIRST SCREENED, THEN PLACED IN A BATCH WASHER-DRYER. IN THE WASHER-DRYER, THE SOLVENT IS ADDED AND THE MEDIA AND SOLVENT ARE MIXED. THE ORGANIC CONTAMINANTS ARE REMOVED FROM THE SOIL/SEDIMENT INTO THE SOLVENT FLUID. THE SOLVENT IS DECANTED FROM THE MIXER AND SENT TO THE SOLVENT RECOVERY SYSTEM. FOR HIGHLY CONTAMINATED MEDIA AND HIGH REMOVAL RATES, MULTIPLE SOLVENT EXTRACTION STEPS MAY BE NECESSARY. AFTER DECANTATION OF THE SOLVENT, THE SOIL/SEDIMENT MEDIA IS THEN DRIED BY THE INTRODUCTION OF STEAM INTO THE WASHER-DRYER. ANY REMAINING SOLVENT IS VOLATILIZED AND COLLECTED FOR REUSE. THE TREATED SOIL/SEDIMENT CAN THEN BE HANDLED USING NORMAL EARTH MOVING EQUIPMENT.

LEAVING THE WASHER-DRYER, THE SOLVENT SOLUTION CONTAINS BOTH THE WATER AND ORGANIC CONTAMINANTS THAT WERE IN THE TREATED MEDIA. A CENTRIFUGE OR VACUUM FILTER MAY BE REQUIRED TO ACHIEVE ADDITIONAL LIQUID/SOLID SEPARATION. THE SOLIDS WOULD BE RETURNED TO THE WASHER-DRYER. THE SOLVENT SOLUTION IS THEN HEATED TO ABOVE 60 C WHICH RESULTS IN A VERY GOOD SEPARATION OF THE SOLVENT CONTAINING THE ORGANIC CONTAMINANTS AND THE WATER WHICH WAS ORIGINALLY IN THE SOIL. BOTH THE WATER AND SOLVENT STREAMS ARE THEN SENT TO STEAM STRIPPERS WHICH RECOVER THE TEA FOR REUSE IN THE EXTRACTION STEP. THE RECOVERED CONTAMINANT STREAM IS PLACED IN STORAGE TANKS FOR

SHIPMENT TO OFFSITE INCINERATION FACILITIES. THE WATER STREAM MAY BE SUITABLE DIRECT DISCHARGE OR MAY BE USED FOR DUST CONTROL ON THE TREATED MEDIA. THE RELATIVELY LOW MOISTURE CONTENT OF THE SOIL/SEDIMENT IS EXPECTED TO GENERATE VERY LITTLE WATER FOR DISPOSAL, THEREFORE, COSTS WILL BE BASED ON USE OF THIS FLOW FOR MOISTURE CONTROL IN THE TREATED MEDIA.

THE ENTIRE EXTRACTION PROCESS TAKES PLACE AT ALKALINE CONDITIONS WHICH PROMOTE THE FORMATION OF METAL HYDROXIDES. THEREFORE, CONVERSION OF INORGANIC CONTAMINANTS SUCH AS LEAD AND COPPER TO LOWER SOLUBILITY HYDROXIDES MAY ALSO BE ACHIEVED IN THIS PROCESS. THESE HYDROXIDES WOULD BE RETAINED IN THE TREATED SOIL/SEDIMENT.

THE SOLVENT EXTRACTION PROCESS IS CAPABLE OF ACHIEVING PCB AND DIOXIN/FURAN REMOVAL EFFICIENCIES OF OVER 99 PERCENT. SINCE THE PROCESS EFFICIENCIES VARIES WITH THE TYPE OF SOIL AND CONTAMINANT, A PILOT TEST IS REQUIRED TO ESTABLISH THE NUMBER OF EXTRACTION STEPS, SOLVENT REQUIREMENTS AND EFFECTIVENESS OF THE PROCESS. SUCH TESTS ARE ALSO REQUIRED TO DETERMINE WHETHER THE TREATED SOIL/SEDIMENT CAN BE RETURNED TO ITS ORIGINAL LOCATION OR MUST DE DISPOSED OF IF A LANDFILL. FOR COMPARISON WITH THE OTHER SOIL/SEDIMENT REMEDIATION ALTERNATIVES, IT IS ASSUMED THAT THE TREATED SOIL/SEDIMENT WOULD DE RETURNED TO ITS ORIGINAL LOCATION.

AS IN THE PREVIOUS SOIL/SEDIMENT REMEDIATION ALTERNATIVES, TWO OPTIONS WILL BE CONSIDERED FOR ALTERNATIVE S/S-6. ALTERNATIVE S/S-6A WOULD EXCAVATE AND TREAT ALL SOIL/SEDIMENT WHICH HAS A PCB CONTENT OF GREATER THAN 1 PPM; ALTERNATIVE S/S 6B ALL SOIL/SEDIMENT WITH A PCB CONTENT GREATER THAN 10 PPM. THE QUANTITIES OF SOIL/SEDIMENT TO BE EXCAVATED AND TREATED WOULD BE THE SAME AS IN THE PARALLEL OPTIONS IN THE OTHER SOIL/SEDIMENT REMEDIATION ALTERNATIVES. THE SAME QUANTITY OF BACKFILL AND LANDFILL COVER REQUIRED BY THE PREVIOUS ALTERNATIVES WOULD BE REQUIRED BY THESE OPTIONS ALSO.

7.3 STRUCTURES

WIPE SAMPLED FROM THE THREE ONSITE BUILDINGS DETERMINED THAT THE WALLS OF THESE STRUCTURES EXHIBIT SURFACE PCB CONTAMINATION AT LEVELS BELOW THE TSCA REQUIREMENTS FOR HIGH-CONTACT, NON-RESTRICTED ACCESS SURFACES. CONTAMINATION LEVELS' OF THE FLOORS OF THESE STRUCTURES AND OF THE RAISED CONCRETE PLATFORM ARE UNKNOWN BUT, BASED ON DEBRIS SAMPLES, THEY COULD EXCEED TSCA IMPOSED LEVELS. THE STRUCTURAL INTEGRITY OF THE THREE ONSITE BUILDINGS IS NOT KNOWN.

ALTERNATIVE S-1: NO ACTION.

THE "NO ACTION" ALTERNATIVE WOULD NOT INVOLVE ANY REMEDIAL ACTION AND THE SITE STRUCTURES WOULD BE LEFT IN PLACE IN THEIR PRESENT CONDITION. FUND' WOULD NOT BE EXPENDED FOR THE MONITORING OR MAINTENANCE OF THE STRUCTURES. THIS ALTERNATIVE IS A BASELINE TO WHICH THE OTHER ALTERNATIVES ARE COMPARED.

ALTERNATIVE S-2: FENCING.

THIS ALTERNATIVE WOULD INVOLVE THE CONSTRUCTION OF A 6-FOOT HIGH, CHAIN LINK FENCE TO SURROUND THE PORTIONS OF THE SITE THAT ARE NOT CURRENTLY FENCED. THIS ALTERNATIVE IS IDENTICAL TO ALTERNATIVE S/S-2 DESCRIBED EARLIER.

ALTERNATIVE S-3: PARTIAL DEMOLITION.

IN THIS ALTERNATIVE, THE ROOFS AND WALLS OF THE THREE ONSITE BUILDINGS WOULD BE DEMOLISHED USING HEAVY EQUIPMENT AND HAND TOOLS. THE DEMOLITION DEBRIS WOULD DE CRUSHED OR SHREDDED IF APPROPRIATE TO REDUCE THE SIZE OF DEBRIS PRIOR TO TRANSPORTATION TO OFFSITE LANDFILLS. THE TOTAL QUANTITY OF DEMOLITION DEBRIS GENERATED BY THE ROOFS AND WALLS OF THESE STRUCTURES WOULD BE APPROXIMATELY 970 CT. THE FLOOR SLABS AND THE RAISED CONCRETE PLATFORM WOULD BE LEFT IN PLACE.

BECAUSE THE EXTENT OF POSSIBLE PCB CONTAMINATION OF THE FLOOR SLAB SURFACES IS UNKNOWN, TWO OPTIONS HAVE BEEN DEVELOPED FOR THIS ALTERNATIVE.

ALTERNATIVE S-3A IS BASED ON THE ASSUMPTION THAT ADDITIONAL WIPE SAMPLING OF THE FLOOR SLABS DETERMINES THAT THE PCB CONTAMINATION IS BELOW THE TSCA CLEANUP REQUIREMENT FOR HIGH CONTACT, OUTDOOR SURFACE INDUSTRIAL AREA, 10 UG/100 CM2. IN THIS CASE, NO ADDITIONAL TREATMENT OF THE STRUCTURE SLABS WOULD BE REQUIRED.

ALTERNATIVE S-3B ASSUMES THAT THE WIPE SAMPLING INDICATES THAT SPECIFIC AREAS OF THE FLOORS ARE CONTAMINATED WITH PCBS AT LEVELS ABOVE 10 UG/100 CM2. AS A BASIS FOR ESTIMATION OF COST, IT IS ASSUMED THAT THE CONTAMINATED AREA CONSISTS OF ALL OF THE FLOOR AREA IN THE BURN AND MAINTENANCE BUILDINGS, THE ONE-HALF OF FLOOR OF THE MAIN BUILDING EXCLUDES THE OFFICE AREA), AND ONE-HALF OF THE RAISED CONCRETE PLATFORM. THIS WOULD RESULT IN A TOTAL AREA TO BE TREATED OF 23,350 SQUARE FEET (SF). THESE AREAS WOULD BE TREATED USING A SOLVENT WASHING SYSTEM TO EXTRACT THE PCBS FROM THE CONCRETE. THE USED SOLVENT AND RINSE WATER WOULD BE VACUUMED FROM THE FLOOR AND DRUMMED. THE DRUMMED WASTE WOULD BE TRANSPORTED TO AN OFF SITE LICENSED INCINERATOR.

ALTERNATIVE S-4: COMPLETE DEMOLITION

THIS ALTERNATIVE INVOLVES COMPLETE DEMOLITION OF ALL THREE ONSITE BUILDINGS AND THE RAISED CONCRETE PLATFORM. THE DEMOLITION WOULD INCLUDE, AS APPLICABLE, ROOFS, WALLS, FLOOR SLABS, AND FOUNDATIONS. THE DEMOLITION WOULD DE ACCOMPLISHED USING HEAD EQUIPMENT AND HAND TOOLS.

AS IN ALTERNATIVE S-3, THE DEBRIS WOULD BE CRUSHED OR SHREDDED, AS APPROPRIATE, TO REDUCE THE SIZE OF THE MATERIAL PRIOR TO BEING TRANSPORTED OFF SITE FOR DISPOSAL. THE NONHAZARDOUS DEMOLITION DEBRIS WOULD BE DISPOSED OF IN THE CUMBERLAND COUNTY LANDFILL. THIS ALTERNATIVE WOULD GENERATE A TOTAL OF 2,195 CY OF DEMOLITION MATERIAL. BECAUSE THE DEGREE OF FLOOR SLAB CONTAMINATION HAS NOT BEEN DETERMINED, TWO OPTIONS HAVE BEEN DEVELOPED FOR THIS ALTERNATIVE.

ALTERNATIVE S-4A IS BASED ON THE PCB CONTAMINATION OF THE FLOOR SLABS BEING LESS THAN 10 UG/100 CM2 ALLOWING DISPOSAL OF ALL SLAB MATERIAL AS NONHAZARDOUS WASTES IN A NON-RCRA LANDFILL. IF ISOLATED AREAS OF SURFACE CONTAMINATION ARE DETECTED THROUGH ADDITIONAL WIPE TESTING, THESE AREAS WOULD BE REMOVED FROM THE SLAB BY PNEUMATIC OR MECHANICAL ABRASIVE EQUIPMENT. THE REMOVED MATERIAL WOULD BE COLLECTED AND DRUMMED FOR DISPOSAL AS HAZARDOUS WASTE. FOR PURPOSES OF DEVELOPING COSTS, ALTERNATIVE S-4A WILL ASSUME A TOTAL OF 2,000 SF OF FLOOR AREA EXCEEDS THE TSCA REQUIREMENTS OF 50 PPM AND MUST BE REMOVED PRIOR TO GENERAL DEMOLITION. ASSUMING THAT 1 INCH OF MATERIAL WOULD BE REMOVED, 6 CY OF HAZARDOUS MATERIAL WOULD DE DRUMMED.

ALTERNATIVE S-4B ASSUMES THAT PCB CONTAMINATION OF FLOOR SLABS IS WIDE SPREAD AND, THEREFORE, REMOVAL OF CONTAMINATED MATERIAL SEPARATE FROM THE BULK OF THE FLOOR SLAB IS IMPRACTICAL. IN THIS ALTERNATIVE, THE SLAB WOULD BE TREATED BY THE SOLVENT WASH TECHNIQUE TO REMOVE THE PCBS FROM THE CONCRETE. THE USED SOLVENT AND RINSE WATER WOULD BE VACUUMED AND DRUMMED FOR OFFSITE INCINERATION. FOLLOWING THE SOLVENT WASH, THE SLABS WOULD BE BROKEN UP AND TRANSPORTED AS NONHAZARDOUS MATERIAL TO THE CUMBERLAND COUNTY LANDFILL. AS IN ALTERNATIVE S-3B, IT IS ASSUMED THAT 21,350 SF OF FLOOR SLAB WOULD BE TREATED BY THE SOLVENT WASH EQUIPMENT.

7.4 DEBRIS/SOLID WASTES

ALTERNATIVE D-1: NO ACTION

THE "NO ACTION" ALTERNATIVE WOULD NOT INVOLVE ANY REMEDIAL ACTION TO COLLECT, CONTROL, OR REMOVE DEBRIS OR SOLID WASTES FROM THE SITE. THIS ALTERNATIVE, IS A BASELINE TO WHICH THE OTHER ALTERNATIVES ARE COMPARED.

ALTERNATIVE D-2: FENCING

THIS ALTERNATIVE IS IDENTICAL TO ALTERNATIVE S/S-2 DESCRIBED EARLIER.

ALTERNATIVE D-3: OFFSITE DISPOSAL

THIS ALTERNATIVE WOULD TRANSPORT ALL DEBRIS AND SOLID WASTE FROM THE SITE FOR DISPOSAL IN OFFSITE LANDFILLS. SOLIDS PROCESSING SUCH AS CRUSHING AND COMPACTION OR THE CUTTING OF LARGE ITEMS SUCH AS TANKS INTO MORE MANAGEABLE SIZES WOULD DE PERFORMED WHERE NECESSARY PRIOR TO TRANSPORTATION. IF THE MATERIAL IS NONHAZARDOUS, IT WORLD BE TRANSPORTED TO THE CUMBERLAND COUNTY LANDFILL, A NON-RCRA FACILITY. IF THE DEBRIS CONTAINS MORE THAN 50 PPM OF PCBS, IT WOULD BE TRANSPORTED TO A TSCA LANDFILL. IF THE DEBRIS CONTAINS LESS THAN 50 PPM PCBS, BUT WOULD BE OTHERWISE CONSIDERED HAZARDOUS (E.G. FAILED EPA'S TCLP LEACHATE TEST), IT WOULD BE TRANSPORTED TO A RCRA LANDFILL.

AS DISCUSSED IN SECTION 3.3.4, PCBS WERE NOT DETECTED IN ANY OF THE LARGE ELECTRICAL TRANSFORMERS ON SITE AND WERE DETECTED IN ONLY ONE OF THE PARTIALLY BURIED TANKS ON SITE. THESE ITEMS WOULD BE CUT UP AND DISPOSED OF AS NON-HAZARDOUS MATERIALS. THE ONE PARTIALLY BURIED TANK WHICH DID CONTAIN MEASURABLE QUANTITIES OF PCBS (72 PPM TOTAL PCBS) WOULD DE DRAINED AND THE DRUMMED LIQUID WOULD BE SENT TO AN OFFSITE INCINERATOR AS REQUIRED BY TSCA. THIS TANK WOULD THEN BE HANDLED IN THE SAME MANNER AS THE OTHER TANKS. THE TANKS AND DRAINED TRANSFORMERS HAVE POTENTIAL VALUE AS SCRAP MATERIAL, BUT THIS OPTION WILL NOT BE CONSIDERED IN DEVELOPING COSTS. THE EMPTY 55-GALLON DRUMS, CERAMIC INSULATORS, AND WOODEN PALLETS WOULD ALSO BE NON-HAZARDOUS MATERIALS AND WOULD BE DISPOSED OF IN THE SANITARY LANDFILL. IT IS ESTIMATED THAT A TOTAL OF 160 CY (80 TONS) OF SOLID WASTE AND DEBRIS WOULD BE TRANSPORTED TO THE CUMBERLAND COUNTY LANDFILL.

TESTS ON THE DIRT SCRAPED FROM ONE FLOORS OF THE THREE ONSITE BUILDINGS INDICATED THAT THIS MATERIAL HAS A SUBSTANTIAL DEGREE OF PCB CONTAMINATION. THIS MATERIAL WOULD BE REMOVED FROM THE BUILDING FLOORS, DRUMMED, AND TRANSPORTED TO A TSCA LANDFILL. THE EXISTING RI-DERIVED WASTES WHICH HAVE BEEN TEMPORARILY STORED ON SITE WOULD ALSO BE DRUMMED AND TRANSPORTED TO THE RCRA LANDFILL. THE TOTAL VOLUME OF HAZARDOUS MATERIAL TRANSPORTED TO THE RCRA LANDFILL WOULD BE APPROXIMATELY 20 CY (10 TONS). AN EQUAL AMOUNT IS ASSUMED TO BE TRANSPORTED TO THE TSCA LANDFILL.

#SCA

8.0 SUMMARY OF COMPARATIVE ANALYSIS

THIS SECTION PRESENTS A DETAILED EVALUATION OF THE ALTERNATIVES DESCRIBED IN SECTION 7. EACH ALTERNATIVE IS EVALUATED, USING THE FOLLOWING NINE CRITERIA. THE RESULTS OF THE EVALUATION OF EACH ALTERNATIVE IS THEN COMPARED AND THE ALTERNATIVE THAT BEST MEET THE REQUIREMENTS OF THE NINE CRITERIA IS IDENTIFIED.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: DETERMINES WHETHER EACH ALTERNATIVE MEETS THE REQUIREMENT THAT IT BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THIS CRITERION IS OF KEY IMPORTANCE. WHILE THE REMEDY SELECTED MAY ON OCCASION SEEK A WAIVER OF A GIVEN ARAR, THE REMEDY SELECTED MUST BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT.

COMPLIANCE WITH ARARS: THIS EVALUATION IS USED TO DETERMINE HOW EACHALTERNATIVE COMPLIES WITH FEDERAL AND STATE (ARARS) AS DEFINED IN CERCLA SECTION 121. A PRESENTATION OF CHEMICAL AND LOCATION SPECIFIC ARARS IS CONTAINED IN SECTION 10. ACTION-SPECIFIC ARARS ARE SUMMARIZED IN APPENDIX A.

LONG-TERM EFFECTIVENESS AND PERMANENCE: ADDRESSES THE RESULTS OF A REMEDIAL ACTION IN TERMS OF

THE RISK REMAINING AT THE SITE AFTER RESPONSE OBJECTIVES HAVE BEEN MET. THE PRIMARY FOCUS OF THIS EVALUATION IS THE EFFECTIVENESS OF THE CONTROLS THAT WILL BE APPLIED TO MANAGE RISK POSED BY TREATMENT RESIDUALS OR UNTREATED WASTES.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: ADDRESSES THE STATUTORY PREFERENCE FOR SELECTING REMEDIAL ACTIONS THAT EMPLOY TREATMENT TECHNOLOGIES THAT PERMANENTLY AND SIGNIFICANTLY REDUCE TOXICITY, MOBILITY, AND VOLUME OF A HAZARDOUS SUBSTANCE AS THEIR PRINCIPAL ELEMENT. THIS PREFERENCE IS SATISFIED WHEN TREATMENT IS USED TO REDUCE THE PRINCIPAL THREATS AT THE SITE THROUGH DESTRUCTION OF TOXIC CONTAMINANTS, IRREVERSIBLE REDUCTION IN CONTAMINANT MOBILITY, OR REDUCTION OF TOTAL VOLUME OF CONTAMINATED MEDIA.

SHORT-TERM EFFECTIVENESS: ADDRESSES THE IMPACTS OF THE ALTERNATIVE DURING THE CONSTRUCTION AND IMPLEMENTATION PHASE UNTIL REMEDIAL RESPONSE OBJECTIVES HAVE BEEN MET. ALTERNATIVES ARE EVALUATED WITH RESPECT TO THEIR EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT DURING IMPLEMENTATION OF THE REMEDIAL ACTION AND UNTIL PROTECTION IS ACHIEVED.

IMPLEMENTABILITY: ADDRESSES THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF IMPLEMENTING AN ALTERNATIVE AND THE AVAILABILITY OF VARIOUS SERVICES AND MATERIALS REQUIRED DURING ITS IMPLEMENTATION.

COST: THE COST ESTIMATES PROVIDE AN ORDER-OF-MAGNITUDE EVALUATION FOR COMPARISON OF ALTERNATIVES. CAPITAL COST, ANNUAL COST, A PRESENT WORTH ANALYSIS, AND A COST SENSITIVITY ANALYSIS (WHERE APPROPRIATE) ARE PART OF THIS EVALUATION.

STATE ACCEPTANCE: EPA REQUESTS STATE COMMENTS AND CONCURRENCE FOR CONSIDERATION IN FINAL SELECTION.

COMMUNITY ACCEPTANCE: EPA CONSIDERS INPUT FROM THE AFFECTED COMMUNITY AND CONSIDERS AND RESPONDS TO ALL COMMENTS RECEIVED PRIOR TO THE FINAL SELECTION OF A REMEDIAL ACTION (LONG TERM CLEANUP).

8.1 GROUNDWATER ALTERNATIVES

8.1.1 ALTERNATIVE G-1: NO ACTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: SINCE NO REMEDIAL ACTION WOULD BE TAKEN, THIS ALTERNATIVE WOULD NOT PROVIDE ANY INCREASE IN THE PROTECTION OF HUMAN HEALTH OR THE ENVIRONMENT.

THE RISK ASSESSMENT CONDUCTED FOR THIS SITE DETERMINED THAT THERE ARE CURRENTLY NO SIGNIFICANT CARCINOGENIC OR NON-CARCINOGENIC RISKS POSED TO EXISTING HUMAN POPULATION BY GROUNDWATER DUE TO TWO FACTORS:

CONTAMINATED GROUNDWATER HAS NOT MIGRATED OFFSITE, AND THERE ARE NO LOCAL ONSITE OR OFFSITE WITHDRAWALS FROM THE SHALLOW AQUIFER.

THE "NO ACTION" ALTERNATIVE WOULD NOT BE PROTECTIVE OF FUTURE ONSITE RESIDENTS WHO MIGHT USE THE SHALLOW AQUIFER FOR DOMESTIC USES. SUCH PERSONS WOULD BE EXPOSED TO GROUNDWATER POSING A NON-CARCINOGENIC HAZARD INDEX GREATER THAN 1 AND A CARCINOGENIC RISK OF GREATER THAN (10-4).

THE "NO ACTION" ALTERNATIVE WOULD ALSO NOT BE PROTECTIVE OF FUTURE OFFSITE RESIDENTS SHOULD CONTAMINATED GROUNDWATER MIGRATE FROM THE SITE AND WELLS BE CONSTRUCTED TO USE THE SHALLOW AQUIFER.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE WOULD NOT RESULT IN RETURNING THE QUALITY OF THE ONSITE, SHALLOW AQUIFER GROUNDWATER TO A LEVEL WHICH WOULD MEET THE SAFE DRINKING WATER STANDARDS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: BECAUSE REMEDIAL ACTIONS WOULD NOT OCCUR, THIS ALTERNATIVE WOULD NOT PROVIDE ANY LONG-TERM EFFECTIVENESS OR PERMANENCE. THE LONG TERM RISKS DUE TO CONTAMINATED GROUNDWATER WOULD BE UNCHANGED.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: THIS ALTERNATIVE WOULD HAVE NO EFFECT ON THE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINATED GROUNDWATER BEYOND NATURAL ATTENUATION EFFECTS DUE TO DILUTION AND NATURAL BIOLOGICAL DEGRADATION OF SOME ORGANIC COMPOUNDS. THE POTENTIAL FOR DILUTION OF CONTAMINANTS IS DEPENDENT ON THE DEGREE OF CROSS-MEDIA CONTAMINATION THAT OCCURS DUE TO CONTACT WITH CONTAMINATED SOIL/SEDIMENT.

SHORT-TERM EFFECTIVENESS: BECAUSE NO SITE ACTIVITIES WOULD OCCUR, THERE WOULD BE NO EFFECT ON THE COMMUNITY. THERE WOULD BE NO CONSTRUCTION OR OPERATION RELATED IMPACTS TO THE ENVIRONMENT.

IMPLEMENTABILITY: THIS CRITERION IS NOT APPLICABLE TO A "NO ACTION" ALTERNATIVE.

COST: THIS ALTERNATIVE WOULD NOT INCUR ANY COSTS.

8.1.2 ALTERNATIVE G-2: DEED RESTRICTIONS

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THIS ALTERNATIVE DOES NOT OFFER ANY INCREASE IN THE PROTECTION OF THE ENVIRONMENT; HOWEVER IT DOES PROVIDE SUBSTANTIAL PROTECTION TO HUMAN HEALTH. IF IMPLEMENTED AND STRICTLY COMPLIED WITH, DEED RESTRICTIONS WHICH PROHIBIT INSTALLATION OF WELLS IN THE SHALLOW AQUIFER WOULD ELIMINATE HUMAN CONTACT WITH CONTAMINATED GROUNDWATER.

COMPLIANCE WITH ARARS. SAME AS ALTERNATIVE G-1: NO ACTION.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THIS ALTERNATIVE WOULD BE EFFECTIVE AT PREVENTING HUMAN EXPOSURE TO CONTAMINATED GROUNDWATER FOR AS LONG AS LOCAL PROPERTY OWNERS ABIDE BY THE DEED RESTRICTIONS. IT IS POSSIBLE THAT AT SOME FUTURE DATE ADDITIONAL GROUNDWATER TESTING WILL INDICATE THAT CONTAMINANTS NO LONGER EXCEED SAFE DRINKING WATER ACT STANDARDS. HOWEVER, UNLESS SUCH A REDUCTION IN CONTAMINANT LEVELS OCCURS, THE DEED RESTRICTIONS MUST BE CONSIDERED PERMANENT. SAMPLING OF THE EXISTING GROUNDWATER MONITORING WELLS WOULD CONTINUE FOR AN INDEFINITE PERIOD.

REDUCTION IN TOXICITY, MOBILITY, AND VOLUME: SAME AS ALTERNATIVE G-1: NO ACTION.

SHORT-TERM EFFECTIVENESS: BECAUSE THIS ALTERNATIVE WOULD INVOLVE ONLY INSTITUTIONAL STEPS, THERE WOULD BE NO CONSTRUCTION PHASE THAT MIGHT AFFECT THE COMMUNITY. SINCE NO ONE IN THE AREA IS CURRENTLY USING WATER FROM THE SHALLOW AQUIFER, THERE WOULD BE NO EXPOSURE TO CONTAMINATED GROUNDWATER DURING THE INTERVAL UNTIL THE DEED RESTRICTIONS ARE PUT IN PLACE. THE IMPLEMENTATION PERIOD WOULD BE SIX MONTHS TO ONE YEAR DEPENDING ON THE DEGREE OF COMMUNITY ACCEPTANCE THIS ALTERNATIVE RECEIVES.

IMPLEMENTABILITY: THE IMPLEMENTABILITY OF DEED RESTRICTIONS IS CONSIDERED THE ABILITY TO ATTACH THE REQUIRED RESTRICTION TO THE PROPERTY DEEDS FOR THE CAROLINA TRANSFORMER SITE AND ADJACENT PROPERTY WHICH MIGHT BE EFFECTED, AND THE ABILITY TO ENFORCE SUCH RESTRICTIONS ONCE ATTACHED.

THE ATTACHMENT OF DEED RESTRICTIONS TO THE CAROLINA TRANSFORMER SITE DEED CAN BE ASSUMED TO BE AGREEABLE TO THE CURRENT PROPERTY OWNER AND, THEREFORE, READILY IMPLEMENTED. VOLUNTARY ACCEPTANCE OF SIMILAR RESTRICTIONS BY THE OWNERS OF ADJACENT PROPERTY IS QUESTIONABLE. THESE OWNERS WOULD BE RELINQUISHING A POTENTIALLY VALUABLE PROPERTY RIGHT (ACCESS TO A SHALLOW AQUIFER) FOR LITTLE OR NO GAIN. SUCH A RESTRICTION ON THEIR DEED WOULD BE EXPECTED TO RESULT IN SOME REDUCTION IN THE COMMERCIAL VALUE OF THEIR PROPERTY.

EVEN IF ACCEPTABLE TO CURRENT OWNERS OF THE SITE AND ADJACENT PROPERTIES, ENFORCEMENT OF SUCH RESTRICTIONS WOULD BE DIFFICULT. THE PROCEDURES FOR ISSUING A STATE GROUNDWATER WITHDRAWAL PERMIT DO NOT REQUIRE DOCUMENTATION THAT NO DEED RESTRICTIONS AGAINST WITHDRAWALS FROM SPECIFIC AQUIFERS EXIST. FUTURE OWNERS COULD CHOOSE TO IGNORE OR BE UNAWARE OF THE EXISTENCE OF THE RESTRICTIONS. THE RESTRICTIONS COULD ALSO BE LOST DURING FUTURE PROPERTY TRANSFERS.

FOR THE ABOVE REASONS, THE IMPLEMENTABILITY OF THIS ALTERNATIVE IS CONSIDERED IS LOW COMPARED TO OTHER ALTERNATIVES.

COSTS: THE COSTS FOR IMPLEMENTATION OF THIS ALTERNATIVE CONSIST OF THE COST TO PURCHASE AGREEMENTS TO ACCEPT DEED RESTRICTIONS FROM ADJACENT PROPERTY OWNERS AND THE ATTORNEY AND COURT COSTS TO AMEND THE AFFECTED PROPERTY DEEDS. IT IS VERY DIFFICULT TO ACCURATELY ESTIMATE THE COST TO PURCHASE DEED RESTRICTION AGREEMENTS. ALTHOUGH NO ONE IS CURRENTLY USING THIS AQUIFER, PROPERTY OWNERS MAY BE EXTREMELY RELUCTANT TO GIVE UP SUCH A PROPERTY RIGHT WITHOUT A FINANCIAL INDUCEMENT TO DO SO. ALSO, SINCE THE CONTAMINATED GROUNDWATER HAS NOT BEEN SHOWN TO HAVE LEFT THE SITE, IT IS DIFFICULT TO DETERMINE WHICH PROPERTY OWNERS WOULD BE AFFECTED.

FOR THESE REASONS, A COST ESTIMATE FOR THIS ALTERNATIVE IS BASED ON ROUGH ASSUMPTIONS AND MAY NOT MEET THE DESIRED DEGREE OF ACCURACY, +50 PERCENT TO -30 PERCENT. ASSUMING THAT THERE ARE FIVE PROPERTY OWNERS IN ADDITION TO THE CAROLINA TRANSFORMER SITE OWNER AND THAT EACH OWNER WOULD AGREE TO ACCEPT $10,000 (INCLUDING ALL ATTORNEY FEES) IN RETURN FOR THE DEED RESTRICTION, THIS ALTERNATIVE WOULD HAVE A COST OF $50,000. THERE WOULD BE NO ANNUAL FEES INCURRED BY THIS ALTERNATIVE.

8.1.3 ALTERNATIVE G-3: METALS REMOVAL/AIR STRIPPING/ADSORPTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THE RISKS TO FUTURE USERS OF GROUNDWATER ASSOCIATED WITH INGESTION, INHALATION, AND DERMAL CONTACT WITH CONTAMINANTS IN THE SHALLOW AQUIFER GROUNDWATER WOULD BE REDUCED BY THIS PUMP-AND-TREAT ALTERNATIVE. THE OPERATION OF THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WOULD CONTINUE UNTIL THE GROUNDWATER MEETS THE REMEDIAL GOALS. THE TREATMENT SYSTEM WOULD REMOVE BOTH METALS AND ORGANICS TO AN EXTENT AT WHICH DISCHARGE OF THE TREATED GROUNDWATER TO THE UNNAMED TRIBUTARY TO THE CAPE FEAR RIVER (ALTERNATIVE G-3A) OR THE FAYETTEVILLE POTW (ALTERNATIVE G-3B) WOULD BE POSSIBLE.

COMPLIANCE WITH ARARS: THE REMEDIAL GOALS FOR GROUNDWATER REMEDIATION ARE BASED, IN PART, IN MEETING THE MCLGS OR MCLS AND THE NORTH CAROLINA GROUNDWATER STANDARDS. OPERATION OF THE ALTERNATIVE G-3 EQUIPMENT WOULD BE CONTINUED UNTIL THE GROUNDWATER ATTAINS THESE LIMITS.

IF DISCHARGED TO THE TRIBUTARY OF THE CAPE FEAR RIVER, THE TREATED WATER FROM THE PROCESS WOULD NOT CAUSE VIOLATION OF ANY AMBIENT WATER QUALITY STANDARD. IF DISCHARGED TO THE POTW, THE EFFLUENT WOULD MEET THE CITY'S STANDARDS FOR DISCHARGE TO THE SEWER SYSTEM. THE ACTIVATED CARBON FILTERS ON THE AIR STRIPPER OFFGAS WOULD ENSURE THE AIR DISCHARGE MEETS ALL EMISSION STANDARDS FROM THIS SOURCE.

LONG-TERM EFFECTIVENESS AND PERMANENCE.

THIS ALTERNATIVE WOULD BE EFFECTIVE AT ACHIEVING A HIGH DEGREE OF PERMANENCE IN REMEDIATING THE EXISTING VOLUME OF CONTAMINATED GROUNDWATER. THE LONG-TERM EFFECTIVENESS AND PERMANENCE OF THIS ALTERNATIVE IS DEPENDENT UPON THE REMOVAL OF CONTAMINATED SOIL/SEDIMENT TO ELIMINATE CONTINUED CROSS-MEDIA CONTAMINATION. ASSUMING THE CONTAMINATED SOIL/SEDIMENT IS ALSO REMOVED, THERE SHOULD BE NO NEED FOR CONTINUED OPERATION OF THE EXTRACTION AND TREATMENT SYSTEM ONCE THE REMEDIAL GOALS ARE MET. SAMPLING OF THE EXISTING MONITORING WELLS WOULD CONTINUE FOR AN INDEFINITE PERIOD AFTER ACHIEVEMENT OF THE REMEDIAL GOALS TO CONFIRM THE PERMANENCE OF THE ACTION.

REDUCTION OF THE TOXICITY, MOBILITY, AND VOLUME: THIS ALTERNATIVE WOULD BE EFFECTIVE AT REDUCING THE MOBILITY AND VOLUME OF BOTH ORGANIC AND INORGANIC GROUNDWATER CONTAMINANTS.

THE ORGANIC CONTAMINANTS WOULD BE ULTIMATELY CONCENTRATED IN THE ACTIVATED CARBON SORBANT WITHOUT CHANGE IN THEIR TOXICITY. THE FATE OF THESE CONTAMINANTS WOULD BE LINKED TO THAT OF THE SPENT SORBANT. IF THE SORBANT IS THERMALLY RECYCLED, THE ORGANICS WOULD BE DESTROYED DURING REGENERATION OR IN A SEPARATE AFTERBURNER. IF THE SPENT SORBANT IS LANDFILLED RATHER THAN RECYCLED, THE TOXICITY OF THE CONTAMINANTS WOULD NOT BE REDUCED BUT THEIR MOBILITY IN THE GENERAL ENVIRONMENT WOULD BE MINIMIZED.

INORGANIC CONTAMINANTS REMOVED FROM THE GROUNDWATER WOULD BE CONCENTRATED IN THE SLUDGE GENERATED BY THE PRECIPITATION PROCESS. EXCEPT FOR CONTAMINANTS SUCH AS CHROMIUM WHICH MAY BE CONVERTED TO A LESS TOXIC VALENCE STATE, THE TOXICITY OF INORGANIC CONTAMINANTS WOULD NOT BE REDUCED BY THE TREATMENT SYSTEM. AT THE LOW CONCENTRATIONS PRESENT IN THE SLUDGE, RECOVERY OF METALS WOULD NOT BE ECONOMICALLY FEASIBLE. DISPOSAL IN AN APPROPRIATE LANDFILL WOULD MINIMIZE THE MOBILITY OF INORGANICS IN THE GENERAL ENVIRONMENT.

SHORT-TERM EFFECTIVENESS: SHORT-TERM RISKS TO HUMAN HEALTH AND THE ENVIRONMENT DURING THE IMPLEMENTATION AND OPERATION PHASES OF ALTERNATIVE G-3 WOULD BE LIMITED. SOME INCREASE IN AMBIENT AIR CONCENTRATIONS OF VOLATILE ORGANIC CONTAMINANTS WHICH ESCAPE THE AIR STRIPPER'S ACTIVATED CARBON ABSORPTION SYSTEM WOULD BE EXPERIENCED BUT AT LEVELS WHICH MEET EMISSION LIMITS AND CAUSE NO THREAT TO HUMAN HEALTH OR THE ENVIRONMENT. SIMILARLY, ORGANIC AND INORGANIC CONTAMINANTS WILL BE PRESENT AT MUCH REDUCED LEVELS IN THE EFFLUENT FROM THE TREATMENT SYSTEM. WHETHER DISCHARGED TO THE CAPE FEAR RIVER'S TRIBUTARY OR TO THE POTW, THIS EFFLUENT WOULD INCREASE THE TOTAL QUANTITY OF THESE CONTAMINANTS IN SURFACE WATERS. THE LOW CONCENTRATIONS PRESENT IN THE EFFLUENT WOULD PROVIDE NO SIGNIFICANT HUMAN HEALTH OR ENVIRONMENTAL EFFECTS.

IMPLEMENTABILITY: THE INSTALLATION TECHNIQUES AND TREATMENT TECHNOLOGIES USED IN ALTERNATIVE G-3 ARE WELL UNDERSTOOD AND HAVE BEEN SUCCESSFULLY IMPLEMENTED AT OTHER SITES ON SIMILAR MEDIA AND CONTAMINANTS. THE PROCESS EQUIPMENT CONSISTS OF STANDARD GROUNDWATER TREATMENT SYSTEMS AND WOULD REQUIRE NO SPECIAL DESIGNS. PILOT PLANT TESTING WOULD BE REQUIRED TO OBTAIN OPTIMUM PROCESS KINETICS AND EQUIPMENT SIZING. SUCH TESTING WOULD OPTIMIZE CHEMICAL UTILIZATION, AIR STRIPPER AIR-TO-FLUID RATIOS, AND ACTIVATED CARBON TYPE AMONG OTHER DESIGN FACTORS.

THE TREATMENT FACILITY COULD BE MOUNTED ON SEVERAL EQUIPMENT SKIDS TO MINIMIZE CONSTRUCTION RELATED PROBLEMS. THE TREATMENT FACILITY MUST BE MANNED FOR BOTH OPERATION AND MAINTENANCE CONSIDERATIONS. WITH SUFFICIENT GROUNDWATER EQUALIZATION STORAGE, THE GROUNDWATER EXTRACTION SYSTEM COULD OPERATE CONTINUOUSLY WHILE THE TREATMENT SYSTEM COULD OPERATE ON A 40-HOUR/WEEK BASIS.

COSTS: THE DETAILED CAPITAL COST ESTIMATES FOR ALTERNATIVES G-3A AND G-3B ARE PRESENTED IN TABLES 8-1 AND 8-2, RESPECTIVELY. THE CAPITAL COSTS OF BOTH SYSTEMS INCLUDE INSTALLATION OF THE GROUNDWATER EXTRACTION SYSTEM (WELLS), STORAGE TANKS FOR GROUNDWATER AND CHEMICALS, THE VARIOUS TREATMENT COMPONENTS, AND SLUDGE DEWATERING AND STORAGE EQUIPMENT. ALTERNATIVE G-3A INCLUDES THE COST OF A DISCHARGE LINE TO THE CAPE FEAR RIVER'S TRIBUTARY. ALTERNATIVE G-3B INCLUDES THE COST OF A PIPELINE TO THE EXISTING SEWER LEFT STATION ADJACENT TO THE SITE.

ANNUAL OPERATION AND MAINTENANCE (O&M) COSTS ASSOCIATED WITH THESE ALTERNATIVES INCLUDE COSTS FOR ELECTRIC POWER, CHEMICALS, ACTIVATED CARBON REPLACEMENT, MAINTENANCE PARTS, SLUDGE DISPOSAL, AND LABOR. BECAUSE OF THE LACK OF PHYSICAL DATA ON THE SHALLOW AQUIFER, THERE IS CONSIDERABLE UNCERTAINTY OVER HOW LONG THE TREATMENT SYSTEM MUST OPERATE TO ACHIEVE THE REMEDIATION GOALS.

FOR PURPOSES OF COMPARATIVE COSTS, IT IS ASSUMED THAT THE SYSTEM WOULD OPERATE FOR 10 YEARS, AND THAT CHEMICAL AND ACTIVATED CARBON CONSUMPTION DROP OFF BY 10 PERCENT EACH YEAR OVER THAT PERIOD

(I.E., 10 PERCENT OF FIRST YEAR'S CONSUMPTION USED IN THE TENTH YEAR). POWER, MAINTENANCE, AND LABOR REQUIREMENTS ARE ASSUMED TO REMAIN CONSTANT OVER THIS PERIOD. THE FIRST YEAR O&M COSTS FOR ALTERNATIVES G-3A AND G-3B ARE PRESENTED IN TABLES 8-1 AND 8-2, RESPECTIVELY.

THE 10-YEAR PRESENT WORTH COSTS OF ALTERNATIVES G-3A AND G-3B ARE $878,500 AND $949,700 RESPECTIVELY.

8.1.4 ALTERNATIVE G-4: METALS REMOVAL/ADSORPTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THIS ALTERNATIVE WOULD PROVIDE APPROXIMATELY THE SAME DEGREE OF PROTECTION OF HUMAN HEALTH AND ENVIRONMENT AS ALTERNATIVE G-3.

COMPLIANCE WITH ARARS: OPERATION OF THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WOULD BE CONTINUED UNTIL THE GROUNDWATER ATTAINS THE MCLGS OR MCLS SET BY THE SAFE DRINKING WATER ACT AND/OR THE NORTH CAROLINA DRINKING WATER STANDARDS. IN ALTERNATIVE G-4A, THE EFFLUENT FROM THE TREATMENT SYSTEM WOULD COMPLY WITH THE CITY'S STANDARDS FOR DISCHARGE TO THE SEWER SYSTEM. IN ALTERNATIVE G-4B, THE DISCHARGE TO THE CAPE FEAR TRIBUTARY WOULD NOT CAUSE VIOLATIONS OF AMBIENT WATER QUALITY STANDARDS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THIS ALTERNATIVE WOULD PROVIDE THE SAME DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE AS ALTERNATIVE G-3.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: THIS ALTERNATIVE WOULD PROVIDE THE SAME REDUCTION IN THE TOXICITY, MOBILITY, AND VOLUME OF GROUNDWATER CONTAMINANTS AS ALTERNATIVE G-3.

SHORT-TERM EFFECTIVENESS: THE SHORT-TERM RISKS ASSOCIATED WITH THIS ALTERNATIVE WOULD BE SIMILAR TO ALTERNATIVE G-3 EXCEPT THAT WITHOUT AN AIR STRIPPER, THERE WOULD BE NO INCREASE IN AMBIENT AIR CONCENTRATIONS OF VOLATILE ORGANICS. THESE COMPOUNDS WOULD BE REMOVED IN THE GROUNDWATER ACTIVATED CARBON ADSORPTION SYSTEM.

IMPLEMENTABILITY: THE IMPLEMENTABILITY OF THIS ALTERNATIVE WOULD BE SIMILAR TO THAT OF ALTERNATIVE G-3.

COSTS: THE DETAILED CAPITAL COST ESTIMATES FOR ALTERNATIVE G-4A AND G-4B ARE PRESENTED IN TABLES 8-3 AND 8-4, RESPECTIVELY. THE CAPITAL COST CATEGORIES ARE IDENTICAL TO ALTERNATIVE G-3 EXCEPT FOR THE DELETION OF THE AIR STRIPPER AND ITS ASSOCIATED EQUIPMENT. IT IS ASSUMED THAT THE ACTIVATED CARBON ADSORPTION EQUIPMENT WOULD BE THE SAME SIZE AS THE EQUIPMENT IN ALTERNATIVE G-3. THE ELIMINATION OF THE AIR STRIPPER WOULD INCREASE THE ORGANIC LOAD ON THE ADSORPTION EQUIPMENT. THE COST ESTIMATE ASSUMES THAT THIS INCREASED LOADING WOULD BE ACCOMMODATED BY MORE FREQUENT ACTIVATED CARBON REPLACEMENT RATHER THAN BY LARGER UNITS.

ANNUAL O&M COSTS ASSOCIATED WITH ALTERNATIVES G-4A AND G-4B INCLUDE THE SAME CATEGORIES AS THEIR RESPECTIVE ALTERNATIVE G-3 OPTIONS AND ARE ALSO PRESENTED IN TABLES 5-3 AND 5-4. THE PRINCIPAL DIFFERENCE BETWEEN THE G-4 OPTION AND G-3 THE OPTION IS THE LOWER POWER COSTS REFLECTING THE DELETION OF THE AIR STRIPPER AND THE HIGHER ACTIVATED CARBON REPLACEMENT COSTS.

THE PRESENT WORTH COSTS OF ALTERNATIVES G-4A AND G-4B BASED ON 10 YEARS OF OPERATION ARE $830,500 AND $898,800, RESPECTIVELY.

8.1.5 ALTERNATIVE G-5: ADSORPTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THE DISCHARGE OF GROUNDWATER TO THE CAPE FEAR RIVER TRIBUTARY WITHOUT TREATMENT FOR METALS REMOVAL WOULD RESULT IN SOME DEGREE OF ELEVATED HAZARD RISK TO HUMAN HEALTH DUE TO POTENTIAL DERMAL CONTACT BY OFFSITE PERSONS DURING WADING.

THE CHRONIC AND LIFETIME HAZARD INDEX POSED BY THE UNTREATED METALS IN THE DISCHARGE WOULD BE 0.04 AND 0.003, RESPECTIVELY. A HAZARD RISK OF 1.0 OR GREATER IS CONSIDERED TO BE SIGNIFICANT.

THE METALS CONTENT IN THE DISCHARGE WOULD EXCEED THE NORTH CAROLINA AMBIENT WATER QUALITY STANDARDS AS DISCUSSED IN THE FOLLOWING SECTION; THEREFORE, SOME DEGREE OF ELEVATED THREAT TO THE AQUATIC ENVIRONMENT WOULD OCCUR UNTIL THE DISCHARGE REACHES THE CAPE FEAR RIVER.

COMPLIANCE WITH ARARS: AS IN THE PREVIOUS TWO ALTERNATIVES, THIS ALTERNATIVE WOULD CONTINUE OPERATION UNTIL THE GROUNDWATER ATTAINS THE SAFE DRINKING WATER ACT MCLGS AND MCLS. WITHOUT METALS REMOVAL, THE TREATED GROUNDWATER WOULD EXCEED THE NORTH CAROLINA AMBIENT WATER QUALITY STANDARDS FOR BARIUM, TOTAL CHROMIUM, COPPER, LEAD, MANGANESE, NICKEL, AND ZINC AT THE POINT OF DISCHARGE. THE EFFLUENT WOULD BE DISCHARGED TO THE NORMALLY DRY DRAINAGE STREAM LEAVING THE SITE AND THE STREAM WOULD NOT MEET AMBIENT WATER QUALITY STANDARDS UNTIL IT CONFLUENCE WITH THE CAPE FEAR RIVER IN APPROXIMATELY ONE-HALF MILE. AT A FLOW RATE OF ONLY 10 GPM, THE MIXING ZONE REQUIRED TO ACHIEVE THE STANDARDS WOULD BE VERY SMALL EVEN DURING LOW FLOW CONDITIONS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THIS ALTERNATIVE WOULD PROVIDE PREVIOUS TWO ALTERNATIVES.

REDUCTION IN TOXICITY, MOBILITY, AND VOLUME: ORGANIC CONTAMINANTS WOULD BE CONCENTRATED IN THE ACTIVATED CARBON MEDIA. AS IN THE PREVIOUS TWO ALTERNATIVES, THESE CONTAMINANTS WOULD BE DESTROYED IF THE ACTIVATED CARBON WERE RECYCLED. IF DISPOSED OF WITHOUT RECYCLING, MOBILITY AND VOLUME WOULD BE REDUCED WITHOUT CHANGE TO THE CONTAMINANTS TOXICITY.

THIS ALTERNATIVE USES DILUTION BY THE REMAINDER OF THE POTW INFLUENT TO REDUCE THE TOXICITY OF INORGANIC CONTAMINANTS. THE SECONDARY TREATMENT PROVIDED BY THE POTW WOULD NOT PROVIDE SIGNIFICANT REMOVAL OF INORGANICS. HOWEVER, THE LEVELS OF INORGANIC WOULD ALSO NOT ADVERSELY AFFECT THE POTW'S OPERATIONS. THIS ALTERNATIVE WOULD INCREASE THE MOBILITY AND VOLUME OF INORGANIC CONTAMINANTS.

SHORT-TERM EFFECTIVENESS: THIS ALTERNATIVE WOULD HAVE FEW SHORT TERM IMPACTS DURING IMPLEMENTATION. THIS ALTERNATIVE REQUIRES MINIMAL SUPERVISION AND GENERATES ONLY SPENT ACTIVATED CARBON AS A WASTE MATERIAL.

IMPLEMENTABILITY: ACTIVATED CARBON ADSORPTION UTILIZES STANDARD MODULES AND CAN BE QUICKLY IMPLEMENTED.

COSTS: THE DETAILED CAPITAL AND ANNUAL O&M COSTS ESTIMATES FOR ALTERNATIVE G-5 ARE PRESENTED IN TABLE 8-5. THE ACTIVATED CARBON ADSORPTION EQUIPMENT WOULD BE THE SAME AS IN THE TWO PREVIOUS ALTERNATIVES. THE PRESENT WORTH OF THIS ALTERNATIVE IS $435,000.

8.1.6 ALTERNATIVE G-6: METALS REMOVAL/UV OXIDATION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: ALTERNATIVE G-6 PROVIDES THE SAME LEVEL OF PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AS ALTERNATIVES G-3 AND G-4. THE HAZARDS DUE TO BOTH METALS AND ORGANICS WOULD BE REDUCED BY THIS ALTERNATIVE.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE OFFERS THE SAME DEGREE OF COMPLIANCE WITH ARARS AS ALTERNATIVES G-3 AND G-4.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE LONG-TERM EFFECTIVENESS AND PERMANENCE OF THIS ALTERNATIVE WOULD BE THE SAME AS ALTERNATIVES G-3, G-4, AND G-5.

REDUCTION IN TOXICITY, MOBILITY, AND VOLUME: THE METALS REMOVAL PROCESS FOR THIS ALTERNATIVE

WOULD BE IDENTICAL TO THE PROCESS USED IN ALTERNATIVES G-3 AND G-4 AND WOULD OFFER THE SAME REDUCTION IN THE MOBILITY AND VOLUME OF INORGANIC CONTAMINANTS.

THE UV OXIDATION PROCESS WOULD CONVERT THE ORGANIC CONTAMINANTS TO LESS HAZARDOUS MATERIALS. THIS WOULD RESULT IN THE REDUCTION OF ORGANIC CONTAMINANT TOXICITY AND VOLUME. THE PROCESS DOES NOT PRODUCE ANY HAZARDOUS BYPRODUCTS WHICH WOULD REQUIRE ADDITIONAL HANDLING OR STORAGE.

SHORT-TERM EFFECTIVENESS: THE METAL REMOVAL AND UV OXIDATION EQUIPMENT WOULD BE MODULAR, SKID MOUNTED SYSTEMS WHICH WOULD MINIMIZE EFFECTS ON HUMAN HEALTH AND THE ENVIRONMENT DURING IMPLEMENTATION AND OPERATION. ORGANIC AND INORGANIC CONTAMINANTS WOULD BE PRESENT AT MUCH REDUCED LEVELS IN THE DISCHARGE FROM THE TREATMENT SYSTEM. WHETHER DISCHARGED TO THE CAPE FEAR RIVER TRIBUTARY (ALTERNATIVE G-6A) OR THE POTW (ALTERNATIVE G-6B), THIS EFFLUENT WOULD ULTIMATELY INCREASE THE TOTAL QUANTITY OF THESE CONTAMINANTS IN SURFACE WATERS. THE LOW CONCENTRATIONS PRESENT IN THE EFFLUENT WOULD PRESENT NO SIGNIFICANT HUMAN HEALTH OR ENVIRONMENTAL EFFECTS. AS IN ALL ALTERNATIVES PROVIDING METAL REMOVAL, METAL OXIDE SLUDGES MUST BE TRANSPORTED FROM THE SITE TO A CHEMICAL WASTE LANDFILL.

IMPLEMENTABILITY: UV OXIDATION IS A DEMONSTRATED TECHNIQUE FOR DESTRUCTION OF ORGANIC COMPOUNDS IN WATER; HOWEVER, A PILOT PLANT STUDY WOULD BE REQUIRED TO OPTIMIZE THE PROCESS FACTORS AND EQUIPMENT SIZING. SUCH TESTING WOULD OPTIMIZE CHEMICAL UTILIZATION, POWER CONSUMPTION, AND OXIDATION TANK DETENTION TIMES AMONG OTHER FACTORS. UV OXIDATION EQUIPMENT IS AVAILABLE FROM SEVERAL QUALIFIED MANUFACTURES WHO WOULD BE CAPABLE OF CONDUCTING THE PILOT TEST AND FURNISHING THE REQUIRED EQUIPMENT.

COSTS: THE DETAILED CAPITAL COST ESTIMATES FOR ALTERNATIVES G-6A AND G-6B ARE PRESENTED IN TABLES 8-6 AND 8-7, RESPECTIVELY. THE COSTS FOR METAL REMOVAL ARE IDENTICAL TO THOSE DEVELOPED FOR THE PREVIOUS ALTERNATIVES USING THIS PROCESS. THE COSTS FOR THE HYDROGEN PEROXIDE STORAGE TANK AND METERING EQUIPMENT AND THE UV LIGHT REACTOR TANK.

ANNUAL O&M COSTS ASSOCIATED WITH THESE ALTERNATIVES INCLUDE THE COSTS OF CHEMICALS, POWER, MAINTENANCE PARTS, SLUDGE DISPOSAL, AND LABOR. THE FIRST YEAR O&M COSTS ARE PRESENTED IN TABLES 8-6 AND 8-7. THE PRESENT WORTH OF THE TWO ALTERNATIVE G-6 OPTIONS ARE $993,300 AND $1,055,500.

8.1.7 ALTERNATIVE G-7: UV OXIDATION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THIS ALTERNATIVE WOULD PROVIDE A DEGREE OF PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT EQUIVALENT TO ALTERNATIVE G-5: ABSORPTION.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE WOULD PROVIDE THE SAME COMPLIANCE WITH ARARS AS ALTERNATIVE G-5. WITHOUT METALS PRECIPITATION, METAL LEVELS IN THE TREATED EFFLUENT WOULD BE ABOVE AMBIENT WATER QUALITY STANDARDS UNTIL AFTER A MIXING ZONE IN THE CAPE FEAR RIVER.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THIS ALTERNATIVE PROVIDES THE SAME DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE AS THE SIX EARLIER ALTERNATIVES.

REDUCTION IN TOXICITY, MOBILITY, AND VOLUME: ORGANIC CONTAMINANTS WOULD BE DESTROYED, ELIMINATING THEIR TOXICITY AND VOLUME. INORGANIC CONTAMINANTS WOULD BE UNAFFECTED BUT THE COMBINATION OF THESE CONTAMINANTS WITH THE REMAINDER OF THE POTW INFLUENT WASTES WOULD PROVIDE DILUTION TO REDUCE THE GROUNDWATER FLOW'S TOXICITY. THE POTW WOULD PROVIDE NO SIGNIFICANT REMOVAL OF INORGANIC CONTAMINANTS.

SHORT-TERM EFFECTIVENESS: THIS ALTERNATIVE WOULD HAVE FEW SHORT TERM IMPACTS ON THE PUBLIC HEALTH OR THE ENVIRONMENT DURING IMPLEMENTATION AND OPERATION. THE ALTERNATIVE GENERATES NO SLUDGES AND REQUIRES ONLY MINIMAL SUPERVISION.

IMPLEMENTABILITY: THE UV OXIDATION SYSTEM IS A DEMONSTRATED TECHNIQUE, HOWEVER; THIS ALTERNATIVE WOULD REQUIRE PILOT TESTING TO OPTIMIZE OXIDATION TANK DETENTION TIME, CHEMICAL DOSAGES, AND OTHER PROCESS VARIABLES.

COSTS: DETAILED CAPITAL AND ANNUAL O&M COSTS OF ALTERNATIVE G-7 ARE PRESENTED IN TABLE 8-8. THESE COSTS ARE IDENTICAL TO ALTERNATIVE G-6: METAL REMOVAL/UV OXIDATION WITH THE DELETION OF THE METAL REMOVAL AND SLUDGE HANDLING EQUIPMENT.

THE PRESENT WORTH OF THIS ALTERNATIVE IS $590,600.

8.2 SOIL/SEDIMENT ALTERNATIVES

8.2.1 ALTERNATIVE S/S-1: NO ACTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: SINCE REMEDIAL ACTION WOULD NOT BE INITIATED, THIS ALTERNATIVE WOULD NOT PROVIDE ANY INCREASED PROTECTION TO HUMAN HEALTH OR THE ENVIRONMENT. SPECIFICALLY, THE NON-CARCINOGENIC HAZARD INDEX WOULD BE GREATER THAN 1 FOR FUTURE ONSITE RESIDENTS AND CARCINOGENIC RISK WOULD BE GREATER THAN 1 X 10-6 FOR ALL POPULATIONS EVALUATED IN THE RISK.

ASSESSMENT REPORT: ALSO CONCERN FOR PCB EXPOSURE BY TERRESTRIAL ANIMALS, BIRDS, AND PLANTS WOULD NOT BE REDUCED.

COMPLIANCE WITH ARARS: THE "NO ACTION" ALTERNATIVE WOULD NOT MEET ARARS; SPECIFICALLY, TSCA REGULATIONS FOR CLEANUP AND DISPOSAL OF PCB SPILLS. VIOLATIONS OF STATE WATER QUALITY STANDARDS IN THE PERIODIC SURFACE WATERS LEAVING THE SITE WOULD BE EXPECTED TO OCCUR DUE TO CROSS-MEDIA CONTAMINATION. CROSS-MEDIAL CONTAMINATION OF GROUNDWATER WOULD ALSO BE EXPECTED TO CONTINUE RESULTING IN CONTAMINANT CONCENTRATIONS EXCEEDING SAFE DRINKING WATER STANDARDS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: BECAUSE REMEDIAL ACTIONS WOULD NOT OCCUR, THE EXISTING RISKS AT THE SITE WOULD REMAIN. SINCE SITE CONTROLS WOULD NOT BE IMPLEMENTED, THE CRITERION ADDRESSING THE ADEQUACY AND RELIABILITY OF CONTROLS IS NOT APPLICABLE TO THE ALTERNATIVE.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD NOT BE A REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS AT THE SITE. THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ONSITE. CROSS-MEDIA CONTAMINATION OF GROUNDWATER, SURFACE WATER, AND SEDIMENT WOULD CONTINUE TO OCCUR.

SHORT-TERM EFFECTIVENESS: BECAUSE SITE ACTIVITIES WOULD NOT OCCUR, PROTECTION OF WORKERS AND THE COMMUNITY WOULD NOT BE REQUIRED. ENVIRONMENTAL IMPACTS DUE TO CONSTRUCTION OR IMPLEMENTATION WOULD NOT BE ENCOUNTERED SINCE THERE WOULD BE NO ACTIVITIES PERFORMED AT THE SITE.

IMPLEMENTABILITY: THIS CRITERION IS NOT APPLICABLE BECAUSE REMEDIAL ACTIVITIES WOULD NOT OCCUR. SERVICES AND MATERIALS AND THE ACTIVITIES NORMALLY NEEDED TO COORDINATE WITH OTHER AGENCIES WOULD NOT BE NECESSARY.

COST: THERE WOULD BE NO COSTS INCURRED SINCE REMEDIAL ACTIVITIES WOULD NOT BE PERFORMED.

8.2.2 ALTERNATIVE S/S-2: FENCE/DEED RESTRICTIONS

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: RISKS ASSOCIATED WITH DERMAL CONTACT WITH OR INGESTION OF ONSITE CONTAMINATED SOIL/SEDIMENT WOULD BE CONTROLLED BY THESE ACCESS AND USE RESTRICTIONS. SECURITY FENCING WITH WARNING SIGNS WOULD REDUCE (BUT NOT ELIMINATE) THE POSSIBILITY OF SITE TRESPASSERS COMING INTO CONTACT WITH CONTAMINATED ONSITE MEDIA. THE USE

RESTRICTIONS WOULD PREVENT THE TYPE OF LONG-DURATION CONTACT ASSOCIATED WITH RESIDENTIAL DEVELOPMENT. THIS ALTERNATIVE WOULD NOT BE EFFECTIVE AT PROTECTING HUMAN HEALTH OR THE ENVIRONMENT OFF THE SITE. AS DISCUSSED IN THE RISK ASSESSMENT REPORT, SIGNIFICANT CARCINOGENIC RISKS ARE PRESENTED BY EXPOSURE TO OFFSITE CONTAMINATED SOIL/SEDIMENT.

THIS ALTERNATIVE WOULD NOT PREVENT THE ADDITIONAL MIGRATION OF HAZARDOUS SUBSTANCES INTO THE SURFACE WATER, OFFSITE SEDIMENTS, OR UNDERLYING GROUNDWATER AQUIFER.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE WOULD HAVE THE SAME LACK OF COMPLIANCE WITH STATE AND FEDERAL ARARS AS ALTERNATIVE S/S-1 NO ACTION.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE LONG-TERM EFFECTIVENESS OF THIS ALTERNATIVE DEPENDS UPON THE ENFORCEMENT AND MAINTENANCE PROVIDED. PRIMARY SITE ACCESS RESTRICTION WOULD BE MAINTAINED BY THE SECURITY FENCE AROUND THE SITE. THIS FENCE WOULD BE REQUIRED INDEFINITELY TO PREVENT ACCESS. PERIODIC REPAIR OR REPLACEMENT OF THE FENCE WOULD BE NECESSARY. THE DEED RESTRICTIONS WOULD PROHIBIT LAND USES THAT COULD DISTURB AND/OR CAUSE EXPOSURE TO HAZARDOUS SUBSTANCES CONTAINED IN THE SOIL/SEDIMENT. THE DEED RESTRICTIONS WOULD BE REQUIRED INDEFINITELY AND MUST FOLLOW THROUGH ANY FUTURE PROPERTY TRANSFERS. THE RESTRICTION MUST BE MAINTAINED INDEFINITELY UNLESS FUTURE TESTING DETERMINES THE CONTAMINATION HAS BEEN NATURALLY ATTENUATED TO SAFE LEVELS OR A FUTURE REMEDIAL ACTION IS UNDERTAKEN.

THIS ALTERNATIVE HAS NO LONG-TERM EFFECTIVENESS FOR OFFSITE SOIL/SEDIMENT SUCH AS THAT FOUND ALONG THE SURFACE WATER DRAINAGE DITCH TO THE SOUTH OF THE SITE.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD BE NO REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF SOIL/SEDIMENT CONTAMINANTS AT THE SITE. THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ONSITE UNDERGOING ONLY NATURAL ATTENUATION OR MIGRATION OFFSITE THROUGH CROSS-MEDIA CONTAMINATION (E.G., THE TRANSPORT OF SOIL AS SEDIMENT TO OFFSITE WATERSHEDS).

SHORT-TERM EFFECTIVENESS: THE MINIMAL INTRUSIVE ACTIVITIES INVOLVED WITH INSTALLING A PERIPHERAL FENCE AROUND THE SITE WOULD RESULT IN VERY SLIGHT ENVIRONMENTAL IMPACTS TO WORKERS OR THE COMMUNITY. SINCE THE FENCE WOULD BE INSTALLED BEYOND THE ZONE OF CONTAMINATED SOIL/SEDIMENT IN MOST CASES, SIMPLE MEASURES TO LIMIT WORKER CONTACT WITH SOIL/SEDIMENT DURING CONSTRUCTION WOULD BE SUFFICIENT. THE ALTERNATIVE WOULD RESULT IN NO ADDITIONAL EXPOSURE BY THE COMMUNITY AT LARGE.

IMPLEMENTABILITY: THE INSTALLATION OF A PERIPHERAL FENCE AT THE SITE CAN BE EASILY IMPLEMENTED. THE FENCE WOULD BE OF STANDARD INDUSTRIAL FENCING MATERIAL WHICH IS READILY AVAILABLE AND INVOLVES NO SPECIAL MATERIALS. A FENCE FOR THE OFFSITE PORTION OF THE WATERWAY WHICH CONTAINS CONTAMINATED SOIL/SEDIMENT WOULD BE VERY DIFFICULT TO IMPLEMENT DUE TO FACTORS SUCH AS MULTIPLE LAND OWNERSHIP, THE STRONG POTENTIAL FOR FLOOD DAMAGE DURING HEAVY RAINS, AND VERY DIFFICULT CONSTRUCTION AND MAINTENANCE REQUIREMENTS. FENCING ALONG THE OFFSITE WATERWAY IS NOT INCLUDED IN THE DEVELOPMENT OF COSTS FOR THIS ALTERNATIVE.

DEED RESTRICTIONS ARE LEGALLY IMPLEMENTABLE FOR THE SITE BUT FOR OFFSITE PROPERTY WOULD REQUIRE EITHER VOLUNTARY COMPLIANCE BY THE PROPERTY OWNERS OR CONDEMNATION OF THE PROPERTY. IN ADDITION, PAST EXPERIENCE WITH WASTE DISPOSAL SITES HAS DEMONSTRATED THAT DEED RESTRICTIONS MAY BE IGNORED BY FUTURE LANDOWNERS OR NOT INCLUDED AS A DEED REQUIREMENT DURING PROPERTY TRANSFERS. THERE IS CURRENTLY NO GOVERNMENTAL AGENCY RESPONSIBLE FOR TRACKING AND ENFORCEMENT OF SUCH DEED RESTRICTIONS.

COST: THE ESTIMATED CAPITAL AND ANNUAL COSTS OF IMPLEMENTING ALTERNATIVE S/S-2 ARE PRESENTED IN TABLE 8-9. THE CAPITAL COSTS INCLUDE THE REQUIRED FENCING MATERIALS AND WARNING SIGNS AND THE

LEGAL COSTS OF INSTITUTING DEED RESTRICTIONS ON THE SITE ONLY. THE ANNUAL COSTS INCLUDE FENCE MAINTENANCE, SITE MOWING, AND WEEKLY SECURITY VISITS TO CONFIRM THE FENCE INTEGRITY. THE ANNUAL COSTS TO ENSURE COMPLIANCE WITH THE DEED RESTRICTIONS HAVE BEEN ESTIMATED. THE 30-YEAR PRESENT WORTH OF THIS ALTERNATIVE WOULD BE $172,000.

NO SENSITIVITY ANALYSIS WAS PERFORMED FOR THIS ALTERNATIVE.

8.2.3 ALTERNATIVE S/S-3: EXCAVATION FOR OFFSITE LANDFILL

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THIS ALTERNATIVE WOULD PROTECT THE LOCAL COMMUNITY AND THE ENVIRONMENT BY ELIMINATING ALL CONTACT WITH SOILS AND SEDIMENTS WHICH HAVE A PCB CONTENT OF OVER 1 PPM. THIS ALTERNATIVE WOULD ALSO ELIMINATE CROSS-MEDIA CONTAMINATION OF SURFACE WATER AND GREATLY REDUCE CONTAMINATION OF THE SURFICIAL AQUIFER GROUNDWATER.

THE DISPOSAL OF CONTAMINATED SOIL/SEDIMENT IN A RCRA OR TSCA LANDFILL, AS APPROPRIATE TO ITS PCB CONTENT, WILL PREVENT FUTURE EXPOSURE TO SITE CONTAMINANTS.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE WOULD COMPLY WITH TSCA REGULATIONS (40 CFR 761.6) RELATING TO THE TREATMENT AND DISPOSAL OF PCB-CONTAMINATED MEDIA SINCE ALL MEDIA WITH A PCB LEVEL OF GREATER THAN 50 PPM WOULD BE DISPOSED OF IN A TSCA-CERTIFIED LANDFILL. THE PCB SPILL POLICY (A POLICY TO BE CONSIDERED) REQUIRES THAT A 10-INCH LAYER OF CLEAN SOIL BE PLACED OVER ANY AREA WHERE PCB-CONTAMINATED (10 PPM OR MORE) MEDIA IS EXCAVATED. BOTH OF THESE ALTERNATIVE OPTIONS MEET THIS REQUIREMENT.

OFFSITE TRANSPORT OF CONTAMINATED SOIL/SEDIMENT WOULD BE GOVERNED BY DOT REGULATIONS. THE PROPOSED LANDFILL FACILITIES MEET THE REQUIREMENTS FOR A RCRA OR TSCA DISPOSAL FACILITY, AS APPLICABLE.

LONG-TERM EFFECTIVENESS AND PERMANENCE. THE EXCAVATION AND REMOVAL OF THE CONTAMINATED MEDIA FROM THE SITE AND OFFSITE DRAINAGE AREA WOULD PERMANENTLY REDUCE THE RESIDUAL RISK TO THE LOCAL COMMUNITY AND THE ENVIRONMENT. IT WOULD ALSO REDUCE THE POTENTIAL FOR CROSS-MEDIA CONTAMINATION OF SURFACE WATER, SEDIMENT, AND GROUNDWATER. ALTERNATIVE S/S-3A WOULD HAVE GREATER EFFECTIVENESS AND PERMANENCE SINCE IT WOULD REMOVE SOIL IN THE 1 PPM TO 10 PPM PCB RANGE WHICH THE OTHER OPTION WOULD NOT.

DISPOSAL OF CONTAMINATED SOIL/SEDIMENT IN A RCRA OR TSCA LANDFILL IS CONSIDERED TO BE A PERMANENT DISPOSAL METHOD. PROPERLY DESIGNED, SITED, AND OPERATED, SUCH LANDFILLS WOULD PERMANENTLY ISOLATE THE CONTAMINANTS FROM THE GENERAL ENVIRONMENT.

ALTERNATIVE S/S-3B WOULD HAVE SOMEWHAT LOWER LONG-TERM EFFECTIVENESS AND PERMANENCE THAN ALTERNATIVE S/S-3A BECAUSE IT DOES NOT REMOVE THE PORTION OF ONSITE SOIL/SEDIMENT CONTAINING BETWEEN 1 AND 10 PPM PCB. ALTHOUGH BOTH ALTERNATIVES MEET THE PCB SPILL POLICY, THE POTENTIAL FOR CONTINUED CROSS-MEDIA CONTAMINATION OF GROUNDWATER IS GREATER FOR THE S/S-3B OPTION.

ALTERNATIVE S/S-3B ALSO WOULD PLACE MORE RELIANCE ON MAINTAINING THE VEGETATIVE GROUND COVER THAN WOULD ALTERNATIVE S/S-3A. THE 10-INCH CLEAN SOIL COVER MUST BE MAINTAINED OVER SOIL COVER EXCEEDING 1 PPM PCB IN ORDER TO PROVIDE THE REQUIRED DEGREE OF PROTECTION OF HUMAN HEALTH.

IN GENERAL, BOTH OF THE TWO ABOVE POINTS WOULD APPLY TO ALL OF THE SOIL/SEDIMENT REMEDIAL ALTERNATIVES' "A" AND "B" OPTIONS.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: LANDFILL DISPOSAL REDUCES THE MOBILITY OF SOIL/SEDIMENT CONTAMINANTS BUT DOES NOT EFFECT THEIR TOXICITY OR VOLUME.

ALTERNATIVE S/S-3A WOULD PROVIDE A HIGHER DEGREE OF REDUCTION IN POLLUTANT MOBILITY THAN WOULD S/S-3B BECAUSE IT REMOVES THE PORTION OF THE ONSITE SOIL CONTAINING BETWEEN 1 AND 10 PPM PCB. THIS FACTOR WOULD APPLY TO ALL OF THE SOIL/SEDIMENT ALTERNATIVES' "A" AND "B" OPTIONS.

SHORT-TERM EFFECTIVENESS: THE PRINCIPAL SHORT TERM IMPACTS OF IMPLEMENTATION OF THIS ALTERNATIVE ARE DUE TO THE EXCAVATION OF THE CONTAMINATED MEDIA AND THE PLACEMENT OF BACKFILL SOIL. THESE ACTIVITIES WOULD RESULT IN INCREASES IN AMBIENT NOISE LEVELS, WINDBLOWN DUST, AND SOIL EROSION. THESE IMPACTS WOULD BE MITIGATED BY LIMITING THE HOURS OF OPERATION, SOIL MOISTURE CONTROL, EROSION CONTROL MEASURES, AND REESTABLISHING VEGETATIVE COVER. THE EXCAVATION WORK WOULD BE STAGED AND COORDINATED WITH THE BACKFILL AND SEEDING ACTIVITIES TO MINIMIZE THE POTENTIAL FOR DUSTING AND EROSION.

THERE WOULD BE SOME RISK OF EXPOSURE TO CONTAMINANTS DURING THE TRANSPORT OF SOIL/SEDIMENT TO THE OFFSITE LANDFILLS AS A RESULT OF DUST LOSSES OR ACCIDENTS. THE TRAILERS WOULD BE COVERED AND ALL APPLICABLE RCRA AND DOT REGULATIONS WOULD BE FOLLOWED. THE TRANSPORT WOULD ALSO RESULT IN UNAVOIDABLE INCREASES IN LOCAL TRUCK TRAFFIC IN THE SITE AREA. THIS EFFECT WOULD BE MINOR GIVEN THE CLOSE PROXIMITY OF MAJOR ROADS (BUSINESS ROUTE 95) TO THE SITE.

IMPLEMENTABILITY: THE EXCAVATION, TRANSPORT, AND LANDFILL DISPOSAL OF SOIL ARE ESTABLISHED PROCESSES AND NUMEROUS CONTRACTORS WOULD BE AVAILABLE TO PERFORM THE WORK. CLEAN BACKFILL SOIL IS READILY AVAILABLE IN THE AREA.

A SIGNIFICANT POTENTIAL PROBLEM WITH THE TRANSPORT OF CONTAMINATED SOIL/SEDIMENT TO OFFSITE RCRA AND TSCA LANDFILLS IS THE CURRENT PROBLEMS WITH SHIPMENTS OF HAZARDOUS WASTE FROM NORTH CAROLINA TO SOUTH CAROLINA OR TO ALABAMA. BOTH OF THESE STATES HAVE ATTEMPTED TO TAX, PROHIBIT, OR OTHERWISE REGULATE SHIPMENTS OF HAZARDOUS MATERIALS TO THE LANDFILLS LOCATED IN THEIR STATES.

COST: THE ESTIMATED CAPITAL AND ANNUAL COST OF ALTERNATIVES S/S-3A AND S/S-3B ARE PRESENTED IN TABLES 8-10 AND 8-11, RESPECTIVELY. BECAUSE THE EXPOSURE RISK DUE TO CONTACT WITH ONSITE SOIL WOULD BE ELIMINATED, THIS ALTERNATIVE DOES NOT INCLUDE COSTS FOR ADDITIONAL FENCING. PERIODIC MOWING AND VISITS BY SECURITY PERSONNEL WOULD OCCUR, HOWEVER. THE TOTAL PRESENT WORTH OF ALTERNATIVES S/S-3A AND S/S-3B WOULD BE $9,228,800 AND $8,463,600, RESPECTIVELY.

8.2.4 ALTERNATIVE S/S-4: EXCAVATION FOR ONSITE INCINERATION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THIS ALTERNATIVE WOULD PROVIDE GENERALLY THE SAME DEGREE OF PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT AS ALTERNATIVE S/S-3. ALL CONTACT WITH SOILS OR SEDIMENTS CONTAINING OVER 1 PPM PCBS WOULD BE ELIMINATED. BECAUSE INCINERATION WOULD NOT ELIMINATE OR REDUCE THE INORGANIC CONTENT OF THE MEDIA, SOME ELEVATED RISK DUE TO INGESTION AND DERMAL CONTACT WITH INORGANICS WOULD REMAIN. THIS RISK WOULD NOT EXCEED A CHRONIC HAZARD QUOTIENT OF 1 OR A CARCINOGENIC RISK INDEX OF GREATER THAN (10-6) FOR ANY AFFECTED ONSITE OR OFFSITE POPULATION.

COMPLIANCE WITH ARARS: THE REQUIREMENTS OF THE NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) AND THE NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAP) ARE RELEVANT AND APPROPRIATE TO THIS ALTERNATIVE AND WOULD BE COMPLIED WITH BY INSTALLING AIR EMISSION CONTROL DEVICES ON THE INCINERATOR AND CONTROLLING THE RELEASE OF FUGITIVE DUST AND VOLATILE EMISSIONS DURING EXCAVATION AND MATERIAL HANDLING. INCINERATION OF THE SOIL/SEDIMENT WOULD MEET THE REQUIREMENTS IN 40 CFR 761.60 AND 761.70.

COMPLIANCE WITH TSCA PCB REGULATIONS (40 CFR 761.60 TO 761.70) WOULD BE ACHIEVED BY FOLLOWING THE TREATMENT, STORAGE, AND DISPOSAL REQUIREMENTS FOR PCBS BASED ON THEIR FORM AND CONCENTRATION. REGULATIONS PERTAINING TO THERMAL DESTRUCTION, SOIL HANDLING, OR GASEOUS WASTE TREATMENT, AND NESHAP GUIDELINES WOULD BE FOLLOWED THROUGH THE USE OF AIR EMISSION CONTROL

DEVICES AT THE SITE. SINCE THIS IS A CERCLA SITE, A NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT IS NOT REQUIRED FOR ONSITE ACTIVITIES; HOWEVER, THE REQUIREMENTS WOULD BE FOLLOWED IF THE SCRUBBER WATER FROM THE INCINERATOR IS TO BE TREATED ONSITE AND DISCHARGED TO A LOCAL STREAM. IF THE SCRUBBER WATER IS DISCHARGED TO THE FAYETTEVILLE WASTEWATER TREATMENT FACILITIES, THE WASTEWATER WOULD BE TREATED AS REQUIRED TO MEET THE CITY PRETREATMENT REQUIREMENTS. RCRA SUBPART O REGULATIONS RELATING TO INCINERATORS WOULD BE RELEVANT AND APPROPRIATE; HOWEVER, THE MORE STRINGENT TSCA REGULATIONS WOULD BE FOLLOWED. APPLICABLE OSHA REQUIREMENTS WOULD BE MET BY FOLLOWING APPROPRIATE SITE SAFETY ACTIVITIES DESCRIBED IN THE CONTRACTOR'S HEALTH AND SAFETY PLAN. THE NORTH CAROLINA HAZARDOUS WASTE MANAGEMENT ACT WOULD BE FOLLOWED WHENEVER THEIR REQUIREMENTS ARE MORE STRINGENT THAN THE CORRESPONDING FEDERAL REQUIREMENTS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE INCINERATION OF CONTAMINATED SOIL/SEDIMENT WOULD PERMANENTLY ELIMINATE THE HAZARDS ASSOCIATED WITH ORGANIC CONTAMINANTS SUCH AS PCB, AND DIOXIN/FURANS. REMOVAL EFFICIENCIES IN EXCESS OF 99.9 PERCENT OF ALL ORGANIC CONTAMINANTS WOULD BE ACHIEVED.

AS DISCUSSED EARLIER, THIS ALTERNATIVE DOES NOT ELIMINATE INORGANIC CONTAMINANTS. IN FACT, INCINERATION MAY CONVERT INORGANIC CONTAMINANTS TO MORE SOLUBLE COMPOUNDS. THIS STUDY ASSUMES THAT THE INCINERATED MEDIA WOULD PASS THE EPA'S TOXICITY CHARACTERISTIC LEACHATE PROCEDURE (TCLP) AND COULD BE REPLACED IN ITS ORIGINAL OFFSITE AND ONSITE LOCATIONS. IF THIS ASSUMPTION PROVES TO BE INCORRECT, THE TREATED MEDIA WOULD BE TRUCKED TO AN OFFSITE RCRA LANDFILL AND REPLACED WITH CLEAN BACKFILL.

ALTERNATIVE S/S-4A WOULD PROVIDE GREATER EFFECTIVENESS AND PERMANENCE SINCE THIS OPTION WOULD TREAT ONSITE SOIL/SEDIMENT IN THE 1 PPM TO 10 PPM PCB RANGE WHICH ALTERNATIVE S/S-4B WOULD NOT. CONTINUED COMPLIANCE WITH THE EPA PCB GUIDANCE WOULD BE POSSIBLE ONLY IF THE 10-INCH SOIL COVER OVER MEDIA IN THIS RANGE WERE MAINTAINED.

ANNUAL MAINTENANCE ACTIVITIES AT THE SITE WOULD INCLUDE PERIODIC SITE VISITS, MAINTENANCE OF VEGETATION COVER, AND GROUNDWATER MONITORING. A 5-YEAR REVIEW WOULD BE REQUIRED TO ENSURE THE EFFECTIVENESS OF THE ALTERNATIVE IN PROTECTING THE PUBLIC HEALTH AND THE ENVIRONMENT.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: INCINERATION WOULD GREATLY REDUCE THE TOXICITY, MOBILITY, AND VOLUME OF PCBS, DIOXIN/FURANS, AND OTHER ORGANIC SOIL/SEDIMENT CONTAMINANTS. THERMAL DESTRUCTION OF PCBS IS AN IRREVERSIBLE PROCESS WITH A DESTRUCTION AND REMOVAL EFFICIENCY EXCEEDING 99.9999 PERCENT AND, THEREFORE, THE ALTERNATIVE WOULD SATISFY THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT OF A REMEDIAL ACTION. THE EFFECTIVENESS OF THIS INCINERATION ALTERNATIVE TO DESTROY ORGANICS WOULD HAVE TO BE TESTED DURING THE TRIAL BURN. INORGANIC CONTAMINANTS (E.G., COPPER) MAY FORM MORE OXIDIZED COMPOUNDS, BUT WOULD NOT BE DESTROYED. THE TOXICITY AND MOBILITY OF THESE OXIDIZED COMPOUNDS MAY BE GREATER OR LESS THAN THE ORIGINAL INORGANIC COMPOUNDS IN THE SOIL/SEDIMENT.

SHORT-TERM EFFECTIVENESS: THE SHORT-TERM EFFECTIVENESS OF THIS ALTERNATIVE WOULD BE SIMILAR TO ALTERNATIVE S/S-3 WITH THE ADDITIONAL CONSIDERATIONS RELATED TO EMISSIONS FROM ONSITE INCINERATION. THE SAME STEPS TO CONTROL SITE ACCESS, FUGITIVE DUST EMISSIONS, AND SURFACE RUNOFF WOULD BE TAKEN. IN ADDITION, INCINERATOR EXHAUST EMISSIONS WOULD BE MONITORED DURING ALL SITE ACTIVITIES TO ENSURE THE EFFECTIVENESS OF INCINERATION EMISSION CONTROLS. EVEN WITH THE STRINGENT CONTROLS PLACED ON INCINERATOR EMISSIONS, COMBUSTION BY-PRODUCTS AND PRODUCTS OF INCOMPLETE COMBUSTION COULD BE INTRODUCED INTO THE ENVIRONMENT.

THE SHORT-TERM RISKS OF THIS ALTERNATIVE TO WORKERS WOULD BE POTENTIAL EXPOSURE TO CONTAMINATED SOIL/SEDIMENT DURING EXCAVATION AND MATERIAL HANDLING. THERE WOULD ALSO BE A RISK OF WORKER EXPOSURE TO INORGANIC CONTAMINANTS WITH TOXIC CHARACTERISTICS DURING SOIL REPLACEMENT. THESE

RISKS WOULD BE MINIMIZED BY COMPLIANCE WITH THE OSHA REQUIREMENTS AND GUIDELINES FOR HAZARDOUS WASTE SITE ACTIVITIES.

SINCE INCINERATION IS A COMPLEX INDUSTRIAL OPERATION, THERE IS ALWAYS THE RISK OF ACCIDENTS. RISKS ASSOCIATED WITH INCINERATION INCLUDE:

- INCOMPLETE DESTRUCTION OF ORGANIC CONTAMINANTS RESULTING IN THE RELEASE OF TOXIC OR HAZARDOUS VAPORS AND PARTICULATES.
- MALFUNCTION OF THE INCINERATOR RESULTING IN FIRE OR EXPLOSION.
- AIR POLLUTION CONTROL EQUIPMENT MALFUNCTION RESULTING IN RELEASE OF TOXIC OR HAZARDOUS VAPORS OR SOLIDS.
- ACCIDENTAL RELEASES DUE TO IMPROPER OPERATION.

THE THREAT FROM THESE POSSIBILITIES WOULD BE MINIMIZED BY FOLLOWING PROPER OPERATION, MAINTENANCE, AND SAFETY PROCEDURES.

THE TIME REQUIRED TO IMPLEMENT AND COMPLETE THIS REMEDIAL PROCESS WOULD BE SUBSTANTIAL. DEPENDING ON WHICH INCINERATION TECHNOLOGY IS USED, INCINERATOR FABRICATION TIME MAY BE NEEDED AND THE ALTERNATIVE IMPLEMENTATION COULD TAKE AN ADDITIONAL 8 TO 9 MONTHS. SINCE INCINERATOR FEED RATES ARE A FUNCTION OF MOISTURE CONTENT AND COMBUSTIBILITY, INCREASED MOISTURE CONTENT OR LOW COMBUSTIBILITY COULD DECREASE THE THROUGHPUT TO THE INCINERATOR, THUS INCREASING THE TIME NECESSARY TO COMPLETE THE REMEDIATION.

IMPLEMENTABILITY: THE EXCAVATION, THERMAL TREATMENT, AND REPLACEMENT SOIL/SEDIMENT ARE ESTABLISHED PRACTICES AND CONTRACTORS THAT SPECIALIZE IN THIS TYPE OF WORK ARE READILY AVAILABLE. TRANSPORTATION AND SETUP OF THE MOBILE INCINERATOR ARE ALSO PROVEN OPERATIONS, BUT COULD BE TIME CONSUMING. COORDINATION BETWEEN SITE ACTIVITIES MAY BE DIFFICULT DUE TO THE LIMITED SIZE OF THE SITE.

THE USE OF A TRANSPORTABLE INCINERATOR TO DESTROY ORGANIC CONTAMINANTS IS A PROVEN AND RELIABLE TECHNOLOGY. INORGANIC CONTAMINANTS WOULD NOT BE DESTROYED AS DISCUSSED PREVIOUSLY. O&M REQUIREMENTS FOR A MOBILE INCINERATOR ARE FAIRLY EXTENSIVE, BUT WOULD NORMALLY BE THE RESPONSIBILITY OF THE INCINERATOR OWNER/OPERATOR.

COMPLEX OPERATING PROCEDURES WOULD REQUIRE FULLY TRAINED OPERATING PERSONNEL. DETAILED AND CAREFUL MONITORING OF THE INCINERATION PROCESSES WOULD BE REQUIRED. LABORATORY ANALYSES OF THE INCINERATED RESIDUE WOULD BE REQUIRED TO ENSURE THAT THE ORGANIC CONTAMINANTS WERE BEING EFFECTIVELY DESTROYED. ADDITIONALLY, SAMPLES FROM EXCAVATED SOIL/SEDIMENT WOULD BE TAKEN TO CONFIRM THAT THE CONTAMINATED SURFACE/SEDIMENT IS REMOVED TO ACCEPTABLE LEVELS.

A MAJOR CONSIDERATION IN EVALUATING THE IMPLEMENTABILITY OF AN ONSITE INCINERATOR IS THE LOCATION OF A WASTE INCINERATOR ON A RELATIVELY SMALL SITE AND IN SUCH CLOSE PROXIMITY TO A FOOD PROCESSING FACILITY, LARRY'S SAUSAGE. A VERY HIGH DEGREE OF STACK EMISSION CONTROLS WOULD BE REQUIRED TO ENSURE THAT OPERATION OF THE INCINERATOR MET ALL ARAR'S.

COSTS: THE ESTIMATED CAPITAL AND ANNUAL COSTS FOR ALTERNATIVES S/S-4A AND S/S-4B ARE PRESENTED IN TABLES 8-12 AND 8-13 RESPECTIVELY. A MAJOR ASSUMPTION IN THE DEVELOPMENT OF THIS ALTERNATIVE'S COST IS THE ASSUMPTION THAT THE TREATED SOIL/SEDIMENT COULD BE PLACED BACK IN ITS ORIGINAL LOCATION. THE TOTAL PRESENT WORTHS OF ALTERNATIVES S/S-4A AND S/S-4B ARE $18,019,300 AND $16,301,200, RESPECTIVELY.

8.2.5 ALTERNATIVE S/S-5: EXCAVATION FOR ONSITE CHEMICAL DECHLORINATION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. THIS ALTERNATIVE WOULD PROTECT HUMAN HEALTH AND THE ENVIRONMENT FROM PCB CONTAMINATION LOCATED AT THE CAROLINA TRANSFORMER SITE BY CHEMICALLY TREATING THE CONTAMINATED SOIL/SEDIMENT AND DECHLORINATING THE PCB MOLECULES. THE CHEMICAL REAGENT WOULD BE RECOVERED AND REUSED, ANY WASTES WOULD BE INCINERATED OFFSITE AND THE TREATED SOIL/SEDIMENT WOULD BE REDEPOSITED ONSITE. THIS ALTERNATIVE WOULD HAVE NO EFFECT ON INORGANIC SOIL CONTAMINANTS SUCH AS COPPER.

THE EXCAVATION AND TREATMENT OF THE CONTAMINATED SOIL/SEDIMENT IN CONFORMANCE WITH THE SPECIFIED CLEANUP LEVEL (LT 1 PPM FOR ALTERNATIVE S/S-5A, OR LT 10 PPM FOR ALTERNATIVE S/S-5B) WOULD EFFECTIVELY MINIMIZE DANGER TO PUBLIC HEALTH AND THE ENVIRONMENT AT THE SITE FROM PCBS AND OTHER CHLORINATED HYDROCARBONS TO APPROXIMATELY THE SAME EXTENT AS ONSITE INCINERATION. CARCINOGENIC RISK WOULD BE REDUCED TO THE RANGE OF 1 X (10-4) TO 1 X (10-6). NON-CARCINOGENIC RISK FACTORS DUE TO CONTACT OR INGESTION OF SOIL/SEDIMENT WOULD NOT BE INCREASED. THIS ALTERNATIVE ELIMINATES THE PRIMARY CONTAMINANTS OF CONCERN TO THE OTHER BIOTIC RECEPTORS, BOTH PLANT AND ANIMAL, AS WELL.

COMPLIANCE WITH ARARS: THE REQUIREMENTS OF NAAQS AND NESHAP ARE RELEVANT AND APPROPRIATE TO THIS ALTERNATIVE AND WOULD BE COMPLIED WITH BY IMPLEMENTING AIR EMISSION CONTROL DEVICES ON THE DECHLORINATION EQUIPMENT AND CONTROLLING THE RELEASE OF FUGITIVE DUST AND VOLATILE EMISSIONS DURING MATERIAL HANDLING.

THIS ALTERNATIVE MAY NOT BE IN COMPLIANCE WITH PARTS OF TSCA CHEMICAL-SPECIFIC AND ACTION-SPECIFIC REGULATIONS, INCLUDING 40 CFR 761.60, 761.70, AND 761.75. SOIL/SEDIMENT HAVING PCB CONCENTRATIONS IN EXCESS OF 50 PPM ARE SPECIFICALLY REQUIRED BY PART 761.60 (A)(4) TO BE DISPOSED IN AN INCINERATOR (761.70), CHEMICAL WASTE LANDFILL (761.75), OR BY EQUIVALENT TREATMENT (761.60 (A)). CHEMICAL DECHLORINATION WILL REQUIRE PILOT TREATMENT TESTS TO BE CONSIDERED AN EQUIVALENT TREATMENT METHOD SINCE LIMITED STUDIES ARE AVAILABLE THAT DOCUMENT ITS EFFECTIVENESS AND EFFECTIVENESS MAY VARY WITH SOIL/SEDIMENT COMPOSITION AND OTHER FACTORS.

THE EVALUATION OF THE FEDERAL LOCATION-SPECIFIC ARARS WOULD BE SIMILAR TO THE EVALUATION OF THE ONSITE INCINERATION ALTERNATIVE WITH THE EXCEPTION THAT A POLLUTANT DISPERSION ANALYSIS WOULD NOT BE REQUIRED SINCE THERE IS NO ONSITE COMBUSTION INVOLVED. THE SAME STATE ARARS WOULD ALSO APPLY.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE EXTENT OF RESIDUAL RISK POSED BY THE CHLORINATED HYDROCARBON CONTAMINATED MATERIAL WOULD BE REDUCED AND POSSIBLY ELIMINATED DEPENDING ON THE DEGREE OF DECHLORINATION ACHIEVED WITH THE IMPLEMENTATION OF THIS ALTERNATIVE. THE DESTRUCTION OF SUCH ORGANIC CONTAMINANTS AT THE SITE WOULD REDUCE THE LONG-TERM RISKS ASSOCIATED WITH DIRECT HUMAN CONTACT AND INHALATION AND WITH CROSS-MEDIA CONTAMINATION. THE SYSTEM IS INEFFECTIVE IN REMOVING INORGANIC CONTAMINANTS FROM SOIL/SEDIMENT MEDIA.

THE REMAINING REAGENT AND RINSE WATER WOULD BE RECYCLED OR INCINERATED OFFSITE AND THE TREATED SOIL/SEDIMENT WOULD BE REDEPOSITED ONSITE.

REDUCTION OF TOXICITY, MOBILITY AND VOLUME: CHEMICAL DECHLORINATION HAS BEEN DEMONSTRATED TO REDUCE PCB CONCENTRATIONS IN TRANSFORMER OIL TO LT 10 PPM. FULL SCALE DEMONSTRATION PLANTS HAVE ACHIEVED REDUCTIONS IN SOIL MEDIA TO A RESIDUAL OF LESS THAN 2 PPM. SINCE THE PCB AND OTHER CHLORINATED HYDROCARBON CONTAMINANTS WOULD BE PERMANENTLY DESTROYED, CHEMICAL DECHLORINATION COULD ESSENTIALLY ELIMINATE THE TOXICITY, MOBILITY, AND VOLUME OF THE CONTAMINANTS AND SATISFY THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPLE ELEMENT OF A REMEDIAL ACTION.

SHORT-TERM EFFECTIVENESS: TEMPORARY HAZARDS TO THE COMMUNITY AND THE ENVIRONMENT DURING THE

IMPLEMENTATION OF THIS ALTERNATIVE WOULD INCLUDE THE POSSIBILITY OF RELEASE OF AND EXPOSURE TO CONTAMINANTS TRANSPORTED BY SURFACE RUNOFF, ADSORPTION OF AIRBORNE DUST, OR RELEASE BY VOLATILIZATION OF PCBS DURING THE CHEMICAL DECHLORINATION PROCESS. THE POTENTIAL FOR RELEASE OR EXPOSURE VIA THESE ROUTES WOULD BE MINIMIZED WITH THE USE OF BERMS AND SUMPS TO CONTROL RUNOFF, NONREACTIVE DUST SUPPRESSANTS AND WIND SCREENS TO PREVENT FUGITIVE DUST EMISSIONS, AND VEHICLE DECONTAMINATION TO PREVENT SPREAD OF CONTAMINANTS OFFSITE. EVEN WITH THE USE OF EMISSION CONTROLS DURING IMPLEMENTATION OF THIS ALTERNATIVE, SOME UNCONTROLLED EMISSIONS TO THE ENVIRONMENT CAN BE EXPECTED.

IMPLEMENTABILITY: HANDLING OF CONTAMINATED SOIL/SEDIMENT DURING CHEMICAL DECHLORINATION ARE ESTABLISHED PROCEDURES AND CONTRACTORS THAT SPECIALIZE IN THIS TYPE OF WORK ARE GENERALLY AVAILABLE.

RESEARCH ON POLYCHLORINATED COMPOUNDS HAS SHOWN THAT A CATALYST CAN BE USED AT ROOM TEMPERATURE TO CAUSE A RAPID REDUCTION REACTION WHERE CHLORINE ATOMS ON THE ORGANIC COMPOUND ARE REPLACED WITH HYDROGEN ATOMS. HOWEVER, THE PROCESS MAY NOT COMPLETELY DECHLORINATE SOME ORGANIC CHEMICALS AND MAY PRODUCE EQUALLY TOXIC OR MORE TOXIC BYPRODUCTS. A TREATABILITY STUDY USING SITE SPECIFIC SOIL/SEDIMENT WOULD BE REQUIRED TO DETERMINE THE DECHLORINATION EFFICIENCY, REAGENT REQUIREMENTS, AND BYPRODUCTS PRODUCED. SUCH TESTING WOULD DETERMINE IF FURTHER REMEDIAL ACTION IS REQUIRED TO TREAT THE BYPRODUCTS PRODUCE.

COST: THE DETAILED CAPITAL AND ANNUAL COST ESTIMATES FOR ALTERNATIVE S/S-5A AND ALTERNATIVE S/S-5B ARE PRESENTED IN TABLE 8-14 AND TABLE 8-15, RESPECTIVELY. THE CAPITAL COSTS ASSOCIATED WITH IMPLEMENTATION INCLUDE TREATABILITY TESTING, MATERIAL HANDLING, CHEMICAL DECHLORINATION, SOIL/SEDIMENT SAMPLING, AND SITE RESTORATION. INCLUDED IN THE COST OF CHEMICAL DECHLORINATION IS THE OPERATING COST OF THE DECHLORINATION EQUIPMENT AND DISPOSAL OF RESIDUAL REAGENT AND RINSE WATER OFFSITE BY THE CONTRACTOR. ANNUAL COSTS ASSOCIATED WITH THIS ALTERNATIVE INCLUDE MOWING THE REVEGETATED AREAS AND WEEKLY VISITS BY SECURITY PERSONNEL. AS IN THE ONSITE INCINERATION ALTERNATIVE, THIS ALTERNATIVE'S COSTS ARE BASED ON THE ASSUMPTION THAT THE TREATED SOIL/SEDIMENT CAN BE REDEPOSITED IN ITS ORIGINAL LOCATION. THE TOTAL PRESENT WORTH OF ALTERNATIVES S/S-5A AND S/S-5B ARE $8,560,900 AND $7,820,800, RESPECTIVELY.

8.2.6 ALTERNATIVE S/S-6: EXCAVATION FOR ONSITE SOLVENT EXTRACTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THIS ALTERNATIVE WOULD PROTECT THE LOCAL COMMUNITY AND THE ENVIRONMENT BY CHEMICALLY TREATING THE CONTAMINATED SOIL/SEDIMENT CONTAINING PCB CONCENTRATIONS ABOVE 1 PPM (FOR ALTERNATIVE S/S-6A) OR ABOVE 10 PPM (FOR ALTERNATIVE S/S-6B). THE TREATMENT WOULD INVOLVE THE EXTRACTION OF THE PCB MOLECULES FROM THE SOIL. THE TREATED SOIL WOULD BE REDEPOSITED ONSITE AND THE SOLVENT RESIDUALS WOULD BE TRANSPORTED OFFSITE FOR RECYCLING OR INCINERATION.

TREATMENT OF THE SOILS AND REMOVAL OF THE PCB CONTAMINANTS WOULD CONTROL THE RISK OF DIRECT CONTACT OR INGESTION OF PCBS IN THE CONTAMINATED SOILS. DEPENDING UPON THE SOLVENT USED, THIS ALTERNATIVE MAY ALSO BE EFFECTIVE FOR OTHER ORGANIC CONTAMINANTS SUCH AS DIOXIN/FURANS. THE TREATMENT SYSTEM WOULD NOT REDUCE RISKS ASSOCIATED WITH CROSS-MEDIA CONTAMINATION BY INORGANIC CONTAMINANTS.

COMPLIANCE WITH ARARS: THIS ALTERNATIVE'S COMPLIANCE WITH ARARS WOULD GENERALLY BE THE SAME AS ONSITE DECHLORINATION. THE CONCENTRATED WASTES WHICH WOULD BE DRUMMED FOR OFFSITE INCINERATION MUST MEET RCRA AND DOT REGULATIONS FOR SHIPMENT OF HAZARDOUS MATERIALS. THIS ALTERNATIVE DOES NOT GENERATE A WASTEWATER STREAM, THEREFORE, NO DISCHARGE TO SURFACE WATERS OR THE POTW WOULD BE REQUIRED.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE LONG-TERM EFFECTIVENESS AND PERMANENCE OF THIS

ALTERNATIVE WOULD BE SIMILAR TO THE PREVIOUS ALTERNATIVE, DECHLORINATION, EXCEPT THAT THE ORGANIC CONTAMINANTS WOULD BE CONCENTRATED AND THEN INCINERATED OFFSITE. RESIDUAL ORGANIC CONTAMINATION IN THE TREATED SOIL/SEDIMENT WOULD BE SIMILAR. THE RESIDUAL RISK DUE TO ALL FORMS OF CONTACT WITH ONSITE AND OFFSITE SOIL/SEDIMENT WOULD BE REDUCED.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: THE SOLVENT EXTRACTION PROCESS ACHIEVES REDUCTIONS IN THE TOXICITY AND VOLUME OF ORGANIC CONTAMINANTS AND IN THE MOBILITY OF INORGANICS. THE PROCESS CONCENTRATES THE ORGANIC CONTAMINANTS IN A LIQUID WASTE STREAM WHICH IS THEN SENT TO AN INCINERATOR FOR DESTRUCTION. THE PROCESS HAS DEMONSTRATED OVER 99 PERCENT PCB REMOVAL FROM SOILS AND SEDIMENTS IN DEMONSTRATION SCALE PROJECTS. SIMILAR REMOVAL EFFICIENCIES WOULD BE EXPECTED FOR DIOXIN/FURANS AND OTHER ORGANICS. THE SOIL DOES RETAIN A RESIDUAL TEA CONTENT OF UP TO 500 PPM, HOWEVER, TEA IS NOT TOXIC AND READILY BIODEGRADES. THE PROCESS DOES NOT REDUCE THE TOXICITY OR VOLUME OF INORGANIC CONTAMINANTS. IT DOES, HOWEVER, CONVERT METALS SUCH AS MERCURY, LEAD, ZINC, CHROMIUM, AND COPPER TO THEIR LOWEST SOLUBILITY STATES, THUS MINIMIZING THEIR MOBILITY.

SHORT-TERM EFFECTIVENESS: THE SHORT-TERM IMPACTS OF THE SOLVENT EXTRACTION PROCESS WOULD BE VERY SIMILAR TO DECHLORINATION. THE PRINCIPLE EFFECTS WOULD BE THE RESULT OF EXCAVATION AND REPLACEMENT ACTIVITIES, NOT THE SOLVENT EXTRACTION EQUIPMENT.

HAZARDOUS MATERIALS EXTRACTED FROM THE SOIL/SEDIMENT WOULD BE TRANSPORTED TO AN OFFSITE LICENSED INCINERATOR.

IMPLEMENTABILITY: AS IN THE TWO PREVIOUS ALTERNATIVES, THE MATERIAL HANDLING PORTION OF THIS ALTERNATIVE USES ESTABLISHED PRACTICES AND CONTRACTORS THAT ARE READILY AVAILABLE. THE SOLVENT EXTRACTION PROCESS MUST BE PILOT TESTED PRIOR TO IMPLEMENTATION TO CONFIRM REMOVAL EFFICIENCIES, NUMBER OF EXTRACTION CYCLES, SOLVENT CONSUMPTION, AND OTHER PROCESS VARIABLES. SUCH TESTING WOULD ALSO CONFIRM WHETHER THE TREATED MEDIA IS SUITABLE FOR REPLACEMENT OR WHETHER IT MUST BE LANDFILLED OFFSITE.

COST: THE DETAILED CAPITAL AND ANNUAL COST ESTIMATES FOR ALTERNATIVES S/S-6A AND S/S-6B ARE PRESENTED IN TABLES 8-16 AND 8-17, RESPECTIVELY.

THE CAPITAL COSTS INCLUDED MATERIAL HANDLING, PILOT PLANT OPERATION, SOLVENT EXTRACTION, CONFIRMATION TESTING, AND SITE RESTORATION. ANNUAL COSTS ARE LIMITED TO PERIODIC SITE MOWING AND SECURITY INSPECTIONS. THE TOTAL PRESENT WORTHS OF ALTERNATIVES S/S-6A AND S/S-6B ARE $9,346,000 AND $8,539,800, RESPECTIVELY.

8.3 STRUCTURE ALTERNATIVES

8.3.1 ALTERNATIVE S-1: NO ACTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THE REMEDIAL INVESTIGATION AND RISK ASSESSMENT FOR THE CAROLINA TRANSFORMER SITE DID NOT IDENTIFY ANY CHEMICAL CONTAMINATION RISKS ASSOCIATED WITH THE ONSITE STRUCTURES ALTHOUGH THE POSSIBILITY EXISTS THAT UNTESTED SURFACES MAY CONTAIN HIGH LEVELS OF PCBS. PHYSICAL RISKS DO EXIST TO TRESPASSERS DUE TO THE UNCERTAIN STRUCTURAL SOUNDNESS OF THE BUILDINGS. THE INTEGRITY OF THE STRUCTURES CAN BE EXPECTED TO CONTINUE TO DETERIORATE, INCREASING THIS RISK. THE "NO ACTION" ALTERNATIVE WOULD NOT PROVIDE ANY MITIGATION OF THIS RISK.

THE ONSITE BUILDING PROVIDES NO HAZARD TO THE ENVIRONMENT UNLESS UNDETECTED HIGH LEVELS OF PCB CONTAMINATION EXISTS ON WALLS AND FLOORS.

COMPLIANCE WITH ARARS: THE RESULTS OF PCB SURFACE CONTAMINATION TESTS INDICATE THAT THE STRUCTURE CURRENTLY MEETS THE PCB SPILL CLEANUP POLICY FOR HIGH CONTACT SURFACES. IF UNTESTED

AREAS EXIST WHICH EXCEED THIS LEVEL, THE "NO ACTION" ALTERNATIVE WOULD NOT BRING THESE AREAS INTO COMPLIANCE.

LONG-TERM EFFECTIVENESS AND PERMANENCE: BECAUSE REMEDIAL ACTIONS WOULD NOT OCCUR, THE EXISTING CHEMICAL AND PHYSICAL RISKS AT THE SITE WOULD REMAIN. SINCE SITE CONTROLS WOULD NOT BE IMPLEMENTED, THE CRITERION ADDRESSING THE ADEQUACY AND RELIABILITY OF CONTROLS IS NOT APPLICABLE TO THE ALTERNATIVE.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD NOT BE A REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS AT THE SITE. IF PRESENT, THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ON SITE.

SHORT-TERM EFFECTIVENESS: BECAUSE SITE ACTIVITIES WOULD NOT OCCUR, PROTECTION OF WORKERS AND THE COMMUNITY WOULD NOT BE REQUIRED. ENVIRONMENTAL IMPACTS DUE TO CONSTRUCTION OR IMPLEMENTATION WOULD NOT BE ENCOUNTERED SINCE THERE WOULD BE NO ACTIVITIES PERFORMED AT THE SITE.

IMPLEMENTABILITY: THIS CRITERION IS NOT APPLICABLE BECAUSE REMEDIAL ACTIVITIES WOULD NOT OCCUR. SERVICES AND MATERIALS AND THE ACTIVITIES NORMALLY NEEDED TO COORDINATE WITH OTHER AGENCIES WOULD NOT BE NECESSARY.

COST: THERE WOULD BE NO COSTS INCURRED SINCE REMEDIAL ACTIVITIES WOULD NOT BE PERFORMED.

8.3.2 ALTERNATIVE S-2: FENCING

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: RISKS ASSOCIATED WITH STRUCTURALLY UNSOUND BUILDING AND DERMAL CONTACT WITH POTENTIALLY CONTAMINATED SURFACES WOULD BE CONTROLLED BY ACCESS RESTRICTIONS. SECURITY FENCING WITH WARNING SIGNS WOULD REDUCE (BUT NOT ELIMINATE) THE POSSIBILITY OF SITE TRESPASSERS GAINING ACCESS TO THE BUILDINGS.

COMPLIANCE WITH ARARS: AS DESCRIBED IN SECTION 8.3.1. THIS ALTERNATIVE WOULD NOT MEET ARARS RELATED TO PCB SPILL CLEANUP IF CONTAMINATED SURFACES EXISTS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE LONG-TERM EFFECTIVENESS OF THIS ALTERNATIVE DEPEND UPON THE ENFORCEMENT AND MAINTENANCE PROVIDED. THE SECURITY FENCE WOULD BE REQUIRED INDEFINITELY TO PREVENT ACCESS. PERIODIC REPAIR OR REPLACEMENT OF THE FENCE WOULD BE NECESSARY.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD NOT BE A REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF STRUCTURE CONTAMINANTS AT THE SITE. IF PRESENT, THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ONSITE.

SHORT-TERM EFFECTIVENESS: THE MINIMAL INTRUSIVE ACTIVITIES INVOLVED WITH INSTALLING A PERIPHERAL FENCE AROUND THE SITE WOULD RESULT IN VERY SLIGHT ENVIRONMENTAL IMPACTS TO WORKERS OR THE COMMUNITY. SINCE THE FENCE WOULD BE INSTALLED BEYOND THE ZONE OF CONTAMINATION FROM THE STRUCTURES, SIMPLE MEASURES TO LIMIT WORKER CONTACT WITH CONTAMINATED STRUCTURES DURING CONSTRUCTION WOULD BE SUFFICIENT.

IMPLEMENTABILITY: THE INSTALLATION OF A PERIPHERAL FENCE AT THE SITE CAN BE EASILY IMPLEMENTED. THE FENCE WOULD BE OF STANDARD INDUSTRIAL FENCING MATERIAL WHICH IS READILY AVAILABLE AND INVOLVES NO SPECIAL MATERIALS.

COST: THE COSTS ASSOCIATED WITH THIS ALTERNATIVE ARE PRESENTED IN TABLE 8-18. THE TOTAL 30-YEAR PRESENT WORTH OF THIS ALTERNATIVE WOULD BE $168,900.

8.3.3 ALTERNATIVE S-3: PARTIAL DEMOLITION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: BY DEMOLISHING ALL BUILDING ROOFS AND WALLS, THIS ALTERNATIVE WOULD ELIMINATE HAZARDS TO TRESPASSERS DUE TO DETERIORATING STRUCTURAL INTEGRITY. SOLVENT TREATMENT OF PCB-CONTAMINATED FLOOR SURFACES (ALTERNATIVE S-3B), IF REQUIRED, WILL REDUCE THE POTENTIAL RISKS ASSOCIATED WITH THE REMAINING FLOOR SLABS.

COMPLIANCE WITH ARARS: THE DEMOLITION OF THE STRUCTURES' ROOFS AND WALLS WILL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE OSHA WORKER SAFETY REGULATIONS. ALTERNATIVE S-3A ASSUMES THAT THE FLOOR SLAB SURFACES CURRENTLY COMPLY WITH PCB SPILL CLEANUP POLICY OF 10 UG/100 CM2. IF SOME FLOOR AREAS CURRENTLY EXCEED THIS LEVEL, ALTERNATIVES S-3B WOULD ACHIEVE THIS ARAR BY SOLVENT WASHING THE AREAS. INCINERATION OF THE SOLVENT AND RINSES WOULD BE CONDUCTED IN AN APPROPRIATELY CERTIFIED TSCA INCINERATOR. NON-HAZARDOUS DEMOLITION DEBRIS WOULD BE DISPOSED OF IN A LICENSED LANDFILL.

LONG-TERM EFFECTIVENESS AND PERMANENCE: BOTH ALTERNATIVES S-3A AND S-3B WOULD PROVIDE THE SAME DEGREE OF LONG-TERM EFFECTIVE REDUCTION IN THE HAZARDS ASSOCIATED WITH ONSITE STRUCTURES. BOTH WOULD BE PERMANENT SOLUTIONS SINCE ALL DEMOLITION DEBRIS (AND WASTEWATER IF APPLICABLE) WOULD BE REMOVED FROM THE SITE.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: THIS CATEGORY IS NOT APPLICABLE FOR ALTERNATIVE S-3A SINCE IT ASSUMES THAT THE ONLY HAZARD PRESENTED BY THE ONSITE STRUCTURES IS A PHYSICAL HAZARD DUE TO DETERIORATING STRUCTURAL SOUNDNESS. IF PCB CONTAMINATION ON FLOOR SURFACES REQUIRES TREATMENT, ALTERNATIVE S-3B, SOLVENT WASHING CONCENTRATES THE CONTAMINANT IN A SOLVENT AND RINSE LIQUIDS WHICH WOULD BE INCINERATED. THIS ALTERNATIVE WOULD PROVIDE DESTRUCTION OF THE CONTAMINANT.

SHORT-TERM EFFECTIVENESS: SHORT-TERM RISKS TO THE ENVIRONMENT AND THE LOCAL COMMUNITY DURING SITE ACTIVITIES WOULD INVOLVE AIRBORNE DUST DURING DEMOLITION ACTIVITIES AND TRANSPORT OF DEMOLITION DEBRIS TO THE LANDFILL. FOR ALTERNATIVE S-3B, THERE WOULD ALSO BE A RISK OF EXPOSURE TO CONTAMINANTS DURING OFFSITE TRANSPORT OF SOLVENT AND RINSE WASTES AS A RESULT OF AN ACCIDENTAL SPILL. RCRA AND DOT REGULATIONS ARE DESIGNED TO MINIMIZE THE DANGER OF ACCIDENTAL RELEASE DURING TRANSPORT AND REDUCE THE HAZARDS ASSOCIATED WITH SUCH A RELEASE SHOULD IT OCCUR. SITE ACCESS WOULD ALSO BE RESTRICTED DURING IMPLEMENTATION TO PREVENT ACCIDENTAL EXPOSURE TO THE PUBLIC. TRANSPORT OF DEMOLITION DEBRIS WOULD RESULT IN UNCONTROLLABLE EFFECTS SUCH AS INCREASED TRAFFIC IN THE AREA OF THE SITE WHICH WOULD LEAD TO INCREASED NOISE AND FUGITIVE DUST EMISSIONS.

IMPLEMENTABILITY: THE DEMOLITION OF STRUCTURES IS AN ESTABLISHED PRACTICE AND CONTRACTORS THAT PERFORM THIS WORK ARE READILY AVAILABLE. CHEMICAL TREATMENT OF THE BUILDING SLABS IS AN INNOVATIVE TECHNOLOGY THAT HAS BEEN SHOWN TO BE EFFECTIVE IN EXTRACTING PCB MOLECULES AS DEEP AS 1-INCH IN NON-EARTHEN SURFACES SUCH AS CONCRETE SLABS.

IMPLEMENTATION OF THIS ALTERNATIVE WOULD REQUIRE THAT THE CHEMICAL TREATMENT PROCESS BE DEMONSTRATED TO PROVIDE TREATMENT OF PCB CONTAMINATED MATERIAL TO 10 UG/100 CM2. THE EFFECTIVENESS OF THE CHEMICAL TREATMENT WOULD HAVE TO BE EVALUATED DURING DEMONSTRATION TESTING.

COST: THE DETAILED CAPITAL AND ANNUAL COST ESTIMATES FOR ALTERNATIVES S-3A AND S-3B ARE PRESENTED IN TABLES 8-19 AND 8-20, RESPECTIVELY. THE CAPITAL COSTS ASSOCIATED WITH THESE ALTERNATIVES INCLUDE DEMOLITION OF THE ROOFS AND WALLS OF THE STRUCTURES, CHEMICAL TREATMENT OF THE BUILDING SLABS AND DISPOSAL OF THE DEMOLITION DEBRIS AND THE WASTE FROM THE CHEMICAL TREATMENT. THE ANNUAL O&M COST WOULD INCLUDE FENCE MAINTENANCE AND WEEKLY SECURITY VISITS. THE TOTAL PRESENT WORTH OF THESE ALTERNATIVES IS ESTIMATED TO BE APPROXIMATELY $189,700 AND $238,100, RESPECTIVELY.

8.3.4 ALTERNATIVE S-4: COMPLETE DEMOLITION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THESE ALTERNATIVES PROVIDE ESSENTIALLY THE SAME DEGREE OF PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT AS PARTIAL DEMOLITION ALTERNATIVES SINCE THE FLOOR SLABS PRESENT NO SIGNIFICANT HAZARDS IF THE PCB LEVEL OF THE SLABS MEETS THE 10 UG/100 CM2 REMEDIAL GOAL.

COMPLIANCE WITH ARARS: COMPLETE DEMOLITION OF THE SITE STRUCTURES WILL BE CONDUCTED IN ACCORDANCE WITH OSHA WORKER SAFETY REGULATIONS. SPOT AREAS OF CONCRETE WHICH CONTAIN EXCESSIVE PCB CONTAMINATION WOULD BE REMOVED AND LANDFILLED IN A TSCA LANDFILL. THE REMAINING DEMOLITION DEBRIS WILL BE DISPOSED OF IN A CONSTRUCTION MATERIAL LANDFILL MEETING STATE REQUIREMENTS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE DEMOLITION AND REMOVAL OF THE STRUCTURES FROM THE SITE WOULD EFFECTIVELY MINIMIZE THE DANGER TO THE PUBLIC AND THE ENVIRONMENT IN THE AREA OF THE SITE. IN ADDITION, PLACEMENT OF THE PCB-CONTAMINATED MATERIAL IN A SECURE LANDFILL WOULD REDUCE THE POTENTIAL FOR THE MIGRATION OF CONTAMINANTS INTO THE SOIL AND GROUNDWATER.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: THIS CATEGORY IS NOT APPLICABLE TO ALTERNATIVE S-4A SINCE IT ASSUMES THAT THE ONLY HAZARD PRESENTED BY THE STRUCTURES IS A PHYSICAL ONE DUE TO DETERIORATING STRUCTURAL SOUNDNESS. IF PCB CONTAMINATION OF FLOOR SURFACES IS PRESENT, THE REMOVAL AND LANDFILL OF THIS MATERIAL WOULD REDUCE ITS MOBILITY BUT WOULD HAVE NO EFFECT ON THE VOLUME OR TOXICITY OF THE CONTAMINATED MATERIAL.

SHORT-TERM EFFECTIVENESS: THE SHORT TERM RISKS TO THE ENVIRONMENT AND THE LOCAL COMMUNITY WOLD BE ESSENTIALLY THE SAME AS THOSE PRESENTED BY PARTIAL DEMOLITION. THE SEPARATE REMOVAL AND DISPOSAL OF PCB-CONTAMINATED CONCRETE FLOORING WOULD RESULT IN THE GENERATION OF MINOR AMOUNTS OF FUGITIVE DUST WHICH COULD BE CONTAMINATED WITH PCBS. DUST COLLECTION EQUIPMENT WOULD BE USED ON THIS EQUIPMENT FOR PROTECTION OF THE GENERAL PUBLIC AND DEMOLITION WORKERS.

IMPLEMENTABILITY: THE DEMOLITION OF STRUCTURES AS WELL AS OFFSITE TRANSPORTATION AND DISPOSAL OF CONTAMINATED MATERIALS WOULD BE EASILY IMPLEMENTED USING CONVENTIONAL CONSTRUCTION TECHNOLOGIES. THESE TECHNOLOGIES ARE ALL ESTABLISHED AND PROVEN METHODS OF HAZARDOUS WASTE REMEDIATION.

COST: THE DETAILED CAPITAL AND ANNUAL COST ESTIMATES FOR ALTERNATIVES S-4A AND S-4B ARE PRESENTED IN TABLES 8-21 AND 8-22, RESPECTIVELY. THE CAPITAL COST CATEGORIES FOR THESE ALTERNATIVES ARE THE SAME AS FOR PARTIAL DEMOLITION WITH THE ADDITION OF COSTS FOR BREAKING UP THE SLABS AND FOUNDATIONS AND TRANSPORTING THE ADDITIONAL WASTE VOLUME TO THE LANDFILL. THE TOTAL PRESENT WORTH OF THESE ALTERNATIVES WOULD BE $337,900 AND $369,700, RESPECTIVELY.

8.5 DEBRIS/SOLID WASTE ALTERNATIVES

8.5.1 ALTERNATIVE D-1: NO ACTION

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. SINCE REMEDIAL ACTION WOULD NOT BE INITIATED, THIS ALTERNATIVE WOULD NOT PROVIDE ANY PROTECTION TO HUMAN HEALTH OR THE ENVIRONMENT. SPECIFICALLY, THE NON-CARCINOGENIC HAZARD INDEX WOULD BE GREATER THAN 1 FOR FUTURE ONSITE RESIDENTS AND CARCINOGENIC RISK WOULD BE GREATER THAN 1 X (10-6) FOR ALL POPULATIONS EVALUATED IN THE RISK ASSESSMENT REPORT. ALSO CONCERN FOR PCB EXPOSURE BY TERRESTRIAL ANIMALS, BIRDS, AND PLANTS WOULD NOT BE REDUCED.

COMPLIANCE WITH ARARS: THE NO ACTION ALTERNATIVE WOULD NOT MEET ARARS; SPECIFICALLY, TSCA REGULATIONS FOR CLEANUP AND DISPOSAL OF PCB SPILLS. VIOLATIONS OF STATE WATER QUALITY STANDARDS IN THE PERIODIC SURFACE WATERS LEAVING THE SITE WOULD BE EXPECTED TO OCCUR DUE TO CROSS-MEDIA CONTAMINATION. CROSS-MEDIA CONTAMINATION OF GROUNDWATER WOULD ALSO BE EXPECTED TO CONTINUE.

LONG-TERM EFFECTIVENESS AND PERMANENCE: BECAUSE REMEDIAL ACTIONS WOULD NOT OCCUR, THE EXISTING RISKS AT THE SITE WOULD REMAIN. SINCE SITE CONTROLS WOULD NOT BE IMPLEMENTED, THE CRITERION ADDRESSING THE ADEQUACY AND RELIABILITY OF CONTROLS IS NOT APPLICABLE TO THE ALTERNATIVE.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD NOT BE A REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS AT THE SITE. THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ONSITE. CROSS-MEDIA CONTAMINATION OF GROUNDWATER, SURFACE WATER, AND SEDIMENT WOULD CONTINUE TO OCCUR.

SHORT-TERM EFFECTIVENESS: BECAUSE SITE ACTIVITIES WOULD NOT OCCUR, PROTECTION OF WORKERS AND THE COMMUNITY WOULD NOT BE REQUIRED. ENVIRONMENTAL IMPACTS DUE TO CONSTRUCTION OR IMPLEMENTATION WOULD NOT BE ENCOUNTERED SINCE THERE WOULD BE NO ACTIVITIES PERFORMED AT THE SITE.

IMPLEMENTABILITY: THIS CRITERION IS NOT APPLICABLE BECAUSE REMEDIAL ACTIVITIES WOULD NOT OCCUR. SERVICES AND MATERIALS AND THE ACTIVITIES NORMALLY NEEDED TO COORDINATE WITH OTHER AGENCIES WOULD NOT BE NECESSARY.

COST: THERE WOULD BE NO COSTS INCURRED SINCE REMEDIAL ACTIVITIES WOULD NOT BE PERFORMED.

8.5.2 ALTERNATIVE D-2: FENCING

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: RISKS ASSOCIATED WITH DERMAL CONTACT WITH OR INGESTION OF ONSITE CONTAMINATED DEBRIS/SOLID WASTES WOULD BE CONTROLLED BY THESE ACCESS RESTRICTIONS. SECURITY FENCING WITH WARNING SIGNS WOULD REDUCE (BUT NOT ELIMINATE) THE POSSIBILITY OF SITE TRESPASSERS COMING INTO CONTACT WITH CONTAMINATED ONSITE MEDIA. THIS ALTERNATIVE WOULD NOT BE EFFECTIVE AT PROTECTING HUMAN HEALTH OR THE ENVIRONMENT OFFSITE. THIS ALTERNATIVE WOULD NOT PREVENT THE ADDITIONAL MIGRATION OF HAZARDOUS SUBSTANCES INTO THE SURFACE WATER, OFFSITE SEDIMENTS, OR THE UNDERLYING GROUNDWATER AQUIFER.

COMPLIANCE WITH ARARS: AS DESCRIBED IN SECTION 5.4.1.2, THIS ALTERNATIVE WOULD NOT MEET STATE AND FEDERAL ARARS.

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE LONG-TERM EFFECTIVENESS OF THIS ALTERNATIVE DEPENDS ON THE ENFORCEMENT AND MAINTENANCE PROVIDED. PRIMARY SITE ACCESS RESTRICTIONS WOULD BE MAINTAINED BY THE SECURITY FENCE AROUND THE SITE. THE FENCE WOULD BE REQUIRED INDEFINITELY TO PREVENT ACCESS. PERIODIC REPAIR OR REPLACEMENT OF THE FENCE WOULD BE NECESSARY.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE REMEDIAL ACTIVITIES WOULD NOT OCCUR, THERE WOULD BE NO REDUCTION IN THE TOXICITY, MOBILITY, OR VOLUME OF DEBRIS/SOLID WASTE CONTAMINANTS AT THE SITE. THE EXISTING TYPE AND QUANTITY OF HAZARDOUS MATERIAL WOULD REMAIN ONSITE UNDERGOING ONLY NATURAL ATTENUATION OR MIGRATION OFFSITE THROUGH CROSS-MEDIA CONTAMINATION.

SHORT-TERM EFFECTIVENESS: THE MINIMAL INTRUSIVE ACTIVITIES INVOLVED WITH INSTALLING A PERIPHERAL FENCE AROUND THE SITE WOULD RESULT IN VERY SLIGHT ENVIRONMENTAL IMPACTS TO WORKERS OR THE COMMUNITY. SINCE THE FENCE WOULD BE INSTALLED BEYOND THE ZONE OF CONTAMINATED DEBRIS/SOLID WASTES IN MOST CASES, SIMPLE MEASURES TO LIMIT WORKER CONTACT WITH DEBRIS/SOLID WASTE DURING CONSTRUCTION WOULD BE SUFFICIENT. THIS ALTERNATIVE WOULD RESULT IN NO ADDITIONAL EXPOSURE BY THE COMMUNITY AT LARGE.

IMPLEMENTABILITY: THE INSTALLATION OF A PERIPHERAL FENCE AT THE SITE CAN BE EASILY IMPLEMENTED. THE FENCE WOULD BE OF STANDARD INDUSTRIAL FENCING MATERIAL WHICH IS READILY AVAILABLE AND INVOLVES NO SPECIAL MATERIALS.

COST: THE COSTS FOR THIS ALTERNATIVE WOULD BE IDENTICAL TO ALTERNATIVE S-2: FENCING WHICH WERE

PRESENTED IN TABLE 8-18.

8.5.3 ALTERNATIVE D-3: OFFSITE LANDFILL

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT: THIS ALTERNATIVE WOULD PROVIDE PROTECTION FROM THE HAZARDS ASSOCIATED WITH CURRENT SITE CONDITIONS BY PERMANENTLY REMOVING THE DEBRIS/SOLID WASTES FROM THE SITE FOR DISPOSAL IN AN OFFSITE SANITARY LANDFILL, RCRA-PERMITTED LANDFILL AS APPROPRIATE. DISPOSAL IN A SECURE HAZARDOUS WASTE LANDFILL, OR TSCA LANDFILL, WOULD ELIMINATE THE THREAT OF DIRECT CONTACT WITH PCBS AND REDUCE THE THREAT OF POTENTIAL MIGRATION OF THESE CONTAMINANTS INTO THE SOIL AND TO THE GROUNDWATER.

COMPLIANCE WITH ARARS: ALL DEBRIS AND SOLID WASTES WITH A PCB LEVEL OF GREATER THAN 50 PPM WOULD BE TRANSPORTED TO A TSCA FACILITY DISPOSAL IN COMPLIANCE WITH 40 CFR 761 (A)(4). IF ANY DEBRIS HAS A HOC EXCEEDING 1000 PPM, IT WILL BE INCINERATED AT THE FACILITY IN ACCORDANCE WITH RCRA 40 CFR 264 SUBPART O. LIQUIDS IF PRESENT, WOULD BE DRUMMED AND INCINERATED IN ACCORDANCE WITH 40 CFR 268.42 (A) (1).

LONG-TERM EFFECTIVENESS AND PERMANENCE: THE REMOVAL OF DEBRIS/SOLID WASTE FROM THE SITE WOULD EFFECTIVELY MINIMIZE THE DANGER TO THE PUBLIC AND THE ENVIRONMENT IN THE AREA OF THE SITE. IN ADDITION, PLACEMENT OF CONTAMINATED MATERIAL IN A SECURE LANDFILL WOULD REDUCE THE POTENTIAL FOR THE MIGRATION OF CONTAMINANTS INTO THE GROUNDWATER.

THE LONG-TERM RISKS ASSOCIATED WITH OFFSITE DISPOSAL WOULD BE THE RESPONSIBILITY OF THE OWNER/OPERATOR OF THE SELECTED HAZARDOUS WASTE FACILITY. EXPOSURE DANGERS WOULD BE MINIMIZED BY CONFORMANCE TO RCRA AND TSCA REGULATIONS PERTAINING TO LEACHATE CONTROL, GROUNDWATER MONITORING, AND CAP MAINTENANCE. A LONG-TERM RESIDUAL RISK, HOWEVER, WOULD BE ASSOCIATED WITH THIS ALTERNATIVE SINCE CONTAMINANTS ARE CONTAINED RATHER THAN TREATED OR DESTROYED.

REDUCTION OF TOXICITY, MOBILITY, AND VOLUME: SINCE DISPOSAL IN AN OFFSITE LANDFILL DOES NOT PERMANENTLY DESTROY OR TREAT CONTAMINATED MATERIAL, IT WOULD NOT DIRECTLY REDUCE THE TOXICITY OR THE VOLUME OF THE CONTAMINATED MATERIAL. HOWEVER, THE MOBILITY OF THE CONTAMINANTS WOULD BE INDIRECTLY REDUCED THROUGH OFFSITE CONTAINMENT. LANDFILL DISPOSAL IS NOT AN IRREVERSIBLE PROCESS AND WOULD NOT COMPLY WITH THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPLE ELEMENT OF A REMEDIAL ACTION.

SHORT-TERM EFFECTIVENESS: THE SHORT-TERM RISKS ASSOCIATED WITH IMPLEMENTATION OF THIS ALTERNATIVE WOULD INVOLVE EXPOSURE OF THE PUBLIC AND THE ENVIRONMENT TO CONTAMINANTS FROM MIGRATION IN AIRBORNE DUST, SURFACE RUNOFF, OR AS A RESULT OF AN ACCIDENTAL SPILL DURING OFFSITE TRANSPORT. THE POTENTIAL FOR CONTAMINANT MIGRATION COULD BE REDUCED THROUGH USE OF NONREACTIVE DUST SUPPRESSANTS ALONG WITH BERMS AND SUMPS.

RCRA AND DOT REGULATIONS ARE DESIGNED TO MINIMIZE THE DANGER OF ACCIDENTAL RELEASE DURING TRANSPORT AND REDUCE THE HAZARDS ASSOCIATED WITH SUCH A RELEASE, SHOULD IT OCCUR. TRANSPORT OF CONTAMINATED MATERIAL OFFSITE WOULD RESULT IN INCREASED TRAFFIC IN THE AREA OF THE SITE WHICH WOULD INCREASE NOISE AND FUGITIVE DUST EMISSIONS. EVEN WITH THE USE OF EMISSION CONTROLS, SOME UNCONTROLLED EMISSIONS CAN BE EXPECTED. ALL VEHICLES WOULD BE DECONTAMINATED BEFORE LEAVING THE SITE TO PREVENT THE SPREAD OF CONTAMINATION TO THE LOCAL COMMUNITY. A POTENTIAL FOR WORKER EXPOSURE TO CONTAMINANTS, INCLUDING VOLATILE PCBS, WOULD EXIST DURING EXCAVATION, MATERIAL HANDLING, TRANSPORT, AND LANDFILL PLACEMENT. WORKER RISK WOULD BE MINIMIZED BY COMPLIANCE WITH OSHA GUIDELINES AND REQUIREMENTS FOR HAZARDOUS WASTE SITE WORK.

IMPLEMENTABILITY: EXCAVATION AND SITE RESTORATION, AS WELL AS OFFSITE TRANSPORT AND DISPOSAL OF CONTAMINATED SOIL, WOULD BE EASILY IMPLEMENTED USING CONVENTIONAL CONSTRUCTION TECHNOLOGIES. THESE TECHNOLOGIES ARE ALL ESTABLISHED AND PROVEN METHODS OF HAZARDOUS WASTE REMEDIATION.

CONTRACTORS THAT SPECIALIZE IN THIS TYPE OF WORK ARE READILY AVAILABLE.

COST: THE DETAILED COST ESTIMATE FOR THE OFFSITE DISPOSAL ALTERNATIVE IS PRESENTED IN TABLE 8-23. CAPITAL COSTS INVOLVED IN IMPLEMENTING THIS ALTERNATIVE WOULD INCLUDE MATERIAL HANDLING, OFFSITE TRANSPORTATION, AND DISPOSAL. THE TOTAL PRESENT WORTH OF THIS ALTERNATIVE WOULD BE $67,600.

8.6 STATE ACCEPTANCE

THE STATE OF NORTH CAROLINA, AS REPRESENTED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL, HEALTH, AND NATURAL RESOURES, CONCURS IN THE SELECTION OF ALTERNATIVES G-4, S/S-6, S-3, AND D-3 AS THE PREFERRED ALTERNATIVE FOR THE CAROLINA TRANSFORMER SITE.

8.7 COMMUNITY ACCEPTANCE

DURING THE PUBLIC MEETING, HELD ON APRIL 17, 1991, THE FAYETTEVILLE COMMUNITY HAD NO OBJECTIONS WITH THE SELECTION OF ALTERNATIVES G-4, S/S-6, S-3, AND D-3 AS THE PREFERRED ALTERNATIVE FOR THE CAROLINA TRANSFORMER SITE.

8.8 SUMMARY

TABLES 8-1 THROUGH 8-3 PRESENT A SUMMARY RANKING OF EACH ALTERNATIVE AGAINST THE EVALUATION CRITERIA AND EACH ALTERNATIVES PRESENT WORTH COST. EACH ALTERNATIVE PERFORMANCE AGAINST THE CRITERIA WAS RANKED ON A SCALE OF ZERO TO FIVE, WITH ZERO INDICATING THAT NONE OF THE CRITERIA'S REQUIREMENTS WERE MET AND FIVE INDICATING ALL OF THE REQUIREMENTS WERE MET.

#SR

9.0 SELECTED REMEDY

EPA HAS SELECTED COMBINATION OF THE ALTERNATIVES PRESENTED IN THIS DOCUMENT TO SERVE AS THE SELECTED REMEDY FOR THE CAROLINA TRANSFORMER SITE. THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THOSE ALTERNATIVES EPA HAS SELECTED TO SERVE AS THE REMEDY FOR THE CAROLINA TRANSFORMER SITE ARE LISTED BELOW. (TABLES 9-1 AND 9-2 LIST THE REMEDIAL GOALS THAT WILL BE MET BY THE SELECTED REMEDY.) THERE MAY BE SOME CHANGES MADE TO THE REMEDY AS A RESULT OF THE REMEDIAL DESIGN AND CONSTRUCTION PROCESS. HOWEVER, SUCH CHANGES IN GENERAL REFLECT MODIFICATIONS RESULTING FROM THE ENGINEERING DESIGN PROCESS.

1. ALTERNATIVE S/S-6: EXCAVATION OF THE CONTAMINATED SOIL WITH PCB'S IN EXCESS OF 1 PPM AND USE OF A SOLVENT EXTRACTION PROCESS TO SEPARATE ORGANIC CONTAMINANTS SUCH AS PCB', DIOXIN/FURANS, VOLATILE ORGANICS, AND POLYNUCLEAR AROMATIC COMPOUNDS FROM THE SOIL AND SEDIMENTS. THE PROCESS WILL CONVERT INORGANIC CONTAMINANTS SUCH AS LEAD AND COPPER TO LOWER SOLUBILITY HYDROXIDES THEREBY REDUCING THEIR MOBILITY. TCLP WILL BE RUN ON THE TREATED SOIL AND SEDIMENT PRIOR TO ITS RETURN TO ITS ORIGINAL LOCATION TO DETERMINE IF IT MEETS THE RCRA TOXICITY CHARACTERISTIC RULE. THE TREATED SOIL AND SEDIMENT WILL ALSO BE MODELED TO ASSURE THAT ITS PLACEMENT WILL NOT CAUSE VIOLATION OF NORTH CAROLINA'S GROUNDWATER STANDARDS. SOIL AND SEDIMENTS NOT MEETING THE TOXICITY RULE OR WHICH IS SHOWN BY MODELING TO CAUSE FUTURE VIOLATIONS OF NORTH CAROLINA'S GROUNDWATER STANDARDS WILL BE SOLIDIFIED. THE CONTAMINANT RICH WASTE STREAM WILL BE TRANSPORTED OFF SITE FOR TREATMENT. TABLE 9-3 LISTS THE MAJOR COMPONENTS INVOLVED AND THEIR ASSOCIATED COST.

2. ALTERNATIVE S-3: DEMOLITION OF THE ROOFS AND WALLS OF THE THREE ON-SITE BUILDINGS. THE DEBRIS WOULD BE CRUSHED AND TRANSPORTED TO AN OFF-SITE LANDFILL. IF THE REMAINING SLABS ARE FOUND TO BE CONTAMINATED WITH PCBS IN EXCESS OF 10 UG/100 CM2

THEY WILL BE TREATED WITH A SOLVENT WASHING SYSTEM TO EXTRACT THE RESIDUAL PCBS. TABLE 9-4 LIST THE MAJOR COMPONENTS AND THEIR ASSOCIATED COST.

3. ALTERNATIVE D-3: THE DEBRIS AND SOLID WASTE FROM THE SITE WILL BE TRANSPORTED TO AN OFF-SITE LANDFILL FOR DISPOSAL AND/OR TREATMENT IN ACCORDANCE WITH RCRA 40 CFR 264 SUBPART O AND 40 CFR 761(A)(4). THIS ALTERNATIVE IS DESIGNED TO REDUCE THE RISK ASSOCIATED WITH DIRECT CONTACT WITH MATERIALS REMAINING ON SITE TO WITHIN THE (10-5) CARCINOGENIC RISK LEVEL AND THE NON-CARCINOGENIC HAZARDOUS INDEX OF 1. TABLE 9-5 LISTS THE MAJOR COMPONENTS AND THEIR ASSOCIATED COST.

4. ALTERNATIVE G-4: INSTALL GROUNDWATER EXTRACTION WELLS AND USE A TWO COMPONENT TREATMENT SYSTEM (METALS REMOVAL, ADSORPTION) TO REMOVE THE METALS AND ORGANIC CONTAMINANTS. THE RISK TO FUTURE USERS OF GROUNDWATER ASSOCIATED WITH INGESTION, INHALATION, AND DERMAL CONTACT WITH CONTAMINANTS IN THE GROUNDWATER WOULD BE REDUCED BY THIS PUMP AND TREAT SYSTEM. THE OPERATION OF THE SYSTEM WOULD CONTINUE UNTIL THE GROUNDWATER MEETS THE REMEDIATION GOALS LISTED IN TABLE 9-1. TABLE 9-6 LIST THE MAJOR COMPONENTS AND THEIR ASSOCIATED COST.

THE GOAL OF THIS REMEDIAL ACTION IS TO RESTORE GROUND WATER TO ITS BENEFICIAL USE, WHICH IS A POTENTIAL POTABLE WATER SOURCE. BASED ONINFORMATION OBTAINED DURING THE REMEDIAL INVESTIGATION AND ON A CAREFUL ANALYSIS OF ALL REMEDIAL ALTERNATIVES, EPA BELIEVES THE SELECTED REMEDY WILL ACHIEVE THIS GOAL. IT MAY BECOME APPARENT, DURING IMPLEMENTATION OR OPERATION OF THE GROUND WATER EXTRACTION SYSTEM AND ITS MODIFICATIONS, THAT CONTAMINANT LEVELS HAVE CEASED TO DECLINE AND ARE REMAINING CONSTANT AT LEVELS HIGHER THAN THE REMEDIATION GOAL OVER SOME PORTION OF THE CONTAMINATED PLUME. IN SUCH A CASE, THE SYSTEM PERFORMANCE STANDARDS AND/OR THE REMEDY MAY BE RE-EVALUATED.

THE SELECTED REMEDY WILL INCLUDE GROUND WATER EXTRACTION FOR AN ESTIMATED PERIOD OF 10 YEARS, DURING WHICH TIME THE SYSTEM'S PERFORMANCE WILL BE CAREFULLY MONITORED ON A REGULAR BASIS AND ADJUSTED AS WARRANTED BY THE PERFORMANCE DATA COLLECTED DURING OPERATION. MODIFICATIONS MAY INCLUDE ANY OR ALL OF THE FOLLOWING:

A. AT INDIVIDUAL WELLS WHERE CLEANUP GOALS HAVE BEEN ATTAINED, PUMPING MAY BE DISCONTINUED;

B. ALTERNATING PUMPING AT WELLS TO ELIMINATE STAGNATION POINTS;

C. PULSE PUMPING TO ALLOW AQUIFER EQUILIBRATION AND TO ALLOW ADSORBATE CONTAMINANTS TO PARTITION INTO GROUND WATER; AND

D. INSTALLATIONS OF ADDITIONAL EXTRACTION WELLS TO FACILITATE OR ACCELERATE CLEANUP OF THE CONTAMINANT PLUME.

BE MONITORED AT THOSE WELLS WHERE PUMPING HAS CEASED ON AN OCCURRENCE OF EVERY 5 YEARS FOLLOWING DISCONTINUATION OF GROUND WATER EXTRACTION.

IF IT IS DETERMINED, ON THE BASIS OF THE PRECEDING CRITERIA AND THE SYSTEM PERFORMANCE DATA, THAT CERTAIN PORTIONS OF THE AQUIFER CANNOT BE RESTORED TO THEIR BENEFICIAL USE, ALL OF THE FOLLOWING MEASURES INVOLVING LONG-TERM MANAGEMENT MAY OCCUR, FOR AN INDEFINITE PERIOD OF TIME, AS A MODIFICATION OF THE EXISTING SYSTEM:

A. ENGINEERING CONTROLS SUCH AS PHYSICAL BARRIERS, OR LONG-TERM GRADIENT CONTROL PROVIDED BY LOW LEVEL PUMPING, AS CONTAINMENT MEASURES;

B. CHEMICAL-SPECIFIC ARARS WILL BE WAIVED FOR THE CLEANUP OF THOSE PORTIONS OF THE AQUIFER BASED ON THE TECHNICAL IMPRACTICABILITY OF ACHIEVING FURTHER CONTAINMENT REDUCTION;

C. INSTITUTIONAL CONTROLS WILL BE PROVIDED AND MAINTAINED TO RESTRICT ACCESS TO THOSE PORTIONS OF THE AQUIFER WHICH REMAIN ABOVE HEALTH-BASED GOALS, SINCE THIS AQUIFER IS CLASSIFIED AS

D. CONTINUED MONITORING OF SPECIFIED WELLS; AND

E. PERIODIC RE-EVALUATION OF REMEDIAL TECHNOLOGIES FOR GROUNDWATER RESTORATION.

THE DECISION TO INVOKE ANY OR ALL OF THESE MEASURES MAY BE MADE DURING A PERIODIC REVIEW OF THE REMEDIAL ACTION, WHICH WILL OCCUR AT INTERVALS OF AT LEAST EVERY FIVE YEARS, IN ACCORDANCE WITH CERCLA 121(C). TO ENSURE STATE AND PUBLIC INVOLVEMENT IN THIS DECISION AT THIS SITE, ANY CHANGES FROM THE REMEDIATION GOALS INDENTIFIED IN THIS ROD WILL BE FORMALIZED IN EITHER AN EXPLANATION OF SIGNIFICANT DIFFERENCE DOCUMENT OR AN AMENDMENT TO THIS RECORD OF DECISION, THEREBY PROVIDING AN OPPORTUNITY FOR STATE AND PUBLIC.

MONITORING WELLS WILL BE INSTALLED INTO THE LOWER AQUIFER TO CONFIRM ITS STATUS. IF IT IS FOUND TO BE CONTAMINATED, THE GROUNDWATER TREATMENT SYSTEM MENTIONED ABOVE WILL BE EXPANDED TO ADDRESS THE CONTAMINATION OF THE LOWER AQUIFER. THE PROTECTIVENESS OF THE REMEDIATION OF THE LOWER AQUIFER WILL BE IDENTICAL TO THAT OF THE SHALLOW AQUIFER AND MEET THE SAME GROUNDWATER QUALITY CRITERIA.

THE TREATED GROUNDWATER WILL BE DISCHARGE TO THE FAYETTEVILLE POTW OR THE UNNAMED TRIBUTARY TO THE CAPE FEAR RIVER.

#SD

10.0 STATUTORY DETERMINATIONS

THE USEPA AND NCDEPARTMENT OF ENVIRONMENT, HEALTH AND NATURAL RESOURCES HAVE DETERMINED THAT THIS REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINS ARARS, IS COST EFFECTIVE, UTILIZES PERMANENT SOLUTIONS, ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE WHICH SATISFIES THE STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA.

10.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

BASED ON THE RISK ASSESSMENT DEVELOPED FOR THIS SITE, DERMAL CONTACT WITH AND INGESTION OF THE CONTAMINATED SOIL AND SEDIMENT, INGESTION AND INHALATION OF THE CONTAMINATED GROUNDWATER, ARE THE IDENTIFIED RISKS ASSOCIATED WITH THE SITE.

THE SELECTED REMEDY OF SOLVENT EXTRACTION IN CONJUNCTION WITH THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE ALTERNATIVES SELECTED PROVIDE A PERMANENT REMEDY THAT REMOVES THE CONTAMINANTS FROM THE ASSOCIATED MEDIA AND DISPOSES OF THE REDUCED CONTAMINATED WASTE STREAM OFF SITE.

10.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

THE REMEDY SELECTED WILL COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE CHEMICAL-, ACTION-, AND LOCATION-SPECIFIC REQUIREMENTS (ARARS) OF FEDERAL AND MORE STRINGENT STATE ENVIRONMENTAL LAWS. THIS SITE DOES NOT CONTAIN CALIFORNIA LIST WASTE AND THE RESIDUAL MATERIALS

REMAINING ON SITE WILL NOT CONTAIN RCRA CHARACTERISTIC WASTE. THE CONCENTRATED WASTE DESIGNATED FOR OFF SITE TREATMENT WILL BE DRUMMED AND TRANSPORTED OFF SITE PER RCRA AND DOT REGULATION.

10.2.1 CHEMICAL SPECIFIC ARARS

CHEMICAL SPECIFIC ARARS INCLUDES THOSE LAWS AND REGULATIONS GOVERNING THE RELEASE OF MATERIALS POSSESSING CERTAIN CHEMICAL OR PHYSICAL CHARACTERISTICS, OR CONTAINING SPECIFIED CHEMICAL COMPOUNDS. THESE REQUIREMENTS GENERALLY SET HEALTH OR RISK-BASED CONCENTRATION LIMITS OR DISCHARGE LIMITATIONS IN VARIOUS ENVIRONMENTAL MEDIA FOR SPECIFIC HAZARDOUS SUBSTANCES, CONTAMINANTS AND POLLUTANTS. THE CHEMICAL SPECIFIC ARARS WHICH SET THE CONCENTRATION LIMITS FOR THE CLEANUP CRITERIA AT THIS SITE ARE LISTED BELOW BY MEDIA.

THE GROUND WATER CLEANUP STANDARDS FOR THIS SITE ARE SET AT THE MOST STRINGENT OF THE FOLLOWING ARARS SINCE THE AQUIFER IS A POTENTIAL DRINKING WATER SOURCE: SAFE DRINKING WATER ACT (SDWA); CLEAN WATER ACT (CWA); AND NORTH CAROLINA WATER QUALITY STANDARDS.

THE SOIL AND DEBRIS CLEANUP STANDARDS ARE BASED ON GUIDANCE ON REMEDIAL ACTIONS FOR SUPERFUND SITES WITH PCB CONTAMINATION, OSWER DIRECTIVE NO. 9355.4-01., TOXIC SUBSTANCE CONTROL ACT (TSCA). TABLE 10-1 GIVES A DETAILED BREAKDOWN OF THE GOVERNING CHEMICAL SPECIFIC ARARS.

10.2.2 LOCATION-SPECIFIC ARARS

LOCATION-SPECIFIC ARARS ARE DESIGN REQUIREMENTS OR ACTIVITY AND/OR CONTAMINANT CONCENTRATION RESTRICTIONS BASED ON THE GEOGRAPHICAL OR PHYSICAL POSITION OF THE SITE AND ITS SURROUNDING AREA. (TABLE 10-2 OUTLINES THE LOCATION SPECIFIC ARARS APPLICABLE TO THE SITE.)

10.2.3 ACTION SPECIFIC ARARS

REQUIREMENTS ON A PARTICULAR TECHNOLOGY OR PLACES CONDITION ON DEALING WITH SPECIFIC SUBSTANCES. (TABLE A-I IN APPENDIX A OUTLINES THE ACTION-SPECIFIC ARARS APPLICABLE TO THIS SITE)

10.3 COST EFFECTIVENESS

THE PRESENT ESTIMATED COST OF EPA'S SELECTED REMEDY IS $10,474,200.00.

THE SELECTED REMEDY PROVIDES A PERMANENT SOLUTION AND AF FORDS OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COSTS SUCH THAT THE REMEDY REPRESENTS A REASONABLE VALUE FOR THE MONEY. WHEN THE COST AND OVERALL EFFECTIVENESS OF THE SELECTED REMEDY IS COMPARED TO THE OTHER ALTERNATIVES, THE SELECTED REMEDY IS THE MOST COST EFFECTIVE.

10.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

THE REMEDY SELECTED MEETS THE STATUTORY REQUIREMENT OF UTILIZING PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICAL. THE SELECTED REMEDY PROVIDES THE BEST BALANCE IN TERMS OF LONG AND SHORT TERM EFFECTIVENESS, PERMANENCE, IMPLEMENTABILITY, COST, REDUCTION IN TOXICITY, MOBILITY AND VOLUME.