

EPA Superfund
Record of Decision:

TEXARKANA WOOD PRESERVING CO.
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I. LOCATION AND DESCRIPTION

THE TEXARKANA WOOD PRESERVING COMPANY (TWPC) SITE IS LOCATED IN BOWIE COUNTY, TEXAS (FIGURE 1). BOTH THE CITY OF TEXARKANA AND THE BOWIE COUNTY LINE RUN THROUGH THE SITE OFF LUBBOCK STREET AND APPROXIMATELY 2800 FEET DUE WEST OF THE MILLER COUNTY, ARKANSAS LINE AS SHOWN IN FIGURE 2. DAYS CREEK, AN INTERSTATE TRIBUTARY OF THE SULPHUR RIVER, IS LOCATED LESS THAN 500 FEET EAST OF THE SITE. THE SITE IS WITHIN THE 100 YEAR FLOOD PLAIN OF DAYS CREEK. FISHING MAY OCCUR FROM THIS CREEK. THE SITE IS BOUNDED TO THE WEST BY THE TEXAS AND PACIFIC RAILROAD RIGHT-OF-WAY, TO THE SOUTH BY LUBBOCK STREET AND TO THE NORTH BY LUBBOCK STREET. ADJACENT LAND USES INCLUDE INDUSTRIAL, RESIDENTIAL, AND GRAZING.

A SMALL RESIDENTIAL AREA OF APPROXIMATELY 70 FAMILIES IS LOCATED ONE THIRD OF A MILE NORTHWEST OF THE SITE. THERE ARE NO SCHOOLS IN THIS SUBDIVISION. ALTHOUGH THE AQUIFER IS CONSIDERED A CLASS 2B AQUIFER, NO ONE IS CURRENTLY USING THE AQUIFER IN THE VICINITY OF THE SITE. THE MAJORITY OF THE COMMUNITY AROUND THE SITE IS ON THE CITY WATER SYSTEM AND DOES NOT USE THE GROUND WATER FOR DRINKING.

THE SITE TOPOGRAPHY COULD BE DESCRIBED AS LEVEL GROUND, SLOPING SLIGHTLY TO THE SOUTHEAST. SURFACE WATER RUNS FROM THE NORTHWESTERN PORTION OF THE SITE TO THE DRAINAGE DITCHES ALONG LUBBOCK STREET. SHORTLY AFTER LUBBOCK STREET TURNS AND RUNS EAST/WEST, THE RUNOFF HEADS SOUTH INTO A NATURAL DRAINAGE DITCH RUNNING THROUGH A FIELD, EVENTUALLY DRAINING INTO DAYS CREEK. SURFACE WATER ON THE EASTERN PORTION OF THE SITE, TRAVELS TO THE SOUTHEAST, DIRECTLY INTO DAYS CREEK.

THE SITE STRATIGRAPHY CONSISTS OF QUATERNARY ALLUVIUM UNDERLAIN BY THE WILCOX FORMATION. THE ALLUVIUM, CALLED SURFICIAL SILTY SAND AND GRAVEL ZONE, CONSISTS OF SILTY SAND WITH GRAVEL AND MINOR SEDIMENTS WITH DEPTH. SURFACE SEDIMENTS ARE PREDOMINANTLY SILTY SAND WITH OCCASIONAL SILTY CLAY AND SILT. THE BASAL DEPOSITS ARE GRAVELLY SAND OR SILTY, SANDY GRAVEL. THE AVERAGE THICKNESS OF THE ALLUVIUM IS 13 AND ONE HALF FEET AND RANGES FROM 9 AND ONE HALF FEET TO 20 FEET. THE BASAL GRAVEL HAS AN AVERAGE THICKNESS OF FOUR FEET AND RANGES IN THICKNESS FROM TWO FEET TO SEVEN FEET. THE QUATERNARY ALLUVIUM IS UNCONFORMABLE UNDERLAIN BY THE WILCOX FORMATION.

THE WILCOX FORMATION IS REPRESENTATIVE OF A FLUVIAL DELTAIC DEPOSITIONAL ENVIRONMENT AND CONSISTS OF CLAYEY AND SILTY SANDS WITH CLAY, CARBONACEOUS SEDIMENTS AND LIGNITE. THE WILCOX FORMATION IS ENCOUNTERED AT AN AVERAGE DEPTH OF 13 AND ONE HALF FEET. THE UPPER PORTION OF THE WILCOX CONSISTS PRIMARILY OF CLAYEY SAND AND COMPRISES ALTERNATING LAMINAE OF SAND AND CLAY, WITH GREATER THAN FIFTY PERCENT OF THE SEDIMENT BEING SAND. THE THICKNESS OF THE CLAYEY SAND ZONE VARIES FROM APPROXIMATELY 30 FEET TO 50 FEET, WITH AN AVERAGE THICKNESS OF 40 FEET.

SEDIMENTS CONSISTING PRIMARILY OF SILTY SAND AND POORLY-GRADED SAND WITH OCCASIONAL THIN LAYERS OF CARBONACEOUS MATERIAL ARE ENCOUNTERED BELOW THE CLAYEY SAND ZONE. THE SILTY SAND ZONE IS FIRST FOUND AT A DEPTH OF 44 TO 69 FEET AND EXTENDS TO A DEPTH OF 90 TO 99 FEET.

THE LIGNITE UNIT, CONSISTING OF SEVERAL LIGNITE LAYERS INTERBEDDED WITH CLAYEY SAND OR SILTY CLAY, IS ENCOUNTERED AT A DEPTH OF ABOUT 99 FEET. THIS UNIT EXTENDS TO ABOUT A DEPTH OF 115 FEET. A DEEP CLAY IS ENCOUNTERED BELOW THIS LIGNITE. THE ELEVATION OF THE TOP OF THE DEEP CLAY ZONE REFLECTS THE TREND OF THE REGIONAL DIP IN THE WILCOX TOWARDS THE SOUTH EAST AT AN ANGLE OF APPROXIMATELY FIFTEEN FEET PER MILE.

THREE DIFFERENT GROUND WATER SYSTEMS CONTROL THE HYDROGEOLOGIC REGIME AT THE SITE; 1) THE SURFICIAL SILTY SAND AND GRAVEL ZONE; 2) THE CLAYEY SAND AND SILTY SAND ZONE, AND; 3) THE LIGNITE AND DEEP CLAY ZONE. A BASIC SCHEMATIC OF THESE IS SHOWN ON FIGURE 3. THIS RECORD OF DECISION ADDRESSES THE SURFICIAL SILTY SAND AND GRAVEL ZONE.

IN 1972, THE SITE PROCESSING AREA WAS MOVED FROM THE SOUTH WESTERN PORTION OF THE SITE TO THE CENTRAL PORTION OF THE SITE. THEREFORE, THE SITE MAY BE BROKEN DOWN INTO TWO PARTS, THE PRE-1972 TREATMENT AREA AND THE POST-1972 TREATMENT AREA. BOTH AREAS HAVE A HEAVILY CONTAMINATED PROCESS AREA, CONSISTING OF A NUMBER OF WASTE PONDS ON THE WEST PART OF THE SITE, AND WATER RETENTION PONDS ON THE EAST PORTION OF THE SITE. MOST TANKS HAVE BEEN SCAVENGED FROM THE SITE, HOWEVER, A FEW STILL REMAIN IN THE MAIN PROCESS AREA OF THE POST-1972 TREATMENT AREA.

THERE ARE ALSO A FEW BUILDINGS, AND CONCRETE SLABS ON THE SITE.

#SHEA

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE TWPC SITE HAS BEEN USED FOR VARIOUS LUMBER-RELATED ACTIVITIES SINCE THE EARLY 1900'S. ANALYSIS OF AERIAL PHOTOS INDICATES THAT WOOD PRESERVING OPERATIONS WERE UNDERWAY AS EARLY AS 1954 IN THE SOUTHWESTERN PORTION OF THE SITE. THE WOOD-TREATING ACTIVITIES LEADING TO THE CURRENT SITE CONFIGURATION WERE BEGUN IN LATE 1971 BY THE TWPC AND INCLUDED THE USE OF BOTH CREOSOTE AND PENTACHLOROPHENOL (PCP). FIGURE 4 SHOWS THE LOCATION OF THE WOOD PRESERVING OPERATIONS IDENTIFIED THROUGHOUT THE SITE HISTORY.

BETWEEN 1903 AND 1910, THE SITE WAS OWNED AND OPERATED BY SEVERAL LUMBER COMPANIES INCLUDING; THE NATIONAL LUMBER COMPANY, THE SOUTHERN TIE AND TIMBER TREATING COMPANY, AND THE NATIONAL LUMBER AND CREOSOTING COMPANY. THESE THREE COMPANIES OPERATED ON A 15-ACRE TRACT EAST OF THE RAILROAD, WEST OF THE NORTH-SOUTH PORTION OF LUBBOCK STREET, NORTH OF THE SOUTHERN PROPERTY BOUNDARY NOW MARKED BY THE EPA FENCE, AND SOUTH OF LUBBOCK STREET WHERE IT CROSSES THE RAILROAD TRACKS. THE EXTENT OF WOOD-TREATING ACTIVITIES DURING THIS PERIOD IS UNKNOWN.

SEVERAL INDIVIDUALS OWNED PORTIONS OF THE SITE BETWEEN 1910 AND 1920, BUT DEED RECORDS DO NOT IDENTIFY SITE USES DURING THIS DECADE. IN MID-1920, THE CONSOLIDATED LUMBER COMPANY ACQUIRED 25.37 ACRES (WHICH ROUGHLY CORRESPONDS TO THE BOUNDARIES NOW DELINEATED BY THE EPA FENCE) AND OPERATED AT THE SITE FOR ABOUT TWO YEARS. THE STATE LINE LUMBER COMPANY TOOK OVER THE SITE IN 1933. NOTHING IS KNOWN ABOUT POTENTIAL CONTAMINATING ACTIVITIES AT THE SITE DURING THESE PERIODS.

CLARA B. BUTCHER, OR HER HEIRS, OWNED THE SITE FROM 1933 UNTIL IT WAS SOLD TO TWPC IN 1981. DURING THAT TIME, VARIOUS COMPANIES LEASED THE PROPERTY. THE POWER MILL AND LUMBER COMPANY (LATER THE THOMAS E. POWER LUMBER CO.) HELD A LEASE FROM 1942 FOR AN INDETERMINATE LENGTH OF TIME. IN 1946, THE SITE WAS LEASED TO THE CHARLES H. PROETZ LUMBER COMPANY FOR A MINIMUM PERIOD OF FIVE YEARS. ANALYSIS OF AN AERIAL PHOTO TAKEN IN 1954 INDICATES WHAT APPEARS TO BE CREOSOTING OPERATIONS IN THE SOUTHWESTERN CORNER OF THE SITE. THIS IS THE FIRST EVIDENCE OF ON-SITE CREOSOTING ACTIVITIES.

THE PORTION OF THE SITE EAST OF LUBBOCK STREET APPEARED TO BE OCCUPIED BY OFFICE BUILDINGS OR WORKSHOPS. NORTH OF THE APPARENT PROCESSING AREA, ON THE WEST SIDE OF LUBBOCK STREET, THE SITE WAS USED FOR LUMBER STORAGE. THERE WAS A LARGE BUILDING LOCATED JUST NORTH OF WHERE THE PRETREATMENT STORAGE PONDS ARE TODAY.

THE TWPC FIRST CAME TO THE ATTENTION OF THE STATE OF TEXAS FOLLOWING DISCHARGES INTO DAYS CREEK. THE FIRST STATE INVESTIGATION OCCURRED IN DECEMBER OF 1968. THE FOLLOWING SIXTEEN YEARS, UNTIL THE TWPC CEASED OPERATION IN AUGUST 1984, WERE MARKED BY A SERIES OF STATE INVESTIGATIONS IN WHICH THE TWPC WAS FOUND TO BE EITHER NEGLIGENT OR DELINQUENT IN THEIR EFFORTS TO FULFILL VARIOUS PERMITTING REQUIREMENTS.

THE SITE WAS NOMINATED TO THE NATIONAL PRIORITIES LIST (NPL) IN DECEMBER 1984. IN JUNE 1986, THE SITE WAS INCLUDED ON THE THIRD NPL UPDATE. SUBSEQUENTLY, EPA HAS TAKEN MEASURES TO CONTROL SURFACE RUNOFF AND SITE ACCESS. STABILIZING ACTIONS TAKEN BY EPA FROM 1986 TO 1988 INCLUDED CONSTRUCTING FENCES TO MINIMIZE ACCESS, CONSTRUCTING A BERM AROUND THE MAIN OPERATIONS POND TO PREVENT SURFACE RUNOFF AND PUMPING DOWN THIS AND OTHER PONDS TO PREVENT OVERFLOW. THE PUMPED LIQUID, PRIMARILY RAIN WATER RUNOFF, WAS PUT IN POND NUMBER 1.

FOURTEEN POTENTIALLY RESPONSIBLE PARTIES (PRP; FORMER OWNER AND/OR OPERATORS) WERE IDENTIFIED IN A PRP SEARCH CONDUCTED IN 1985. ON JANUARY 16, 1986, 104(E) NOTICE LETTERS WERE SENT TO THE PRPS NOTIFYING THEM OF THEIR POTENTIAL LIABILITY AND OF PLANNED INVESTIGATIONS AT THE SITE. THE PRPS CONTACTED WERE ASKED IF THEY WOULD LIKE TO EITHER CONDUCT OR FINANCE THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY (RI/FS) AT THE SITE. OF THE PRPS NOTIFIED, ALL DECLINED TO PARTICIPATE IN THE RI/FS PROCESS. ON DECEMBER 17, 1986, AN ACTION LETTER WAS SENT TO THE PRPS INFORMING THEM OF AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT DUE TO ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THE SITE AND ASKED TO POST WARNING SIGNS AND INSTALL A FENCE AROUND THE SITE. ALL THE NOTIFIED PRPS DECLINED TO VOLUNTARILY INSTALL WARNING SIGNS AND A FENCE. ON FEBRUARY 5, 1987, SPECIAL NOTICE LETTERS WERE SENT TO PRPS ASKING THEM TO PARTICIPATE IN THE RI/FS. ALL THE PRPS DECLINED TO PARTICIPATE IN

THE RI/FS.

A REVISED 104(E) INFORMATION REQUEST LETTER WAS ISSUED TO 13 IDENTIFIED PRPS ON AUGUST 23, 1990. THESE 13 PRPS WERE INVOLVED AT THE SITE FROM 1960-1984. THE NOTIFIED PRPS WILL HAVE 30 DAYS FROM RECEIVING THEIR LETTER TO RESPOND. THE FOCUS OF THIS 104(E) LETTER IS TO DETERMINE THE FINANCIAL VIABILITY OF PRPS. A SPECIAL NOTICE LETTER HAS BEEN DRAFTED AND WILL BE SENT TO ALL IDENTIFIED PRPS ASKING THEM TO PARTICIPATE IN AND/OR FINANCE THE REMEDIAL DESIGN AT THE SITE. THE OTHER PRP WHO WAS NOT SENT THE 104(E) LETTER WILL BE SENT A SIMILAR LETTER, EXCEPT THE QUESTIONS WILL BE MODIFIED TO ADDRESS THE PERIOD OF TIME AT WHICH THE PRP OPERATED AT THE SITE (1930S-1940S). SHOULD THE PRPS DECLINE TO CONDUCT FUTURE REMEDIAL ACTION ACTIVITIES, EPA WILL EITHER TAKE ENFORCEMENT ACTIONS AND/OR PROVIDE FUNDING FOR THESE ACTIVITIES WHILE SEEKING COST RECOVERY FOR ALL EPA-FUNDED RESPONSE ACTIONS FROM THE PRPS.

#HCP

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

A COMMUNITY RELATIONS PLAN FOR THE TEXARKANA WOOD PRESERVING SITE WAS FINALIZED IN DECEMBER 1987. THIS DOCUMENT LISTS CONTACTS AND INTERESTED PARTIES THROUGHOUT GOVERNMENT AND THE LOCAL COMMUNITY. IT ALSO ESTABLISHES COMMUNICATION PATHWAYS TO ENSURE TIMELY DISSEMINATION OF PERTINENT INFORMATION. THE REMEDIAL INVESTIGATION WAS RELEASED TO THE PUBLIC IN JUNE OF 1989. THE FEASIBILITY STUDY AND THE PROPOSED PLAN WERE RELEASED TO THE PUBLIC IN JULY 1990. ALL OF THESE DOCUMENTS WERE MADE AVAILABLE IN BOTH THE ADMINISTRATIVE RECORD AND TWO INFORMATION REPOSITORIES MAINTAINED AT THE TEXARKANA PUBLIC LIBRARY AND TEXARKANA CITY HALL. A PUBLIC COMMENT PERIOD WAS HELD FROM JULY 12, 1990 TO AUGUST 11, 1990. IN ADDITION, A PUBLIC MEETING WAS HELD ON JUNE 28, 1989 TO PRESENT THE RESULTS OF THE REMEDIAL INVESTIGATION AND ON JULY 24, 1990 TO PRESENT THE RESULTS OF THE FEASIBILITY STUDY AND THE PREFERRED ALTERNATIVE AS PRESENTED IN THE PROPOSED PLAN FOR THE SITE. 42 COMMENTS WERE RECEIVED DURING THE PUBLIC COMMENT PERIOD. THESE COMMENTS, INCLUDING THOSE EXPRESSED VERBALLY AT THE PUBLIC MEETING ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY WHICH IS ATTACHED AS APPENDIX A TO THE RECORD OF DECISION.

#SRO

IV. SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

AS WITH MANY SUPERFUND SITES, THE PROBLEMS AT THE TEXARKANA WOOD PRESERVING COMPANY ARE COMPLEX. DURING THE INVESTIGATION IT WAS DETERMINED THAT THE DEEPER GROUND WATER IS CONTAMINATED. TO EXPEDITE THE REMEDIATION OF THE SOURCE AND THE SHALLOW GROUND WATER, THIS SITE WAS BROKEN INTO TWO PARTS, CALLED OPERABLE UNITS. THESE ARE;

- OPERABLE UNIT ONE; CONTAMINATED SOILS AND SHALLOW GROUND WATER (AVERAGE DEPTH OF 13.5 FEET)
- OPERABLE UNIT TWO; LOWER GROUND WATER

THIS RECORD OF DECISION ADDRESSES OPERABLE UNIT ONE. THE STUDIES UNDERTAKEN AT THE TEXARKANA WOOD PRESERVING COMPANY SITE HAVE IDENTIFIED TWO PRINCIPAL THREATS TO BE ADDRESSED IN THE FIRST OPERABLE UNIT; CONTAMINATED SOIL AND SHALLOW GROUND WATER. THE CONTAMINATED SOIL WAS DETERMINED TO BE A PRINCIPAL THREAT TO HUMAN HEALTH AND THE ENVIRONMENT AT THE SITE. THE POTENTIAL ROUTES OF EXPOSURE ARE THROUGH DIRECT CONTACT WITH AND INGESTION OF THE SOIL AND GROUND WATER, AS WELL AS THE SOIL'S LEACHING POTENTIAL TO THE GROUND WATER. THE OPERATIONS AND CHEMICAL HOLDING PONDS CONTRIBUTE GREATLY AS THE PRINCIPAL RISK. THE SOIL OUTSIDE THESE PONDS REPRESENTS LOWER LEVEL RISK. THESE PONDS ARE IDENTIFIED IN FIGURE 4. THE SHALLOW GROUND WATER IS NOT CURRENTLY BEING USED NEAR THE SITE. HOWEVER, IT HAS A POTENTIAL TO BE USED, THEREFORE, IT IS CONSIDERED A CLASS 2-B AQUIFER. THE CONTAMINATION IN BOTH THE SOIL AND THE SHALLOW GROUND WATER IS ABOVE HEALTH-BASED LEVELS (AS DETAILED IN THE SUMMARY OF SITE RISK SECTION). THE REMEDIAL OBJECTIVES FOR THE SOIL ARE TO PREVENT CURRENT OR FUTURE EXPOSURE TO THE CONTAMINATED SOIL THROUGH TREATMENT AND/OR CONTAINMENT, AND TO REDUCE THE MIGRATION OF CONTAMINANTS FROM THE SOIL TO GROUND WATER.

THE CONTAMINATED SHALLOW GROUND WATER WAS ALSO DETERMINED TO BE A PRINCIPAL THREAT AT THE SITE BECAUSE OF THE POTENTIAL OF INGESTION AND POTENTIAL OF MIGRATION OF CONTAMINANTS TO DEEPER ZONES OF GROUND WATER. THE DEEPER GROUND WATER ZONES ARE USED FOR INDUSTRIAL, IRRIGATION, AND DRINKING WATER PURPOSES. THE REMEDIAL OBJECTIVES FOR THE CONTAMINATED SHALLOW GROUND WATER IS TO ADDRESS THE PRINCIPLE THREAT BY REDUCING THE AMOUNT OF CONTAMINATION, RETURN THE GROUNDWATER TO ITS BENEFICIAL USE AND TO PREVENT ADVERSE IMPACT TO LOWER GROUND WATER ZONES. THIS CAN BE

ACCOMPLISHED BY ESTABLISHING, AND REMEDIATING THE GROUND WATER TO HEALTH BASED LEVELS.

THE ALTERNATIVES CONSIDERED TO ADDRESS THE SOIL AND GROUND WATER CONTAMINATION SATISFY THE STATUTORY PREFERENCE FOR THE REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT AS A PRINCIPAL ELEMENT.

#SCC

V. SUMMARY OF SITE CHARACTERISTICS

AS PREVIOUSLY DISCUSSED, THE SITE MAY BE BROKEN DOWN INTO TWO PARTS, THE PRE-1972 TREATMENT AREA AND THE POST-1972 TREATMENT AREA. BOTH AREAS HAVE A HEAVILY CONTAMINATED PROCESS AREA, CONSISTING OF A NUMBER OF TREATMENT, CHEMICAL STORAGE AND WATER RETENTION PONDS (FIGURE 4). AS ONE MAY EXPECT, THE SOIL SURROUNDING THESE AREAS AND THE SHALLOW GROUND WATER IS CONTAMINATED WITH THE WOOD PRESERVING WASTES PENTACHLOROPHENOL AND CREOSOTE. ALSO FOUND ON THE SITE WERE MERCURY AND DIOXIN. THE MAJOR CONTAMINANTS OF CONCERN MAY BE GROUPED, IN A BROAD SENSE, AS SEMIVOLATILES INCLUDING SUCH COMPOUNDS AS PENTACHLOROPHENOL, NAPHTHALENE, PYRENE, CHRYSENE, BENZO(A)ANTHRACENE AND BENZO(A)PYRENE.

PENTACHLOROPHENOL IS ONE OF THE MOST HEAVILY USED PESTICIDES IN THE UNITED STATES. PENTACHLOROPHENOL DOES NOT OCCUR NATURALLY IN THE ENVIRONMENT. PENTACHLOROPHENOL IS RAPIDLY DEGRADED UNDER CERTAIN CONDITIONS IN AIR, ON LAND, AND IN WATER. RESULTS FROM ANIMAL STUDIES INDICATE THAT SHORT-TERM, HIGH-LEVEL EXPOSURE TO PENTACHLOROPHENOL CAN DAMAGE THE LIVER, KIDNEYS, SKIN, LUNGS, NERVOUS SYSTEM, AND GASTROINTESTINAL TRACT. THE MAJOR ORGANS OR SYSTEMS AFFECTED BY LONGER-TERM EXPOSURE TO LOWER LEVELS OF PENTACHLOROPHENOL IN ANIMALS ARE THE LIVER, THE KIDNEYS, THE NERVOUS SYSTEM, AND THE IMMUNE SYSTEM. AN INCREASED RISK FOR CANCER HAS BEEN DEMONSTRATED IN ANIMALS EXPOSED TO PENTACHLOROPHENOL. PENTACHLOROPHENOL IS MOBILE IN SOIL AND TENDS TO MIGRATE FROM THE SOIL INTO THE GROUND WATER. THE HIGHEST CONCENTRATION OF PENTACHLOROPHENOL IS 1,400 PPM, 4.1 PPM AND 5,100 PPM IN THE SOIL, SHALLOW GROUND WATER, AND POND SLUDGE RESPECTIVELY.

CREOSOTE IS A COMMON WOOD PRESERVING PRODUCT. CREOSOTE IS PRIMARILY MADE UP OF POLYNUCLEAR AROMATIC HYDROCARBONS LIKE, ANTHRACENE, FLUORANTHENE, PYRENE, BENZO(A)ANTHRACENE, CHRYSENE, BENZO(B)FLUORANTHENE, BENZO(K)FLUORANTHENE, BENZO(A)PYRENE, INDENO(1,2,3-CD)PYRENE, DIBENZO(A,H)ANTHRACENE, AND BENZO(G,H,I)PERYLENE. POLYNUCLEAR AROMATIC HYDROCARBONS ARE A GROUP OF CHEMICALS THAT ARE FORMED DURING THE INCOMPLETE BURNING OF COAL, OIL AND GAS, GARBAGE, OR OTHER ORGANIC SUBSTANCES. POLYNUCLEAR AROMATIC HYDROCARBONS CAN BE BOTH MAN-MADE OR NATURALLY OCCURRING. THEY ARE FOUND THROUGHOUT THE ENVIRONMENT IN THE AIR, WATER, AND SOIL. SEVERAL OF THE POLYNUCLEAR AROMATIC HYDROCARBONS HAVE CAUSED CANCER IN LABORATORY ANIMALS. CERTAIN POLYNUCLEAR AROMATIC HYDROCARBONS ARE, THEREFORE, CONSIDERED AS PROBABLE CARCINOGENS (LIKE BENZO(A)PYRENE). STUDIES IN ANIMALS HAVE ALSO SHOWN THAT POLYNUCLEAR AROMATIC HYDROCARBONS CAN CAUSE HARMFUL, NON-CARCINOGENIC EFFECTS ON SKIN, BODY FLUIDS, AND THE BODY'S SYSTEM FOR FIGHTING DISEASE AFTER BOTH SHORT-AND LONG-TERM EXPOSURE. THESE EFFECTS HAVE GENERALLY NOT BEEN SEEN IN HUMANS. THE HIGHEST CONCENTRATION OF CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS IS 1,396 PPM, .137 PPM AND 3,918 PPM AS BENZO(A)PYRENE IN THE SOIL, SHALLOW GROUND WATER, AND POND SLUDGE RESPECTIVELY.

CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN (COMMONLY CALLED DIOXIN AND FURAN) ARE ALSO CONTAMINANTS OF CONCERN AT THE SITE. DIOXIN AND FURANS ARE IMPURITIES IN PENTACHLOROPHENOL. DIOXIN IS A GROUP OF COMPOUNDS. THE MOST TOXIC OF THE GROUP IS KNOWN AS 2,3,7,8-TCDD. AT THE PRESENT TIME 2,3,7,8-TCDD IS NOT USED FOR ANY PURPOSE OTHER THAN SCIENTIFIC RESEARCH. DIOXIN IS A MAN-MADE COMPOUND. DIOXIN IS VERY IMMOBILE IN SOIL. IN HUMANS, TCDD CAUSES SEVERE SKIN IRRITATIONS THAT USUALLY OCCURS ON THE HEAD AND UPPER BODY. THERE IS SUGGESTIVE EVIDENCE THAT TCDD CAUSES LIVER DAMAGE AND DIGESTIVE DISORDERS IN HUMANS. ANIMAL STUDIES HAVE INDICATED THAT DIOXIN IS TOXIC TO THE IMMUNE SYSTEM, AND PROMOTES ADVERSE REPRODUCTIVE EFFECTS, ALTHOUGH THIS LATTER EFFECT HAS NOT BEEN DEMONSTRATED IN HUMANS. THE HUMAN EVIDENCE FOR TCDD ALONE IS INADEQUATE TO DEMONSTRATE OR REFLECT A CARCINOGENIC HAZARD. BASED ON THE POSITIVE EVIDENCE PROVIDED THROUGH ANIMAL STUDIES, TCDD IS CONSIDERED BY EPA TO BE A PROBABLE HUMAN CARCINOGEN. THE MAXIMUM CONCENTRATION IN THE SOIL, GROUND WATER AND POND SLUDGE ARE 76 PPB, 10.6 PPB AND 302 PPB 2,3,7,8 TCDD EQUIVALENTS RESPECTIVELY.

THE PAST WOOD PRESERVING ACTIVITIES AT THE SITE HAVE RESULTED IN AN ESTIMATED 77,000 CUBIC YARDS OF SOIL, SLUDGE, AND SEDIMENT, AND 16 MILLION GALLONS OF SHALLOW GROUND WATER CONTAMINATED WITH PENTACHLOROPHENOL, POLYNUCLEAR AROMATIC HYDROCARBONS, AND DIOXIN. THIS SOIL ESTIMATE INCLUDES

CONTAMINATED MATERIAL IN THE SATURATED ZONE.

THREE PRIMARY AREAS OF WIDESPREAD SOIL CONTAMINATION WERE IDENTIFIED AT THE SITE. THESE AREAS ARE SHOWN ON FIGURE 5. THE FIRST AREA SURROUNDS THE "POST-1972 PROCESS AREA" AND COVERS AN AREA OF ROUGHLY 180,000 SQUARE FEET. THE CONTAMINATION IN THIS AREA EXTENDS NORTH OF THE PROCESS AREA NEARLY TO THE NORTH SITE FENCE AND ACROSS THE ENTIRE WIDTH OF THE WEST SIDE OF THE SITE. CONTAMINATED SOILS IN THIS AREA CONSTITUTE AN ESTIMATED VOLUME OF 26,100 CUBIC YARDS.

THE SECOND AREA OF CONTAMINATION IS THE PROCESS AREA IN THE SOUTHWEST CORNER OF THE WEST SIDE, THE "PRE-1972 PROCESS AREA" WHICH ALSO COVERS ABOUT 180,000 SQUARE FEET. THE CONTAMINATION IN THIS AREA BEGINS IN THE SOUTH CENTRAL PART OF THE WEST SIDE AND EXTENDS ABOUT 50 FEET SOUTH OF THE SOUTH FENCE. THE FAR SOUTHWEST CORNER OF THIS AREA CONTAINS THE MOST SEVERE CONTAMINATION. SEMI-VOLATILE CONCENTRATION RANGE FROM BELOW THE DETECTION LIMIT TO 18,000 MG/KG IN THIS AREA. APPROXIMATELY 17,800 CUBIC YARDS WERE CALCULATED TO BE CONTAMINATED.

A THIRD AREA OF CONTAMINATION ON THE EAST SIDE IS LESS WELL DEFINED THAN THE OTHER TWO AREAS. THE SEMIVOLATILE CONTAMINATION HAS NO OBVIOUS SOURCE AND COVERS APPROXIMATELY 100,000 SQUARE FEET. SOIL IS CONTAMINATED AT CONCENTRATIONS BELOW THE DETECTION LIMIT TO 870 MG/KG, AND CONSTITUTE A VOLUME OF APPROXIMATELY 18,400 CUBIC YARDS.

TWO DISTINCT PLUMES OF CONTAMINATED GROUND WATER ORIGINATING FROM THE FORMER TWO PROCESS AREAS WERE IDENTIFIED IN THE SHALLOW GROUND WATER CONTAINED IN THE GRAVEL ZONE AT THE SITE. THESE PLUMES ARE REFERRED TO AS AREA A AND AREA B ON FIGURE 6.

THE AREA A PLUME IS THE LARGER AND CONTAINS AN ESTIMATED 14 MILLION GALLONS OF GROUND WATER CONTAMINATED WITH SEMI-VOLATILES. THE AREA A PLUME'S MAJOR SOURCE IS THE MAIN PROCESS AREA. DETECTABLE CONCENTRATIONS IN THE PLUME RANGE FROM 84 MG/L TOTAL SEMI-VOLATILES (PRINCIPALLY, PENTACHLOROPHENOL AND NON-CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS) JUST DOWN GRADIENT OF THE SOURCE TO 0.024 MG/L TOTAL SEMI-VOLATILES AT THE EXTREME SOUTH EDGE. FREE CREOSOTE, IN A SEPARATE PHASE, WAS DETECTED JUST DOWN GRADIENT OF THE SOURCE.

A SMALLER CONTAMINATED GROUND WATER PLUME EXTENDS ABOUT 400 FEET SOUTHEAST FROM THE OLD PROCESS AREA IN THE SOUTHWEST CORNER. THE SOURCES OF THIS CONTAMINATION ARE PROBABLY PONDS 11, 12 AND 13 AND THE WIDE SPREAD SOIL CONTAMINATION EXTENDING TO THE SHALLOW GROUND WATER.

AN ESTIMATED 2.1 MILLION GALLONS OF CONTAMINATED GROUND WATER IS CONTAINED IN THE AREA B PLUME. CONCENTRATIONS OF SEMI-VOLATILE (PRINCIPALLY PENTACHLOROPHENOL) ORGANICS RANGE FROM 22 MG/L CLOSEST TO THE SOURCE TO 0.69 MG/L AT THE PLUME'S EDGE.

PRELIMINARY SAMPLING OF THE LOWER WATER-BEARING ZONE, THE SILTY SAND ZONE, INDICATES IT IS CONTAMINATED. TOTAL SEMI-VOLATILE CONCENTRATIONS OF 0.86 AND 0.065 MG/L WERE FOUND IN THIS ZONE. NO VOLUME IN THE SILTY SAND ZONE COULD BE CALCULATED WITH ONLY TWO WELLS. CONTAMINATION IN THIS ZONE PROBABLY ORIGINATED IN THE CONTAMINATED SHALLOW GROUND WATER ABOVE THIS ZONE.

THE POPULATION OF TEXARKANA IS APPROXIMATELY 33,500. NO ONE LIVES ON THE SITE. THE IMMEDIATE AREA, WITHIN ONE HALF MILE, INCLUDES INDUSTRIES AND A SMALL RESIDENTIAL COMMUNITY OF ABOUT 70 HOMES. THIS RESIDENTIAL COMMUNITY IS ABOUT 1/3 MILE FROM THE SITE. APPROXIMATELY 1,000 PEOPLE LIVE WITHIN A 1 MILE RADIUS. THE SITE IS FENCED AND HAZARD SIGNS ARE POSTED AROUND THE SITE TO DISCOURAGE PEOPLE FROM ENTERING THE SITE. CONTAMINATION CONTINUES TO MIGRATE FROM THE SOIL THROUGH LEACHATE GENERATION AND SURFACE RUNOFF. SURFACE RUNOFF MAY CARRY CONTAMINANTS INTO DAYS CREEK.

APPROXIMATELY 95% OF THE SURFACE CONTAMINATION IS WITHIN THE FENCED BOUNDARY OF THE OLD FACILITY. ONLY ABOUT 5 % OF THE CONTAMINATION IS OUTSIDE THE BOUNDARY OF THE FENCE IN THE SOUTHWEST CORNER OF THE WEST PORTION OF THE SITE. THIS DECISION DOCUMENT ADDRESSES THE SHALLOW GROUND WATER, AS WELL AS THE SOIL, SLUDGE, AND SEDIMENT, ON AND OFF SITE, WHICH IS THE MOST HEAVILY CONTAMINATED GROUND WATER ZONE. THE SATURATED ZONE OF THE SHALLOW GROUND WATER IS CLASSIFIED AS A 2B AQUIFER WITH AN AVERAGE DEPTH OF 13.5 FEET, AND APPEARS TO HAVE TWO DISTINCT PLUMES. THE DEEPER ZONES ARE STILL UNDER INVESTIGATION. CONTAMINATION IN THESE ZONES ARE ONLY SLIGHTLY ABOVE THE DETECTION LIMIT FOR NON-CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS.

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VI. SUMMARY OF SITE RISKS

A RISK ASSESSMENT IS A SCIENTIFIC PROCEDURE WHICH USES FACTS AND ASSUMPTIONS TO ESTIMATE THE POTENTIAL FOR ADVERSE EFFECT ON HUMAN HEALTH AND THE ENVIRONMENT FROM EXPOSURE TO CHEMICALS. RISK IS DETERMINED BY EVALUATING KNOWN CHEMICAL EXPOSURE LIMITS AND ACTUAL CHEMICAL CONCENTRATIONS ON SITE. THE ACTUAL CHEMICAL CONCENTRATIONS ARE COMPARED TO THE LEVEL OF EXPOSURE TO THE CHEMICAL SHOWN TO CAUSE HARM. THE RISK POTENTIAL IS EXPRESSED IN TERMS OF THE CHANCE OF A DISEASE OCCURRING. CONSERVATIVE ASSUMPTIONS THAT WEIGH IN FAVOR OF PROTECTING HUMAN HEALTH AND THE ENVIRONMENT ARE MADE IN THIS CALCULATION. TO PROTECT HUMAN HEALTH, THE EPA IS MOST CONCERNED WITH THE PROBABILITY THAT EXPOSURE TO SPECIFIC CHEMICALS MAY RESULT IN CANCER.

THE NATIONAL RISK OF DEVELOPING SOME FORM OF CANCER FROM EVERYDAY SOURCES OVER A 70-YEAR LIFE SPAN IS ESTIMATED AT THREE IN TEN. ACTIVITIES SUCH AS TOO MUCH EXPOSURE TO THE SUN, OCCUPATIONAL EXPOSURES, OR SMOKING HABITS CONTRIBUTE TO THIS HIGH RISK. THE THREE IN TEN PROBABILITY IS THE "NATURAL INCIDENCE" OF CANCER. TO PROTECT HUMAN HEALTH, THE EPA HAS SET THE RISK RANGE OF ONE IN TEN THOUSAND TO ONE IN ONE MILLION EXCESS CANCER RISK AS A GOAL FOR SUPERFUND SITES. THESE MAY ALSO BE DESCRIBED BY SCIENTIFIC NOTATION; 1×10^{-4} TO 1×10^{-6} . A RISK LEVEL OF 1 IN 1,000,000 MEANS THAT ONE ADDITIONAL PERSON OUT OF 1 MILLION PEOPLE EXPOSED COULD POSSIBLY DEVELOP CANCER AS A RESULT OF EXTENSIVE CONTINUOUS EXPOSURE TO THE SITE.

THE RISK ASSESSMENT BEGINS BY EVALUATING THE CURRENT SITE RISK, ALSO CALLED SITE BASELINE RISK, POSED TO HUMAN HEALTH BY THE TEXARKANA WOOD PRESERVING COMPANY SITE. SINCE THE SITE IS CURRENTLY UNOCCUPIED, INFORMATION FROM THE LOCAL OFFICIALS WAS OBTAINED TO DETERMINE A LIKELY FUTURE LAND USE. THIS INFORMATION INDICATED THAT THE MOST LIKELY FUTURE LAND USE SCENARIO FOR THE SITE IS INDUSTRIAL. THE SITE IS WITHIN THE 100-YEAR FLOOD PLAIN, AND MANY INDUSTRIAL AREAS SURROUND THE SITE. THEREFORE, THE FUTURE USE OF THE SITE FOCUSED ON THE EFFECTS OF A WORKER EXPOSURE TO THE CONTAMINANTS. THE RISK ASSESSMENT DETERMINED THAT THE CHEMICALS WHICH POSE THE GREATEST HEALTH THREAT TO WORKERS ARE POLYNUCLEAR AROMATIC HYDROCARBONS (I.E., CREOSOTE), PENTACHLOROPHENOL, AND POLYCHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN.

UNDER THE FUTURE USE EVALUATION, ASSUMING SITE CONDITIONS ARE UNCHANGED, THE BASELINE RISK ASSESSMENT INDICATED THAT THE INCREASED CHANCE OF CANCER A WORKER WOULD HAVE WOULD BE ONE IN ONE HUNDRED (1:100). MOST OF THE RISK WAS POSED BY THE DERMAL ABSORPTION FROM SOIL AND INCIDENTAL INGESTION OF SOIL EXPOSURE PATHWAY. ALMOST 100 PERCENT OF THE CARCINOGENIC RISK WAS POSED BY THE CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS. THE BASELINE RISK ALSO INDICATED THERE IS AN INCREASED CHANCE FOR NON-CARCINOGENIC HEALTH EFFECTS, (HEALTH EFFECTS OTHER THAN CANCER) FROM TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS AND CHLORINATED DIBENZO DIOXIN AND FURANS. THIS ASSUMED A 40-YEAR TENURE AT THE SITE, WORKING 50 WEEKS PER YEAR, 5 DAYS PER WEEK, 8 HOURS PER DAY, EXPOSURE TO THE MAXIMUM CONCENTRATION OF THE CHEMICALS, A WORKER WEIGHT OF 154 POUNDS (70 KG), AND WORKER CONSUMPTION OF .1 GRAM OF SOIL PER DAY, (HALF IS INGESTED AT WORK). THE SLOPE FACTOR (PREVIOUSLY KNOWN AS THE CANCER POTENCY FACTOR) FOR BENZO(A)PYRENE OF 11.5 (MG/KG/DAY)⁽⁻¹⁾ AND A REFERENCE DOSE OF 1.2×10^{-3} (MG/KG/DAY) FOR POLYNUCLEAR AROMATIC HYDROCARBON WERE ALSO USED. AS A RESULT OF THESE CONSERVATIVE ASSUMPTIONS, THE RISK ASSESSMENT SHOULD NOT BE CONSTRUED AS PRESENTING AN ABSOLUTE ESTIMATE OF RISK TO HUMAN HEALTH. RATHER IT IS A CONSERVATIVE ANALYSIS INTENDED TO ESTIMATE THE POTENTIAL FOR ADVERSE HEALTH EFFECTS TO OCCUR.

THE SITE IS SEPARATED INTO EAST AND WEST SECTIONS BY LUBBOCK STREET WHICH RUNS IN A ROUGHLY NORTH-SOUTH DIRECTION. THE WEST SECTION IS SECURED BY A LOW BARBED WIRE FENCE ON THE SOUTH AND WEST BORDERS AND BY A SIX FEET HIGH CHAIN LINK FENCE ON THE NORTH AND EAST BORDERS. THE BARBED WIRE FENCE, AS WELL AS TRAFFIC ON EACH SIDE ON THE SITE, WOULD MOST LIKELY DETER CHILDREN FROM TRESPASSING ON THE PROPERTY. HOWEVER, THESE BOUNDARIES WOULD NOT PREVENT ADULT TRESPASSERS FROM ENTERING THE SITE TO SALVAGE EQUIPMENT. THE TRESPASSER IS ASSUMED TO SPEND EIGHT HOURS PER DAY ON THE SITE, TWO DAYS PER WEEK FOR TWO WEEKS DURING ONE YEAR. THIS IS THE "CURRENT USE" SCENARIO.

SOIL CONCENTRATIONS OF INDICATOR CHEMICALS (WHICH INCLUDE PENTACHLOROPHENOL, NAPHTHALENE, BENZO(A)PYRENE AND DIOXIN) WERE AVERAGED OVER THE ENTIRE SITE FOR THIS SCENARIO SINCE IT IS ASSUMED THE INDIVIDUAL WOULD WALK THROUGHOUT THE SITE. THE SOIL CONCENTRATIONS ARE ONLY USED FOR THE INHALATION PATHWAY IN THIS SCENARIO; EXPOSURE TO CONTAMINANTS THROUGH DERMAL CONTACT AND INCIDENTAL SOIL INGESTION WERE BASED ON SLUDGE CONCENTRATIONS. INCIDENTAL INGESTION AND DERMAL CONTACT EXPOSURES WERE BASES ON SLUDGE CONTACT BECAUSE IT IS ASSUMED THAT THE ADULT TRESPASSER WOULD BE ON THE SITE FOR THE PURPOSES OF SALVAGING EQUIPMENT WHICH IS LOCATED IN AREAS WITH A SIGNIFICANT PRESENCE OF SLUDGE.

THE POTENTIAL UPPERBOUND CARCINOGENIC RISK ESTIMATED FOR THE TRESPASSER RANGED FROM

APPROXIMATELY ONE IN ONE MILLION BASED ON THE AVERAGE CONTAMINANT CONCENTRATION TO 4 IN ONE HUNDRED THOUSAND BASED ON THE MAXIMUM CONTAMINANT CONCENTRATION. THE MAJOR PORTION OF THE RISK WAS POSED BY DERMAL ABSORPTION FROM SLUDGE AND INCIDENTAL SLUDGE INGESTION. OF THE CONTAMINANTS, THE CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS CONTRIBUTED CLOSE TO 100 PERCENT OF THE RISK. THE RISK ASSESSMENT ALSO INDICATED NON-CARCINOGENIC HEALTH EFFECTS WILL OCCUR UNDER THIS SCENARIO. PEOPLE LIVING IN THE VICINITY OF THE SITE ARE NOT CURRENTLY AT RISK FROM THE SITE.

TABLE 1 OUTLINES BASELINE RISKS CALCULATED FOR THE WORKER AND TRESPASSER SCENARIO. FOR MORE INFORMATION ON THE RISK ASSESSMENT, REFER TO APPENDIX B IN VOLUME 2 OF THE FEASIBILITY STUDY REPORT, JULY 1990.

REMEDIATION GOALS

THE NEXT STEP IN THE RISK ASSESSMENT IS TO DETERMINE WHAT LEVELS OF THE CHEMICALS AT THE SITE WOULD NOT POSE ADVERSE HEALTH EFFECTS. FOLLOWING METHODOLOGY REFINED BY THE AND PUBLISHED IN THE SUPERFUND PUBLIC HEALTH EVALUATION MANUAL, 1986 OSWER DIRECTIVE 9285.4-1 AND RISK ASSESSMENT GUIDANCE FOR HUMAN HEALTH EVALUATION MANUAL, 1989 OSWER DIRECTIVE 9285.701, EPA DETERMINED REMEDIATION GOALS.

IN DECEMBER 1989, EPA'S OFFICE OF EMERGENCY AND REMEDIAL RESPONSE PUBLISHED THE INTERIM FINAL RISK ASSESSMENT GUIDANCE FOR SUPERFUND (RAGS)-VOLUME I. THE PURPOSE OF THIS GUIDANCE WAS TO SUPERSEDE THE SUPERFUND PUBLIC HEALTH EVALUATION MANUAL (SPHEM) AND ENDANGERMENT ASSESSMENT HANDBOOK WHICH, TO THAT DATE, HAD BEEN USED FOR ASSESSING THE EFFECTS OF CHEMICAL CONTAMINATION ON HUMAN HEALTH. RAGS REVISED THE SPHEM METHODOLOGY IN SEVERAL WAYS.

ONE KEY MODIFICATION CAME THROUGH THE INTRODUCTION OF THE CONCEPT OF REASONABLE MAXIMUM EXPOSURE (RME). RME IS DEFINED AS THE HIGHEST EXPOSURE THAT COULD REASONABLY BE EXPECTED TO OCCUR AT A SITE. THIS APPROACH DIFFERS FROM THE SPHEM APPROACH OF DEFINING WORST-CASE EXPOSURE TO SITE CONTAMINANTS. ONE OF THE PRIMARY DIFFERENCES IS THAT WHILE SPHEM UTILIZED A "WORST-CASE" SCENARIO BASED ON CONTINUED EXPOSURE TO THE MAXIMUM DETECTED CONCENTRATION OF A CHEMICAL CONSTITUENT AT THE SITE, RME BASES THE MAXIMUM EXPOSURE ON THE 95% UPPER CONFIDENCE LIMIT OF THE MEAN, PROVIDING A SPATIALLY AVERAGED EXPOSURE CONCENTRATION.

WHILE THERE ARE ADVANTAGES AND DISADVANTAGES REALIZED IN BOTH THE SPHEM AND RAGS METHODS, THE TEXARKANA WOOD PRESERVING RECORD OF DECISION SUMMARIZES THE RESULTS OF THE RISK ASSESSMENT CONDUCTED UNDER SPHEM GUIDANCE. RAGS WAS NOT USED BECAUSE AT THE TIME OF ITS PUBLICATION, THE RISK ASSESSMENT FOR THE TEXARKANA WOOD PRESERVING SITE WAS NEARING COMPLETION. CONSIDERING THAT THE UNDERLYING ASSUMPTIONS UTILIZED UNDER SPHEM WERE AT LEAST AS CONSERVATIVE AS THOSE USED IN RAGS, THE RESULTS OF THE RISK ASSESSMENT WOULD BE AT LEAST AS PROTECTIVE AS THOSE WHICH WOULD HAVE BEEN DERIVED UNDER EXPOSURE PARAMETERS (SUCH AS BODY WEIGHT, INGESTION RATES, EXPOSURE FREQUENCIES AND DURATIONS, ETC.) WHICH WERE CONSISTENT WITH THE RAGS. THEREFORE, THE DECISION WAS MADE TO COMPLETE THE RISK ASSESSMENT UNDER THE SPHEM GUIDANCE.

THE FOLLOWING SUMMARY HIGHLIGHTS THE METHODOLOGY USED IN THE RISK ASSESSMENT PROCESS. ONLY THE WORST CASE RISK (BASED ON THE MAXIMUM CONTAMINANT CONCENTRATION) IS PRESENTED. THE SAME CONSERVATIVE ASSUMPTIONS WERE USED IN DERIVING THE REMEDIATION GOALS AS USED IN THE BASELINE RISK ASSESSMENT. AS PREVIOUSLY MENTIONED, THE FUTURE USE OF THIS SITE WILL MOST LIKELY BE AN INDUSTRIAL, THEREFORE AN INDUSTRIAL EXPOSURE SCENARIO WAS DEVELOPED. THIS EXPOSURE SCENARIO IS BASED ON AN INDIVIDUAL WORKING ON THE SITE FOR 40 YEARS, THE OTHER ASSUMPTIONS ARE THE SAME AS ABOVE.

CANCER CAUSING COMPOUNDS;

THE CREOSOTE COMPOUNDS (POLYNUCLEAR AROMATIC HYDROCARBONS, SEE TABLE 2) KNOWN OR SUSPECTED TO BE CANCER CAUSING VARY IN TOXIC POTENCY. MANY OF THESE COMPOUNDS ALSO CAUSE NON-CARCINOGENIC EFFECTS, CREATING A COMPLEX TOXICITY PICTURE. THE EXPOSURE AND UPTAKE OF THESE COMPOUNDS VARY WITH THE CIRCUMSTANCES ON THE SITE AND WITH THE MIXTURE OF POLYNUCLEAR AROMATIC HYDROCARBON PRESENT. IN ORDER TO RELATE EACH COMPLEX MIXTURE OF POLYNUCLEAR AROMATIC HYDROCARBONS TO THE OTHER, THE EPA HAS DRAFTED AN EQUIVALENCY RATING FOR EACH COMPOUND. THIS EQUIVALENCY SYSTEM RELATES THE TOXICITY OF BENZO(A)PYRENE, CONSIDERED THE MOST TOXIC POLYNUCLEAR AROMATIC HYDROCARBON, TO THE OTHER POLYNUCLEAR AROMATIC HYDROCARBON. THE EQUIVALENCY FACTORS ARE SHOWN ON TABLE 2.

SOME DIOXIN AND FURANS ARE ALSO KNOWN TO BE CANCER CAUSING AND ARE PRESENT IN THE SOILS AT THE SITE. THE POTENTIAL THREAT TO HUMAN HEALTH POSED BY CHLORINATED DIOXIN AND FURANS IS BASED ON THE ESTABLISHED CRITERIA FOR 2,3,7,8-TETRACHLORODIBENZO-P-DIOXIN (2,3,7,8-TCDD). CHLORINATED DIBENZOFURANS AND OTHER ISOMERS OF DIOXIN ARE CONSIDERED TO BE LESS TOXIC THAN 2,3,7,8-TCDD AND ARE EXPRESSED IN TOXIC EQUIVALENTS OF 2,3,7,8-TCDD. THEREFORE, ALTHOUGH 2,3,7,8-TCDD IS NOT A MAJOR CONTRIBUTOR TO THE DIOXIN CONCENTRATION AT THE SITE, THE TARGET ACTION LEVEL FOR DIOXIN AND FURANS IS EXPRESSED IN TOXIC EQUIVALENCIES OF 2,3,7,8-TCDD. GUIDANCE USED TO EVALUATE THE LEVELS PRESENT IN SOIL AT TEXARKANA WOOD PRESERVING SITE INCLUDE INTERIM PROCEDURES FOR ESTIMATING RISKS ASSOCIATED WITH EXPOSURES TO MIXTURES OF CHLORINATED DIBENZO-P-DIOXIN AND -DIBENZOFURANS (CDDS AND CDFS) AND 1989 UPDATE, EPA/625/3-89/016, MARCH 1989. THESE EQUIVALENCY FACTORS ARE SHOWN ON TABLE 3.

NON-CANCER CAUSING COMPOUNDS;

ALTHOUGH SOME COMPOUNDS AT THE SITE DO NOT CAUSE CANCER, THEY DO CAUSE OTHER HEALTH EFFECTS. THE CHEMICALS OF CONCERN IN THIS GROUP ARE PENTACHLOROPHENOL AND THE NON-CANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBONS (E.G., NAPHTHALENE, ACENAPHTHENE, ACENAPHTHYLENE AND FLUORENE).

AS WITH THE CANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBONS AND DIOXIN, THE NON-CANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBONS HAVE A SPECIFIC COMPOUND THE TOXICITY OF THE NON-CANCER CAUSING COMPOUND ARE RELATED TO. ALL NON-CANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBONS ARE CONSIDERED EQUAL TO NAPHTHALENE BECAUSE IT IS AMONG THE MOST PREVALENT AND MOST STUDIED NONCANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBON. THE BASELINE RISK ASSESSMENT INDICATED THAT THE NON-CANCER CAUSING COMPOUNDS DO NOT PRESENT A RISK BY THEMSELVES. HOWEVER, WHEN COMBINED WITH THE NON CANCER EFFECTS ASSOCIATED WITH THE CANCER CAUSING POLYNUCLEAR AROMATIC HYDROCARBONS THERE IS A POTENTIAL FOR ADVERSE EFFECTS TO HUMAN HEALTH AND THE ENVIRONMENT. THEREFORE, A "TOTAL POLYNUCLEAR AROMATIC HYDROCARBON" REMEDIATION LEVEL WAS ESTABLISHED.

BASED ON THE BASELINE RISK ASSESSMENT, I.E., IN THE CASE OF THE INDUSTRIAL SCENARIO, THE INGESTION OF THE CONCENTRATIONS OF PENTACHLOROPHENOL IN THE SOIL, ON SITE, WILL NOT CAUSE ADVERSE HEALTH EFFECTS. HOWEVER, THE CONCENTRATION IN THE SOIL IS HAVING A SEVERE ADVERSE EFFECT ON THE SHALLOW GROUND WATER, WHICH MAY CAUSE FUTURE ADVERSE EFFECT ON HUMAN HEALTH THROUGH THE DEEPER AQUIFER. THEREFORE, A REMEDIATION LEVEL WAS ESTABLISHED FOR THE SOIL TO PROTECT THE GROUND WATER AND THE ENVIRONMENT.

THE LEVELS THE EPA HAS DETERMINED WILL PROVIDE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, BASED ON AN INDUSTRIAL EXPOSURE SCENARIO, ARE THE FOLLOWING;

SOIL;

CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS 3 PARTS PER MILLION AS BENZO(A)PYRENE EQUIVALENTS. TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS 2450 PARTS PER MILLION. CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN 20 PARTS PER BILLION AS 2,3,7,8 TCDD EQUIVALENTS. PENTACHLOROPHENOL 150 PARTS PER MILLION.

SHALLOW GROUND WATER:

PENTACHLOROPHENOL 0.2 PARTS PER MILLION CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS 2.8 PARTS PER TRILLION AS BENZO(A)PYRENE EQUIVALENTS OR TO BELOW DETECTION LIMIT. CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN 2.2×10^{-4} PARTS PER TRILLION AS 2,3,7,8 TCDD EQUIVALENTS OR TO BELOW DETECTION LIMIT.

THE GROUND WATER REMEDIATION LEVEL ESTABLISHED FOR PENTACHLOROPHENOL IS A PROPOSED MAXIMUM CONTAMINANT LEVEL (MCL). THE GROUND WATER REMEDIATION LEVELS ESTABLISHED FOR BOTH THE CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS AND THE DIOXIN ARE THE FEDERAL AMBIENT WATER QUALITY CRITERIA STANDARDS WHICH ARE BASED ON A 1×10^{-6} EXCESS CANCER RISK. THESE STANDARDS ARE BELOW THE ANALYTICAL DETECTION LIMIT FOR THESE COMPOUNDS AND ARE THEREFORE IMMEASURABLE. THE ANALYTICAL DETECTION LIMIT OF 10 PPB FOR CARCINOGENIC PNAS AND .001 PPB FOR DIOXIN/FURANS WILL BE THE GOAL FOR THE GROUND WATER.

THE REMEDIATION GOALS THE EPA IS PROPOSING WILL REDUCE THIS RISK TO AT LEAST ONE IN ONE HUNDRED THOUSAND (1:100,000), ONE THOUSAND TIMES SAFER THAN WHAT THE BASELINE RISK ASSESSMENT INDICATED

IS CURRENTLY POSED BY THE SITE AND WITHIN THE RISK RANGE OF 1×10^{-4} TO 1×10^{-6} AS DIRECTED BY THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN, THURSDAY, MARCH 8, 1990.

AN ENVIRONMENTAL ASSESSMENT WAS PERFORMED TO DETERMINE WHETHER THE SITE CONTAMINATION HAS IMPACTED ON-SITE AND OFF-SITE VEGETATION AND ANIMAL LIFE. MORE SPECIFICALLY, THE PURPOSE OF THE PROGRAM WAS TO DETERMINE IF SITE CONTAMINANTS HAVE ENTERED THE FOOD CHAIN AND POSE A RISK TO HUMAN HEALTH. NO ENDANGERED SPECIES WERE NOTED ON-SITE AT ANY TIME. THE SITE DOES APPEAR TO HAVE SOME WETLAND VEGETATION. IT IS BELIEVED THAT TO REMEDIATE THE SITE WILL IMPROVE THESE AREAS AND PROMOTE WETLAND DEVELOPMENT. BIOLOGICAL SAMPLING INDICATED THE CONTAMINANTS ARE NOT ACCUMULATING IN THE ANIMAL LIFE ON THE SITE OR IN DAYS CREEK. NO SIGNS OF STUNTED GROWTH IN VEGETATION THAT COULD BE CORRELATED WITH A CONTAMINATION RESPONSE WERE APPARENT. IN AREAS WHERE KNOWN CONTAMINATION OCCURRED, THE VEGETATION IS SIMILAR IN SIZE TO OTHER COMPARABLE AREAS OFF-SITE.

FOR MORE INFORMATION ABOUT THE RISK ASSESSMENT, REFER TO APPENDIX B IN VOLUME 2 OF THE FEASIBILITY STUDY.

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VIII. DESCRIPTION OF ALTERNATIVES

SOIL ALTERNATIVES

THE ALTERNATIVES FOR THE SOIL REMEDIATION ARE THE FOLLOWING;

- ALTERNATIVE A-1; NO ACTION
- ALTERNATIVE A-2; CAPPING
- ALTERNATIVE A-3; THERMAL DESTRUCTION AND BACKFILLING
- ALTERNATIVE A-4; CHEMICAL TREATMENT AND BACKFILLING
- ALTERNATIVE A-5; SOLIDIFICATION AND BACKFILLING
- ALTERNATIVE A-6; BIOLOGICAL TREATMENT AND BACKFILLING
- ALTERNATIVE A-7; OFFSITE THERMAL DESTRUCTION

COMMON ELEMENTS; EXCEPT FOR THE "NO ACTION" AND "CAPPING" IN PLACE ALTERNATIVES, ALL OF THE ALTERNATIVES NOW BEING CONSIDERED FOR THE SITE WOULD INCLUDE A NUMBER OF COMMON ELEMENTS. ALL ALTERNATIVES INVOLVE EXCAVATION OF APPROXIMATELY 77,000 CUBIC YARDS OF ON-SITE SOIL ABOVE EPA'S ON SITE REMEDIATION GOALS. "CONTAMINATED SOIL" MEANS ALL SOIL, SLUDGE, AND SEDIMENT CONTAMINATED ABOVE THE EPA REMEDIATION GOALS. THE PROPOSED EXCAVATION WOULD INCLUDE SOIL IN THE UPPER GROUND WATER REGION, TO HELP EXPEDITE THE REMEDIATION OF THE GROUND WATER. SHALLOW GROUND WATER MONITORING ACTIVITIES WILL BE CONDUCTED AFTER SOIL REMEDIATION TO ENSURE THAT THE REMEDY IS EFFECTIVE. AN AIR MONITORING PLAN WOULD BE IMPLEMENTED TO REDUCE/ELIMINATE ANY ADVERSE SHORT TERM HEALTH EFFECTS DURING EXCAVATION AND TREATMENT ACTIVITIES. AFTER TREATMENT AND REPLACEMENT, THE TREATED SOILS WILL BE COVERED WITH CLEAN TOPSOIL AND REVEGETATED.

DEED RECORDATION WILL BE OBTAINED IN PREVENTING FUTURE USE OF THE SITE. THE STATE OF TEXAS DOES NOT HAVE A MECHANISM TO FORCE A LANDOWNER TO RECORD ANYTHING ON THE DEED. THE WATER RIGHTS ARE ALSO THE LANDOWNER'S, SO INSTITUTIONAL CONTROLS ARE DIFFICULT TO ENFORCE.

ALTERNATIVE A-7 INVOLVES TREATMENT AND DISPOSAL OF THESE SOILS OFFSITE; ALL OTHER ALTERNATIVES INVOLVE ONSITE TREATMENT OR CONTAINMENT OF THE SOIL.

ARARS

THE ORIGIN OF THE WASTES IDENTIFIED ON SITE WERE COMPARED TO RCRA LISTED HAZARDOUS WASTES. THE WASTES WERE NOT IDENTIFIED AS BEING RCRA LISTED HAZARDOUS WASTES. ADDITIONALLY, BASED ON CURRENT INFORMATION, THE WASTES ARE NOT CONSIDERED "CHARACTERISTIC" OF HAZARDOUS WASTES. ALTHOUGH A NEW DEFINITION OF "TOXICITY CHARACTERISTIC, (TC)" WAS ESTABLISHED FOR THE LEACHABILITY OF PENTACHLOROPHENOL OF 100 PARTS PER MILLION, IT IS NOT EXPECTED THAT TEXARKANA WOOD PRESERVING WASTE SAMPLE EXTRACT OR LEACHATE RESULTING FROM APPLICATION OF THE TCLP WILL EXCEED THIS LIMIT. AS A GENERAL RULE OF THUMB, WASTE CONCENTRATIONS BELOW 20 TIMES THE "TC" LEACHATE CONCENTRATION WILL NOT EXCEED THE "TC" LEACHATE CONCENTRATION IN THE EXTRACT.

BECAUSE THE WASTE ARE NOT RCRA WASTE, RCRA LAND DISPOSAL RESTRICTIONS AS PRESENTED IN 40 CFR PART 268 ARE NOT APPLICABLE. FURTHERMORE, SUPERFUND LAND DISPOSAL RESTRICTIONS GUIDE NUMBER 7,

"DETERMINING WHEN LAND DISPOSAL RESTRICTIONS (LDRS) ARE RELEVANT AND APPROPRIATE TO CERCLA RESPONSE ACTIONS", STATES THAT EPA WILL NOT CONSIDER THE LAND DISPOSAL RESTRICTION TO BE RELEVANT AND APPROPRIATE FOR SOIL AND DEBRIS CONTAMINATED WITH HAZARDOUS SUBSTANCES THAT ARE NOT RCRA RESTRICTED WASTES. THEREFORE, LAND DISPOSAL RESTRICTIONS ARE NOT CONSIDERED RELEVANT AND APPROPRIATE FOR THE DIOXIN-CONTAMINATED SOILS AT THE TEXARKANA WOOD PRESERVING SITE.

CONTINUING THIS THOUGHT, BECAUSE THE WASTE ARE NOT RCRA HAZARDOUS WASTE, THE REGULATIONS PERTAINING TO HAZARDOUS WASTE (FOR EXAMPLE 40 CFR PART 264) ARE NOT APPLICABLE, BUT MAY BE CONSIDERED RELEVANT AND APPROPRIATE. THE DISCUSSION OF RELEVANCE AND APPROPRIATENESS WILL BE COVERED IN EACH ALTERNATIVE.

COSTS

ALL COSTS AND TIME REQUIRED TO IMPLEMENT THE ALTERNATIVES ARE ESTIMATES. THE COSTS HAVE A DEGREE OF ACCURACY OF +50% TO -30%.

SOIL ALTERNATIVE A-1;

NO ACTION

- PRESENT WORTH; \$680,000
- CAPITAL COST; \$210,000
- OPERATION AND MAINTENANCE; \$470,000
- YEARS TO IMPLEMENT; 30

THE SUPERFUND PROGRAM REQUIRES THAT A NO ACTION ALTERNATIVE BE CONSIDERED AT EVERY SITE AS A BASIS OF COMPARISON WHEN EVALUATING OTHER ALTERNATIVES. NO ACTION WOULD CONSIST OF ERECTING A NEW FENCE AROUND THE ENTIRE SITE, AND MONITORING THE AIR AND GROUND WATER FOR 30 YEARS. "NO ACTION" WOULD NOT BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THEREFORE, "NO ACTION" IS NOT A FAVORED ALTERNATIVE BY THE EPA FOR THIS SITE. THIS ALTERNATIVE WOULD NOT DECREASE THE TOXICITY, MOBILITY, OR VOLUME OF CONTAMINANTS OR REDUCE PUBLIC HEALTH OR ENVIRONMENTAL RISKS. THE QUALITY OF THE GROUND WATER WOULD PROBABLY CONTINUE TO DEGRADE.

SOIL ALTERNATIVE A-2;

CAPPING

- PRESENT WORTH; \$7,300,000
- CAPITAL COSTS; \$6,900,000
- OPERATION AND MAINTENANCE COSTS; \$430,000
- YEARS TO IMPLEMENT; 1
- INSTALL MULTI-LAYER CAP OVER SITE.

THE CAPPING ALTERNATIVE CALLS FOR ALL SOILS ABOVE THE REMEDIATION LEVEL TO BE CAPPED ON SITE. IN THIS ALTERNATIVE, A RCRA SUBTITLE C CAP WOULD BE CONSIDERED RELEVANT AND APPROPRIATE. THE CAP WOULD CONSIST OF THREE FEET OF CLAY, 80 MIL HIGH DENSITY POLYETHYLENE SYNTHETIC LINER PLACED ABOVE THE CLAY, ONE FOOT OF TOPSOIL ABOVE THE SYNTHETIC LINER AND A VEGETATIVE COVER. AS THIS SITE IS IN THE 100-YEAR FLOOD PLAIN OF DAYS CREEK, AN IMPORTANT DESIGN CONSIDERATION WOULD BE TO MAINTAIN THE FLOOD STORAGE OF THE CREEK'S WATERSHED. A TREATABILITY TEST WAS NOT PERFORMED IN THE FEASIBILITY STUDY ON THIS ALTERNATIVE.

NO TREATMENT OF THE SOILS WOULD BE DONE BEFORE THE SITE WAS CAPPED. ALTHOUGH THE MOBILITY OF THE CONTAMINANTS IN THE SOIL WOULD BE REDUCED IF A CAP WERE CONSTRUCTED OVER THE SITE, THE VOLUME OF THE CONTAMINATED SOILS AND THE TOXICITY OF THE CONTAMINANTS WOULD NOT BE REDUCED. THEORETICALLY, THE EXCESS CANCER RISK WOULD BE ELIMINATED BECAUSE THE CAP WOULD ELIMINATE THE POSSIBILITY OF EXPOSURE.

A VARIATION OF THIS ALTERNATIVE WOULD BE CONSOLIDATING ALL OR A PORTION OF THE WASTE BEFORE CAPPING. SPECIFICALLY EVALUATED IN THIS ALTERNATIVE WAS CONSOLIDATING ALL 77,000 CUBIC YARDS OF WASTE UNDER A CAP ON THE WEST HALF OF THE SITE.

EPA IS DIRECTED BY FEDERAL ENVIRONMENTAL REGULATIONS TO "UTILIZE PERMANENT SOLUTION AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE" AND TO PREFER REMEDIAL ACTIONS IN WHICH TREATMENT "PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS SUBSTANCES, POLLUTANTS, AND CONTAMINANTS AS A PRINCIPAL ELEMENT".

SINCE HAZARDOUS WASTE WILL BE LEFT ON THE SITE, "LANDFILL" CLOSURE WILL APPLY. RCRA REGULATIONS AFFECTING LANDFILL CLOSURE REQUIRE THE SITE TO BE CAPPED, WITH A FINAL COVER DESIGNED AND CONSTRUCTED TO PROVIDE LONG-TERM PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THROUGH MINIMIZATION OF THE INFILTRATION OF LIQUIDS THROUGH THE CAPPED AREA AND PROPER MAINTENANCE OF THE INTEGRITY OF THE CAP OVER TIME WITH MAINTENANCE. THIS TYPE OF CLOSURE ANTICIPATES THAT POST CLOSURE CARE AND MAINTENANCE WILL BE CARRIED OUT AT THE FACILITY FOR AT LEAST 30 YEARS. IF THE WASTES ARE NOT CONSOLIDATED, THE "LANDFILL" CLOSURE REGULATIONS WILL BE RELEVANT AND APPROPRIATE. IF THE WASTES ARE CONSOLIDATED, THE LANDFILL CLOSURE REGULATIONS WILL BE APPLICABLE. IN EITHER CASE, LONG-TERM MONITORING AND MAINTENANCE OF THE SITE, INCLUDING GROUND WATER MONITORING AND CAP REPAIRS, WOULD BE REQUIRED TO GUARANTEE THE EFFECTIVENESS OF THIS REMEDY.

DEED RECORDATION WOULD BE OBTAINED TO PREVENT FUTURE USE OF THE SITE. HOWEVER, THE STATE OF TEXAS DOES NOT HAVE A MECHANISM TO FORCE A LANDOWNER TO RECORD ANYTHING ON THE DEED, AND THE WATER RIGHTS ARE ALSO THE LANDOWNER'S, SO INSTITUTIONAL CONTROLS ARE DIFFICULT TO ENFORCE. DEED RECORDATION WILL BE REQUESTED. IT MAY NOT BE POSSIBLE TO DELETE THE SITE FROM THE NATIONAL PRIORITIES LIST IF THIS ALTERNATIVE IS SELECTED.

SOIL ALTERNATIVE A-3

THERMAL DESTRUCTION AND BACKFILLING

- PRESENT WORTH; \$43,100,000
- CAPITAL COSTS; \$42,000,000
- OPERATION AND MAINTENANCE; \$60,000
- YEARS TO IMPLEMENT; 2.5
- EXCAVATE CONTAMINATED MATERIAL AND THERMALLY DESTROY.
- BACKFILL AND GRADE WITH THE TREATED SOIL.

THERMAL DESTRUCTION IS THE CONTROLLED COMBUSTION OF ORGANIC WASTES. MANY TYPES OF THERMAL DESTRUCTION UNITS ARE SUITABLE FOR THIS ALTERNATIVE. THE COST AND IMPLEMENTATION TIME ARE BASED ON TWO ROTARY KILN INCINERATORS OPERATING AT 4 CUBIC YARDS PER HOUR (CY/HR). THE INCINERATORS WILL BE RUN CONTINUOUSLY (24 HOURS/DAY) TO AVOID START UP DELAYS ASSOCIATED WITH INTERMITTENT OPERATIONS. REDUCTION OF TOXICITY, MOBILITY AND VOLUME OF CONTAMINATED WASTE IS ACHIEVED BY THERMAL DESTRUCTION.

SINCE THE RECOGNIZED METHOD FOR THE TREATMENT OF DIOXIN AND FURAN UNDER THE LAND DISPOSAL RESTRICTIONS IS THERMAL DESTRUCTION THERE IS A HIGH DEGREE OF CONFIDENCE IN THIS ALTERNATIVE. TREATABILITY STUDIES WERE NOT DONE DURING THE FEASIBILITY STUDY. AS DISCUSSED IN THE COMMON ELEMENTS SECTION, THE SITE CONTAMINANTS ARE NOT RCRA HAZARDOUS WASTE. THEREFORE, 40 CFR PART 264 SUBPART O IS NOT APPLICABLE. HOWEVER, THE WASTES ARE SIMILAR, THEREFORE, PERFORMANCE STANDARDS ARE RELEVANT AND APPROPRIATE. A TEST BURN WILL BE NECESSARY TO DETERMINE OPERATING PARAMETERS (FEED RATE, TEMPERATURE, MATERIAL HANDLING TECHNIQUES, ETC.,) AND TO VERIFY COMPLIANCE WITH SUBPART O OF 40 CFR PART 264. ALSO TO BE CONSIDERED ARE THE PROPOSED INCINERATION REGULATIONS, FEDERAL REGISTER FRIDAY, APRIL 27, 1990, WHICH ADDRESS PRODUCTS OF INCOMPLETE COMBUSTION, METALS, AND HYDROCHLORIC ACID. A THERMAL DESTRUCTION UNIT BURNING HAZARDOUS WASTE MUST ACHIEVE A DESTRUCTION AND REMOVAL EFFICIENCY OF AT LEAST 99.99% FOR THE NON DIOXIN CONTAINING MATERIAL AND 99.9999% FOR DIOXIN CONTAINING WASTE. OTHER MAJOR OPERATING REQUIREMENTS ARE;

- MONITOR CARBON MONOXIDE IN THE STACK GAS WITH THE LEVEL NOT TO EXCEED THE SPECIFIED LIMIT;
- MONITOR WASTE FEED RATE;
- MONITOR COMBUSTION TEMPERATURE;
- MONITOR EXCESS OXYGEN;
- MONITOR COMBUSTION GAS VELOCITY;
- PROPER CONTROLS DURING START-UP AND SHUT-DOWN OPERATIONS;
- MAINTAIN PROPER CONTROLS FOR FUGITIVE EMISSIONS FROM THE COMBUSTION ZONE, INCLUDING TOTALLY SEALING THE COMBUSTION ZONE AGAINST FUGITIVE EMISSIONS AND MAINTAINING A COMBUSTION ZONE PRESSURE LOWER THAN ATMOSPHERIC PRESSURE.

DURING IMPLEMENTATION OF THIS REMEDY, THE SOILS WILL BE EXCAVATED AND STORED ON THE SITE A SHORT TIME IN A MANNER WHICH MEETS ALL RELEVANT AND APPROPRIATE STORAGE ELEMENTS UNTIL THEY ARE FED THROUGH THE THERMAL DESTRUCTION UNIT. UPON COMPLETION OF THE TREATMENT, THE SOILS WOULD BE REPLACED ONSITE AND COVERED WITH TOP SOIL AND REVEGETATED. NO MATERIAL WILL BE SHIPPED OFF SITE FOR DISPOSAL OR REQUIRE ONSITE CONTAINMENT. BECAUSE THERMAL DESTRUCTION REMOVES ALL THE ORGANIC

MATTER IN THE SOIL IT MAY BE HELPFUL TO ADD ORGANIC MATTER, LIKE STRAW, TO THE SOIL TO ENCOURAGE VEGETATIVE GROWTH.

IT IS EXPECTED THAT ALL THE WASTES ABOVE THE HEALTH BASED TREATMENT GOALS WILL BE TREATED TO BELOW THE HEALTH BASED GOALS. AS PREVIOUSLY STATED, THE WASTE IS NOT A RCRA WASTE, THEREFORE, THE RCRA REGULATIONS ON CLEAN CLOSURE WILL NOT BE APPLICABLE, HOWEVER, THEY ARE RELEVANT AND APPROPRIATE. THESE REGULATIONS REQUIRE THAT ALL WASTE RESIDUES AND CONTAMINATED CONTAINMENT SYSTEM COMPONENTS BE MANAGED AS HAZARDOUS WASTE. THESE SHOULD BE REMOVED AND/OR DECONTAMINATED BEFORE THE SITE REMEDIATION OPERATIONS ARE COMPLETED.

UPON COMPLETION OF THIS REMEDIAL ACTION, THE RISK FROM THE TREATED SOIL WILL BE REDUCED BELOW 1×10^{-6} EXCESS CANCER RISK. FURTHER DEGRADATION OF THE SHALLOW GROUND WATER AND OFFSITE CONTAMINANT MIGRATION WOULD BE ELIMINATED. FOLLOWING REMEDIATION, SITE DELETION FROM THE NATIONAL PRIORITY LIST SHOULD OCCUR, ALLEVIATING THE NEED FOR INSTITUTIONAL CONTROLS.

SOIL ALTERNATIVE A-4

CHEMICAL TREATMENT AND BACKFILLING

- PRESENT WORTH; \$ 34,600,000 - \$48,400,000
- CAPITAL COST; \$ 34,500,000 - \$48,300,000
- OPERATION AND MAINTENANCE; \$ 80,400
- YEARS TO IMPLEMENT; 2-4
- EXCAVATE THE SOIL AND CHEMICALLY TREAT.
- BACKFILL TREATED SOIL.

CHEMICAL TREATMENT MAY INVOLVE SOLVENT EXTRACTION OR CHEMICAL DECHLORINATION. SOLVENT EXTRACTION, WHICH IS A SOIL WASHING TECHNIQUE, INVOLVES TREATING THE EXCAVATED SOIL WITH A SOLVENT THAT PREFERENTIALLY DISSOLVES ABSORBED SUBSTANCES. CONTAMINANTS ARE TRANSFERRED FROM THE SOIL TO THE SOLVENT. SOIL IS SEPARATED FROM THE SOLVENT BY GRAVITY SETTLING AND IT IS THEN DEWATERED. CLEAN SOLVENT IS RECOVERED BY DISTILLATION. THE SPENT SOLVENT MAY REQUIRE FURTHER TREATMENT, ON OR OFF THE SITE. THE TREATMENT TIME IS ESTIMATED ASSUMING A 100 CUBIC YARD/DAY TREATMENT SYSTEM. A CONCENTRATED LIQUID CONTAINING AN ESTIMATED 125,000 GALLONS WOULD REQUIRE OFF-SITE INCINERATION OR ON-SITE WET AIR OXIDATION.

CHEMICAL DECHLORINATION INVOLVES MIXING EXCAVATED SOIL WITH DECHLORINATION AGENTS THAT REACT WITH CHLORINATED DIBENZO-P-DIOXIN AND OTHER CHLORINATED COMPOUNDS. THE SOIL/REAGENT MIXTURE IS HEATED TO 30 DEGREES C - 150 DEGREES C WITH MIXING UNTIL THE REACTION IS COMPLETED. THE SOILS ARE THEN WASHED WITH SEVERAL RINSES OF WATER. A SIX CUBIC YARD/HOUR CAPACITY WAS USED TO ESTIMATE THE TREATMENT TIME. THE DECHLORINATED SOIL CAN THEN BE BACKFILLED AND THE REAGENT IS RECYCLED FOR REUSE. SPACE AND ELECTRICITY ARE AVAILABLE TO SETUP AND RUN THE REACTOR TANK. DURING IMPLEMENTATION OF CHEMICAL TREATMENT, A SMALL SOIL STORAGE PILE MAY BE NECESSARY TO ALLOW FOR CONSTANT FEEDING OF THE SOIL.

THESE ARE INNOVATIVE TECHNOLOGIES. TREATABILITY TESTS HAVE SHOWN THAT CHEMICAL TREATMENT CAN REMOVE POLYNUCLEAR AROMATIC HYDROCARBONS, PENTACHLOROPHENOL, CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN COMPOUNDS FROM SOILS. TREATABILITY TESTS OF THE DECHLORINATION PROCESS HAVE BEEN CONDUCTED USING SITE SOILS. TREATABILITY TESTS FOR SOLVENT EXTRACTION HAS BEEN CONDUCTED ON SIMILAR SOILS WITH SIMILAR CONTAMINATION. THE REMEDIATION GOALS ESTABLISHED FOR TEXARKANA WOOD PRESERVING FACILITY WERE NOT CONSISTENTLY ACHIEVED. FINE TUNING THE PROCESS MAY ENABLE THE PROCESS TO ACHIEVE THE REMEDIATION GOALS. PILOT STUDIES WOULD BE NECESSARY BEFORE REMEDIAL DESIGN COULD BE POSSIBLE. BECAUSE IT IS UNLIKELY THESE TECHNOLOGIES WILL ACHIEVE THE REMEDIATION LEVELS, THE RISK REMAINING AFTER IMPLEMENTING THIS ALTERNATIVE MAY APPROACH THE 1×10^{-5} EXCESS CANCER RISK. THIS IS HIGHER THAN FOR ALTERNATIVE A-3 WHICH WILL MEET THE REMEDIATION GOALS.

THE WASTES ON SITE ARE NOT RCRA WASTE, AND THE LAND DISPOSAL RESTRICTIONS ARE NOT APPLICABLE. HOWEVER, IN THE EVENT THE WASTES ARE LISTED AFTER THIS DOCUMENT IS WRITTEN, BUT BEFORE IT IS SIGNED, THIS ALTERNATIVE WILL COMPLY WITH THE LAND DISPOSAL RESTRICTIONS THROUGH A TREATABILITY VARIANCE UNDER 40 CFR 268.44. THIS VARIANCE WILL RESULT IN THE USE OF CHEMICAL TREATMENT TO ATTAIN THE AGENCY'S INTERIM "TREATMENT LEVELS/ RANGES" FOR THE CONTAMINATED SOIL AT THE SITE. THE TOXICITY, MOBILITY AND VOLUME OF THE CONTAMINANTS ARE REDUCED THROUGH TREATMENT BY TRANSFERRING THE CONTAMINANTS FROM THE SOIL TO A CONCENTRATED LIQUID PHASE WHICH WOULD THEN BE TREATED OFF-SITE BY THERMAL DESTRUCTION.

IT IS NOT EXPECTED THAT ALL THE HAZARDOUS WASTES ON THE SITE WILL BE TREATED BELOW THE HEALTH BASED REMEDIATION GOAL. THEREFORE, A "LANDFILL" CLOSURE MAY BE REQUIRED. A CAP WOULD COVER THE 77,000 CUBIC YARDS OF RESIDUE FROM THE TREATMENT PROCESS. RCRA REGULATIONS AFFECTING LANDFILL CLOSURE REQUIRE THE SITE TO BE CAPPED, WITH A FINAL COVER DESIGNED AND CONSTRUCTED TO PROVIDE LONG-TERM PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THROUGH MINIMIZATION OF THE INFILTRATION OF LIQUIDS THROUGH THE CAPPED AREA AND PROPER MAINTENANCE OF THE INTEGRITY OF THE CAP OVER TIME WITH MAINTENANCE. THIS TYPE OF CLOSURE ANTICIPATES THAT POST CLOSURE CARE AND MAINTENANCE WILL BE CARRIED OUT AT THE FACILITY FOR AT LEAST 30 YEARS. IT MAY NOT BE POSSIBLE TO DELETE THE SITE FROM THE NATIONAL PRIORITIES LIST.

SOIL ALTERNATIVE A-5

SOLIDIFICATION AND BACKFILL

- PRESENT WORTH; \$ 8,800,000
- CAPITAL COSTS; \$ 8,400,000
- OPERATION AND MONITORING; \$ 430,000
- YEARS TO IMPLEMENT; 1
- EXCAVATE THE CONTAMINATED SOIL AND TREAT BY SOLIDIFICATION PROCESS.
- BACKFILL SITE WITH TREATED SOIL.

SOLIDIFICATION IS A PROCESS WHICH MIXES CEMENT, LIME OR OTHER KINDS OF BINDING MATERIALS WITH CONTAMINATED SOIL TO REDUCE THE ABILITY OF THE CONTAMINANTS TO LEACH OUT OF THE SOIL INTO THE SURROUNDING ENVIRONMENT. THIS TECHNOLOGY WILL INCREASE THE VOLUME OF THE CONTAMINATED SOIL TO BE BACKFILLED. A 20 PERCENT INCREASE IN VOLUME IS ESTIMATED.

SOLIDIFICATION HAS BEEN USED SUCCESSFULLY MANY TIMES ON HAZARDOUS WASTE SITES AND DOES COMPLY WITH THE FEDERAL ENVIRONMENTAL PREFERENCE THAT CONTAMINANTS BE TREATED. HOWEVER, ORGANIC CONTAMINANTS, LIKE THE MATERIAL FOUND ON THE TEXARKANA WOOD PRESERVING SITE, ARE OFTEN DIFFICULT TO SOLIDIFY. A TREATABILITY STUDY TECHNOLOGY WAS NOT PERFORMED ON THIS SITE, BECAUSE THE TECHNOLOGY IS A WELL KNOWN TECHNOLOGY. A TREATABILITY STUDY OR PILOT STUDY WOULD BE NECESSARY TO DETERMINE SPECIFIC SITE PARAMETERS. SOLIDIFICATION MAY NEED TO BE PRECEDED BY A TECHNOLOGY TO ADDRESS THE HIGH ORGANIC CONCENTRATION IN THE SITE SOIL. ONCE THE AMOUNT OF ORGANIC MATERIAL IS REDUCED, SOLIDIFICATION IS AN EFFECTIVE WAY TO REDUCE THE MOBILITY OF THE REMAINING CONTAMINANTS.

BECAUSE BINDING MATERIALS ARE ADDED TO THE SOIL, AN INCREASE IN VOLUME WILL OCCUR. DESIGN CONSIDERATION SHOULD BE GIVEN TO ENSURE NONE OF THE DAYS CREEK FLOOD STORAGE IS LOST WHEN THE SOILS ARE REPLACED.

THE EFFECTIVENESS OF THIS ALTERNATIVE WILL BE DETERMINED BY THE TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP). IN COMPLIANCE WITH THE NCP, THE CONCENTRATION OF EACH CONTAMINANT WILL BE 90 TO 99% REDUCTION.

THE EXCESS CANCER RISK SHOULD BE ELIMINATED, BECAUSE EXPOSURE IS ELIMINATED.

ALTHOUGH THE WASTE ON SITE IS NOT A RCRA WASTE, HAZARDOUS WASTES WILL REMAIN ON THE SITE. THEREFORE, A LANDFILL CLOSURE MAY BE RELEVANT AND APPROPRIATE. RCRA REGULATIONS AFFECTING LANDFILL CLOSURE REQUIRE THE SITE TO BE CAPPED, WITH A FINAL COVER DESIGNED AND CONSTRUCTED TO PROVIDE LONG-TERM PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THROUGH MINIMIZATION OF THE INFILTRATION OF LIQUIDS THROUGH THE CAPPED AREA AND PROPER MAINTENANCE OF THE INTEGRITY OF THE CAP OVER TIME WITH MAINTENANCE. THIS TYPE OF CLOSURE ANTICIPATES THAT POST CLOSURE CARE AND MAINTENANCE WILL BE CARRIED OUT AT THE FACILITY FOR AT LEAST 30 YEARS. IT MAY NOT BE POSSIBLE TO DELETE THE SITE FROM THE NATIONAL PRIORITY LIST. AS PREVIOUSLY STATED, INSTITUTIONAL CONTROLS ARE NOT CURRENTLY ENFORCEABLE IN THE STATE OF TEXAS AND THEREFORE NOT CONSIDERED.

ALTERNATIVE A-6

BIOLOGICAL TREATMENT AND BACKFILLING

- PRESENT WORTH; \$ 6,400,000
- CAPITAL COST; \$ 6,300,000
- OPERATION AND MAINTENANCE; \$ 120,000
- YEARS TO IMPLEMENT; 10
- TREAT EXCAVATED CONTAMINATED SOIL BIOLOGICALLY
- BACKFILL TREATED SOIL ON SITE

BIOLOGICAL TREATMENT USES BACTERIA TO DEGRADE ORGANIC COMPOUNDS IN SOIL. THESE BACTERIA ARE NATURALLY OCCURRING IN THE SOIL AND ARE CAPABLE OF DEGRADING ORGANIC COMPOUNDS INTO WATER AND CARBON DIOXIDE. THE SOILS WOULD NEED WATER, OXYGEN AND NUTRIENTS ADDED TO ENHANCE THE BIOLOGICAL TREATMENT PROCESS. THIS ALTERNATIVE INVOLVES EXCAVATING THE SOILS, PLACING THEM IN A TREATMENT CELL, TREATING THE SOIL, THEN BACKFILL THE TREATED MATERIAL. THIS ALTERNATIVE ASSUMES 4,000 CUBIC YARDS WILL BE TREATED AT A TIME AND CAN BE TREATED IN 3 MONTHS. NO ONSITE STORAGE IS ANTICIPATED.

THIS TECHNOLOGY HAS BEEN PROVEN EFFECTIVE IN DESTROYING, THEREBY REDUCING TOXICITY AND VOLUME OF PENTACHLOROPHENOL AND SOME OF THE POLYNUCLEAR AROMATIC HYDROCARBONS. IT HAS NOT BEEN DEMONSTRATED TO ACHIEVE THE REMEDIATION GOALS ESTABLISHED FOR THE CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS AND DOES NOT DEGRADE THE CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN. RISK REDUCTION, THEREFORE, MAY APPROACH A 1×10^{-4} EXCESS CANCER RISK. THIS TECHNOLOGY MAY BE USED IN CONJUNCTION WITH OTHER TECHNOLOGIES TO FURTHER REDUCE THE TOXICITY AND MOBILITY OF THE CONTAMINANTS.

TREATABILITY STUDIES HAVE NOT BEEN DONE AT THE SITE FOR THIS ALTERNATIVE. A TREATABILITY STUDY WILL BE NECESSARY TO DETERMINE DESIGN PARAMETERS. THE WASTES ON SITE ARE NOT RCRA WASTE, AND THE LAND DISPOSAL RESTRICTIONS ARE NOT APPLICABLE. HOWEVER, IN THE EVENT THE WASTES ARE LISTED AFTER THIS DOCUMENT IS WRITTEN, BUT BEFORE IT IS SIGNED, THIS ALTERNATIVE WILL COMPLY WITH THE LAND DISPOSAL RESTRICTIONS THROUGH A TREATABILITY VARIANCE UNDER 40 CFR 268.44. THIS VARIANCE WILL RESULT IN THE USE OF BIOLOGICAL TREATMENT TO ATTAIN THE AGENCY'S INTERIM "TREATMENT LEVELS/RANGES" FOR THE CONTAMINATED SOIL AT THE SITE. IF ALL THE "TREATMENT LEVELS/RANGES" ARE NOT MET, THIS VARIANCE WILL RESULT IN THE USE OF BIOLOGICAL TREATMENT AND SOLIDIFICATION TO ATTAIN THE AGENCY'S INTERIM "TREATMENT LEVELS/RANGES" FOR THE CONTAMINATED SOIL AT THE SITE.

CLOSURE REQUIREMENTS WILL VARY WITH EACH TECHNOLOGY CONSIDERED IN CONJUNCTION WITH BIOLOGICAL TREATMENT. HOWEVER, IT IS LIKELY THAT HAZARDOUS WASTES WILL REMAIN ON THE SITE. THEREFORE, A "LANDFILL" CLOSURE MAY BE REQUIRED. THE VOLUME OF MATERIAL UNDER THE CAP WILL DEPEND UPON THE VOLUME REDUCTION AFFORDED BY BIOLOGICAL TREATMENT. RCRA REGULATIONS AFFECTING LANDFILL CLOSURE REQUIRE THE SITE TO BE CAPPED, WITH A FINAL COVER DESIGNED AND CONSTRUCTED TO PROVIDE LONG-TERM PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT THROUGH MINIMIZATION OF THE INFILTRATION OF LIQUIDS THROUGH THE CAPPED AREA AND PROPER MAINTENANCE OF THE INTEGRITY OF THE CAP OVER TIME WITH MAINTENANCE. THIS TYPE OF CLOSURE ANTICIPATES THAT POST CLOSURE CARE AND MAINTENANCE WILL BE CARRIED OUT AT THE FACILITY FOR AT LEAST 30 YEARS. IT MAY NOT BE POSSIBLE TO DELETE THE SITE FROM THE NATIONAL PRIORITY LIST. AS PREVIOUSLY STATED, INSTITUTIONAL CONTROLS ARE NOT ENFORCEABLE IN THE STATE OF TEXAS AND THEREFORE NOT CONSIDERED.

ALTERNATIVE A-7

OFFSITE THERMAL TREATMENT AND DISPOSAL

- PRESENT WORTH; \$ 191,200,000
- CAPITAL COSTS; \$ 191,200,000
- OPERATION AND MAINTENANCE; \$ 43,000
- YEARS TO IMPLEMENT; 5
- EXCAVATE THE SOIL AND TRANSPORT TO AN OFFSITE THERMAL DESTRUCTION FACILITY.
- BACKFILL SITE WITH CLEAN FILL.

THIS ALTERNATIVE REQUIRES THAT THE SOIL BE EXCAVATED AND TRANSPORTED TO AN OFFSITE THERMAL DESTRUCTION UNIT. THE RATE OF EXCAVATION AND TRANSPORTATION OF CONTAMINATED SOIL WILL BE GOVERNED BY OFF-SITE INCINERATOR CAPACITY, CURRENTLY 2.5 TONS/HOUR AT THE NEAREST FACILITY. THE COST AND THE IMPLEMENTATION TIME WAS BASED ON TRANSPORTATION OFF SITE ON 22 CUBIC YARD DUMP TRUCKS WITH AN ACTUAL HAULING CAPACITY OF 20 CUBIC YARDS. THIS CALCULATES OUT TO ABOUT 4,400 TRUCKS. ON SITE STORAGE OF THE CONTAMINATED SOIL IS NOT EXPECTED. THE ASH WILL BE DISPOSED OF COMPLIANT TO RELEVANT AND APPROPRIATE REGULATIONS. THIS ALTERNATIVE MEETS THE FEDERAL REQUIREMENT THAT MOBILITY, TOXICITY, AND VOLUME BE REDUCED THROUGH TREATMENT. HOWEVER, SINCE THIS ALTERNATIVE IS SIGNIFICANTLY MORE EXPENSIVE THAN AN EQUALLY PROTECTIVE ACTION, IT COULD COMPROMISE EPA'S ABILITY TO FUND ACTIONS AT OTHER SITES. THEREFORE, THE EPA DOES NOT FAVOR THIS ALTERNATIVE. THE RISK THAT WILL REMAIN ON SITE AFTER IMPLEMENTING THIS REMEDY IS APPROXIMATELY 1×10^{-5} . THERE ARE NO COMMERCIAL FACILITIES CURRENTLY PERMITTED TO THERMALLY DESTROY DIOXIN.

IT IS EXPECTED THAT ALL THE WASTES ABOVE THE HEALTH BASED TREATMENT GOALS WILL BE REMOVED AND TREATED TO BELOW THE HEALTH BASED GOALS. THEREFORE, THE RCRA REGULATIONS ON CLEAN CLOSURE WILL BE APPROPRIATE.

#SCA

VIII. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE NINE CRITERIA ARE CATEGORIZED INTO THREE GROUPS; THRESHOLD, PRIMARY BALANCING, AND MODIFYING. THE THRESHOLD CRITERIA MUST BE SATISFIED IN ORDER FOR AN ALTERNATIVE TO BE ELIGIBLE FOR SELECTION. THE PRIMARY BALANCING CRITERIA ARE USED TO WEIGH MAJOR TRADEOFFS AMONG ALTERNATIVES. THE MODIFYING CRITERIA ARE TAKEN INTO ACCOUNT AFTER PUBLIC COMMENT IS RECEIVED ON THE PROPOSED PLAN OF ACTION.

THE NINE (9) CRITERIA USED IN EVALUATING ALL OF THE ALTERNATIVES IDENTIFIED ARE AS FOLLOWS;

THRESHOLD CRITERIA

OVERALL PROTECTION OF HUMAN HEALTH AND ENVIRONMENT ADDRESSES WHETHER OR NOT A REMEDY PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS POSED THROUGH EACH PATHWAY ARE ELIMINATED, REDUCED, OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS OR INSTITUTIONAL CONTROLS.

COMPLIANCE WITH ARARS ADDRESSES WHETHER OR NOT A REMEDY WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF OTHER FEDERAL AND STATE ENVIRONMENTAL STATUTES AND/OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

PRIMARY BALANCING CRITERIA

LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE MAGNITUDE OF RESIDUAL RISK AND THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEANUP GOALS HAVE BEEN MET.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES THAT MAY BE EMPLOYED IN A REMEDY.

SHORT-TERM EFFECTIVENESS REFERS TO THE SPEED WITH WHICH THE REMEDY ACHIEVES PROTECTION, AS WELL AS THE REMEDY'S POTENTIAL TO CREATE ADVERSE IMPACT ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY RESULT DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD.

IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE CHOSEN SOLUTION.

COST INCLUDES CAPITAL AND OPERATION AND MAINTENANCE COSTS.

MODIFYING CRITERIA

STATE ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE RI/FS AND PROPOSED PLAN, THE STATE CONCURS WITH, OPPOSES, OR HAS NO COMMENT ON THE PREFERRED ALTERNATIVE.

COMMUNITY ACCEPTANCE WILL BE ASSESSED IN THE RECORD OF DECISION FOLLOWING A REVIEW OF THE PUBLIC COMMENTS RECEIVED ON THE RI/FS REPORT AND THE PROPOSED PLAN.

A RANKING OF THE COMPARATIVE ANALYSIS FOR THE SOIL REMEDIAL ALTERNATIVES IS INCLUDED (SEE TABLE 4). THE SYMBOLIC RANKING IS BASED ON THE NARRATIVE ANALYSIS THAT FOLLOWS.

ANALYSIS

OVERALL PROTECTION. THERMAL TREATMENT (ALTERNATIVES 3 AND 7) WOULD DESTROY THE CONTAMINANTS ON SITE TO BELOW THE HEALTH BASED CRITERIA, AND THEREBY PROVIDES THE MOST PROTECTION. BIOLOGICAL TREATMENT (ALTERNATIVE 6) MAY ACHIEVE A LEVEL OF TREATMENT COMPARABLE TO CHEMICAL TREATMENT. COMBINING EITHER OF THESE TWO ALTERNATIVES WITH SOLIDIFICATION WOULD DESTROY AND/OR IMMOBILIZE ALL SITE CONTAMINATION AND OFFER OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. HOWEVER, WASTE WOULD BE LEFT ON THE SITE. BIOLOGICAL REMEDIATION WILL TAKE CONSIDERABLY LONGER POSING A LONGER SHORT TERM RISK AT THE SITE. SOLIDIFICATION (ALTERNATIVE 5) DOES NOT REDUCE THE VOLUME OR TOXICITY OF THE WASTE TO THE DEGREE THERMAL TREATMENT, BIOLOGICAL TREATMENT AND CHEMICAL TREATMENT DO. SO SOLIDIFICATION IS NOT CONSIDERED AS PROTECTIVE AS THE OTHER TREATMENT TECHNOLOGIES. BECAUSE THE WASTE IS NOT TREATED IN THE NO-ACTION AND CAPPING ALTERNATIVES, (ALTERNATIVES 1 AND 2) THE DEGREE OF OVERALL PROTECTION WOULD BE REDUCED. NO-ACTION IS NOT

PROTECTIVE AND THEREFORE WILL NOT BE CONSIDERED IN THE OTHER EVALUATIONS.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). ARARS ARE THE FEDERAL AND STATE REQUIREMENTS THAT A SELECTED REMEDY MUST MEET. FOR EXAMPLE, AN ARAR MAY REQUIRE CERTAIN RESTRICTIONS FOR BUILDING IN A FLOOD PLAIN. AS PREVIOUSLY DISCUSSED, THIS SITE DOES NOT CONTAIN A "RCRA HAZARDOUS WASTE". THEREFORE, ALTHOUGH THE RCRA REGULATIONS WHICH REGULATE RCRA HAZARDOUS WASTES ARE NOT APPLICABLE, THEY MAY BE RELEVANT AND APPROPRIATE. EACH ALTERNATIVE HAS BEEN REVIEWED IN THE "DESCRIPTION OF ALTERNATIVES" SECTION OF THIS DOCUMENT FOR ARARS.

THE "THERMAL DESTRUCTION AND BACKFILLING" AND "OFFSITE TREATMENT" ALTERNATIVES WILL MEET ALL THE ARARS. THE COMBINATION OF CHEMICAL TREATMENT OR BIOLOGICAL TREATMENT AND SOLIDIFICATION ALTERNATIVES WILL ALSO MEET THE ARARS PROVIDED RCRA CLOSURE REGULATIONS ARE APPLIED. CAPPING AND STABILIZATION WILL COMPLY WITH THE ARARS APPROPRIATE TO THESE REMEDIES.

LONG-TERM EFFECTIVENESS AND PERMANENCE. THE THERMAL DESTRUCTION ALTERNATIVES WOULD DESTROY ALL THE CONTAMINANTS ON THE SITE TO BELOW THE HEALTH-BASED CRITERIA. THE COMBINATION OF THE CHEMICAL TREATMENT, BIOLOGICAL TREATMENT, AND SOLIDIFICATION ALTERNATIVES WILL DESTROY AND/OR IMMOBILIZE ALL THE CONTAMINANTS ON THE SITE, PROVIDING A PERMANENT REMEDY. CHEMICAL TREATMENT OR BIOLOGICAL TREATMENT FOLLOWED BY SOLIDIFICATION WILL REQUIRE LONG TERM MAINTENANCE OF THE STABILIZED MATERIAL. ALTERNATIVE A-2, "CAPPING" WOULD ELIMINATE THE RISKS OF DIRECT CONTACT AND THE CONTINUED RELEASE OF CONTAMINANTS INTO THE AIR BUT THERE COULD BE A CONTINUED RELEASE OF THE SOIL CONTAMINATION INTO THE GROUND WATER. THIS REMEDY WOULD ALSO REQUIRE LONG TERM MAINTENANCE TO INSURE THE INTEGRITY OF THE CAP.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF THE CONTAMINANTS THROUGH TREATMENT. ALTERNATIVES 1, AND 2 DO NOT MEET THE FEDERAL PREFERENCE THAT TOXICITY, MOBILITY OR VOLUME OF THE CONTAMINANTS BE REDUCED THROUGH TREATMENT. AS PREVIOUSLY MENTIONED, CHEMICAL TREATMENT IS AS EFFECTIVE AT REMOVING THE CONTAMINANTS FROM THE SOIL AS BIOLOGICAL TREATMENT. NEITHER OF THESE ALTERNATIVES CAN ACHIEVE THE LEVEL OF DESTRUCTION THERMAL DESTRUCTION DOES. THERMAL DESTRUCTION DESTROYS THE CONTAMINANTS ABOVE THE HEALTH BASED CRITERIA, REDUCING MOBILITY, TOXICITY AND VOLUME. SOLIDIFICATION REDUCES THE MOBILITY OF THE CONTAMINANTS BUT DOES NOT REDUCE THE TOXICITY, OR THE VOLUME OF THE CONTAMINATION. BECAUSE A BINDING AGENT WILL BE ADDED TO THE SOIL IN SOLIDIFICATION, THE ACTUAL VOLUME OF MATERIAL THAT WILL BE HANDLED INCREASES.

SHORT-TERM EFFECTIVENESS. NONE OF THE ALTERNATIVES POSE UNACCEPTABLE SHORT TERM RISK. THE SURROUNDING COMMUNITY WILL BE PROPERLY PROTECTED DURING THE IMPLEMENTATION OF CHEMICAL TREATMENT, THERMAL DESTRUCTION, AND CHEMICAL TREATMENT OR BIOLOGICAL TREATMENT FOLLOWED BY SOLIDIFICATION. AIR EMISSIONS PRODUCED BY THESE TECHNOLOGIES WILL BE CONTROLLED BY A TREATMENT SYSTEM. 40 CFR PART 264, SUBPART O SPECIFICALLY ADDRESS THE AIR EMISSIONS ASSOCIATED WITH THERMAL DESTRUCTION. EXCAVATION OF SOILS PRESENT THE POTENTIAL OF AIR EMISSIONS. DUST CONTROL MEASURES MAY BE REQUIRED DURING THE EXCAVATION OF THE SOIL. THE BIOLOGICAL TREATMENT FOLLOWED BY SOLIDIFICATION ALTERNATIVE WILL TAKE APPROXIMATELY ELEVEN YEARS AS COMPARED WITH APPROXIMATELY, THREE TO FIVE YEARS FOR CHEMICAL TREATMENT FOLLOWED BY SOLIDIFICATION OR TWO AND A HALF FOR THERMAL DESTRUCTION, AND ONE YEAR FOR CAPPING. ADDITIONAL SHORT TERM RISKS ARE ASSOCIATED WITH TRANSPORTING THE WASTE OFFSITE FOR TREATMENT.

IMPLEMENTABILITY. THE COMBINATION OF CHEMICAL TREATMENT OR BIOLOGICAL TREATMENT AND SOLIDIFICATION, ARE CONSIDERED INNOVATIVE TECHNOLOGIES. THEY EACH WOULD REQUIRE LARGE SCALE PILOT STUDIES TO DETERMINE DESIGN CRITERIA. BOTH TECHNOLOGIES HAVE BEEN DEMONSTRATED EFFECTIVE AT OTHER SITES WITH SIMILAR WASTES. HOWEVER, THESE TECHNOLOGIES HAVE NOT BEEN DEMONSTRATED AS CONSISTENTLY EFFECTIVE AT DESTROYING THIS PARTICULAR MIXTURE OF WASTE AS THERMAL DESTRUCTION HAS. CHEMICAL TREATMENT AND BIOLOGICAL TREATMENT WILL BOTH REQUIRE A LONGER DESIGN AND SHAKE DOWN PERIOD THAN THERMAL DESTRUCTION BECAUSE OF THE NUMBER OF UNKNOWN WITH THESE PROCESSES. CAPPING IS THE EASIEST ALTERNATIVE TO IMPLEMENT. THERMAL TREATMENT, ON OR OFF SITE, ARE COMPARABLE BASED ON IMPLEMENTABILITY, AND EASIER TO IMPLEMENT THAN CHEMICAL TREATMENT, BIOLOGICAL TREATMENT OR SOLIDIFICATION.

COST. THE ESTIMATED COST OF THE COMBINATION OF BIOLOGICAL TREATMENT FOLLOWED BY SOLIDIFICATION IS \$15,000,000. THIS CAN BE COMPARED TO \$43,000,000 FOR ON-SITE THERMAL DESTRUCTION, APPROXIMATELY \$ 40,000,000 FOR CHEMICAL TREATMENT, AND \$190,000,000 FOR OFFSITE THERMAL DESTRUCTION. EPA BELIEVES THAT WHEN A REMEDIAL ACTION WOULD BE SIGNIFICANTLY MORE EXPENSIVE THAN AN EQUALLY PROTECTIVE ALTERNATIVE, IT COULD COMPROMISE EPA'S ABILITY TO FUND ACTIONS AT

OTHER SITES. THEREFORE, OFFSITE THERMAL DESTRUCTION IS NOT CONSIDERED A VIABLE ALTERNATIVE.

STATE ACCEPTANCE. THE STATE OF TEXAS THROUGH THE TEXAS WATER COMMISSION HAS REVIEWED THE RECORD OF DECISION. THE STATE SUPPORTS EPA'S SELECTED REMEDY OF ONSITE THERMAL DESTRUCTION.

COMMUNITY ACCEPTANCE. JUDGING ON THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD, THE COMMUNITY SUPPORTS THE THERMAL DESTRUCTION TECHNOLOGY. THE PREFERENCE FOR OFFSITE THERMAL DESTRUCTION WAS VOICED. ALL THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES ARE IN APPENDIX A.

#DOA

IX. DESCRIPTION OF ALTERNATIVES

GROUND WATER REMEDIAL ALTERNATIVES

THE ALTERNATIVES FOR THE GROUND WATER CLEANUP ARE THE FOLLOWING;

- ALTERNATIVE B-1; EXTRACTION, TREATMENT AND DISCHARGE
- ALTERNATIVE B-2; EXTRACTION, TREATMENT, AND REINJECTION
- ALTERNATIVE B-3; SLURRY WALL
- ALTERNATIVE B-4; NO ACTION

COMMON ELEMENTS; PRIMARILY, THE GROUND WATER ACTION WILL OCCUR AFTER THE SOIL PORTION OF THE REMEDIAL ACTION HAS BEEN COMPLETED. THE TREATMENT PROCESS MAY NEED TO BE ON THE SITE AND OPERATIONAL DURING THE SOIL PORTION OF THE REMEDIAL ACTION TO TREAT ANY GROUND WATER ENCOUNTERED DURING THE EXCAVATION PROCESS.

THIS GROUND WATER DISCUSSION ONLY ADDRESSES THE SHALLOW GROUND WATER (TO APPROXIMATELY 13.5 FEET). THE DEEPER ZONES ARE STILL UNDERGOING INVESTIGATION AND WILL BE ADDRESSED IN A FUTURE RECORD OF DECISION. THE EPA HAS CLASSIFIED THIS SHALLOW AQUIFER AS A CLASS 2-B AQUIFER BASED ON ITS POTENTIAL FOR FUTURE USE AS A WATER SUPPLY. THE REMEDIATION LEVELS ARE DISCUSSED IN THE "SUMMARY OF SITE RISKS" SECTION. REMEDIATION GOALS ARE BASED ON CURRENTLY ACHIEVABLE DETECTION LIMITS. THE REMEDIAL INVESTIGATION IDENTIFIED TWO AREAS OF GROUND WATER CONTAMINATION, SEE FIGURE 6. THESE AREAS ARE CALLED "AREAS OF ATTAINMENT". THERE ARE APPROXIMATELY 16 MILLION GALLONS OF GROUND WATER OUTLINED IN THESE AREAS OF ATTAINMENT. THERE ARE NO SURFACE IMPOUNDMENTS WHICH CONTAIN WATER THAT WILL NEED TO BE TREATED IN CONJUNCTION WITH THE GROUND WATER. THE LOCATION AND NUMBER OF ANY WELLS NEEDED IN AN EXTRACTION+ SYSTEM WILL BE DETERMINED DURING THE REMEDIAL DESIGN.

ALL THE GROUND WATER ALTERNATIVES, EXCEPT "NO ACTION", ASSUME THE CONTAMINATED SOIL IS REMEDIATED. SOIL REMEDIATION IS THE BASIS FOR THE IMPLEMENTATION TIME AND COST. THE GROUND WATER IN THE SHALLOW ZONE HAS A VERY LOW FLOW AND THEREFORE, IT WILL BE DIFFICULT TO MAINTAIN A CONSTANT PUMPING RATE.

WITH THE EXCEPTION OF THE "NO ACTION" ALTERNATIVE, ALL THE GROUND WATER ALTERNATIVES REQUIRE RESAMPLING OF ALL MONITORING WELLS TO DETERMINE CURRENT PLUME SIZE AND MIGRATION OF THE PLUME, IF ANY, SINCE THE COMPLETION OF THE REMEDIAL INVESTIGATION. ALSO REQUIRED WILL BE DRILLING SOIL BORINGS AND INSTALLING SHALLOW WELLS TO DETERMINE IF ALL THE DENSE NON-AQUEOUS PHASE IS REMOVED BY THE SOURCE CONTROL REMEDY. TREATABILITY STUDIES ARE NOT NECESSARY FOR THE GROUND WATER TREATMENT. HOWEVER, IN DEPTH AQUIFER CHARACTERIZATION IS NECESSARY TO DETERMINE WELL PLACEMENT, WHICH WILL MAXIMIZE PUMPING RATE AND MINIMIZE THE PUMPING DURATION. DUE TO THE LOW YIELD OF THIS AQUIFER, THE ABILITY OF THE PUMP AND TREAT SYSTEM TO EFFECTIVELY REACH THE REMEDIATION GOAL IS UNCERTAIN.

THE GOAL OF THIS REMEDIAL ACTION IS TO RESTORE GROUND WATER TO ITS BENEFICIAL USE. HOWEVER, STUDIES SUGGEST THAT GROUND WATER EXTRACTION AND TREATMENT ARE NOT, IN ALL CASES COMPLETELY SUCCESSFUL IN REDUCING CONTAMINANTS TO THE REMEDIAL GOALS IN THE AQUIFER. EPA RECOGNIZES THAT OPERATION OF AN EXTRACTION AND TREATMENT SYSTEM MAY INDICATE THE TECHNICAL IMPRACTICABILITY OF REACHING THE GOALS USING THIS APPROACH.

IN THE STATE OF TEXAS, THE WATER RIGHTS BELONG TO THE LAND OWNER. AS SUCH, THE STATE HAS NO MECHANISM TO PROHIBIT USE OF A STREAM, OR GROUND WATER. THEREFORE, IT IS PARTICULARLY IMPORTANT THAT THE GROUND WATER BE REMEDIATED TO PROTECT PUBLIC HEALTH.

AS WITH THE SOIL, THE WASTE IN THE GROUND WATER IS NOT A RCRA HAZARDOUS WASTE. THE COSTS ARE

ESTIMATES AND WITHIN A +50% TO -30% DEGREE OF ACCURACY.

GROUND WATER ALTERNATIVE B-1;

EXTRACTION, TREATMENT AND DISCHARGE

- PRESENT WORTH; \$ 4,300,000
- CAPITAL COST; \$ 3,100,000
- OPERATION AND MAINTENANCE COSTS; \$1,200,000
- YEARS TO IMPLEMENT; 15
- PUMP GROUND WATER FROM CONTAMINATED AQUIFER.
- TREAT GROUND WATER WITH CARBON ADSORPTION.
- DISCHARGE CONTAMINATED WATER.

THIS ALTERNATIVE WOULD REDUCE SITE RISK BY SUBSTANTIALLY DECREASING GROUND WATER CONTAMINATION PRESENT IN THE AREA SURROUNDING THE SITE.

CARBON ADSORPTION IS A PROCESS WHERE CONTAMINANTS ARE REMOVED FROM WATER BY ADSORBING ONTO CARBON IN A TREATMENT UNIT. THE TOXIC MATERIALS ARE RETAINED ON THE CARBON. THE CONTAMINANTS ON THE CARBON CAN THEN BE THERMALLY DESTROYED (ON OR OFF SITE), RECYCLED OR LANDFILLED. AS THE WASTE IS NOT A RCRA HAZARDOUS WASTE, THE CARBON IS NOT CONSIDERED A RCRA HAZARDOUS WASTE. THEREFORE, DISPOSAL OF THE CARBON COMPLIANT WITH RCRA HAZARDOUS WASTE REGULATIONS IS NOT APPLICABLE. THIS ALTERNATIVE MEETS THE SUPERFUND PREFERENCE FOR TREATMENT OF CONTAMINANTS. THIS ALTERNATIVE MAY BE REQUIRED TO MEET STANDARDS ESTABLISHED FOR NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) OR FOR A PUBLICLY OWNED TREATMENT WORKS (POTW).

ALTERNATIVE B-2;

EXTRACTION, TREATMENT, AND REINJECTION

- PRESENT WORTH; \$ 4,400,000
- CAPITAL COSTS; \$ 3,400,000
- OPERATION AND MAINTENANCE COSTS; \$ 1,000,000
- YEARS TO IMPLEMENT; 10
- PUMP GROUND WATER FROM CONTAMINATED AQUIFER.
- TREAT CONTAMINATED GROUND WATER ON SITE BY CARBON ADSORPTION.
- REINJECT TREATED GROUND WATER IN THE AQUIFER.

CARBON ADSORPTION IS A PROCESS WHERE CONTAMINANTS ARE REMOVED FROM WATER BY ADSORBING ONTO CARBON IN A TREATMENT UNIT. THE TOXIC MATERIALS ARE RETAINED ON THE CARBON. AS WITH THE PREVIOUS ALTERNATIVE, THE CARBON CAN BE THERMALLY TREATED, RECYCLED OR LANDFILLED. ONCE TREATED, THE WATER WOULD BE REINJECTED INTO THE GROUND. THE ADVANTAGE TO REINJECTION IS THAT THE PUMPING RATE MAY BE MAINTAINED. THROUGH THE CARBON TREATMENT PROCESS, THIS ALTERNATIVE WOULD REDUCE SITE RISK BY SUBSTANTIALLY DECREASING GROUND WATER CONTAMINATION PRESENT ON THE SITE. IT WOULD COMPLY WITH FEDERAL SUPERFUND PREFERENCE FOR TREATMENT OF CONTAMINANTS.

GROUND WATER ALTERNATIVE B-3;

SLURRY WALL

- PRESENT WORTH; \$ 8,500,000
- CAPITAL COSTS; \$ 7,000,000
- OPERATION AND MAINTENANCE COSTS; \$ 1,500,000
- YEARS TO IMPLEMENT; .5
- INSTALL SLURRY WALL BARRIER AROUND THE AREA CONTAINING CONTAMINATED GROUNDWATER.

A SLURRY WALL IS A TRENCH FILLED WITH MATERIALS THAT LIMIT THE FLOW OF GROUND WATER THROUGH THE AREA SURROUNDED BY THE TRENCH. A SLURRY WALL WOULD REDUCE SITE RISK BY MINIMIZING FURTHER MIGRATION OF CONTAMINANTS. THIS ALTERNATIVE WOULD NOT REDUCE THE TOXICITY OR VOLUME OF CONTAMINANTS PRESENT IN GROUND WATER, AND IT WOULD NOT MEET THE SUPERFUND PREFERENCE FOR TREATMENT OF CONTAMINANTS. THIS ALTERNATIVE COULD INCREASE DOWNWARD MIGRATION OF THE CONTAMINATED WATER INTO DEEPER ZONES. SINCE A SLURRY WALL IS A CONTAINMENT ALTERNATIVE, IT WILL BE NECESSARY TO WAIVE THE MCLS AND AMBIENT WATER QUALITY CRITERIA ARARS.

GROUND WATER ALTERNATIVE B-4

NO ACTION

THIS ALTERNATIVE ASSUMES NO ACTION WOULD BE TAKEN TO PREVENT MIGRATION OF CONTAMINATED GROUND WATER AT THE SITE. THE COSTS ASSOCIATED WITH THE ALTERNATIVE ARE LISTED IN CONJUNCTION WITH SOIL

ALTERNATIVE A-1. WITH THIS ALTERNATIVE, FUTURE USE OF CONTAMINATED GROUND WATER OFFSITE COULD RESULT IN UNACCEPTABLE PUBLIC HEALTH RISKS. CONTAMINANTS WOULD CONTINUE TO ADVERSELY AFFECT THE SURROUNDING ENVIRONMENT.

#SCAA

X. SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THE NINE (9) CRITERIA USED IN EVALUATING ALL OF THE ALTERNATIVES IDENTIFIED ARE AS FOLLOWS;

- OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT,
- COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS,
- LONG-TERM EFFECTIVENESS AND PERMANENCE,
- REDUCTION OF TOXICITY, MOBILITY, OR VOLUME TREATMENT,
- SHORT-TERM EFFECTIVENESS,
- IMPLEMENTABILITY,
- COST
- STATE/SUPPORT AGENCY ACCEPTANCE, AND
- COMMUNITY ACCEPTANCE.

A SYMBOLIC RANKING OF THE COMPARATIVE ANALYSIS FOR THE GROUND WATER ALTERNATIVES ARE INCLUDED (SEE TABLE 5). THE SYMBOLIC RANKING IS BASED ON THE NARRATIVE ANALYSIS THAT FOLLOWS.

ANALYSIS

OVERALL PROTECTION. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT IS PROVIDED BY ALL OF THE ALTERNATIVES EXCEPT "NO ACTION". ALTERNATIVES B-1 AND B-2 PROVIDE PROTECTION BECAUSE OF TREATMENT OF GROUND WATER PRIOR TO DISCHARGE OR REINJECTION. SLURRY WALLS, ALTERNATIVE B-3, MAY NOT OBTAIN THE LEVELS OF PROTECTION ALTERNATIVES B-1 AND B-2 DO. ALTERNATIVE B-4 DOES NOT PROVIDE ANY PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ARARS. ARARS ARE THE FEDERAL AND STATE REQUIREMENTS THAT A SELECTED REMEDY MUST MEET. ALL OF THE ARARS FOR ALTERNATIVES B-1 AND B-2 CAN BE MET. NO TREATMENT OCCURS IN ALTERNATIVES B-3; HOWEVER AS IT IS A CONTAINMENT REMEDY, THE MCLS AND AMBIENT WATER CRITERIA WILL BE WAIVED.

SHORT-TERM EFFECTIVENESS. DURING THE CONSTRUCTION OF THE EXTRACTION WELLS, OR EXCAVATION FOR THE SLURRY WALL, PRECAUTIONS WILL BE TAKEN TO ELIMINATE ANY RISK TO THE PUBLIC FROM EXCAVATION OR INSTALLATION OF THE WELLS. GROUND WATER REMEDIATION IS SCHEDULED TO OCCUR UPON COMPLETION OF THE SOIL REMEDIATION SO AIR EMISSIONS FROM ANY ACTION SHOULD NOT CONSTITUTE A THREAT. THE ESTIMATED TIME REQUIRED TO COMPLETE ALTERNATIVES B-1, B-2, AND B-3 IS 15 YEARS, 10 YEARS AND ONE HALF A YEAR RESPECTIVELY.

LONG-TERM EFFECTIVENESS AND PERMANENCE. ALTERNATIVES B-1 AND B-2 CALL FOR THE REMOVAL AND TREATMENT OF THE CONTAMINATED GROUND WATER. THE RISK FROM INGESTION OF, OR DIRECT CONTACT WITH, THE CONTAMINATED GROUND WATER WILL BE ELIMINATED. THE SLURRY WALL CANNOT BE CONSIDERED A PERMANENT REMEDY SINCE NO GROUND WATER TREATMENT WILL OCCUR AND DOWNWARD MIGRATION WILL CONTINUE. THE ADEQUACY AND RELIABILITY OF THE PUMP AND TREAT TECHNOLOGIES HAVE BEEN WELL PROVEN, HOWEVER, MAINTAINING AN ADEQUATE PUMPING RATE MAY BE DIFFICULT CONSIDERING THE LOW GROUND WATER YIELD.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME OF THE CONTAMINANTS THROUGH TREATMENT. ALTERNATIVES B-1 AND B-2 MEET THE AGENCY'S PREFERENCE THAT THE TOXICITY, MOBILITY AND VOLUME OF THE CONTAMINANTS ARE REDUCED THROUGH TREATMENT. THE TREATMENT TECHNOLOGY TO BE USED FOR ALTERNATIVES B-1 AND B-2 IS CARBON ABSORPTION. CARBON ADSORPTION IS WELL PROVEN AND FULLY CAPABLE OF REMOVING THE CONTAMINATION FROM THE GROUND WATER. ALTERNATIVE B-3 AND ALTERNATIVE B-4 DO NOT PROVIDE ANY REDUCTIONS.

IMPLEMENTABILITY. OF THE "ACTION" TECHNOLOGIES, ALTERNATIVE B-3 HAS THE SHORTEST IMPLEMENTATION TIME, FOLLOWED ALTERNATIVE B-2 AND FINALLY BY ALTERNATIVE B-1. IN MANY CASES, INFORMATION MAY EMERGE DURING IMPLEMENTATION AND MONITORING OF THE GROUND WATER RECOVERY SYSTEM WHICH STRONGLY SUGGESTS THAT IT IS TECHNICALLY IMPRACTICAL TO ACHIEVE THE REMEDIATION LEVELS THROUGHOUT THE AREA OF ATTAINMENT. A CONTINGENCY PLAN FOR THE GROUND WATER REMEDIATION IS DISCUSSED IN THE SELECTED REMEDY SECTION OF THIS DOCUMENT.

COST. THE COST OF THE ALTERNATIVES ARE OUTLINED IN TABLE 6.

STATE ACCEPTANCE. THE STATE OF TEXAS THROUGH THE TEXAS WATER COMMISSION HAS REVIEWED THE RECORD OF DECISION. THE STATE SUPPORTS THE EPA'S DECISION OF PUMPING AND TREATING THE GROUND WATER.

COMMUNITY ACCEPTANCE. JUDGING ON THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD, THE COMMUNITY SUPPORTS THE SELECTED REMEDY OF PUMPING, TREATING AND REINJECTING THE GROUND WATER. ALL THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES ARE IN APPENDIX A.

#SR

XI. SELECTED REMEDY

BASED ON CONSIDERATION OF THE REQUIREMENTS OF CERCLA, THE DETAILED ANALYSIS OF THE ALTERNATIVES, AND PUBLIC COMMENTS, THE EPA HAS DETERMINED THAT SOIL ALTERNATIVE A-3; THERMAL DESTRUCTION, AND GROUND WATER ALTERNATIVE B-2; EXTRACTION, TREATMENT AND REINJECTION ARE THE MOST APPROPRIATE REMEDIES FOR THE TEXARKANA WOOD PRESERVING SUPERFUND SITE IN TEXARKANA, TEXAS.

THE REMEDIATION GOALS SELECTED FOR THE CONTAMINATED SOILS AND GROUND WATER ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THEY WERE SELECTED TO ELIMINATE OR REDUCE RISKS ASSOCIATED WITH POTENTIAL EXPOSURE TO THE CONTAMINANTS VIA INGESTION OR DIRECT CONTACT WITH SOIL, SEDIMENTS AND SLUDGES; AND THE INGESTION OF CONTAMINATED SHALLOW GROUND WATER. THE GOALS CALL FOR THE REMOVAL TO CONCENTRATIONS OF; SOIL;

CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS; 3 PARTS PER MILLION AS BENZO(A)PYRENE EQUIVALENTS.

TOTAL POLYNUCLEAR AROMATIC HYDROCARBONS; 2450 PARTS PER MILLION.

CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN; 20 PARTS PER BILLION AS 2,3,7,8 TCDD EQUIVALENTS.

PENTACHLOROPHENOL; 150 PARTS PER MILLION.

GROUND WATER;

PENTACHLOROPHENOL; 0.2 PARTS PER MILLION.

CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS; 10 PARTS PER BILLION AS BENZO(A)PYRENE EQUIVALENTS.

CHLORINATED DIBENZO-P-DIOXIN AND DIBENZOFURAN; .001 PARTS PER BILLION AS 2,3,7,8 TCDD EQUIVALENTS.

APPROXIMATELY 77,000 CUBIC YARDS OF SOIL, SEDIMENT AND SLUDGES CONTAMINATED ABOVE THESE LEVELS WILL BE EXCAVATED. THE MAJORITY OF THIS WILL BE ONSITE AND IN THE PONDS. THE EXCEPTION TO THIS IS IN THE SOUTHWEST CORNER OF THE WEST HALF OF THE SITE, WHERE CONTAMINATED SOIL WILL BE EXCAVATED. APPROXIMATELY 16 MILLION GALLONS OF CONTAMINATED GROUND WATER WILL BE PUMPED AND TREATED.

THERMAL DESTRUCTION IS THE CONTROLLED COMBUSTION OF ORGANIC WASTES. THIS IS THE COMPLETE DESTRUCTION OF THE CONTAMINANTS. MANY TYPES OF THERMAL DESTRUCTION UNITS ARE SUITABLE FOR THIS ALTERNATIVE. CONVENTIONAL THERMAL DESTRUCTION TECHNOLOGY IS CAPABLE OF DESTROYING ORGANICS IN WASTES TO VERY HIGH EFFICIENCIES, TYPICALLY IN THE ORDER OF 99.99 TO 99.9999%, EXCEPT WHEN THE TOXIC COMPOUND CONCENTRATION IN THE FEED IS VERY LOW (HAZARDOUS WASTE INCINERATION, A RESOURCE DOCUMENT, JANUARY 1988, BY THE ASME RESEARCH COMMITTEE ON INDUSTRIAL AND MUNICIPAL WASTE).

THE GROUND WATER EXTRACTION SYSTEM WILL PUMP THE CONTAMINATED GROUND WATER FROM THE SHALLOW WATER (13.5 FEET DEEP) BEARING ZONE. THE LOCATION AND NUMBER OF WELLS AND PUMPING RATE WILL BE DETERMINED DURING REMEDIAL DESIGN. THE TREATMENT OF THE CONTAMINATED WATER USING CARBON ABSORPTION TECHNOLOGY IS WELL PROVEN. ABSORPTION, IN GENERAL, IS THE PROCESS OF COLLECTING SOLUBLE SUBSTANCES THAT ARE IN SOLUTION ON A SUITABLE INTERFACE. IN THIS CASE THE INTERFACE IS THE BETWEEN THE GROUND WATER AND THE CARBON. THE CARBON IS USED TO REMOVE THE DISSOLVED ORGANIC MATTER. THE CARBON CAN BE REGENERATED EASILY IN A FURNACE BY OXIDIZING THE ORGANIC MATTER AND THUS REMOVING IT FROM THE CARBON SURFACE, OR LANDFILLING THE CARBON. PRETREATMENT OF THE GROUND WATER MAY BE NECESSARY TO REMOVE SUSPENDED PARTICLES. THIS PRETREATMENT MAY CONSIST OF FERRIC HYDROXIDE PRECIPITATION AND FLOCCULATION, FOLLOWED BY CLARIFICATION AND FILTRATION.

AS STATED, THE GOAL OF THIS PART OF THE REMEDIAL ACTION IS TO RESTORE THE GROUND WATER TO A

USEABLE STATE, I.E., REMOVING THE ORGANIC CONTAMINATION TO THE LEVELS ESTABLISHED IN THE SAFE DRINKING WATER ACT AND THE CLEAN WATER ACT (MCLS AND AWQC). BASED ON INFORMATION OBTAINED DURING THE REMEDIAL INVESTIGATION, AND THE ANALYSIS OF ALL REMEDIAL ALTERNATIVES, THE EPA AND THE STATE OF TEXAS BELIEVE THAT THE SELECTED REMEDY WILL ACHIEVE THIS GOAL. HOWEVER, STUDIES SUGGEST THAT IT MAY NOT BE POSSIBLE TO REDUCE CONTAMINANTS TO THE REMEDIATION GOALS LISTED ABOVE, THROUGHOUT THE AREA OF ATTAINMENT WITHIN THE DESIRED TIME-FRAME OF 15 YEARS. GROUND WATER CONTAMINATION MAY BE ESPECIALLY PERSISTENT IN THE IMMEDIATE VICINITY OF THE CONTAMINANTS' SOURCE, WHERE CONCENTRATIONS ARE RELATIVELY HIGH. THE PRACTICABILITY OF ACHIEVING CLEANUP GOALS THROUGHOUT THE SITE CANNOT BE DETERMINED UNTIL THE EXTRACTION SYSTEM HAS BEEN IMPLEMENTED AND PLUME RESPONSE MONITORED OVER TIME. IF THE SELECTED REMEDY CANNOT MEET THE HEALTH BASED REMEDIATION GOALS, DURING IMPLEMENTATION, CONTINGENCY MEASURES AND GOALS MAY REPLACE THE SELECTED REMEDY AND GOALS. THESE MEASURES ARE STILL CONSIDERED TO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, AND ARE TECHNICALLY PRACTICABLE UNDER THE CORRESPONDING CIRCUMSTANCES.

BOTH THE SELECTED REMEDY AND THE CONTINGENCY REMEDY WILL INCLUDE GROUND WATER EXTRACTION, DURING WHICH 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;

- A) DISCONTINUING OPERATION OF EXTRACTION WELLS IN AREAS WHERE REMEDIATION GOALS HAVE BEEN ATTAINED;
- B) ALTERNATING PUMPING AT WELLS TO ELIMINATE STAGNATION POINTS; AND
- C) PULSE PUMPING TO ALLOW AQUIFER EQUILIBRATION AND ENCOURAGE ADSORBED CONTAMINANTS TO PARTITION INTO GROUND WATER.

THE CONTINGENCY MAY BE IMPLEMENTED UNDER THE FOLLOWING CONDITIONS;

- A) STRONG EVIDENCE OF HYDROGEOLOGIC CONDITIONS OR THE PRESENCE OF NONAQUEOUS PHASE LAYERS WHICH SERIOUSLY CALLS INTO QUESTION THE ABILITY OF GROUND WATER EXTRACTION AND TREATMENT TECHNOLOGIES TO ACHIEVE REMEDIATION GOALS IN PORTIONS OF THE AQUIFER;
- B) CONTAMINANT LEVELS HAVE CEASED TO DECLINE OVER TIME, AND ARE REMAINING CONSTANT AT SOME STATISTICALLY SIGNIFICANT LEVEL ABOVE HEALTH-BASED GOALS IN PORTIONS OF THE AQUIFER.

IF ONE OR BOTH OF THESE CRITERIA ARE MET DURING THE DESIGN OR OPERATION OF THE PRIMARY REMEDY, THE CONTINGENCY REMEDY MAY BE INVOKED.

IF IT IS DETERMINED, ON THE BASIS OF THE PRECEDING CRITERIA AND THE SYSTEM PERFORMANCE DATA, THAT PORTIONS OF THE AQUIFER CANNOT BE RESTORED TO THEIR BENEFICIAL USE, ANY OR ALL OF THE FOLLOWING CONTINGENCY MEASURES MAY OCCUR AS A MODIFICATION OF THE EXISTING SYSTEM;

- A) ARARS MAY BE WAIVED FOR THOSE PORTIONS OF THE AQUIFER BASED ON THE TECHNICAL IMPRACTICABILITY OF ACHIEVING FURTHER CONTAMINANT REDUCTION.
- B) LOW LEVEL PUMPING MAY BE IMPLEMENTED AS A LONG-TERM GRADIENT CONTROL, OR CONTAINMENT MEASURE.

THE DECISION TO INVOKE ANY OR ALL OF THESE MEASURES MAY BE MADE DURING A PERIODIC REVIEW OF THE REMEDIAL ACTION, WHICH MAY OCCUR AT 5 YEAR INTERVALS. AN EXPLANATION OF SIGNIFICANT DIFFERENCES WILL BE ISSUED TO INFORM THE PUBLIC OF THE DETAILS OF THESE ACTIONS WHEN THEY OCCUR.

STATUTORY DETERMINATIONS

UNDER ITS LEGAL AUTHORITIES, EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO UNDERTAKE REMEDIAL ACTIONS THAT ACHIEVE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF CERCLA ESTABLISHES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES THAT THE REMEDY SELECTED MUST MEET. CERCLA 121 SPECIFIES THAT WHEN COMPLETE, THE SELECTED REMEDIAL ACTION FOR THIS SITE MUST COMPLY WITH APPLICABLE OR RELEVANT AND APPROPRIATE ENVIRONMENTAL STANDARDS ("ARARS") ESTABLISHED UNDER FEDERAL AND STATE ENVIRONMENTAL LAWS UNLESS A STATUTORY WAIVER IS JUSTIFIED. THE SELECTED REMEDY, ALSO MUST BE COST-EFFECTIVE AND UTILIZE PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. FINALLY, THE STATUTE INCLUDES A PREFERENCE FOR REMEDIES THAT

EMPLOY TREATMENT THAT PERMANENTLY AND SIGNIFICANTLY REDUCE THE VOLUME, TOXICITY, OR MOBILITY OF HAZARDOUS WASTES AS THEIR PRINCIPAL ELEMENT. THE FOLLOWING SECTIONS DISCUSS HOW THE SELECTED SOIL AND GROUND WATER REMEDIES MEET THESE STATUTORY REQUIREMENTS.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT;

THE SELECTED SOIL REMEDY PROTECTS HUMAN HEALTH AND THE ENVIRONMENT BY EXCAVATING ALL SOILS, SEDIMENT AND SLUDGES CONTAMINATED ABOVE THE REMEDIATION GOALS, A 1×10^{-5} EXCESS CANCER RISK, AND THERMALLY DESTROYING THE CONTAMINANTS. REMOVING AND DESTROYING ALL THE CONTAMINATED MATERIAL ABOVE THE REMEDIATION GOALS WILL ELIMINATE THE THREAT OF EXPOSURE FROM DIRECT CONTACT, INHALATION, OR INGESTION OF THE CONTAMINATED SOILS, AND WILL PREVENT THE MIGRATION OF THE CONTAMINANTS INTO THE GROUND WATER. THE REMEDIATED SITE RISK WILL BE 1×10^{-6} . THE MAXIMUM RISK AT THE SITE WILL BE 1×10^{-5} .

THE SELECTED GROUND WATER REMEDY PROTECT HUMAN HEALTH AND THE ENVIRONMENT BY PUMPING GROUND WATER FROM THE SHALLOW CONTAMINATED WATER BEARING ZONE AND THEN TREATING CONTAMINATED GROUND WATER BY CARBON ADSORPTION. FOLLOWING TREATMENT, THE WATER WILL BE REINJECTED INTO THE AQUIFER. THE CURRENT GROUND WATER MONITORING SYSTEM WILL BE MAINTAINED OR A NEW SYSTEM DESIGNED TO ENSURE THAT THE REMEDIAL ACTION GOALS ARE BEING MET AND WILL BE IMPLEMENTED.

THE CAPTURE AND TREATMENT OF THE CONTAMINATED GROUND WATER WILL ELIMINATE THREATS OF DIRECT CONTACT AND INGESTION POSED BY THE SITE. THE CURRENT RISKS ASSOCIATED WITH THESE PATHWAYS ARE UNACCEPTABLE. THE TARGET ACTION LEVELS ARE ESTABLISHED MCLS AND DETECTION LIMITS FOR PENTACHLOROPHENOL, DIOXIN AND POLYNUCLEAR AROMATIC HYDROCARBONS. HOWEVER, IF AFTER MONITORING THE CONTAMINANT LEVELS IN THE GROUND WATER BEING PUMPED FOR TREATMENT IT APPEARS THAT THE REMEDIATION GOALS CANNOT BE MET, A CONTINGENCY MAY BE INVOKED, AS DISCUSSED IN THE SELECTED REMEDY SECTION OF THIS RECORD OF DECISION. BY MAINTAINING A GROUND WATER MONITORING PROGRAM IN CONJUNCTION WITH THE PUMP AND TREATMENT SYSTEM, ELIMINATION OF THE THREATS POSED BY POSSIBLE INGESTION OR DIRECT CONTACT CAN BE ASSURED. THERE ARE NO SHORT-TERM THREATS ASSOCIATED WITH THE SELECTED REMEDY THAT CANNOT BE READILY CONTROLLED. ALSO, NO ADVERSE CROSS-MEDIA IMPACTS ARE EXPECTED FROM THE SELECTED GROUND WATER REMEDY.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS;

SOIL REMEDIATION;

THE SELECTED SOIL REMEDY OF EXCAVATION OF PENTACHLOROPHENOL, POLYNUCLEAR AROMATIC HYDROCARBON, AND DIOXIN CONTAMINATED SOILS, THERMAL DESTRUCTION AND REPLACING THE TREATED SOIL WILL COMPLY WITH ALL APPLICABLE RELEVANT AND APPROPRIATE ACTION-, CHEMICAL-, AND LOCATION-, SPECIFIC REQUIREMENTS ("ARARS"). THE ARARS ARE PRESENTED AS FOLLOWS;

ACTION-SPECIFIC SOIL REMEDIATION ARARS;

AS STATED IN THE ALTERNATIVES DESCRIPTION SECTION, THE WASTE ON SITE ARE NOT RCRA HAZARDOUS WASTE. ACCORDING ALL REGULATIONS WHICH GOVERN THE DISPOSAL OF WASTE ARE NOT APPLICABLE, RATHER THEY MAY BE CONSIDERED RELEVANT AND APPROPRIATE. SPECIFIC DISCUSSIONS ABOUT THE ARARS FOLLOW.

ACCORDING TO RCRA (SECTION 1004(34)), HAZARDOUS WASTE THERMAL DESTRUCTION UNITS ARE CONSIDERED TREATMENT AND ARE, THEREFORE, SUBJECT TO SEVERAL SECTIONS IN SUBTITLE C WHICH ADDRESS THE PROBLEMS OF HAZARDOUS WASTE. THE 40 CODE OF FEDERAL REGULATIONS (40 CFR) PART 264, SUBPART O ADDRESSES STANDARDS FOR THE OPERATION OF HAZARDOUS WASTE THERMAL DESTRUCTION UNITS. THIS REGULATION IS RELEVANT AND APPROPRIATE FOR THIS ACTION. THIS REGULATION GOVERNS APPLICABILITY, WASTE ANALYSIS, PRINCIPAL ORGANIC HAZARDOUS CONSTITUENTS (POHCS), PERFORMANCE STANDARD, HAZARDOUS WASTE PERMITS AND OPERATING REQUIREMENTS. SIMILARLY, THE PROPOSED STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTES INCINERATORS AND BURNING OF HAZARDOUS WASTES IN BOILERS AND INDUSTRIAL FURNACES, FEDERAL REGISTER FRIDAY, APRIL 27, 1990 SHOULD BE CONSIDERED IN THE DESIGN AND TREATMENT PROCESS.

RCRA LAND DISPOSAL RESTRICTIONS (LDRS) ESTABLISHED UNDER THE HAZARDOUS AND SOLID WASTE AMENDMENTS, ARE NOT CONSIDERED APPLICABLE OR RELEVANT AND APPROPRIATE. A DISCUSSION HOW LDRS INTERACT WITH THE TEXARKANA WOOD PRESERVING SITE FOLLOWS.

BECAUSE THE WASTE ONSITE ARE NOT RCRA LISTED OR "CHARACTERISTIC" WASTE, THE LAND DISPOSAL RESTRICTIONS ARE NOT APPLICABLE. THE WASTE ON SITE ARE SOIL AND DEBRIS, THEREFORE, THE LAND DISPOSAL REGULATIONS ARE NOT RELEVANT AND APPROPRIATE.

CHEMICAL-SPECIFIC SOIL REMEDIATION ARARS;
NO CHEMICAL-SPECIFIC SOIL REMEDIATION ARARS EXIST.

LOCATION-SPECIFIC SOIL REMEDIATION ARARS;
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REQUIREMENTS, 40 CFR 264.18, FOR LOCATION OF A TREATMENT, STORAGE OR DISPOSAL FACILITY IN A 100-YEAR FLOODPLAIN, AND ALSO GENERAL REQUIREMENTS FOR THE PROTECTION OF FLOODPLAINS, 40 CFR 6, APPENDIX A AS THE SITE IS WITHIN THE 100-YEAR FLOOD PLAIN, THESE REGULATIONS ARE RELEVANT AND APPROPRIATE.

GROUND WATER REMEDIATION;
THE SELECTED GROUND WATER REMEDY OF EXTRACTION AND TREATMENT, FOLLOWED BY REINJECTION INTO THE GROUND WILL COMPLY WITH ALL APPLICABLE OR RELEVANT AND APPROPRIATE ACTION-, CHEMICAL-, AND LOCATION-SPECIFIC REQUIREMENTS (ARARS). THE ARARS ARE PRESENTED AS FOLLOWS;

ACTION-SPECIFIC GROUND WATER REMEDIATION ARARS;
RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) REQUIREMENTS, 40 CFR 264.117(A) (1) POST-CLOSURE AND MONITORING REQUIREMENTS FOR 30 YEARS OR ANOTHER PERIOD DETERMINED BY THE REGIONAL ADMINISTRATOR.

RCRA REQUIREMENTS, 40 CFR 264.190-198 MAY ALSO APPLY.

RCRA REQUIREMENTS, 40 CFR 264.190-192, 40 CFR 268.601 TREATMENT OF HAZARDOUS WASTE IN A UNIT.

CHEMICAL-SPECIFIC GROUND WATER REMEDIATION ARARS;
THE SAFE DRINKING WATER ACT (42 USC 300(F)) ESTABLISHED MAXIMUM

CONTAMINANT LEVELS (MCLS, 40 CFR 141.11-141.16) FOR DRINKING WATER; (PROPOSED AT 0.2 PPM FOR PENTACHLOROPHENOL).

REQUIREMENTS OF THE CLEAN WATER ACT (CWA) (33 USCA 1251-1376) SPECIFICALLY REGARDING 10(-6) WATER QUALITY CRITERIA (CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS OF 2.8 PARTS PER TRILLION AND CHLORINATED DIBENZO-P-DIOXIN OF 2.2×10^{-4} PARTS PER TRILLION).

LOCATION SPECIFIC GROUND WATER REMEDIATION ARARS;
RCRA REQUIREMENTS, 40 CFR 264.18 FOR LOCATION OF A TREATMENT, STORAGE OR DISPOSAL FACILITY IN A 100-YEAR FLOODPLAIN, 40 CFR 6, APPENDIX A.

COST EFFECTIVENESS;

THE REMEDIAL ACTION SATISFIES THE THRESHOLD CRITERIA SET FORTH IN SECTION 300.430(F)(1)(III) (A) AND (B). THE SELECTED SOIL REMEDY IS COST EFFECTIVE BECAUSE IT WILL PROVIDE OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COST, THE NET PRESENT WORTH VALUE BEING \$43 MILLION.

THE SELECTED GROUND WATER REMEDY IS ALSO COST EFFECTIVE, ITS PRESENT WORTH VALUE BEING \$ 4.4 MILLION. THE ESTIMATED COST OF THE SELECTED REMEDY IS LESS THAN THE COST ASSOCIATED WITH INSTALLATION OF A SLURRY WALL (\$ 8.5 MILLION) BUT ARE MORE THAN THE COST ASSOCIATED WITH DIRECTLY DISCHARGING THE EXTRACTED GROUND WATER TO A PUBLICLY OWNED TREATMENT WORKS OR DISCHARGING IT INTO A SURFACE BODY. IT IS BELIEVED THE REINJECTION WILL AID IN THE EXTRACTION PROCESS AND IS NECESSARY IN OBTAINING THE REMEDIATION GOALS.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES (OR RESOURCE RECOVERY TECHNOLOGIES) TO THE MAXIMUM EXTENT PRACTICAL;

EPA HAS DETERMINED THAT THE SELECTED SOIL AND GROUND WATER REMEDIES REPRESENT THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTION AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST EFFECTIVE MANNER FOR SOURCE CONTROL AND REMEDIATION AT THE TEXARKANA WOOD PRESERVING SITE. OF THOSE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, EPA HAS DETERMINED THAT THE SELECTED SOIL AND GROUND WATER REMEDIES PROVIDE THE BEST BALANCE OF TRADE-OFFS IN TERMS OF REDUCTION OF MOBILITY, TOXICITY OR VOLUME ACHIEVED THROUGH TREATMENT, SHORT TERM EFFECTIVENESS, IMPLEMENTABILITY AND COSTS, ALSO CONSIDERING THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT AND CONSIDERING STATE AND COMMUNITY ACCEPTANCE.

THE THERMAL DESTRUCTION TECHNOLOGY AFFORDS THE MOST PERMANENT AND LONG-TERM EFFECTIVE SOLUTION

TO THE CONTAMINATION PROBLEM POSED BY THE TEXARKANA WOOD PRESERVING COMPANY SITE. IT IS THE PROVEN AND ACCEPTED METHOD FOR THE TREATMENT OF DIOXIN CONTAMINATED WASTE. THE OTHER TREATMENT TECHNOLOGIES INVESTIGATED AS POSSIBLE REMEDIES FOR THE SITE WERE CHEMICAL TREATMENT AND BIOLOGICAL TREATMENT. NEITHER OF THESE TECHNOLOGIES OFFER ARE PROVEN IN THE DESTRUCTION OF THE COMBINATION OF CONTAMINANTS THAT COEXIST ON THE SITE. THEREFORE, THE DEGREE OF PERMANENCE AND PROTECTION THAT BIOLOGICAL TREATMENT OFFERS IS NOT ASSURED. THE LONG-TERM EFFECTIVENESS OF BIOLOGICAL AND CHEMICAL TREATMENT HAS NOT BEEN PROVEN.

IN REGARD TO SHORT TERM EFFECTIVENESS, WHEN A THERMAL DESTRUCTION UNIT IS OPERATED AT THE DESIGNED TEMPERATURE, WITHIN THE DESIGNED FEED RATE, PROVIDED WITH THE APPROPRIATE MIXING, IT WILL MEET ALL THE STATE AND FEDERAL REQUIREMENTS AND WILL BE PROTECTIVE.

THERMAL TREATMENT IS THE ACCEPTED METHOD FOR THE TREATMENT OF DIOXIN AND IS WELL PROVEN FOR THE DESTRUCTION OF THE OTHER ORGANICS IN THE WASTE. THE OTHER ALTERNATIVES HAVE BEEN PROVEN EFFECTIVE ON CERTAIN PARTS OF THE CONTAMINATION, BUT IS NOT EFFECTIVE AT REMEDIATING ALL THE SITE CONTAMINATION. A "TREATMENT TRAIN" COULD BE CONSTRUCTED TO TREAT ALL THE CONTAMINANTS USING A NUMBER OF THE TECHNOLOGIES. HOWEVER, AS MORE TECHNOLOGIES ARE USED ON THE SITE, THE IMPLEMENTATION BECOMES CONSIDERABLY MORE COMPLEX, NOT TO MENTION MORE EXPENSIVE. THERMAL TREATMENT PROVIDES NO OBVIOUS COST SAVINGS, HOWEVER, IT IS IN THE SAME RELATIVE RANGE AS THE CHEMICAL TREATMENT ALTERNATIVE, OFFERING A GREATER DEGREE OF CERTAINTY OF REMEDIATION. THERMAL TREATMENT IS WITHIN THE SAME ORDER OF MAGNITUDE AS BIOLOGICAL TREATMENT FOLLOWED BY STABILIZATION, AND OFFERS MORE PERMANENT TREATMENT. COST IS NOT A TRADE-OFF FOR PROTECTION.

THE SELECTED GROUND WATER REMEDY, SATISFIES THE LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT, AND IMPLEMENT-ABILITY CRITERIA BETTER THAN ALL OF THE OTHER ALTERNATIVES INVESTIGATED. IT IS SLIGHTLY MORE EXPENSIVE THAN DISCHARGING THE EXTRACTED GROUND WATER INTO A SURFACE BODY OR PUBLICLY OWNED TREATMENT WORKS HOWEVER, IT OFFERS A GREATER ASSURANCE THAT PUMPING IS IMPLEMENTABLE. THE SHORT-TERM RISK ASSOCIATED WITH THE SELECTED GROUND WATER REMEDY ARE COMPOSED OF POSSIBLE EXPOSURE OF WORKERS AND THE COMMUNITY TO THE GROUND WATER TREATMENT SYSTEM, HOWEVER, THESE POTENTIAL RISKS ARE EASILY CONTROLLED, THEREFORE ALL BUT ELIMINATED.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT;
BOTH THE GROUND WATER ALTERNATIVE AND SOIL, SLUDGE AND SEDIMENT ALTERNATIVE USE TREATMENT AS THE PRIMARY REMEDIATION TECHNOLOGY FOR THE PRINCIPAL THREAT POSED BY SOURCE MATERIAL. THEREFORE, THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT AS A PRINCIPAL ELEMENT IS SATISFIED.

#NSC

XII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

THE PROPOSED PLAN FOR THE TEXARKANA WOOD PRESERVING COMPANY SITE WAS RELEASED FOR PUBLIC COMMENT IN JULY 1990. THE PROPOSED PLAN IDENTIFIED ALTERNATIVE A-3, THERMAL DESTRUCTION FOLLOWED BY BACKFILLING THE TREATED SOIL AND ALTERNATIVE B-2, EXTRACTION TREATMENT FOLLOWED BY REINJECTION OF THE TREATED GROUND WATER, AS THE PREFERRED ALTERNATIVES. EPA REVIEWED ALL WRITTEN AND VERBAL COMMENTS SUBMITTED DURING THE PUBLIC COMMENT PERIOD. UPON REVIEW OF THESE COMMENTS, IT WAS DETERMINED THAT NO SIGNIFICANT CHANGES TO THE REMEDY, AS IT WAS ORIGINALLY IDENTIFIED IN THE PROPOSED PLAN WERE NECESSARY.

**TEXARKANA WOOD PRESERVING COMPANY SITE
RESPONSIVENESS SUMMARY**

THE COMMUNITY RELATIONS RESPONSIVENESS SUMMARY HAS BEEN PREPARED TO PROVIDE WRITTEN RESPONSES TO COMMENTS SUBMITTED REGARDING THE PROPOSED PLAN AT THE TEXARKANA WOOD PRESERVING COMPANY SITE. THE SUMMARY IS DIVIDED INTO TWO SECTIONS.

SECTION I; BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS. THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS RAISED DURING THE REMEDIAL PLANNING ACTIVITIES AT THE TEXARKANA WOOD PRESERVING COMPANY SITE.

SECTION II; SUMMARY OF MAJOR COMMENTS RECEIVED. THE COMMENTS (BOTH ORAL AND WRITTEN) ARE SUMMARIZED AND EPA'S RESPONSES ARE PROVIDED.

I. BACKGROUND OF COMMUNITY INVOLVEMENT AND CONCERNS

THE COMMUNITY OF TEXARKANA IS ACUTELY AWARE OF THE PROBLEMS ASSOCIATED WITH THE TEXARKANA WOOD PRESERVING COMPANY SITE. THIS AWARENESS IS EVIDENT BY THE NUMBER OF COMMUNITY ENVIRONMENTAL ACTION GROUPS IN TEXARKANA AND THE PARTICIPATION OF THE COUNTY AND CITY OFFICIALS THROUGHOUT THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY. JUDGING BY THE COMMENTS RECEIVED THE PRIMARY CONCERN THE RESIDENTS OF TEXARKANA EXPRESSED DURING PUBLIC COMMENT WAS THAT THERMAL DESTRUCTION WILL CAUSE ADVERSE HEALTH AFFECTS TO THOSE WHO LIVE IN THE AREA.

II. SUMMARY OF MAJOR COMMENTS RECEIVED

PUBLIC NOTICE ANNOUNCING THE PUBLIC COMMENT PERIOD AND INVITATION TO A PUBLIC MEETING WAS GIVEN ON JULY 8, 1990 IN THE TEXARKANA GAZETTE. THE PROPOSED PLAN FACT SHEET WAS DISTRIBUTED ON JULY 9, 1990. THE COMMENT PERIOD BEGAN ON JULY 12 AND ENDED ON AUGUST 11, 1990. A PUBLIC MEETING WAS HELD ON JULY 24, 1990, AT THE CITY HALL COUNCIL CHAMBERS IN TEXARKANA, TEXAS. THE PURPOSE OF THIS MEETING WAS TO DISCUSS THE PROPOSED ALTERNATIVES AND THE PREFERRED ALTERNATIVES.

APPROXIMATELY 35 PEOPLE WERE IN ATTENDANCE AND 18 PEOPLE ASKED QUESTIONS OR MADE COMMENTS. TWO LETTERS WERE RECEIVED WITH COMMENTS.

THE COMMENTS AND QUESTIONS RECEIVED DURING THE PUBLIC COMMENT PERIOD FOLLOW.

1. COMMENT;

THE VOLUME OF CONTAMINATED MATERIAL MENTIONED IN THE PROPOSED PLAN AND IN THE PUBLIC MEETING WAS 76,000 CUBIC YARDS. YET IN THE COST CALCULATIONS IN THE FEASIBILITY STUDY, THE COSTS ARE BASED ON EIGHTY-EIGHT THOUSAND CUBIC YARDS. WHY IS THERE A DIFFERENCE?

RESPONSE;

THE VOLUME DISCUSSED IN THE PROPOSED PLAN AND AT THE PUBLIC MEETING IS THE COMPACTED VOLUME OF WASTES. THE VOLUME OF SOIL USED TO DETERMINE THE COST IS BASED AN EXPANDED VOLUME, 88,000 CUBIC YARD. THE VOLUME IS EXPECTED TO EXPAND AS IT IS EXCAVATED DUE TO AN INCREASE OF AIR IN THE NONCOMPACTED SOIL.

2. COMMENT;

HOW LONG WILL EPA SUPERFUND ACTIVITIES ONSITE PRECLUDE DEVELOPMENT OF THE PROPERTY?

RESPONSE;

REMEDICATION OF THE SOIL IS EXPECTED TO LAST TWO TO THREE YEARS. REMEDIATION OF THE GROUND WATER IS EXPECTED TO LAST TEN YEARS BEGINNING UPON COMPLETION OF THE SOIL REMEDIATION. THE PLACEMENT OF THE GROUND WATER EXTRACTION, TREATMENT AND REINJECTION SYSTEMS MAY PRECLUDE DEVELOPMENT OF SOME PARTS OF THE SITE DURING THE GROUND WATER REMEDIATION. THEREFORE, IT IS ESTIMATED THAT IT WILL BE TWELVE TO THIRTEEN YEARS ONCE THE REMEDIAL ACTION HAS BEGUN BEFORE DEVELOPMENT OF THE WHOLE SITE CAN OCCUR.

3. COMMENT;

ARE THE DIOXIN CONCENTRATIONS MENTIONED IN THE PROPOSED PLAN AND AT THE PUBLIC MEETING THE 2,3,7,8-TCDD TYPE OF DIOXIN? WAS 2,3,7,8 TCDD FOUND ON THE SITE?

RESPONSE;

THE DIOXIN CONCENTRATIONS MENTIONED IN THE PROPOSED PLAN AND IN THE PUBLIC MEETING WAS 2,3,7,8-TCDD EQUIVALENTS. THIS MEANS THAT EACH TYPE OF DIOXIN WAS COMPARED TO THE 2,3,7,8-TCDD TYPE, USING THE ESTABLISHED EPA TOXIC EQUIVALENCIES GUIDE, AND AN EQUIVALENT POTENCY IS CALCULATED. USING THIS METHOD, THE POTENCY OF THE DIOXIN ON SITE IS ALL RELATED TO THE 2,3,7,8-TCDD TYPE. A DISCUSSION OF THE EQUIVALENCY FACTORS AND THE TABLE LISTING THESE FACTORS IS IN THE SUMMARY OF SITE RISKS SECTION OF THE RECORD OF DECISION. TWO SAMPLES INDICATED THAT THE 2,3,7,8-TCDD TYPE DIOXIN IS ON SITE.

4. COMMENT;

WHY CAN'T WE SEND THE CONTAMINATED SOIL TO TIMES BEACH, MISSOURI AND BURN IT UP THERE?

RESPONSE;

ONE OF THE ALTERNATIVES EVALUATED DURING THE FEASIBILITY STUDY WAS OFF SITE THERMAL DESTRUCTION. IN THIS EVALUATION, THE SOIL WAS EXCAVATED, TRUCKED TO A COMMERCIAL INCINERATOR. THE ESTIMATED COST OF THIS ALTERNATIVE WAS \$191 MILLION, ALMOST 400% MORE THAN THE SECOND MOST EXPENSIVE ALTERNATIVE, AND ALMOST 450% THE COST OF ON SITE THERMAL DESTRUCTION. THE INCINERATOR TO BE USED AT TIMES BEACH WILL NOT BE A FEDERALLY OWNED FACILITY, BUT A CONTRACT WITH A COMMERCIAL FIRM.

5. COMMENT;

HOW OFTEN WILL AIR MONITORING BE DONE? HOW LONG DOES IT TAKE TO RECEIVE THE ANALYTICAL RESULTS FROM THE AIR MONITORING?

RESPONSE;

INSTACK MONITORING IS CONTINUOUS AND NEARLY INSTANTANEOUS. THE STACK MONITORING IS LINKED TO THE FEED. ULTIMATELY, WHEN STACK MONITORING DETECTS EMISSIONS ABOVE PRESET LIMITS, THE INCINERATOR AUTOMATICALLY SHUTS DOWN. AMBIENT AIR MONITORING SYSTEMS ARE USED TO EVALUATE THE QUANTITY AND QUALITY OF DUST LEAVING THE SITE FROM THE EXCAVATION PROCESS, NOT AIR QUALITY PROBLEMS GENERATED BY THE INCINERATOR.

6. COMMENT;

WHAT PERMEABILITY OR LEACHABILITY LIMITS WOULD BE ESTABLISHED FOR THE SOLIDIFICATION OF THE WASTE?

RESPONSE;

THE PERMEABILITY WILL BE DETERMINED BY THE TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP). THE ESTABLISHED LIMIT OF LEACHATE CONCENTRATION FOR PENTACHLOROPHENOL IS 100 PARTS PER MILLION. THIS CONCENTRATION WAS IN THE TOXICITY CHARACTERISTIC RULE. IN THE PREAMBLE TO THE NCP, THE EPA STATES THAT IT EXPECTS TO REDUCE CONTAMINANT MOBILITY AT LEAST 90 TO 99%.

7. COMMENT;

WHY IS THE EPA SPENDING MONEY TO REMEDIATE THE TEXARKANA WOOD PRESERVING COMPANY SITE? THE MONEY BEING SPENT ON THE TEXARKANA WOOD PRESERVING CO. SITE WOULD BE BETTER SPENT ON THE KOPPERS TEXARKANA SITE. NO ONE LIVES ON THE TEXARKANA WOOD PRESERVING COMPANY SITE, BUT MANY FAMILIES LIVE ON THE KOPPERS TEXARKANA SITE.

RESPONSE;

BOTH THE TEXARKANA WOOD PRESERVING COMPANY AND KOPPERS TEXARKANA SITE HAVE BEEN JUDGED TO PRESENT A LONG TERM THREAT TO HUMAN HEALTH AND THE ENVIRONMENT. EPA IS PROCEEDING TO CORRECT POLLUTION PROBLEMS AT BOTH SITES; FUNDING ONE SITE DOES NOT JEOPARDIZE PRECEDING WITH THE OTHER.

8. COMMENT;

CITY OF TEXARKANA AND BOWIE COUNTY OFFICIALS WOULD LIKE TO HAVE THE OPPORTUNITY TO COMMENT ON THE CONTRACTOR BEFORE THE CONTRACT IS AWARDED.

RESPONSE;

THE CONTRACTOR FOR THE REMEDIAL ACTION WILL, BY FEDERAL LAW, BE SELECTED THROUGH OPEN AND COMPETITIVE BIDDING. EPA WILL PROVIDE LOCAL OFFICIALS AND RESIDENTS WITH AN OPPORTUNITY TO UNDERSTAND THE REMEDIAL DESIGN AT VARIOUS STAGES OF COMPLETION. HOWEVER, IT WOULD BE INAPPROPRIATE FOR COUNTY AND CITY OFFICIALS TO SELECT THE CONTRACTOR OR TO REVIEW AND COMMENT ON BIDDERS TO THE PROJECT AS IT IS OUTSIDE THE REQUIREMENTS OF FEDERAL LAW.

9. COMMENT;

HOW WILL DUST BE CONTROLLED DURING THE EXCAVATION OF THE SOIL? HOW WILL RUNOFF BE MAINTAINED?

RESPONSE;

GENERALLY, THE BEST METHOD OF CONTROLLING DUST EMISSIONS IS TO SPRAY THE AREA BEING WORKED AT FREQUENT INTERVALS (30 MINUTES TO 2 OR 3 HOURS). WATER OR A SURFACTANT CAN BE USED, AND IT CAN BE SPRAYED FROM A MOBILE TOWER. SPRAYING MOISTENS THE SOIL ON THE SURFACE BUT NOT ALL THE SOIL BEING MOVE; HOWEVER, SOIL BELOW THE SURFACE IS FREQUENTLY MORE MOIST THAN SOIL ON THE SURFACE. THE SURFACE SPRAY REDUCES EMISSIONS FROM DUST. AMBIENT AIR MONITORING WILL ALSO OCCUR. RUNOFF WILL BE CONTROLLED BY DIKING THE SITE AREA.

10. COMMENT;

PLEASE EXPLAIN THE DIFFERENCE BETWEEN "PRESENT WORTH COST", "CAPITOL COST" AND "OPERATIONAL AND MAINTENANCE COST".

RESPONSE;

THE "CAPITOL COST" IS HOW MUCH THE SETTING UP THE EQUIPMENT, EXCAVATING THE SOIL, RUNNING THE PROCESS, AND REMOVING THE EQUIPMENT FROM THE SITE WILL COST. "OPERATIONAL AND MAINTENANCE COSTS" ARE THE COSTS ASSOCIATED WITH THE SITE AFTER REMEDIATION IS COMPLETE. THESE COSTS INCLUDE THINGS LIKE MAINTAINING A CAP, LEACHATE TESTS FOR A SOLIDIFIED MASS, AND MAINTAINING A FENCE AROUND THE SITE. "PRESENT WORTH COSTS" ARE THE TOTAL OF THESE TWO COSTS IN TODAY'S DOLLAR. THESE CALCULATIONS INCLUDE AN 8% INFLATION RATE FOR 30 YEARS.

11. COMMENT;

WHAT IS THE HAZARD RANKING SYSTEM SCORE OF THE SITE? WHAT YEAR DID THE SITE GO ON THE LIST?

RESPONSE;

THE HAZARD RANKING SYSTEM NUMBER IS 40.19. THE SITE WAS PUT ON THE LIST IN 1986.

12. COMMENT;

WHAT IS THE HAZARD RANKING SYSTEM SCORE FOR THE KOPPERS TEXARKANA SITE?

RESPONSE;

THE HAZARD RANKING SYSTEM NUMBER FOR THE KOPPERS TEXARKANA SITE IS 31.31.

13. COMMENT;

IS THE HIGHEST SCORE UNDER THE NEW CRITERIA 28? PLEASE EXPLAIN THE NEW SYSTEM. HOW IS THE

SYSTEM DIFFERENT THAN THE OLD SYSTEM? WHAT PROMPTED THE NEW SYSTEM?

RESPONSE;

FOR A SITE TO BE PROPOSED TO THE NATIONAL PRIORITIES LIST A MINIMUM SCORE OF 28.5 MUST BE MAINTAINED UNDER THE HAZARDOUS RANKING SYSTEM (HRS). IN 1986, CONGRESS PASSED THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), SECTION 105 OF WHICH REQUIRES EPA TO AMEND THE HRS TO ASSURE "TO THE MAXIMUM EXTENT FEASIBLE, THAT THE HRS ACCURATELY ASSESSES THE RELATIVE DEGREE OF RISK TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY SITES AND FACILITIES SUBJECT TO REVIEW." EPA PUBLISHED PROPOSED REVISIONS TO THE HRS ON DECEMBER 23, 1988 (53 FR 51962). WHILE THE GENERAL STRUCTURE OF THE HRS CONTINUES TO BE SIMILAR TO THE ORIGINAL HRS, THE PROPOSED RULE CONSTITUTED A SUBSTANTIAL REVISION OF THE HRS. VIRTUALLY EVERY FACTOR HAS BEEN REVISED AND SEVERAL NEW FACTORS AND THREATS HAVE BEEN ADDED. THE MAJOR PROPOSED CHANGES INCLUDE CONSIDERATION OF POTENTIAL RELEASES TO AIR, ADDITION OF MOBILITY FACTORS, ADDITION OF DILUTION AND DISTANCE WEIGHING FOR THE WATER PATHWAYS, REVISIONS TO THE TOXICITY FACTOR, ADDITIONS TO THE LIST OF COVERED SENSITIVE ENVIRONMENTS, ADDITIONS OF HUMAN FOOD CHAIN TO THE SURFACE WATER PATHWAY, REVISION OF WASTE QUANTITY FACTOR TO ALLOW FOR CONSIDERATION OF HAZARDOUS EVALUATING POPULATION FACTORS, AND INCLUSION OF AN ONSITE EXPOSURE PATHWAY. THE REVISED HRS CONTINUES TO UNDERGO REVISION, AND HAS NOT YET BEEN FINALIZED. FINALIZATION MAY OCCUR IN THE FALL OF 1990.

14. COMMENT;

WHEN WAS THE POTENTIALLY RESPONSIBLE PARTY INVESTIGATION BEGUN? IS IT STILL ONGOING? WHO ARE THE POTENTIALLY RESPONSIBLE PARTIES? WHAT IS THE STATUS OF THESE COMPANIES? WHAT IS THE STATUS OF THE NATIONAL LUMBER AND CREOSOTE COMPANY? ARE THEY CONSIDERED THE FIRST OPERATORS AT THE SITE? WHO RAN THE TEXARKANA WOOD PRESERVING COMPANY?

RESPONSE;

THE INITIAL PRP INVESTIGATION BEGAN IN 1985. A REVISED PRP SEARCH WAS BEGUN IN APRIL, 1990 AND IS STILL ONGOING. ALTHOUGH SOME POTENTIALLY RESPONSIBLE PARTIES HAVE BEEN IDENTIFIED, THE INVESTIGATION CONTINUES. THE NAMES AND STATUSES OF POTENTIALLY RESPONSIBLE PARTIES ARE AVAILABLE UNDER THE FREEDOM OF INFORMATION ACT REQUEST.

JOHN T. LOGAN ORGANIZED THE NATIONAL LUMBER COMPANY IN 1903. BETWEEN 1903 AND 1923 MR. LOGAN ORGANIZED SEVERAL COMPANIES WHICH BECAME KNOWN AS THE "NATIONAL LUMBER & CREOSOTING COMPANY". NATIONAL LUMBER & CREOSOTING COMPANY, INC. INCORPORATED, DISSOLVED, AND REINCORPORATED SEVERAL TIMES IN TEXAS, ARKANSAS, AND FINALLY, DELAWARE. BY 1938, THE LAST NATIONAL LUMBER & CREOSOTING COMPANY DISSOLVED. IT IS PRESUMED THAT THE NATIONAL LUMBER & CREOSOTE COMPANY WERE THE FIRST OPERATORS AT THE SITE.

THE QUESTION OF WHO RAN THE TEXARKANA WOOD PRESERVING COMPANY AND AT WHAT TIMES IS ONE OF THE FOCUS' OF THE CURRENT INVESTIGATION.

15. COMMENT;

WHAT EFFECT WOULD LOCATING A VIABLE RESPONSIBLE PARTY HAVE ON THE SITE? WOULD THE RESPONSIBLE PARTY HAVE THE OPPORTUNITY TO SELECT ANOTHER REMEDY?

RESPONSE;

ALL POTENTIALLY RESPONSIBLE PARTIES (PRPS) WILL BE GIVEN THE OPPORTUNITY TO PERFORM THE REMEDIATION SELECTED FOR THE SITE. THE RESPONSIBILITY FOR SELECTING REMEDIES IS SOLELY AND UNIQUELY EPA'S, NOT THE RESPONSIBLE PARTIES NOR OTHER PARTS OF THE GOVERNMENT. AFTER THE REMEDY IS SELECTED, THE EPA IS REQUIRED TO PROVIDE AN OPPORTUNITY FOR THE PRPS TO IMPLEMENT THE REMEDY IN THE RECORD OF DECISION. THE MORATORIUM CANNOT BE USED TO NEGOTIATE A NEW REMEDY.

16. COMMENT;

WHY ARE THE PRPS SELECTING A NEW REMEDY AT KOPPERS TEXARKANA?

RESPONSE;

THEY ARE NOT. EPA DECIDED, BASED ON AN INTERNAL REVIEW OF CREOSOTE SITE ACTION LEVEL, THAT THE ACTION LEVEL FOR THE RESIDENTIAL PORTION OF THE KOPPERS SITE NEEDED TO BE UPDATED TO FURTHER PROTECT HUMAN HEALTH. THE PRPS HAD NOTHING TO DO WITH THIS DECISION. THE PRPS DO NOT SELECT REMEDIES AT SUPERFUND SITES. REVISING THE ACTION LEVEL WILL NOT ALTER THE OVERALL APPROACH INTENDED FOR THE SELECTED REMEDY OUTLINED IN THE 1988 RECORD OF DECISION.

17. COMMENT;

IS THE EPA HOLDING BEAZER RESPONSIBLE FOR THE REMEDIATION OF KOPPERS TEXARKANA?

RESPONSE;

YES. BEAZER IS THE PRIMARY RESPONSIBLE PARTY FOR THE KOPPERS TEXARKANA SITE.

18. COMMENT;

WHO WAS CHARGED WITH THE RESPONSIBILITY OF REGULATING AND MONITORING THE COMPANIES WHO OPERATED AT THE TEXARKANA WOOD PRESERVING COMPANY SITE?

RESPONSE;

THE SITE WAS THE RESPONSIBILITY OF THE TEXAS WATER COMMISSION AND ITS PREDECESSORS, THE TEXAS DEPARTMENT OF WATER RESOURCES AND THE TEXAS WATER QUALITY BOARD.

19. COMMENT;

WHO PERFORMED THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY AT THE TEXARKANA WOOD PRESERVING COMPANY SITE?

RESPONSE;

THE STATE OF TEXAS, UNDER DIRECTION OF THE TEXAS WATER COMMISSION, WAS THE LEAD AGENCY. THE TEXAS WATER COMMISSION CONTRACTED THE REMEDIAL INVESTIGATION AND THE FEASIBILITY STUDY OUT TO ROY F. WESTON COMPANY, A CONSULTING ENGINEERING FIRM.

20. COMMENT;

WHEN WILL THE INCINERATION PROCESS BEGIN?

RESPONSE;

THE TENTATIVE SCHEDULE FOR THE REMEDIAL DESIGN AND REMEDIAL ACTION IS TO BEGIN DESIGN IN FEBRUARY OR MARCH OF 1991, FOLLOWED BY THE REMEDIAL ACTION ABOUT 18 MONTHS TO 2 YEARS LATER, IN THE FALL OR WINTER OF 1992.

21. COMMENT;

IS THE BID PROCESS COMPETITIVE? WHERE WILL THE ADVERTISEMENT BE RUN?

RESPONSE;

THE BID PROCESS, AS REQUIRED BY FEDERAL LAW, IS A FREE AND OPEN COMPETITION BID WHEN FEDERAL FUNDING IS USED. THE ADVERTISEMENT FOR THE BID WILL BE IN THE COMMERCE BUSINESS DAILY. FOR SUBSCRIPTIONS WRITE; COMMERCE BUSINESS DAILY, SUPERINTENDENT OF DOCUMENTS, GOVERNMENT PRINTING OFFICE, WASHINGTON, D.C. 20302-9370, TELEPHONE (202) 783-3238. THE ADVERTISEMENT MAY ALSO BE IN THE TEXAS REGISTER. FOR MORE INFORMATION CONTACT ROBERTA KNIGHT IN AUSTIN (512) 463-5561.

22. COMMENT;

WHERE ANY INORGANICS FOUND AT THE SITE? WHERE THE CONCENTRATIONS HIGH?

RESPONSE;

SOIL SAMPLES WERE ANALYZED FOR PRIORITY POLLUTANT METALS, PRIMARILY TO CONFIRM THAT THE CHROMIUM-COPPER-ARSENIC PROCESS HAD NOT USED AT THE TEXARKANA WOOD PRESERVING SITE. WITH THE EXCEPTION OF MERCURY, MOST METAL CONCENTRATIONS WERE BELOW THE NATURAL RANGE. IN MOST CASES, MERCURY CONCENTRATION EXCEEDED NATURAL CONCENTRATIONS ONLY SLIGHTLY. HOWEVER IN THREE SAMPLES, THE MERCURY CONCENTRATIONS APPEAR TO BE HIGHER, ALTHOUGH IT IS NOT WIDE SPREAD. IT IS SUSPECTED THE MERCURY SOURCE IS FROM A BROKEN INSTRUMENT, ESPECIALLY MANOMETERS OR THERMOMETERS, USED IN PRESSURE CYLINDERS. THE CONCENTRATIONS OF MERCURY ONSITE DO NOT POSE A HUMAN HEALTH OR ENVIRONMENTAL RISK.

23. COMMENT;

WAS THERE ANY OFFSITE MIGRATION OF MERCURY?

RESPONSE;

NO.

24. COMMENT;

WERE THERE ANY HEAVY METALS FOUND IN THE GROUND WATER?

RESPONSE;

NO.

25. COMMENT;

WILL THE PENTACHLOROPHENOL, DIOXIN, FURANS, AND POLYNUCLEAR AROMATIC HYDROCARBONS BE REMOVED FROM THE GROUND WATER?

RESPONSE;

YES. THE PENTACHLOROPHENOL WILL BE REMOVED DOWN TO THE HEALTH BASED CRITERIA, THE MAXIMUM CONTAMINANT LEVEL (MCL). THE DIOXIN FURANS, AND POLYNUCLEAR AROMATIC HYDROCARBONS WILL BE REMOVED DOWN TO BELOW THE DETECTION LIMIT.

26. COMMENT;

HOW WILL THE CARBON BE TREATED AFTER IT HAS COLLECTED THE CONTAMINANTS?

RESPONSE;

GENERALLY, THE CARBON IS THERMALLY TREATED AND THE ORGANICS ARE DESTROYED DURING THE THERMAL TREATMENT PROCESS.

27. COMMENT;

HAS THE EQUIPMENT OR VENDER FOR THIS PROCESS BEEN SELECTED?

RESPONSE;

NO. THE BIDDING PROCESS WILL BE THE SAME AS THAT FOR THE REMEDIATION OF THE SOIL.

28. COMMENT;

HOW CAN WE BE CERTAIN THE PENTACHLOROPHENOL, DIOXIN AND POLYNUCLEAR AROMATIC HYDROCARBONS WILL BE DESTROYED IN THE INCINERATION PROCESS?

RESPONSE;

THE EPA HAS EXPERIENCE IN TREATING THESE TYPES OF WASTES AT OTHER SITES, LIKE TIMES BEACH (MISSOURI), LOVE CANAL (NEW YORK), AND DENNEY FARM (MISSOURI). THE TEST BURNS COMPLETED AT THESE SITES INDICATED THAT THE SOILS MET ALL APPROPRIATE GOALS. THE TRIAL BURN AT TEXARKANA

WOOD PRESERVING CO. SITE WILL BE REQUIRED TO HAVE 99.9999% REDUCTION OF DIOXIN IN THE STACK EMISSIONS, AND 99.99% REDUCTION OF PENTACHLOROPHENOL AND POLYNUCLEAR AROMATIC HYDROCARBONS IN THE STACK EMISSIONS. THE SOIL WILL BE REQUIRED TO BE AT, OR BELOW, THE HEALTH BASED CRITERIA, AND AT LEAST A 90% REDUCTION OF CONTAMINATION. ALL EPA'S EXPERIENCE WITH THE THERMAL DESTRUCTION INDICATES IT PROVIDES PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. FOR THIS REASON, INCINERATION IS CONSIDERED THE BEST DEMONSTRATED AVAILABLE TECHNOLOGY FOR THE DESTRUCTION OF DIOXIN.

29. COMMENT;

WHAT AIR EMISSIONS WILL BE RELEASED FROM THE STACK DURING OPERATION?

RESPONSE;

THE MAJOR CONSTITUENTS OF INCINERATOR STACK GASES ARE NITROGEN, CARBON DIOXIDE AND WATER VAPOR. OTHER COMMON CONSTITUENTS FOUND IN LESSER QUANTITIES ARE CARBON MONOXIDE, HYDROCHLORIC ACID AND UNBURNED HYDROCARBONS. THE MAJOR CONSTITUENTS OF THE UNBURNED HYDROCARBONS ARE LOW MOLECULAR WEIGHT HYDROCARBONS LIKE METHANE.

30. COMMENT;

ARE THERE ESTABLISHED INCINERATION EXHAUST LIMITS AS THERE ARE LEGALLY ESTABLISHED DRINKING WATER LIMITS?

RESPONSE;

YES. ONE OF THE LIMITS ESTABLISHED FOR INCINERATION IS BASED ON PERCENT REDUCTION OF THE CONTAMINATION (99.9999% FOR DIOXIN AND 99.99% FOR OTHER HAZARDOUS ORGANIC CONSTITUENTS). IN ADDITION EMISSIONS STANDARDS ARE BASED ON THE INCINERATOR DESIGN, PARTICULARLY STACK HEIGHT. THE TRIAL BURN WILL ESTABLISH OTHER PARAMETERS THAT ARE RELATED TO EMISSIONS (CARBON DIOXIDE, CARBON MONOXIDE, TEMPERATURE, AND CHAMBER TIME.

31. COMMENT;

IS THERE ANY OTHER RELIABLE TECHNOLOGY FOR THE TREATMENT OF DIOXIN CONTAINING WASTE?

RESPONSE;

AFTER YEARS OF RESEARCH, EPA HAS NOT YET FOUND AN ALTERNATIVE WITH THE SAME EFFECTIVENESS AND RELIABILITY. CHEMICAL TREATMENT TO DECHLORINATE DIOXIN IS THEORETICALLY POSSIBLE BY OUR TESTS, TO DATE, HAVE SHOWN IT TO COST AS MUCH OR MORE AS INCINERATION WITH LESS RELIABILITY. TESTS CONDUCTED HAVE SHOWN BIOTREATMENT TO BE EFFECTIVE IN THE FORESEEABLE FUTURE. INCINERATION IS THEREFORE THE TECHNIQUE OF CHOICE FOR DIOXIN.

32. COMMENT;

IS THERE ANY RESEARCH GOING ON TO FIND AN ALTERNATIVE TO INCINERATION?

RESPONSE;

YES, THERE IS RESEARCH TO DEVELOP NEW ALTERNATIVES TO REMEDIATE MOST ALL TYPES OF CONTAMINATION. AS MENTIONED IN QUESTION NUMBER 31, THESE INCLUDE CHEMICAL DECHLORINATION AND BIOLOGICAL TREATMENT.

33. COMMENT;

WHAT WILL HAPPEN WITH THE INCINERATOR ASH?

RESPONSE;

THE ASH WILL BE TESTED FOR HAZARDOUS CONSTITUENTS. ONCE THE ASH IS PROVEN NOT TO HAVE CONTAMINATION ABOVE THE HEALTH BASED GOALS, IT WILL BE BACKFILLED ON THE SITE. IF THE ASH IS STILL FOUND TO CONTAIN HAZARDOUS MATERIAL, IT WILL BE RETREATED. IF METAL CONTAMINATION IS

FOUND, THE ASH WILL BE PLACED IN A HAZARDOUS WASTE LANDFILL, OR SOLIDIFIED.

34. COMMENT;

IS AN ENVIRONMENTAL IMPACT STATEMENT REQUIRED FOR THE REMEDIATION PROCESS?

RESPONSE;

NO, AN ENVIRONMENTAL IMPACT STATEMENT IS NOT REQUIRED. SUPERFUND REMEDIES ARE REQUIRED TO MEET ALL APPLICABLE AND RELEVANT AND APPROPRIATE REQUIREMENTS, THEREFORE, AN ENVIRONMENTAL IMPACT STATEMENT IS NOT REQUIRED.

35. COMMENT;

HAS INCINERATION BEEN USED AT OTHER DIOXIN CONTAMINATED SITES? IS THERE A REPORT ABOUT HOW INCINERATION HAS WORKED AT THESE OTHER SITES? HOW MAY I GET A COPY OF THE REPORT?

RESPONSE;

THERMAL DESTRUCTION HAS BEEN SHOWN EFFECTIVE AT TIMES BEACH (MISSOURI, REGION 7), LOVE CANAL, (NEW YORK, REGION 2), AND DENNEY FARM (MISSOURI, REGION 7). COPIES OF THE REPORTS MAY BE OBTAINED FROM THE EPA REGIONAL OFFICES. REGION 2, JACOB K. JAVITZ FEDERAL BUILDING, 26 FEDERAL PLAZA, NEW YORK, NEW YORK 10278. REGION 7, 726 MINNESOTA AVENUE, KANSAS CITY, KS 66101.

36. COMMENT;

WHERE ANY OF THESE FULL SCALE INCINERATORS?

RESPONSE;

YES, A FULL SCALE INCINERATOR WAS SET UP AT DENNEY FARM.

37. COMMENT;

WHO WILL BE FINANCIALLY LIABLE FOR INJURIES, SICKNESS, OR DEATH BY THE AIR POLLUTION CAUSED BY THE INCINERATION?

RESPONSE;

THE BUILT IN MONITORING SYSTEM WILL NOT ALLOW THE INCINERATOR TO OPERATE OUTSIDE THE GOALS ESTABLISHED HEALTH BASED GOALS, THEREFORE, INJURIES, SICKNESSES OR DEATH WILL NOT BE CAUSED. LIABILITY FOR DAMAGES WHICH OCCUR UNDER GOVERNMENT CONTRACTS IS DETERMINED BY FEDERAL STATUTE. ALTHOUGH THE STATE OF TEXAS IS THE LEAD AGENCY IN THIS ACTION, THE GOVERNING LAW WILL STILL BE FEDERAL RATHER THAN STATE LAW. CONGRESS INCLUDED IN THE SUPERFUND STATUTE PROVISIONS FOR CONTRACTOR LIABILITY FOR DAMAGES WHICH OCCUR DURING REMEDIAL ACTIONS, 42 USC SECTION 9619.

UNDER NORMAL CONDITIONS THE CONTRACTOR WHO IS PERFORMING THE REMEDY WILL BE RESPONSIBLE FOR DAMAGES DONE TO FOUNDATIONS BY IMMEDIATELY ADJACENT EXCAVATION WORK, AND CAN OBTAIN INSURANCE TO COVER SUCH A POSSIBILITY. WHETHER OR NOT THE CONTRACTOR IS FOUND TO BE LIABLE OR WHETHER LIABILITY MAY BE BORN BY THE UNITED STATES OR THE STATE OF TEXAS MAY RELY, HOWEVER, ON THE APPLICATION OF THE STATUTE AND ON DETERMINATIONS OF NEGLIGENCE, GROSS NEGLIGENCE, OR WILLFUL CONDUCT ON THE PART OF THE CONTRACTOR. THESE DETERMINATIONS MAY IN TURN BE BASED ON WHETHER THE CONTRACTOR IS FOLLOWING THE CONSTRUCTION SPECIFICATIONS AT THE TIME THE DAMAGE OCCURS. THERE IS NO BLANKET INDEMNITY BY ANY PARTY AND LIABILITY WILL HAVE TO BE DETERMINED IN EACH CASE ACCORDING TO THE FACTS.

38. COMMENT;

HOW DID THE TEXAS WATER COMMISSION GET SELECTED AS THE LEAD AGENCY FOR THIS SITE?

RESPONSE;

THE GOVERNOR OF TEXAS DESIGNATED THE TEXAS WATER COMMISSION AS THE LEAD AGENCY FOR SUPERFUND

ACTIVITIES IN TEXAS.

39. COMMENT;

CAN THE INCINERATOR BE USED TO REMEDIATE BOTH THE TEXARKANA WOOD PRESERVING CO. SITE AND THE KOPPERS TEXARKANA SITE?

RESPONSE;

INCINERATION IS NOT THE SELECTED REMEDY FOR THE WASTE AT THE KOPPERS TEXARKANA SITE. THEREFORE, INCINERATION OF THE KOPPERS WASTE AT THE TEXARKANA WOOD PRESERVING SITE HAS NOT BEEN CONSIDERED.

40. COMMENT;

THE COSTS FOR THE REMEDIES EVALUATED FOR THE SITE APPEAR TO BE SKEWED IN FAVOR OF A REMEDY THAT CANNOT ASSURE DESTRUCTION OF THE MOST TOXIC CONSTITUENTS, BIOLOGICAL TREATMENT WITH SOLIDIFICATION OF ORGANICS, AND MAKES THE MOST ENVIRONMENTALLY PROTECTIVE OPTION, INCINERATION, APPEAR TO BE FAR MORE EXPENSIVE THAN IT ACTUALLY IS.

RESPONSE;

ALL THE COSTS DETERMINED FOR THE CONSIDERED ALTERNATIVES WERE DETERMINED BY THE SAME TECHNIQUE AND ARE THEREFORE COMPARABLE. ALL ALTERNATIVES WERE EVALUATED IN THE SAME WAY. AS STATED IN THE RECORD OF DECISION, THE COSTS ARE ESTIMATED TO BE WITHIN -30% TO +50%. THE PRIMARY CRITERIA EVALUATED IN THE SELECTION OF A REMEDY ARE OVERALL PROTECTION TO HUMAN HEALTH AND THE ENVIRONMENT AND ATTAINMENT OF APPLICABLE OR RELEVANT AND APPROPRIATE REGULATIONS, NOT COST. IT WAS, IN FACT, THERMAL DESTRUCTION RATING OF ABILITY TO ACHIEVE THESE TWO PRIMARY CRITERIA THAT PROMPTED THE AGENCY TO SELECT IT AS THE SELECTED REMEDY.

41. COMMENT;

HOW OFTEN AND HOW MANY YEARS SHOULD THE MONITORING WELLS AT THE KOPPERS TEXARKANA SITE BE SAMPLED?

RESPONSE;

THE MONITORING WELLS WILL BE SAMPLED DURING THE REMEDIAL ACTION. THE FREQUENCY AND DURATION FOR SAMPLING THE GROUND WATER WILL BE DETERMINED DURING THE REMEDIAL DESIGN.

42. COMMENT;

WILL THE VEGETATION ON THE KOPPERS TEXARKANA SITE EVER BE CUT?

RESPONSE;

THERE ARE TWO SEPARATE AREAS OF CONCERN AT THE KOPPERS SITE, THEY ARE; 1) THE CARVER TERRACE SUBDIVISION, AND 2) THE KENNEDY SAND AND GRAVEL POT AREA. THE YARDS IN THE CARVER TERRACE SUBDIVISION ARE MAINTAINED ON A REGULAR BASIS BY THE RESIDENTS. A MAINTENANCE PROGRAM DOES NOT EXIST FOR THE KENNEDY SAND AND GRAVEL PIT PROPERTY. EPA HAS NOTIFIED CITY OFFICIALS THAT THIS AGENCY HAS NO OBJECTION TO THE CITY MAINTAINING THE OVERGROWN VEGETATION ON THIS SITE. SINCE THIS NOTIFICATION, EPA HAS BEEN INFORMED BY A CITY OFFICIAL THAT PLANS HAVE BEEN DEVELOPED TO MAINTAIN THIS AREA, AND WILL BE IMPLEMENTED IN THE NEAR FUTURE.

TABLE 1

**BASELINE SCENARIO
TOTAL RISK(1)**

CHEMICAL	RECEPTOR	RFD(2)	SF(3)
PAHS	WORKER	1.2 X 10(-3)	11.5
DIOXIN/FURAN	WORKER	1.0 X 10(-9)	1.56 X 10(+5)
PENTACHLOROPHENOL	WORKER	3.0 X 10(-2)	
PAHS	TRESPASSER	1.2 X 10(-3)	11.5
DIOXIN/FURAN	TRESPASSER	1.0 X 10(-9)	1.56 X 10(+5)
PENTACHLOROPHENOL	TRESPASSER	3.0 X 10(-2)	
CHEMICAL	RECEPTOR	HI(3)	RISK
PAHS	WORKER	1.21 X 10(+1)	1 X 10(-2)
DIOXIN/FURAN	WORKER	1.05 X 10(+1)	9 X 10(-4)
PENTACHLOROPHENOL	WORKER	2.78 X 10(-1)	
PAHS	TRESPASSER	6.16 X 10(+1)	4 X 10(-5)
DIOXIN/FURAN	TRESPASSER	2.18 X 10(+1)	2 X 10(-6)
PENTACHLOROPHENOL	TRESPASSER	1.12 X 10(0)	

1. THE "TOTAL RISK" IS BASED ON INGESTION OF SOIL/SLUDGE/SEDIMENT, INGESTION OF WATER, DERMAL SOIL CONTACT, AND SOIL INHALATION.
2. REFERENCE DOSE (MG/KG/DAY). THE REFERENCES OF THE REFERENCE DOSES ARE AVAILABLE IN THE RISK ASSESSMENT PORTION OF THE FEASIBILITY STUDY.
3. SLOE FACTOR (MG/KG/DAY)(-1). THE REFERENCES OF THE SLOPE FACTORS ARE AVAILABLE IN THE RISK ASSESSMENT PORTION OF THE FEASIBLILTY STUDY.

TABLE 2

TEXARKANA WOOD PRESERVING COMPANY
 RELATIVE POTENCY FACTORS
 FOR CARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBON
 (AS BENZO (A) PYRENE)

COMPOUNDS	RELATIVE POTENCY
BENZO(A)PYRENE	1.0
DIBENZO(A,H)ANTHRACENE	0.069
BENZO(B)FLUORANTHENE	0.08
INDENO(1,2,3-C,D)PYRENE	0.0171
BENZO(A)ANTHRACENE	0.0134
BENZO(G,H,I)PERYLENE	0.01
BENZO(K)FLUORANTHENE	0.044
CHRYSENE	0.0012

TABLE 3

1989 EPA 2,3,7,8-TCDD TOXICITY EQUIVALENCY FACTORS

ISOMER	PROPORTIONALITY FACTOR	1989 TEF	EXAMPLE CALCULATION
2,3,7,8 TCDD	.05	1	(TOTAL TCDD) X (0.05) =
OTHER TCDD	0.95	0	
2,3,7,8-PECDD	0.07	0.5	(TOTAL PECDD) X (0.035) =
OTHER PECDD	0.93	0	
2,3,7,8-HXCDD	0.3	0.1	(TOTAL HXDCC) X (0.03) =
OTHER HXCDD	0.5	0	
2,3,7,8-HPCDD	0.5	0.01	(TOTAL HPCDD) X (0.005) =
OTHER HPCDD	0.5	0	
OCDD	1	0.001	(OCDD) X (0.001) =
2,3,7,8-TCDF	0.03	0.1	(TOTAL TCDF) X (0.003) =
OTHER TCDF	0.97	0	
1,2,3,7,8-PCDF	0.04	0.05	(TOTAL PCDF) X (0.002) =
2,3,4,7,8-PCDF	0.04	0.05	(TOTAL PCDF) X (0.002) =
OTHER PCDF	0.92	0	
2,3,7,8-HXCDF	0.25	0.1	(TOTAL HXCDF) X (0.025) =
OTHER HXCDF	0.75	0	
2,3,7,8-HPCDF	0.5	0.01	(TOTAL HPCDF) X (0.005) =
OTHER HPCDF	0.5	0	
OCDF	1	0.001	(OCDF) X (0.001) =
ADDITIVE TOTAL = 2,3,7,8 TCDD EQUIVALENT			

TABLE 6
COST ANALYSIS
(MILLIONS DOLLARS)

ALTERNATIVE	PRESENT WORTH	CAPITAL COST	TOTAL OPERATIONAL MAINTENANCE
ALTERNATIVE A-1	.68	.21	.47
ALTERNATIVE A-2	7.3	6.9	.43
ALTERNATIVE A-3	43.1	42.0	.06
ALTERNATIVE A-4	34.6-48.4	34.5-48.3	.08
ALTERNATIVE A-5	8.8	8.4	.43
ALTERNATIVE A-6	6.4	6.3	.12
ALTERNATIVE A-7	191.2	191.2	.04
ALTERNATIVE B-1	4.3	3.1	1.2
ALTERNATIVE B-2	4.4	3.4	1.0
ALTERNATIVE B-3	8.5	7.0	1.5