

**EPA Superfund
Record of Decision:**

**LASKIN/POPLAR OIL CO.
EPA ID: OHD061722211
OU 01
JEFFERSON TOWNSHIP, OH
06/29/1989**

\$11,000,000.00

* ESTIMATED TIME TO COMPLETE: 2 YEARS

#DE

DECLARATION

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINS FEDERAL AND STATE REQUIREMENTS THAT ARE APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION, AND IS COST-EFFECTIVE. THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE FOR THIS SITE. TREATMENT IS NOT A MAJOR COMPONENT OF THIS REMEDY, AS THERMAL TREATMENT OF APPROXIMATELY 300 CUBIC YARDS OF DIOXIN-CONTAMINATED MATERIAL IS THE ONLY TREATMENT COMPONENT OF THE REMEDY. THE 1987 SOURCE REMOVAL OPERABLE UNIT DOES ADDRESS THE PRINCIPAL THREAT POSED BY THE SITE THROUGH THERMAL TREATMENT OF CONTAMINATED SOURCE MATERIALS. THE PRINCIPAL THREATS ARE CONSIDERED TO BE THE WASTE OIL, SLUDGE, AND SATURATED SOILS NEAR THE PITS AND TANKS (APPROXIMATELY 5,000 C.Y.), WHICH WILL BE THERMALLY TREATED ON-SITE UNDER THE SOURCE REMOVAL OPERABLE UNIT. THE COMBINATION OF THE TWO REMEDIAL ACTIONS SATISFY THE STATUTORY PREFERENCE FOR TREATMENT AS THE PRINCIPAL ELEMENT OF THE FINAL REMEDY. THE REMEDY ALSO WILL REDUCE THE VOLUME, TOXICITY, AND MOBILITY OF HAZARDOUS SUBSTANCES PRESENT AT THE SITE.

BECAUSE THIS REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ON-SITE, A REVIEW WILL BE CONDUCTED WITHIN FIVE YEARS AFTER COMMENCEMENT OF REMEDIAL ACTION TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT.

DATE

VALDAS V. ADAMKUS, REGIONAL ADMINISTRATOR
US ENVIRONMENTAL PROTECTION AGENCY, REGION V

#SNLD

1.0 SITE NAME, LOCATION, AND DESCRIPTION

THE LASKIN POPLAR OIL SITE IS 50 MILES NORTHEAST OF CLEVELAND, IN ASHTABULA COUNTY, JEFFERSON TOWNSHIP, OHIO, WEST OF THE VILLAGE OF JEFFERSON (ESTIMATED POPULATION 3,012 IN 1986). IT IS SOUTHWEST OF THE INTERSECTION OF OHIO ROUTE 307 AND POPLAR STREET, AND IMMEDIATELY SOUTH OF CEMETERY CREEK (FIGURE 1-1).

THE PREDOMINANT DEVELOPED LAND USES ADJACENT TO THE SITE ARE RECREATIONAL AND RESIDENTIAL. THE SITE IS BOUNDED ON THE NORTH BY A WOODED RAVINE THROUGH WHICH CEMETERY CREEK FLOWS AND THE OLD POPLAR STREET RIGHT-OF-WAY; ON THE SOUTH BY OPEN FIELDS, A HORSE SHOW ARENA, AND VIEWING STANDS OF THE ASHTABULA COUNTY FAIRGROUNDS; ON THE WEST BY A WOODED AREA AND SOFTBALL FIELDS; AND ON THE EAST BY POPLAR STREET AND THE COUNTY FAIRGROUNDS (FIGURE 1-2). EAST OF POPLAR STREET, IN THE FAIRGROUNDS, IS A HORSE RACETRACK. ALTHOUGH MOST OF THE RECREATIONAL FACILITIES ARE LIMITED TO USE DURING THE SUMMER, A CERTAIN AMOUNT OF ACTIVITY OCCURS YEAR ROUND, ESPECIALLY IN RELATION TO OPERATION OF THE RACETRACK AND HORSE STABLES.

SEVERAL RESIDENTIAL PROPERTIES ARE LOCATED NORTH OF THE LASKIN POPLAR OIL SITE ALONG STATE HIGHWAY 307. WATER FOR ALL HOMES WITHIN 0.5 MILE OF THE SITE IS OBTAINED THROUGH THE OHIO WATER SERVICE, A PRIVATE WATER FACILITY.

THE 9-ACRE SITE CONTAINS THE RESIDENCE OF THE PROPERTY OWNER (MR. ALVIN LASKIN), A GREENHOUSE COMPLEX, A BOILER HOUSE/GARAGE CONTAINING 4 BOILERS FORMERLY USED TO HEAT THE GREENHOUSES, A SMOKESTACK, 4 IN-GROUND OIL STORAGE PITS (2 OF WHICH HAVE BEEN FILLED IN PREVIOUS RESPONSE ACTIONS), 1 UNDER-GROUND AND 32 ABOVEGROUND STORAGE TANKS, A RETENTION POND, A FRESHWATER POND, 2 DRAINED PONDS (PONDS 18 AND 19), AND MISCELLANEOUS SMALL BUILDINGS AND SHEDS. THREE SMALL TREATMENT PONDS CONSTRUCTED BY THE US EPA CONTRACTORS DURING EMERGENCY ACTIONS ARE AT THE BOTTOM OF THE SOUTH SLOPE OF CEMETERY CREEK AND NORTH OF THE RETENTION POND.

LOCAL STRATIGRAPHY CONSISTS OF TILL OVERLYING SHALE BEDROCK. THE SHALE IS WEATHERED TO A DEPTH OF APPROXIMATELY 8 FEET. AT THE LASKIN POPLAR OIL SITE, GROUNDWATER IN THE SURFICIAL AQUIFER FLOWS IN THE WEATHERED SHALE, TILL, AND OVERBURDEN SOIL AND DISCHARGES AT CEMETERY CREEK. GROUNDWATER FLOW IN THE UNWEATHERED SHALE IS SLOW. ON-SITE PONDS ARE HYDRAULICALLY CONNECTED TO THE GROUNDWATER. GROUNDWATER FLOWS OUT OF THE PONDS AT A STEEP GRADIENT IN THE EARTHEN DIKES ON THE DOWNGRADIENT SIDE OF THE PONDS. THE ON-SITE PITS AND TANKS ARE ABOVE THE WATER TABLE. MUCH OF THE SITE SURFACE CONSISTS OF FILL MATERIAL.

SURFACE ELEVATIONS AT OR NEAR THE SITE RANGE FROM 855 TO 925 FEET ABOVE MEAN SEA LEVEL (MSL), WITH ELEVATIONS NEAR THE FRESHWATER POND AND TANKS RANGING FROM 915 TO 925 FEET MSL. THE LOWER PLATEAU, CONTAINING THE RETENTION POND, IS RELATIVELY FLAT WITH ELEVATIONS APPROXIMATELY 10 TO 20 FEET LOWER THAN THE AREA OF THE PITS AND TANKS. NORTH OF THE RETENTION POND, THE SITE SLOPES STEEPLY DOWNWARD TOWARD CEMETERY CREEK.

#SHEA

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE GREENHOUSES ON THE LASKIN POPLAR OIL SITE WERE IN OPERATION FOR APPROXIMATELY 80 YEARS, BEGINNING IN THE EARLY 1890S. IN THE 1950S, BOILERS WERE INSTALLED TO HEAT THE GREENHOUSES. STORAGE PITS AND TANKS WERE INSTALLED DURING THE 1960S TO STORE THE OIL THAT FIRED THE BOILERS, AND THE POPLAR OIL COMPANY CONTINUED TO ACCEPT WASTE OIL DURING THE 1960S AND 1970S. THE COMPANY RESOLD SOME OF THE WASTE OIL AND OILED GRAVEL AND DIRT ROADS IN 17 TOWNSHIPS OF ASHTABULA COUNTY. IN 1977, THE US EPA AND OEPA IDENTIFIED PCBS IN THE WASTE OIL. IN 1981, A COURT ORDER STOPPED ACTIVITIES AT THE LASKIN POPLAR OIL COMPANY.

IN EARLY 1981, THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (US EPA) CONDUCTED AN INVESTIGATION AT THE SITE AND DETECTED POLYCHLORINATED BIPHENYLS (PCBS) IN GROUNDWATER AND SOILS. IN 1981 AND 1982, THE US EPA PERFORMED SEVERAL EMERGENCY ACTIONS AT THE SITE. THE EMERGENCY ACTIONS INCLUDED THE FOLLOWING: TWO PONDS, 18 AND 19, WERE DRAINED AND REGRADED; SURFACE RUNOFF WAS DIVERTED TO A RETENTION POND TO PREVENT FLOODING; 302,000 GALLONS OF WASTE OIL WAS REMOVED AND TAKEN TO AN OFF-SITE INCINERATOR; 430,000 GALLONS OF CONTAMINATED SURFACE WATER WAS TREATED AND DISCHARGED OFF-SITE; AND 205,000 GALLONS OF SLUDGE WAS SOLIDIFIED.

IN 1983 THE SITE WAS PLACED ON THE US EPA'S SUPERFUND NATIONAL PRIORITIES LIST (NPL) OF UNCONTROLLED HAZARDOUS WASTE SITES. THE US EPA IS THE LEAD AGENCY RESPONSIBLE FOR MANAGING THE INVESTIGATION AND REMEDIATION OF THE LASKIN POPLAR OIL SITE. THE OHIO ENVIRONMENTAL PROTECTION AGENCY (OEPA) IS THE SUPPORT AGENCY FOR THE LASKIN POPLAR OIL SUPERFUND ACTIVITIES.

REMEDIAL INVESTIGATION (RI) ACTIVITIES WERE CONDUCTED FROM DECEMBER 1983 TO NOVEMBER 1984. ACTIVITIES INCLUDED SAMPLING OF SOILS, SEDIMENTS, OILED ROAD SURFACES, SURFACE WATER, BOILER AND SMOKESTACK; INSTALLATION OF MONITORING WELLS, AND SAMPLING OF GROUNDWATER. THE ACTIVITIES WERE PART OF THE PHASE I RI AT THE SITE. DURING THE WINTER OF 1985-1986, THE POTENTIALLY RESPONSIBLE PARTIES (PRPS) REMOVED APPROXIMATELY 250,000 GALLONS OF WASTE OIL AND WASTE WATER, IN RESPONSE TO AN ADMINISTRATIVE ORDER ISSUED IN AUGUST 1984.

A SECOND ADMINISTRATIVE ORDER WAS ISSUED TO THE PRPS IN LATE 1986, ORDERING THEM TO DEVELOP A WORK PLAN TO ADDRESS THE STORAGE PITS, TANKS, AND THEIR CONTENTS, AND SOILS SURROUNDING THE PITS AND TANKS. A THIRD ADMINISTRATIVE ORDER ISSUED IN FEBRUARY 1988 ORDERED THE PRPS TO INCINERATE THE MATERIALS IN THE PITS, TANKS, AND A PORTION OF THE MOST HEAVILY CONTAMINATED SOIL. THE PRPS ARE CURRENTLY DEVELOPING A DESIGN FOR THE US EPA'S REVIEW AND APPROVAL OF THIS WORK.

A PHASE II RI WAS CONDUCTED IN FALL AND WINTER OF 1987-1988. WORK INCLUDED GEOPHYSICAL STUDIES; BATHYMETRIC SURVEYS; INSTALLATION OF MONITORING WELLS, AND; SAMPLING OF GROUNDWATER, SURFACE WATER, SOILS, AND SEDIMENTS. THE RESULTS OF THE RI ARE BRIEFLY DISCUSSED LATER IN THIS DOCUMENT.

FOLLOWING COMPLETION OF THE RI, A FEASIBILITY STUDY (FS) WAS PREPARED WHICH PRESENTED AN ARRAY OF ALTERNATIVES TO ADDRESS SITE CONTAMINATION. EIGHT ALTERNATIVES FOR THE LASKIN POPLAR OIL SITE WERE EVALUATED BY THE US EPA. BASED ON THE US EPA'S EVALUATION, A PREFERRED ALTERNATIVE WAS PROPOSED AND PRESENTED TO THE PUBLIC FOR REVIEW AND COMMENT. THE PROPOSED ALTERNATIVE WAS DOCUMENTED THROUGH A PROPOSED PLAN AND PRESENTED AT A PUBLIC MEETING ON APRIL 26, 1989 IN JEFFERSON, OHIO. THIS RECORD OF DECISION (ROD) DOCUMENTS THE US EPA'S CHOICE OF THAT PREFERRED ALTERNATIVE.

ON APRIL 19, 1989, THE US EPA SENT A SPECIAL NOTICE LETTER TO A NUMBER OF PRPS. THIS LETTER NOTIFIED THE PRPS OF THEIR LIABILITY AND RESPONSIBILITY IN CONDUCTING THE DESIGN AND IMPLEMENTATION OF THE US EPA'S PREFERRED REMEDIAL ALTERNATIVE FOR THE LASKIN POPLAR OIL SITE. TECHNICAL DISCUSSIONS BETWEEN THE US EPA AND THE PRPS HAVE INDICATED THE PRPS APPEAR TO BE INTERESTED IN CARRYING OUT THE SELECTED ALTERNATIVE.

THE US EPA HELD AN ORGANIZATIONAL MEETING ON MAY 10, 1989, IN CLEVELAND, OHIO, WITH REPRESENTATIVES OF THE PRPS, THE UNITED STATES DEPARTMENT OF JUSTICE (DOJ), THE OEPA, AND THE US EPA IN ATTENDANCE. AT THAT MEETING, PRP RESPONSIBILITIES UNDER CERCLA SECTION 122 WERE DISCUSSED AND THE PRPS WERE ENCOURAGED TO ORGANIZE INTO A GROUP TO PROMOTE EFFICIENCY IN COMPLETING THE REMEDIAL DESIGN/REMEDIAL ACTION (RD/RA) NEGOTIATIONS.

#CRH

3.0 COMMUNITY RELATIONS HISTORY

THE US EPA HAS CONDUCTED A COMMUNITY RELATIONS PROGRAM TO KEEP THE PUBLIC INFORMED OF PROGRESS DURING THE RI/FS FOR THE LASKIN POPLAR OIL SITE AND TO DISCUSS UPCOMING EVENTS. THE RI WAS RELEASED TO THE PUBLIC IN DECEMBER, 1988, AND THE FS AND PROPOSED PLAN WERE RELEASED IN APRIL, 1989. THE US EPA PROVIDED THE PUBLIC WITH AN OPPORTUNITY TO COMMENT ON THE US EPA'S PREFERRED ALTERNATIVE AND THE OTHER ALTERNATIVES PRESENTED IN THE FEASIBILITY STUDY DURING A 30 DAY PUBLIC COMMENT PERIOD FROM APRIL 12 TO MAY 12, 1989. DURING THIS TIME PERIOD, INTERESTED INDIVIDUALS WERE ENCOURAGED TO REVIEW THE FS AND PROPOSED PLAN AND SEND WRITTEN COMMENTS TO THE US EPA. INDIVIDUALS WERE ALSO ENCOURAGED TO REVIEW THE ADMINISTRATIVE RECORD FOR THE SITE LOCATED AT THE COUNTY DISASTER SERVICE OFFICES, IN THE ASHTABULA COUNTY COURTHOUSE, 25 WEST JEFFERSON STREET, JEFFERSON, OHIO; AND THE ASHTABULA COUNTY DISTRICT LIBRARY, 335 WEST 44TH STREET, ASHTABULA COUNTY, OHIO. ALL FORMAL REPORTS DEVELOPED BY THE US EPA ARE AVAILABLE AT THESE LOCATIONS.

NOTIFICATION OF THE AVAILABILITY OF THE DOCUMENTS WAS PUBLISHED IN THE FOLLOWING NEWSPAPERS ON THE DATES INDICATED:

THE ASHTABULA COUNTY SENTINEL - APRIL 17, 24;

THE JEFFERSON GAZETTE - APRIL 20;

THE VALLEY NEWS - APRIL 12, 19;

THE PYMA NEWS - APRIL 12, 19.

IN ADDITION TO THE FORMAL REPORTS, THE US EPA DISTRIBUTED SUMMARY FACT SHEETS ON THE SOURCE REMOVAL OPERABLE UNIT (AUGUST, 1987), REMEDIAL INVESTIGATION (MARCH, 1989), AND THE FEASIBILITY STUDY (APRIL, 1989).

ON APRIL 26, 1989, THE US EPA HELD A FORMAL PUBLIC MEETING AT THE ASHTABULA COUNTY COURTHOUSE IN JEFFERSON, OHIO. DURING THE MEETING, THE US EPA MADE PRESENTATIONS TO THE COMMUNITY ON TOPICS SUCH AS: SAMPLING RESULTS FOR SOIL, GROUND WATER, SURFACE WATER, AND SEDIMENT; RISK ASSESSMENT RESULTS; THE SOURCE REMOVAL OPERABLE UNIT; THE REMEDIAL ACTION GOALS; THE REMEDIAL ALTERNATIVES DEVELOPED IN THE FS; AND THE US EPA'S PREFERRED ALTERNATIVE. FOLLOWING THE PRESENTATIONS, THE US EPA ANSWERED QUESTIONS FROM INTERESTED PARTIES PRESENT AT THE MEETING.

A TRANSCRIPT OF THIS MEETING IS INCLUDED AS PART OF THE ADMINISTRATIVE RECORD (SEE ADMINISTRATIVE RECORD INDEX, ATTACHED AS APPENDIX A) FOR THE LASKIN POPLAR OIL SITE. THE US EPA'S RESPONSES TO COMMENTS RECEIVED DURING THIS PUBLIC MEETING AND TO WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD ARE INCLUDED IN THE RESPONSIVENESS SUMMARY ATTACHED TO THIS DOCUMENT.

THIS DECISION DOCUMENT PRESENTS THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY'S (US EPA'S) SELECTED REMEDIAL ACTION FOR THE LASKIN POPLAR OIL SITE LOCATED IN JEFFERSON, OHIO. THIS DECISION DOCUMENT WAS DEVELOPED IN ACCORDANCE WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA), AND TO THE EXTENT PRACTICABLE, THE NATIONAL CONTINGENCY PLAN (NCP). THIS DECISION IS BASED ON INFORMATION AND DOCUMENTS CONTAINED IN THE ADMINISTRATIVE RECORD FOR THIS SITE.

#ROURA

4.0 RELATIONSHIP TO THE OPERABLE UNIT OR RESPONSE ACTION

THE PROBLEMS AT THE LASKIN POPLAR OIL SITE ARE COMPLEX. AS A RESULT, THE US EPA ORGANIZED THE WORK INTO TWO OPERABLE UNITS (OUS). THE SOURCE REMOVAL OPERABLE UNIT (SROU) AND THE FINAL OPERABLE UNIT. CONTAMINANTS ADDRESSED BY THESE TWO OPERABLE UNITS ARE:

- * SROU: ADDRESSES 6,000 GALLONS OF RESIDUAL OIL, 60,000 RESIDUAL GALLONS OF WASTEWATER, 700,000 GALLONS OF PUMPABLE AND NONPUMPABLE SLUDGES, AND 5,000 CUBIC YARDS (C.Y.) OF CONTAMINATED SOIL.

- * FINAL OU: ADDRESSES EXPOSURE TO CONTAMINATED SOILS SPREAD THROUGHOUT THE SITE, AND IN THE BOILER HOUSE AND GREENHOUSE AREAS; DIOXIN-CONTAMINATED DEBRIS; AND GROUNDWATER DIRECTLY BENEATH THE SITE (CHIEFLY UNDERNEATH PONDS 18 AND 19).

THE US EPA HAS ALREADY SELECTED A REMEDY FOR THE SROU. THE PRPS ARE CURRENTLY IN COMPLIANCE WITH THE DESIGN PORTION OF AN ADMINISTRATIVE ORDER TO DESIGN AND IMPLEMENT A REMEDY FOR THE MATERIALS ADDRESSED IN THE SROU. THIS RECORD OF DECISION (ROD) DOCUMENTS A REMEDY CONSISTENT WITH THE SROU REMEDY. THIS FINAL ROD, IN COMBINATION WITH THE SROU, ADDRESSES ALL THE CONTAMINATED MATERIALS ON-SITE.

#SC

5.0 SITE CHARACTERISTICS

THE RI CONSISTED OF ON-SITE SCIENTIFIC STUDIES AND LABORATORY ANALYSES TO DETERMINE THE NATURE AND EXTENT OF CONTAMINATION AT THE SITE AND AFFECTED AREAS. DURING THE RI SAMPLES WERE TAKEN FROM SURFACE AND SUB-SURFACE SOILS; SURFACE WATER; SEDIMENTS; GROUNDWATER; RESIDENTIAL WELLS; AND SOILS, ASH, AND DEBRIS FROM INSIDE THE

BOILER HOUSE. THE RI REPORT FOR THE LASKIN POPLAR OIL SITE WAS COMPLETED IN DECEMBER 1988. THE RESULTS OF THE RI ARE SUMMARIZED BELOW.

CONTAMINATION AND AFFECTED MEDIA:

EIGHTY-TWO ORGANIC CHEMICALS AND TWENTY-FOUR INORGANIC CHEMICALS ON THE US EPA'S HAZARDOUS SUBSTANCES LIST (HSL) WERE DETECTED IN THE VARIOUS MEDIA AT THE SITE (TABLE 5-1). THE ORGANIC SUBSTANCES WERE GROUPED BY ANALYTICAL CLASS (VOCS, SEMIVOLATILE ORGANIC COMPOUNDS, PESTICIDES, PCBS). INORGANIC SUBSTANCES WERE EVALUATED INDIVIDUALLY, SINCE THEY DO NOT EXHIBIT THE FUNCTIONAL SIMILARITIES OF ORGANIC CHEMICALS. THE CHEMICALS AND THEIR ASSOCIATED CHARACTERISTICS ARE LISTED IN TABLE 5-2.

5.1 GROUNDWATER

THE NATURE AND EXTENT OF GROUNDWATER CONTAMINATION WAS DEFINED AT THE SITE (FIGURE 5-1). THE STUDY IDENTIFIED TWO AQUIFERS BENEATH THE SITE THAT FLOW NORTH TOWARDS THE CEMETERY CREEK. THE SHALLOW AQUIFER IS COMPOSED OF COMBINED FILL/TILL AND BROKEN SHALE. THE DEEPER AQUIFER IS CHARACTERIZED BY UNBROKEN SHALE. THE TWO AQUIFERS APPEAR TO BE POORLY CONNECTED, WITH LITTLE FLOW EVIDENT FROM THE SHALLOW AQUIFER INTO THE DEEPER AQUIFER. THE ESTIMATED VOLUME OF CONTAMINATED GROUNDWATER IN THE AQUIFER PRESENTING AN UNACCEPTABLE RISK (BASED ON 10% POROSITY) IS 650,000 GALLONS.

GROUNDWATER CONTAMINATION WAS DETECTED IN THE SHALLOW AQUIFER BENEATH POND 19. HALOGENATED ALKANES, KETONES, AND POLYNUCLEAR AROMATIC HYDROCARBONS (PAHS) WERE DETECTED IN THE SHALLOW AQUIFER.

ORGANIC CONTAMINANTS WERE DETECTED AT LOW LEVELS (LESS THAN 30 UG/L) DOWNGRADIENT BETWEEN THE SITE AND CEMETERY CREEK. GROUNDWATER COLLECTED UPGRADIENT OF THE SITE CONTAINED NO DETECTABLE CONCENTRATIONS OF HSL ORGANIC COMPOUNDS. SEVERAL HSL ORGANIC COMPOUNDS WERE DETECTED IN THE DEEP AQUIFER GROUNDWATER AT LOW CONCENTRATIONS (LESS THAN 10 UG/L). HOWEVER, THE OCCURRENCE WAS SPORADIC AND THE CONTAMINANTS ARE THOUGHT TO BE THE RESULT OF LABORATORY OR BOTTLE CONTAMINATION. GROUNDWATER IN THE DEEPER AQUIFER DOES NOT APPEAR TO BE SIGNIFICANTLY CONTAMINATED. ANALYTICAL RESULTS INDICATE THAT THE RESIDENTIAL WELLS NEAR THE SITE HAVE NOT BEEN AFFECTED BY SITE GROUNDWATER CONTAMINATION.

5.2 SURFACE WATER AND SEDIMENT

SURFACE WATER ANALYTICAL RESULTS FROM THE ON-SITE RETENTION POND AND FRESH WATER POND DID NOT DETECT CONTAMINANT CONCENTRATIONS ABOVE ANY WATER QUALITY STANDARDS. SAMPLING INDICATED SEDIMENTS FROM THE PONDS ARE CONTAMINATED WITH PAHS, PCBS, BENZENE, TOLUENE, AND XYLENES (FIGURE 5-2).

SURFACE WATER SAMPLES FROM CEMETERY CREEK DID NOT DETECT ANY HSL CONTAMINANTS. HOWEVER, SEDIMENTS IN THE CREEK WERE CONTAMINATED WITH PAHS AT SIMILAR CONCENTRATIONS BOTH UPSTREAM AND DOWNSTREAM OF THE SITE, WHICH SUGGESTS THAT THE CONTAMINANTS IN THE SEDIMENT ARE NOT SOLELY THE RESULT OF ACTIVITIES AT THE LASKIN POPLAR OIL SITE.

5.3 SOIL

SOIL CONTAMINATION IS PRESENT THROUGHOUT THE SITE, WITH PAHS AND PCBS BEING THE MOST PREVALENT CONTAMINANTS. LEAD IS THE ONLY INORGANIC CHEMICAL OF CONCERN ABOVE BACKGROUND LEVELS IN THE ON-SITE SOIL, EXCLUDING SOIL WITHIN STRUCTURES, ATTRIBUTABLE TO THE ACTIVITIES OF THE LASKIN POPLAR OIL COMPANY (FIGURE 5-2). ON-SITE SOIL SAMPLES FOR POLYCHLORINATED DIBENZO-P-DIOXINS (PCDD) AND POLYCHLORINATED DIBENZO-P-FURANS (PCDF) CONTAINED LESS THAN 1 PART PER BILLION (PPB) OF 2,3,7,8-TETRACHLORINATED DIBENZO-P-DIOXIN (TCDD) EQUIVALENTS. UNDER US EPA GUIDANCE, NO ACTION IS CALLED FOR IF THE TCDD EQUIVALENT LEVEL IS UNDER 1 PPB. THE AREAS WHERE SOIL CONTAMINATION IS CONCENTRATED ARE NEAR THE PITS, PONDS 18 AND 19, AND THE RETENTION POND. THE HIGHEST CONCENTRATIONS OCCUR AT THE PIT BOTTOMS, 15 TO 25 FEET, AND CONTINUE TO A DEPTH OF APPROXIMATELY 40 FEET.

NUMEROUS OFF-SITE SAMPLES WERE ALSO TAKEN TO ESTABLISH BACKGROUND LEVELS AND CONTAMINANT MIGRATION. RESULTS DID NOT INDICATE THAT OFF-SITE SOILS HAVE BEEN AFFECTED BY SITE ACTIVITY.

5.4 STRUCTURES

SOIL SAMPLES FROM THE BOILER HOUSE FLOORS, BOILERS, AND SMOKE STACK ARE CONTAMINATED WITH PAHS, PCBS, DIOXIN, AND INORGANIC COMPOUNDS, PRIMARILY LEAD AND ZINC. IT IS ASSUMED THAT THE BOILER HOUSE ITSELF IS ALSO CONTAMINATED WITH SIMILAR COMPOUNDS, INCLUDING DIOXIN RESULTING FROM OPERATIONS OF THE BOILER HOUSE. THE ASH AND RESIDUES STILL IN THE BOILER AND SMOKESTACK CONTAIN SEVERAL INORGANIC CHEMICALS AT CONCENTRATIONS SEVERAL ORDERS OF MAGNITUDE ABOVE BACKGROUND AND DIOXIN CONCENTRATIONS UP TO 65 PPB OF 2,3,7,8-TCDD EQUIVALENTS.

ANALYTICAL RESULTS FROM THE GREENHOUSE SOILS ARE CONTAMINATED PRIMARILY WITH PAHS AND PESTICIDES, AT CONCENTRATIONS OF ABOUT 1,000 UG/KG AND 2,000 UG/KG RESPECTIVELY. THE PESTICIDES COULD BE ATTRIBUTED TO PREVIOUS GREENHOUSE OPERATIONS RATHER THAN LASKIN POPLAR OIL COMPANY ACTIVITY.

5.5 AIR

ON-SITE AIR SAMPLING AND MONITORING WAS CONDUCTED DURING THE FIRST PHASE OF THE RI FOR THE SITE, BUT NOT CONDUCTED DURING THE PHASE II RI FIELD ACTIVITY. INTERPRETATION OF THE RESULTS INDICATED THAT ON-SITE OR OFF-SITE AIR CONTAMINATION WOULD NOT OCCUR UNLESS THERE IS A SUBSTANTIAL SURFACE DISTURBANCE OF THE SITE. DURING THE CONSTRUCTION PHASE OF THE REMEDY, CONTROLS WILL BE IMPLEMENTED TO MINIMIZE EXPOSURE. INHALATION RISKS ARE DISCUSSED IN SECTION 6.2.4.

SSR

6.0 SUMMARY OF SITE RISKS

THE US EPA CONDUCTED A RISK ASSESSMENT TO DETERMINE IF THE SITE POSES POTENTIAL EFFECTS ON PUBLIC HEALTH AND THE ENVIRONMENT. THE RISK ASSESSMENT WAS DEVELOPED IN ACCORDANCE WITH US EPA PROCEDURES, AS OUTLINED IN THE SUPERFUND PUBLIC HEALTH EVALUATION MANUAL (SPHEM; US EPA 1986G). THE STUDY CONCLUDED THAT THE SITE COULD POSE A SIGNIFICANT RISK TO HUMAN HEALTH THROUGH DIRECT CONTACT WITH, INCIDENTAL INGESTION, OR INHALATION OF ON-SITE CONTAMINATED SOILS; DIRECT CONTACT WITH, INCIDENTAL INGESTION, OR INHALATION OF MEDIA INSIDE THE BOILER HOUSE, AND; INGESTION OF CONTAMINATED GROUNDWATER.

6.1 INTRODUCTION

CONTAMINANTS OF CONCERN

THE RISK ASSESSMENT DID NOT USE THE INDICATOR SELECTION PROCESS SUGGESTED IN THE SPHEM. INSTEAD, ALL KNOWN CONTAMINANTS AT THE SITE WERE REVIEWED TO DETERMINE WHETHER THEY HAD ENVIRONMENTAL CRITERIA OR CRITICAL TOXICITY VALUES (I.E., CANCER POTENCY FACTORS, REFERENCE DOSE VALUES, AQUATIC LIFE PROTECTION CRITERIA, DRINKING WATER HEALTH ADVISORIES, OR OTHER DRINKING WATER STANDARDS). IF THE CONTAMINANTS WERE SUBJECT TO THESE VALUES OR CRITERIA, THEY WERE SELECTED FOR EVALUATION IN THE HEALTH ASSESSMENT. THE CONTAMINANTS OF POTENTIAL CONCERN FOR THE LASKIN POPLAR OIL SITE ARE LISTED IN TABLE 6-1.

NOT EVERY CHEMICAL REVIEWED HAD A CRITICAL TOXICITY VALUE OR AN ENVIRONMENTAL CRITERION. HOWEVER, THE CHEMICALS THAT DID NOT HAVE SUCH VALUES OR CRITERIA OCCURRED INFREQUENTLY WITH NO UNIFORM DISTRIBUTION ON-SITE OR OFF-SITE. REVIEW OF THE DATA INDICATED THAT OMISSION OF THOSE CHEMICALS FROM THE QUANTITATIVE RISK EVALUATION WOULD NOT SUBSTANTIALLY ALTER THE CONCLUSIONS OF THE RISK ASSESSMENT.

6.2 EXPOSURE ASSESSMENT

THE CONTAMINANTS OF CONCERN IDENTIFIED IN VARIOUS ENVIRONMENTAL MEDIA DURING THE RI WERE EVALUATED TO DETERMINE THE LEVEL OF RISK THEY POSE TO PUBLIC HEALTH AND THE ENVIRONMENT. THE RISK ASSESSMENT IDENTIFIED VARIOUS POTENTIAL EXPOSURE SCENARIOS FOR CONTAMINANTS AT THE LASKIN POPLAR OIL SITE. THE POTENTIAL RISKS ASSOCIATED WITH EACH SCENARIO ARE PRESENTED BELOW. TABLE 6-2 SUMMARIZES THE DIFFERENT SCENARIOS EVALUATED IN THE RISK ASSESSMENT AND THE ASSOCIATED RISK POSED.

FIGURES 6-1 AND 6-2 ILLUSTRATE EXPOSURE PATHWAYS FOR CURRENT AND FUTURE LAND USE THAT WERE EVALUATED IN THE RISK ASSESSMENT FOR THE SITE.

6.2.1 INGESTION OF GROUND WATER

THE RISK ASSESSMENT MADE THE CONSERVATIVE ASSUMPTION THAT THE GROUNDWATER WOULD BE USED FOR A WATER SUPPLY BECAUSE THERE ARE NO LEGAL RESTRICTIONS FOR GROUNDWATER USE. THE RISKS ASSOCIATED WITH FUTURE GROUNDWATER USE RESULTING FROM SITE AND AREA DEVELOPMENT WERE ESTIMATED BASED ON THE PHASE II GROUNDWATER MONITORING WELL DATA.

UNDER THIS ASSUMPTION, THE ASSESSMENT IDENTIFIED A POTENTIAL RISK FROM DRINKING SITE GROUND WATER. THE PLUME OF CONTAMINATED GROUNDWATER IS LIMITED TO THE AREA SHOWN IN FIGURE 5-1. CONTAMINATED GROUNDWATER HAS NOT MIGRATED OFF-SITE AND IS NOT THREATENING ANY PRIVATE GROUNDWATER SUPPLIES IN THE AREA. GROUND WATER IN THIS AREA CONTAINS PAHS, HALOGENATED ALKANES, AND KETONES. CERTAIN LEVELS DETECTED EXCEED THE US EPA'S MAXIMUM CONTAMINANT LEVELS (MCLS) FOR DRINKING WATER (TABLE 6-3). THEREFORE, CONSUMPTION OF THE GROUNDWATER DOES POSE A RISK TO HUMAN HEALTH.

THE RISK EVALUATION FOR GROUNDWATER INGESTION IS SUMMARIZED BY INDIVIDUAL MONITORING WELL IN TABLE 6-4. GROUNDWATER IN MONITORING WELLS WHERE CARCINOGENS WERE DETECTED CAUSED EXCESS LIFETIME CANCER RISKS RANGING FROM 2×10^{-2} TO 1×10^{-6} . NON-CARCINOGENIC HAZARD INDICES RANGED FROM LESS THAN 1 TO 61.

ALTHOUGH THESE RISKS ARE SIGNIFICANT, EXPOSURE IS UNLIKELY TO OCCUR AT THIS TIME. GROUND WATER ON-SITE IS CURRENTLY NOT USED AS A DRINKING WATER SOURCE AND WILL BE DRAINED WITHIN 2 YEARS AS PART OF THE REMEDY FOR THE SITE. RESIDENTS IN THE AREA ARE CONNECTED TO A MUNICIPAL WATER SUPPLY AND WILL NOT BE IMPACTED BY THE DEWATERING ACTIVITY. THE COMBINATION OF DIVERSION TRENCH AND CAP OVER THE SITE WILL VIRTUALLY ELIMINATE ANY FURTHER GENERATION OF CONTAMINATED GROUNDWATER.

6.2.2 INGESTION OF SURFACE WATER

INDIVIDUALS MAY BE EXPOSED TO CONTAMINANTS RELEASED TO THE SURFACE WATER ON-SITE (THE FRESHWATER AND RETENTION PONDS) OR ADJACENT TO THE SITE AT CEMETERY CREEK. EXPOSURES MAY RESULT FROM CHILDREN TRESPASSING ON THE SITE OR PLAYING IN THE CREEK.

THE RISKS ASSOCIATED WITH INCIDENTAL INGESTION OF WATER FROM THE PONDS ARE SUMMARIZED ON TABLE 6-6. THE RISKS TO TRESPASSERS WHO MAY INGEST SURFACE WATER FROM THE RETENTION OR FRESHWATER PONDS ARE VERY LIMITED. CARCINOGENS WERE NOT DETECTED IN WATER FROM EITHER POND. THE ESTIMATION OF NONCARCINOGENIC RISK INDICATED THAT THE HAZARD INDICES FOR EITHER EXPOSURE ARE MUCH LESS THAN ONE.

THE RISK ASSOCIATED WITH INGESTION OF CREEK WATER IS ALSO SHOWN ON TABLE 6-6. ORGANIC AND INORGANIC CONTAMINANTS ATTRIBUTABLE SOLELY TO THE SITE WERE NOT DETECTED IN THE WATERS OF CEMETERY CREEK. POTENTIAL GROUNDWATER DISCHARGE TO CEMETERY CREEK WAS ESTIMATED AND RISKS FOR EXPOSURE TO CONTAMINANTS WERE EVALUATED. BECAUSE SOME OF THE ESTIMATED VALUES WERE BELOW THE US EPA CONTRACT LABORATORY PROGRAM (CLP) ROUTINE ANALYTICAL SERVICE (RAS) DETECTION LIMITS, RISKS WERE ALSO ESTIMATED ASSUMING CONTAMINANT LEVELS AT DETECTION LIMITS TO YIELD A CONSERVATIVE ESTIMATE OF EXPOSURE LEVELS.

EXPOSURE TO THE CREEK IS ASSUMED TO BE INFREQUENT. RISKS ASSOCIATED WITH CARCINOGENS RANGE FROM 1×10^{-7} TO 4×10^{-8} FOR THE ROUTINE ANALYTICAL SERVICE (RAS) DETECTION LIMIT AND MAXIMUM PREDICTED CONCENTRATIONS, RESPECTIVELY. THE HAZARD INDEX IS LESS THAN ONE FOR BOTH SETS OF CONCENTRATIONS.

THE DISCHARGE OF CONTAMINANTS TO THE CREEK COULD RESULT IN THE EXPOSURE OF AQUATIC ORGANISMS IN THE CREEK. THE MAKEUP OF THE AQUATIC COMMUNITY IN THE CREEK IS NOT KNOWN, BUT THE CREEK IS CLASSIFIED AS A LIMITED WARM WATER HABITAT BY THE OEPA. BECAUSE THE EFFLUENT FROM THE JEFFERSON WASTEWATER TREATMENT PLANT CONSTITUTES MOST OF THE FLOW DURING DRY WEATHER, FACTORS RELATED TO THE DISCHARGE OF TREATED EFFLUENT MAY LIMIT THE AQUATIC POPULATION. BECAUSE OF THE LIMITATIONS TO THE AQUATIC POPULATIONS IN THE CREEK, PEOPLE PROBABLY DO NOT FISH THE CREEK FREQUENTLY. IF PEOPLE DO FISH THE CREEK, IT IS UNLIKELY THAT THEY WILL CATCH AND CONSUME SUBSTANTIAL AMOUNTS OF FISH.

IN SUMMARY, THE RISK ASSESSMENT INDICATED THAT ALTHOUGH THERE ARE MECHANISMS FOR RELEASE OF CONTAMINANTS TO CEMETERY CREEK, THE POTENTIAL EXPOSURES THAT RESULT MAY NOT POSE SUBSTANTIAL RISK. THE ASSESSMENT CONCLUDED THAT:

* BECAUSE NO CONTAMINANTS ASSOCIATED WITH THE SITE WERE

DETECTED AT THE CREEK, THERE WERE NO CURRENT MEASURABLE IMPACTS FROM THE SITE AT THE CREEK.

- * BASED ON CONCENTRATIONS PROJECTED AT THE CREEK IN THE FUTURE, NONCARCINOGENIC RISKS FOR TRESPASSERS (SITE RESIDENTS ARE ASSUMED TO BE AWARE OF THE RISK INCURRED BY CONSUMING CREEK WATER) WERE BELOW LEVELS OF CONCERN, CANCER RISKS FOR TRESPASSERS WERE LESS THAN 4×10^{-8} , AND NEITHER FEDERAL WATER QUALITY CRITERIA OR STATE WATER QUALITY STANDARDS ARE EXCEEDED AT THE COMPLETION OF THE REMEDIAL ACTION.

6.2.3 INGESTION OF CONTAMINATED SOILS

THE RISK ASSESSMENT EVALUATED THREE SOIL EXPOSURE SETTINGS: EXPOSURES OF SITE TRESPASSERS UNDER CURRENT SITE USE; EXPOSURE OF CONSTRUCTION WORKERS DURING FUTURE SITE DEVELOPMENT; AND EXPOSURE OF CURRENT AND FUTURE RESIDENTS. THESE USES COULD RESULT IN PERSONS COMING INTO DIRECT CONTACT WITH CONTAMINANTS IN THE SOIL AND BEING EXPOSED THROUGH THE SOIL INGESTION AND DERMAL ABSORPTION ROUTES OF EXPOSURE.

THE US EPA HAS NOT DEVELOPED STANDARD SOIL INGESTION EXPOSURE ASSUMPTIONS AS IT HAS FOR DRINKING WATER EXPOSURES. INFORMATION ON SOIL INGESTION EXPOSURES WAS REVIEWED AND REPRESENTATIVE SOIL INGESTION RATES WERE SELECTED. THESE EXPOSURE SCENARIOS AND INGESTION RATES ARE PRESENTED IN SECTION 6.5.

DERMAL ABSORPTION IS ALSO A POTENTIAL EXPOSURE ROUTE ASSOCIATED WITH SOIL CONTACT. CALCULATIONS IN THE RISK ASSESSMENT INDICATED EXPOSURES THROUGH DERMAL ABSORPTION WERE TWO ORDERS OF MAGNITUDE LESS THAN EXPOSURES THROUGH SOIL INGESTION. BECAUSE OF THIS, RISKS ASSOCIATED WITH SOIL INGESTION WERE ASSUMED TO BE REPRESENTATIVE OF DIRECT CONTACT SOIL EXPOSURES.

ACCESS TO THE SITE IS NOT CURRENTLY RESTRICTED, AND ACCORDINGLY A TRESPASSING INDIVIDUAL (INCLUDING CHILDREN) COULD REACH THE SITE AND INGEST CONTAMINATED SOIL. RISKS TO SITE RESIDENTS AND CONSTRUCTION WORKERS WERE ALSO CALCULATED.

THE RISK ASSESSMENT IDENTIFIED A POTENTIAL RISK FROM INGESTING CONTAMINATED SOILS AT THE LASKIN POPLAR OIL SITE. CARCINOGENIC RISK REACHES A HIGH OF 2×10^{-3} TO A RESIDENT IN THE BOILER HOUSE WHO INGESTS SOIL FROM 0 TO 14 FEET WITH THE HIGHEST DETECTED CONCENTRATIONS OF PAHS AND PCBS. THIS SAME SOIL PROVIDED THE HIGHEST CUMULATIVE NONCARCINOGENIC HI AT 10,000 DUE TO CONSUMPTION OF SOIL CONTAINING INORGANIC CONTAMINANTS (RESIDENTIAL CHILD-WORST CASE SCENARIO).

SOIL AND SEDIMENT INGESTION RISKS UNDER THE THREE DIFFERENT SCENARIOS (RESIDENTIAL, TRESPASS, AND CONSTRUCTION) ARE SUMMARIZED IN TABLE 6-5.

6.2.4 AIRBORNE CONTAMINANT INHALATION

ON-SITE EXPOSURES UNDER CURRENT LAND USE CONDITIONS MAY INCLUDE RISKS FROM THE INHALATION OF VOLATILIZED OR RESUSPENDED CONTAMINANTS. THE PRESENCE OF CONTAMINANTS IN SURFACE SOIL, SUB-SURFACE SOIL, AND GROUNDWATER PRESENTS THE POTENTIAL FOR INHALATION EXPOSURES. INHALATION RISKS FOR TRESPASSERS WERE CALCULATED SEPARATELY FOR EXPOSURES TO VOLATILIZED AND RESUSPENDED CONTAMINANTS.

AIRBORNE CONTAMINANT CONCENTRATIONS AT THE SITE BOUNDARIES WERE ASSUMED TO BE EQUIVALENT TO AIRBORNE CONCENTRATIONS ON-SITE. RISKS WERE CALCULATED FOR A 70KG ADULT WHO IS EXPOSED FOR 12 HOURS/DAY, 7 DAYS/WEEK, FOR 20 YEARS. EXPOSURE WAS ASSUMED TO OCCUR DURING THE SUMMER MONTHS WHEN PREDICTED CONCENTRATIONS FROM VOLATILIZATION WERE AT THE HIGHEST LEVELS. CUMULATIVE RISK LEVELS REACHED HIGHS OF 1×10^{-6} FOR INHALATION OF VOLATILIZED CONTAMINANTS (VINYL CHLORIDE, METHYLENE CHLORIDE) AND 2×10^{-7} FOR INHALATION OF RESUSPENDED MATERIAL BY A SITE BOUNDARY RESIDENT.

TABLE 6-6 SUMMARIZES RISK FROM AMBIENT AIR INHALATION.

6.3 TOXICITY ASSESSMENT

THE ASSESSMENT ADDRESSED CONTAMINANTS IN TERMS OF TWO CATEGORIES OF TOXICITY; CARCINOGENIC AND NONCARCINOGENIC HEALTH EFFECTS. CARCINOGENIC POTENCY FACTORS (CPFS) AND REFERENCE DOSE FACTORS (RFDS) FOR CHEMICALS DETECTED AT THE SITE ARE PRESENTED IN TABLE 6-7 AND TABLE 6-8, RESPECTIVELY.

6.4 SUMMARY OF RISK CHARACTERIZATION

THE RISK ASSESSMENT FOR THE LASKIN POPLAR OIL SITE DID NOT ADDRESS THE TOTAL RISK ASSOCIATED WITH THE SITE. FIRSTLY, STANDARDS OR CRITICAL TOXICITY VALUES DO NOT EXIST FOR EVERY CHEMICAL DETECTED AT THE SITE. SECONDLY, ALL EXPOSURE PATHWAYS AND THEIR ASSOCIATED ROUTES OF EXPOSURE COULD NOT BE QUANTIFIED.

THE ADVERSE POTENTIAL RISKS ASSOCIATED WITH THE SITE ARE SUMMARIZED BELOW.

SURFACE WATER

- * ALTHOUGH THERE ARE PATHWAYS FOR THE RELEASE OF CONTAMINANTS TO CEMETERY CREEK, THE POTENTIAL EXPOSURES DO NOT APPEAR TO POSE AN UNACCEPTABLE RISK. BASED ON CONCENTRATIONS PROJECTED AT THE CREEK, TRESPASSERS ARE AT AN EXCESS CANCER RISK LEVEL LESS THAN 4×10^{-8} , AND RELEASES OF GROUNDWATER INTO CEMETERY CREEK ARE NOT PREDICTED TO EXCEED ANY FEDERAL AWQCS OR STATE WATER QUALITY STANDARDS.

GROUNDWATER

- * THERE ARE NO CURRENT EXPOSURES ASSOCIATED WITH GROUNDWATER, BUT IF RESIDENTIAL WELLS WERE INSTALLED ON-SITE, RESIDENTS WOULD BE EXPOSED TO A EXCESS LIFETIME CANCER RISK RANGING FROM 2×10^{-2} TO 1×10^{-6} , AND CONCENTRATIONS OF NONCARCINOGENS AT LEVELS THAT EXCEED THEIR RESPECTIVE RFDS.

SOIL AND SEDIMENT

- * TRESPASSERS COULD BE EXPOSED TO PCDD/PCDF, PAHS, AND PCBS IN SURFACE SOIL THAT COULD YIELD AN EXCESS LIFETIME CANCER RISK OF 2×10^{-6} .
- * TRESPASSERS IN THE BOILER HOUSE COULD BE EXPOSED TO PCDD/PCDF CONTAMINATION THAT COULD YIELD AN EXCESS LIFETIME CANCER RISK OF 2×10^{-4} .
- * BOILER HOUSE SOIL HAS LEAD CONCENTRATIONS OF 212,000 MG/KG THAT COULD CAUSE TRESPASSERS TO INTAKE LEAD AT OVER 400 TIMES THE RFD.
- * TRESPASSERS IN THE GREENHOUSE COULD BE EXPOSED TO EXCESS LIFETIME CANCER RISKS OF 4×10^{-7} TO 3×10^{-7} FROM PAHS AND DIELDRIN.
- * CONTACT WITH RETENTION POND SEDIMENT AND SEEPS BY TRESPASSERS COULD YIELD EXCESS LIFETIME CANCER RISKS OF 3×10^{-5} DUE TO PAH AND PCB CONTAMINATION.
- * CONSTRUCTION ACTIVITIES AT THE SITE COULD LEAD TO EXCESS LIFETIME CANCER RISKS OF 3×10^{-6} FROM CONTACT WITH PAHS AND PCBS IN SURFACE AND SUBSURFACE SOIL.
- * FUTURE SITE RESIDENTS COULD BE EXPOSED TO PAH AND PCB

CONTAMINATION THAT YIELDS EXCESS LIFETIME CANCER RISKS OF 2×10^{-3} TO 7×10^{-5} BASED ON CONTAMINANTS PRESENT AT 0 TO 2 FEET AND 2×10^{-3} TO 1×10^{-4} BASED ON CONTAMINANTS PRESENT AT 0 TO 14 FEET.

- * CONTACT WITH CONTAMINATED SURFACE SOIL COULD BE A POTENTIAL EXPOSURE ROUTE TO ANIMALS, ALTHOUGH SPECIFIC ANIMAL RISKS WERE NOT QUANTIFIED.

AIR

- * THERE IS NO CURRENT UNACCEPTABLE RISK ASSOCIATED WITH AMBIENT AIR INHALATION AT THE SITE. THE EXCESS LIFETIME RISK ASSOCIATED WITH AMBIENT AIR INHALATION AT THE SITE RANGES FROM 1×10^{-6} TO 5×10^{-8} . THE NONCARCINOGENIC HAZARD INDEX IS LESS THAN ONE.

LIMITATIONS AND ASSUMPTIONS

THE RISK ASSESSMENT IS SUBJECT TO UNCERTAINTY FROM A VARIETY OF SOURCES INCLUDING:

- * SAMPLING AND ANALYSIS
- * FATE AND TRANSPORT ESTIMATION
- * EXPOSURE ESTIMATION
- * TOXICOLOGICAL DATA

UNCERTAINTY FACTORS IN THE RISK ASSESSMENT DUE TO UNCERTAINTY COMMON TO RISK ASSESSMENTS IN GENERAL ARE SUMMARIZED IN TABLE 6-9. UNCERTAINTY FACTORS IN THIS PARTICULAR SITE'S RISK ASSESSMENT ARE SUMMARIZED IN TABLE 6-10.

6.5 ANALYTICAL METHODS

GENERAL

THE RISK ASSESSMENT CALCULATED DOSES FOR THOSE CONTAMINANTS OF CONCERN FOUND ON-SITE AT CONCENTRATIONS HIGHER THAN BACKGROUND. NONCARCINOGENIC RISKS WERE ESTIMATED BY CALCULATING A HAZARD INDEX (HI), THE RATIO OF THE EXPOSURE DOSE TO THE ACCEPTABLE CHRONIC INTAKE. CANCER RISKS WERE ESTIMATED BY MULTIPLYING THE AVERAGE LIFETIME EXPOSURE DOSE BY THE CPF.

IN GENERAL, THE RFD IS AN ESTIMATE (WITH UNCERTAINTY SPANNING PERHAPS AN ORDER OF MAGNITUDE) OF A DAILY EXPOSURE TO THE HUMAN POPULATION (INCLUDING SENSITIVE SUBGROUPS) THAT IS LIKELY TO BE WITHOUT AN APPRECIABLE RISK OF DELETERIOUS EFFECTS DURING A LIFETIME. THE RFD IS GENERALLY EXPRESSED IN UNITS OF MILLIGRAMS PER KILOGRAM OF BODY WEIGHT PER DAY (MG/KG/DAY).

THE HI APPROACH ASSUMES DOSE ADDITIVITY, WHICH MEANS THAT THE ESTIMATED DAILY INTAKE OF EACH CHEMICAL IS DIVIDED BY ITS RFD AND THE RESULTING QUOTIENTS ARE SUMMED. THE RESULTING SUM IS THE HI. ANY SINGLE CHEMICAL WITH A DAILY INTAKE GREATER THAN THE RFD WILL CAUSE THE HI TO EXCEED UNITY. OF COURSE, THE HAZARD INDEX CAN EXCEED UNITY EVEN IF NO SINGLE CHEMICAL EXCEEDS ITS RFD. WHEN THE HI EXCEEDS ONE, THERE MAY BE CONCERN FOR A POSSIBLE NONCARCINOGENIC HEALTH RISK.

THE DOSE-RESPONSE RELATIONSHIP FOR CARCINOGENS IS EXPRESSED AS A CPF OR SLOPE FACTOR. CPFs ARE PRESENTED IN UNITS OF THE INVERSE OF MILLIGRAMS OF CHEMICAL PER KILOGRAM OF BODY WEIGHT PER DAY. THE APPROACH USED BY THE US EPA TO ESTIMATE THE CPF FROM ANIMAL STUDIES OR HUMAN DATA ASSUMES A DOSE-RESPONSE RELATIONSHIP WITH NO THRESHOLD.

THE POTENTIAL FOR CARCINOGENIC EFFECTS IS EVALUATED BY ESTIMATING EXCESS LIFETIME CANCER RISK. EXCESS

LIFETIME CANCER RISK IS THE INCREMENTAL INCREASE IN THE PROBABILITY OF DEVELOPING CANCER OVER THE BACKGROUND PROBABILITY (I.E., IF NO EXPOSURE TO SITE CONTAMINANTS OCCURRED). FOR EXAMPLE, A 1×10^{-6} EXCESS LIFETIME CANCER RISK MEANS THAT FOR EVERY 1 MILLION PEOPLE EXPOSED TO THE CARCINOGEN THROUGHOUT THEIR LIFETIMES, THE AVERAGE INCIDENCE OF CANCER IS INCREASED BY ONE EXTRA CASE OF CANCER.

GROUNDWATER

THE RISK ASSESSMENT ASSUMED THAT A 70-KG ADULT WOULD DRINK 2 LITERS OF GROUNDWATER PER DAY OVER A 70-YEAR LIFETIME.

SURFACE WATER

THE CHEMICAL CONCENTRATION IN CEMETERY CREEK WAS ESTIMATED USING A FOUR-STEP PROCESS:

1. THE SITE WAS DIVIDED INTO THREE DISTINCT AREAS OF FLOW (FLOW TUBES), EACH CHARACTERIZED BY A REPRESENTATIVE DISCHARGE AND CONCENTRATION.
2. THE AVERAGE DISCHARGE WAS DETERMINED FOR EACH FLOW TUBE.
3. A REPRESENTATIVE CONCENTRATION FOR EACH CHEMICAL DETECTED WAS DETERMINED FOR EACH FLOW TUBE, AND THE ESTIMATED CHEMICAL MASS LOADING FROM EACH FLOW TUBE TO CEMETERY CREEK WAS CALCULATED.
4. THE RESULTANT CHEMICAL CONCENTRATION IN CEMETERY CREEK WAS DETERMINED.

SOIL

PROBABLE AVERAGE CASE DOSES FOR EXPOSURE WERE CALCULATED BASED ON INGESTING 0.1 G/DAY OF SOIL CONTAINING AVERAGE CONTAMINANT LEVELS. WORST CASE DOSES WERE CALCULATED BASED ON INGESTING 1.0 G/DAY OF SOIL CONTAINING MAXIMUM CONTAMINANT LEVELS. THE RISK ASSESSMENT USED THE RESULTING DOSES TO ESTIMATE POTENTIAL RISKS.

TO EVALUATE EXPOSURES ASSOCIATED WITH TRESPASSING, THE RISK ASSESSMENT ASSUMED THAT SITE VISITS BY AN INDIVIDUAL (70 KG ADULT, 35 KG CHILD) WOULD BE 2 DAYS PER WEEK, 16 WEEKS OF THE YEAR (SUMMER MONTHS) FOR 10 YEARS.

INGESTION EXPOSURE CALCULATIONS FOR A SITE RESIDENT ASSUMED A BODY WEIGHT OF 70 KG, DAILY SOIL INTAKE, 70 YEAR LIFETIME, AND 70 YEAR, FULL-TIME EXPOSURE.

EXPOSURE CALCULATIONS FOR CONSTRUCTION WORKERS ASSUMED A 70 KG WORKER WOULD BE INGESTING CONTAMINATED SOIL FOR 8 HOURS/DAY, 5 DAYS/WEEK, FOR A PERIOD OF 1 YEAR.

AIR

NO QUANTITATIVE ON-SITE AMBIENT AIR QUALITY SAMPLING WAS PERFORMED DURING THE PHASE II RI, AND THE INHALATION EXPOSURE IS BASED ENTIRELY UPON MODELING EFFORTS.

POSSIBLE RELEASE MECHANISMS INCLUDE VOLATILIZATION OF ORGANIC COMPOUNDS FROM THE SUBSURFACE AND MECHANICAL RESUSPENSION OF BOTH ORGANIC AND INORGANIC COMPOUNDS IN THE SURFACE SOIL.

THE RISK ASSESSMENT ASSUMED THAT THE VOLATILE CONTAMINANT LEVELS IN THE SUBSURFACE WERE AT EQUILIBRIUM BETWEEN THE PORE AIR, THE SOIL, AND THE GROUNDWATER FOR ESTIMATING THE RELEASE OF VOCs.

THE ASSESSMENT ASSUMED THE AIRBORNE CONCENTRATION OF RESPIRABLE SUSPENDED MATERIAL WAS 100 UG/M³. IT WAS FURTHER ASSUMED THAT ALL OF THE AIRBORNE MATERIAL WAS DERIVED FROM THE SURFACE SOIL AT THE SITE. THE RESULTING AIRBORNE CONCENTRATIONS OF CONTAMINANTS WERE THE PRODUCT OF THE SURFACE SOIL CONCENTRATION AND A

MASS LOADING OF 100 UG/M3.

6.4 POTENTIAL FUTURE RISKS

ALTHOUGH THE SITE IS NOT OPERATING, THERE IS NO SITE DEVELOPMENT, AND GROUNDWATER IS NOT BEING USED FOR DRINKING WATER PURPOSES, THERE IS STILL A POTENTIAL THREAT OF FUTURE CONTAMINANT RELEASES THAT MAY ENDANGER PUBLIC HEALTH AND THE ENVIRONMENT. A MAJOR REMEDIAL ACTION OBJECTIVE FOR THE SITE IS TO REDUCE THIS THREAT OF FUTURE CONTAMINANT RELEASES IN ADDITION TO REDUCING CURRENT RISKS IDENTIFIED IN THE RISK ASSESSMENT. SEVERAL FACTORS CONTRIBUTE TO THE POTENTIAL THREAT OF FUTURE RELEASES.

THE MAJOR CONCERN OF THE SITE ARE THE SOURCE WASTE OILS CONTAINED IN PITS AND TANKS. THIS MAJOR CONCERN IS BEING ADDRESSED AS PART OF THE SOURCE REMOVAL OPERABLE UNIT (SEE SECTION 4.0). THIS SECOND REMEDIAL ACTION DEALS BASICALLY WITH THE RESIDUAL CONTAMINATION CONTAINED IN SOILS, SEDIMENTS, GROUNDWATER, AND THE BOILER HOUSE AREA.

#DSC

7.0 DOCUMENTATION OF SIGNIFICANT CHANGES

THIS RECORD OF DECISION SELECTS ALTERNATIVE 3A, AS DESCRIBED IN THE PROPOSED PLAN, AS THE PREFERRED REMEDIAL ALTERNATIVE FOR THE LASKIN POPLAR OIL SITE. THE US EPA HAS REVIEWED AND RESPONDED TO ALL COMMENTS RECEIVED FROM THE INTERESTED PARTIES, INCLUDING THOSE FROM THE STATE AND NEIGHBORING COMMUNITIES, DURING THE PUBLIC COMMENT PERIOD. COMMENTS WERE MADE ON ALTERNATIVE 3A AND OTHER REMEDIAL ALTERNATIVES. BASED ON THE PUBLIC COMMENTS, THE US EPA HAS DETERMINED THAT THERE IS NO NEED FOR ANY SIGNIFICANT CHANGES TO ALTERNATIVE 3A.

IN THE EVENT THAT ADDITIONAL DATA OR INFORMATION DURING THE DESIGN OF THE REMEDY REVEALS THE NEED FOR A MODIFICATION, THE US EPA WILL NOTIFY THE PUBLIC OF ANY CHANGES TO THE REMEDY PRESENTED HERE IN THIS RECORD OF DECISION.

#DA

8.0 DESCRIPTION OF ALTERNATIVES

THE US EPA IDENTIFIED POTENTIAL RISKS THAT SHOULD BE ADDRESSED BY REMEDIAL RESPONSE ACTIONS AT THE LASKIN POPLAR OIL SITE. THESE RISKS ARE ASSOCIATED WITH; DIRECT CONTACT WITH, INCIDENTAL INGESTION OR INHALATION OF CONTAMINATED SOILS AND CERTAIN SEDIMENTS ON-SITE; DIRECT CONTACT WITH, INCIDENTAL INGESTION OR INHALATION OF CONTAMINATED SOILS IN THE GREENHOUSE AREA; DIRECT CONTACT WITH, INCIDENTAL INGESTION OR INHALATION OF CONTAMINATED SOILS AND ASH IN THE BOILER HOUSE, AND INGESTION OF ON-SITE CONTAMINATED GROUND WATER.

THE FS IDENTIFIED TECHNOLOGIES THAT COULD ELIMINATE OR REDUCE THE RISKS FOR EACH OF THESE MEDIA. THESE MEDIUM-SPECIFIC TECHNOLOGIES WERE SCREENED BASED ON COMPATIBILITY WITH WASTE AND SITE CHARACTERIZATION. THE SURVIVING TECHNOLOGIES WERE THEN ASSEMBLED INTO SITE-WIDE REMEDIAL ALTERNATIVES. THE FS THEN EVALUATED THE ALTERNATIVES BASED ON PROTECTIVENESS; LONG AND SHORT-TERM EFFECTIVENESS; MEETING APPLICABLE, RELEVANT, AND APPROPRIATE REQUIREMENTS; REDUCTION IN TOXICITY, MOBILITY, OR VOLUME; IMPLEMENTABILITY, AND COST. THIS EVALUATION PROCESS WAS CARRIED OUT ACCORDING TO PROCEDURES SPECIFIED BY THE US EPA IN CERCLA, SARA, THE NCP, AND THE US EPA GUIDANCE DOCUMENTS INCLUDING INTERIM GUIDANCE ON SUPERFUND SELECTION OF REMEDY (OSWER DIRECTIVE NUMBER 9355.0-19, DECEMBER 24, 1986) AND INTERIM FINAL GUIDANCE FOR CONDUCTING REMEDIAL INVESTIGATIONS AND FEASIBILITY STUDIES UNDER CERCLA (OSWER DIRECTIVE NO. 9355.3-01, OCTOBER, 1988).

THE ALTERNATIVES TO REDUCE SITE RISKS THAT ARE EVALUATED IN DETAIL INCLUDE A NO ACTION ALTERNATIVE, AND EIGHT OTHER ALTERNATIVES. THE EIGHT OTHER ALTERNATIVES RANGE FROM ONE WHICH RELIES UPON CONTAINMENT OF WASTE, WITH LITTLE OR NO TREATMENT, UP TO AN ALTERNATIVE THAT RELIES ALMOST COMPLETELY UPON TREATMENT, TO REDUCE SITE RISKS. THE FS LOOKED AT ALTERNATIVES INVOLVING TREATMENT IN ORDER TO REDUCE THE TOXICITY, MOBILITY, OR VOLUME OF SITE WASTES.

EACH OF THE EIGHT REMEDIAL ALTERNATIVES EVALUATED IN DETAIL IS DESCRIBED BRIEFLY BELOW. THE DESCRIPTIONS INCLUDE CONTAINMENT COMPONENTS, TREATMENT COMPONENTS, INSTITUTIONAL CONTROLS, ESTIMATED TIME FOR IMPLEMENTATION, COST (ESTIMATED TO TWO SIGNIFICANT FIGURES), OVERALL PROTECTION, AND COMPLIANCE WITH

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS). SECTION 9.0, WHICH DESCRIBES THE COMPARATIVE ANALYSIS OF THE ALTERNATIVES, SUPPLIES ADDITIONAL DETAIL ON THESE SUBJECTS.

8.1 ALTERNATIVE 1

THE US EPA IS REQUIRED TO EVALUATE A "NO ACTION" ALTERNATIVE. UNDER THIS ALTERNATIVE, THERE WOULD BE NO FURTHER SITE REMEDIATION PERFORMED BEYOND THE WASTE MATERIALS ADDRESSED IN THE SOURCE REMOVAL OPERABLE UNIT. NO ADDITIONAL COSTS OR TIME WOULD BE REQUIRED BEYOND THE SOURCE REMOVAL ACTION.

8.2 ALTERNATIVE 2

ALTERNATIVE 2 CONSISTS MAINLY OF A CONTAINMENT OPTION. FIRSTLY, RETENTION AND FRESHWATER PONDS WOULD BE DRAINED AND THE SURFACE WATER WOULD BE DISCHARGED TO CEMETERY CREEK. SAMPLING OF SURFACE WATER WOULD BE CONDUCTED PRIOR TO DISCHARGING SURFACE WATER INTO CEMETERY CREEK. IF LEVELS DETECTED EXCEED THE OHIO AMBIENT WATER QUALITY CRITERIA, OR THE US EPA'S AMBIENT WATER QUALITY CRITERIA (AWQC), TREATMENT WOULD BE REQUIRED PRIOR TO DISCHARGING WATER. THE FRESH WATER POND WOULD BE BACK FILLED WITH CLEAN SOIL MATERIAL. THE RETENTION POND WOULD BE RE-GRADED AND SHIELDED BY THE SOIL COVER.

THE BOILER HOUSE WOULD BE DEMOLISHED. MATERIALS AMENABLE TO DECONTAMINATION WOULD BE DECONTAMINATED, AND DISPOSED OF IN AN OFF-SITE SANITARY LANDFILL. IF THE DIOXIN-CONTAMINATED STRUCTURES CANNOT BE DECONTAMINATED, THEN THEY WOULD BE DISPOSED OF IN A CONCRETE VAULT ON-SITE. DIOXIN-CONTAMINATED SOILS, ASH, AND DEBRIS FROM WITHIN THE BOILER HOUSE WOULD ALSO BE DISPOSED OF IN THE CONCRETE VAULT ON-SITE. THE CONCRETE VAULT WOULD BE PLACED ON-SITE BENEATH THE SOIL COVER AND WOULD BE IN COMPLIANCE WITH TANK AND STORAGE RCRA REQUIREMENTS. THE STORAGE OF DIOXIN MATERIAL IS A TEMPORARY MEASURE UNTIL A TECHNOLOGY IS DEVELOPED AND PROVEN TO ADDRESS DIOXIN MATERIAL.

THE GREENHOUSE STRUCTURES WOULD BE DISMANTLED, DECONTAMINATED (IF NECESSARY), AND DISPOSED OFF-SITE TO A SANITARY LANDFILL. CONTAMINATED SOILS FROM WITHIN THE GREENHOUSE AREA WOULD BE CONSOLIDATED WITH CONTAMINATED SOILS NEAR THE PITS AND TANKS. THE GREENHOUSE AREA WOULD THEN BE REGRADED AND VEGETATED TO ALLOW FOR PROPER DRAINAGE.

A 2 FOOT CLEAN SOIL COVER WOULD BE PLACED OVER ALL SOILS THAT EXCEED 1×10^{-6} EXCESS LIFETIME CANCER RISK LEVELS AND TOTAL HAZARD INDEX OF ONE. THE SOIL COVER WOULD BE PLACED OVER APPROXIMATELY 3.5 ACRES OF THE SITE. THE SOIL COVER WOULD PREVENT DIRECT CONTACT WITH CONTAMINATED SOILS BUT ALLOW INFILTRATION OF SURFACE WATER THROUGH THE COVER.

UNDER ALTERNATIVE 2, A LONG-TERM MONITORING PROGRAM WOULD BE IMPLEMENTED TO MONITOR CONTAMINANT CONCENTRATIONS AND MIGRATION. THIS PROGRAM WOULD INCLUDE THE INSTALLATION OF ADDITIONAL MONITORING WELLS NORTH OF THE LASKIN POPLAR OIL SITE. THE MONITORING PROGRAM WOULD BE DESIGNED TO ASSESS THE QUALITY OF GROUNDWATER REACHING CEMETERY CREEK.

ADDITIONALLY, THE PROGRAM WOULD SAMPLE WATER FROM THE UPPER AND LOWER AQUIFERS THAT MAY FLOW UNDER CEMETERY CREEK AND JOIN REGIONAL GROUNDWATER FLOW. AT A MINIMUM, THE PROGRAM WOULD MEET THE SUBSTANTIVE REQUIREMENTS FOR GROUND-WATER MONITORING UNDER THE RCRA AS DESCRIBED IN 40 CFR SS 264, SUBPART F.

IF THE LEVELS OF CONTAMINANTS IN GROUND WATER DO NOT INCREASE OVER TIME, THE SAMPLING SCHEDULE WOULD BE RE-EVALUATED AND A REDUCTION IN THE FREQUENCY OF SAMPLING MAY BE CONSIDERED. A STATISTICAL TEST WOULD BE DEVELOPED TO DETERMINE WHEN A SIGNIFICANT INCREASE IN THE LEVEL OF CONTAMINANTS HAD OCCURRED.

INSTITUTIONAL CONTROLS AND USE RESTRICTIONS WOULD BE IMPOSED TO PROHIBIT SITE USE, LAND DEVELOPMENT, AND GROUND-WATER EXTRACTION. ACCESS RESTRICTIONS WOULD ALSO BE ENFORCED TO PREVENT ANY INTERFERENCE OR VANDALISM AT THE SITE.

THE US EPA WOULD RECOMMEND THAT ON-SITE RESIDENTS TEMPORARILY RELOCATE DURING CONSTRUCTION OF THE REMEDY FOR SAFETY REASONS. STRINGENT MEASURES WOULD BE TAKEN TO ENSURE THE HEALTH AND SAFETY OF WORKERS ON-SITE AS WELL AS THE LOCAL RESIDENTS NEAR THE SITE.

ALTERNATIVE 2 RELIES MAINLY ON CONTAINMENT, INSTITUTIONAL CONTROLS, AND MONITORING. CONTAINMENT OF SOIL PREVENTS EXPOSURE TO CONTAMINATED SOILS. RESTRICTING GROUND-WATER USE ON-SITE WOULD BE EFFECTIVE IN ELIMINATING RISKS FROM DRINKING THIS GROUND WATER. FENCING WOULD RESTRICT ACCESS TO THE SITE. POTENTIAL FUTURE RISKS, AS DESCRIBED IN SECTION 6.3, WOULD BE REDUCED. HOWEVER, ALTERNATIVE 2 ALLOWS FURTHER GENERATION OF CONTAMINATED GROUNDWATER BY POTENTIAL RELEASE OF CONTAMINANTS IN SOIL. FURTHER, ALTERNATIVE 2 DOES NOT MEET STATE OF OHIO CLOSURE REQUIREMENTS FOR SOLID OR HAZARDOUS WASTE LANDFILLS, WHICH HAS BEEN IDENTIFIED AS AN ARAR.

THE COSTS OF ALTERNATIVE 2 AND THE ESTIMATED TIME FOR IMPLEMENTATION ARE AS FOLLOWS:

CAPITAL COST:	\$ 3,300,000
PRESENT WORTH O&M COSTS:	\$ 1,400,000
TOTAL COSTS:	\$ 4,700,000
TIME TO IMPLEMENT:	1 YEAR

NOTE: THE ESTIMATED TOTAL PRESENT WORTH OF THE ALTERNATIVES DESCRIBED IN SECTIONS 8.3 THROUGH 8.8 DO NOT TAKE INTO ACCOUNT THE PLANNED ACTIVITIES FROM THE SOURCE REMOVAL OPERABLE UNIT ACTIVITY CURRENTLY UNDER DESIGN BY THE PRPS. SIGNIFICANT COST SAVINGS CAN BE MADE IF THE PLANNED INCINERATION OF THE WASTE OILS, SLUDGE, AND SATURATED SOILS TAKE PLACE AT THE SAME TIME THE FINAL REMEDIAL ALTERNATIVE IS IMPLEMENTED. THE TOTAL COSTS FOR ALTERNATIVES 3 THROUGH 6 WHICH INVOLVE THERMAL TREATMENT OF SOILS AND DIOXIN-CONTAMINATED MATERIAL, CAN BE REDUCED BY APPROXIMATELY \$3,000,000 TO \$4,000,000. THE REDUCTION IN COST IS BASED ON SITE PREPARATION, MOBILIZATION, AND DEMOBILIZATION OF THE INCINERATOR.

8.3 ALTERNATIVE 3A

ALTERNATIVE 3A HAS THE SAME COMPONENTS AS ALTERNATIVE 2 WITH THE EXCEPTION OF THE SOIL COVER. ADDITIONALLY, ALTERNATIVE 3A INCORPORATES A GROUNDWATER CONTROL SYSTEM AND THERMAL TREATMENT OF DIOXIN CONTAMINATED MATERIAL.

THE GROUNDWATER CONTROL SYSTEM IS A COMBINATION OF A MULTI-LAYER CAP AND GROUNDWATER DIVERSION TRENCH UP-GRADIENT FROM THE SITE. THE DIVERSION TRENCH WOULD COLLECT UP-GRADIENT GROUNDWATER AND RE-DIRECT THE GROUNDWATER AROUND THE SITE AND DISCHARGE TO CEMETERY CREEK WHERE IT WOULD CONTINUE ITS NORMAL FLOW PATTERN. THIS DIVERSION TRENCH WOULD PREVENT REGIONAL GROUNDWATER FROM PASSING THROUGH CONTAMINATED SOILS. THE MULTI-LAYER CAP WOULD SIGNIFICANTLY REDUCE INFILTRATION OF SURFACE WATER INTO THE CONTAMINATED SOILS. TOGETHER, THESE TWO TECHNOLOGIES WOULD VIRTUALLY ELIMINATE FURTHER GENERATION OF CONTAMINATED GROUNDWATER AND EFFECTIVELY DE-WATER THE SITE. SAFE DRINKING WATER ACT (SDWA) MCLS WOULD NOT APPLY TO THE REMEDY BECAUSE THE GROUNDWATER IN THE SHALLOW AQUIFER BENEATH THE SITE WOULD BE VIRTUALLY ELIMINATED.

THE MULTI-LAYER CAP WOULD BE PLACED OVER SOILS WITH GREATER THAN 1×10^{-6} EXCESS LIFETIME CANCER RISK LEVELS AND A TOTAL HAZARD INDEX GREATER THAN ONE. PRIOR TO CAP INSTALLATION, A DETAILED GEOTECHNICAL INVESTIGATION WOULD BE CONDUCTED TO MEASURE THE PROPERTIES OF THE SOIL AND CLAY USED TO CONSTRUCT THE CAP. THE PURPOSE OF THIS INVESTIGATION WOULD BE TO DETERMINE THE STABILITY OF THESE MATERIALS UNDER FLOOD CONDITIONS. THE COVER WOULD THEN BE CONSTRUCTED WITH SIDE SLOPES FLAT ENOUGH TO PROTECT THE CONTAINED AREA FROM DAMAGE DUE TO FLOODING. IN ADDITION, THE CAP WOULD BE CONSTRUCTED, OPERATED, AND MAINTAINED TO ENSURE ITS PERFORMANCE IN CONTAINING CONTAMINATED SOILS. THIS ALTERNATIVE DOES MEET OHIO CLOSURE REQUIREMENTS FOR SOLID WASTE LANDFILLS AND REQUIREMENTS FOR LANDFILL CLOSURE OUTLINED UNDER 40 CFR SS 264.310. THE CAP WOULD BE DESIGNED AND CONSTRUCTED TO PROMOTE DRAINAGE, MINIMIZE THE EROSION OF THE COVER, AND PROVIDE LONG-TERM MINIMIZATION OF MIGRATION OF LIQUIDS THROUGH THE UNDERLYING CONTAMINATED SOILS.

ALTERNATIVE 3A INCORPORATES TREATMENT OF SOURCE MATERIAL. THE CONTAMINATED SOIL TO BE TREATED CONTAINS DIOXIN AND RCRA-LISTED WASTES (INCLUDING, BUT NOT LIMITED TO, K035, F001, AND F005). DIOXIN-CONTAMINATED SOIL, ASH, AND DEBRIS WOULD BE INCINERATED ON-SITE BY A MOBILE INCINERATOR. APPROXIMATELY 300 C.Y. OF DIOXIN-CONTAMINATED MATERIAL FROM THE BOILER HOUSE AREA WOULD BE INCINERATED. THE RESIDUE ASH WOULD BE TESTED FOR HAZARDOUS CONSTITUENTS, AND HAZARDOUS CHARACTERISTICS (RCRA CHARACTERISTIC WASTE TESTS). ANALYTICAL RESULTS WOULD BE COMPARED TO THE US EPA'S DELISTING CRITERIA. IF LEVELS DO NOT EXCEED THE DELISTING CRITERIA, THE RESIDUE ASH WOULD BE DISPOSED OF ON-SITE BENEATH THE CAP. IF THE ASH DOES NOT MEET THE DELISTING CRITERIA, THE ASH WOULD BE DISPOSED OF OFF-SITE IN A RCRA HAZARDOUS WASTE FACILITY. THE ASH

WOULD BE REQUIRED TO MEET THE TREATMENT STANDARDS SPECIFIED IN THE LAND DISPOSAL RESTRICTIONS (40 CFR PART 268) FOR ANY RESTRICTED RCRA-LISTED WASTE (INCLUDING, BUT NOT LIMITED TO, K035, F001, AND F005) IT CONTAINED PRIOR TO DISPOSAL OFF-SITE.

DIOXIN-CONTAMINATED STRUCTURES WOULD BE DISMANTLED AND DECONTAMINATED OR THERMALLY TREATED. DIOXIN MATERIAL THAT COULD NOT BE DECONTAMINATED OR INCINERATED, WOULD BE STORED ON-SITE IN A CONCRETE VAULT AS DESCRIBED UNDER ALTERNATIVE 2.

ALTERNATIVE 3A INCORPORATES THE GROUND-WATER MONITORING, SURFACE WATER MONITORING, AND SITE RESTRICTIONS ALREADY DESCRIBED UNDER ALTERNATIVE 2.

THE COSTS OF ALTERNATIVE 3A AND THE ESTIMATED TIME TO IMPLEMENT THIS ALTERNATIVE ARE:

CAPITAL COST:	\$ 10,000,000
PRESENT WORTH O&M COSTS:	\$ 1,300,000
TOTAL COSTS:	\$ 11,000,000
TIME TO IMPLEMENT:	2 YEARS

8.4 ALTERNATIVE 3B

ALTERNATIVE 3B HAS THE SAME COMPONENTS AS ALTERNATIVE 3A EXCEPT THAT THE CONTAMINATED GROUNDWATER IS ADDRESSED IN A DIFFERENT MANNER. ALTERNATIVE 3B PROVIDES A PERMEABLE SOIL COVER RATHER THAN AN IMPERMEABLE MULTI-LAYER CAP OVER. THE SOIL COVER WOULD ALLOW RAINFALL TO PERCOLATE THROUGH THE CONTAMINATED SOILS AND ENTER GROUNDWATER. A GROUNDWATER COLLECTION TRENCH WOULD BE INSTALLED DOWNGRADIENT FROM THE SITE RATHER THAN A DIVERSION TRENCH AS DESCRIBED IN ALTERNATIVE 3A. THE TRENCH WOULD COLLECT GROUNDWATER FLOW PASSING THROUGH THE SITE. GROUNDWATER WOULD THEN BE TREATED AND DISCHARGED TO CEMETERY CREEK, AT LEVELS BELOW THAT REQUIRED TO MAINTAIN AWQCS IN CEMETERY CREEK.

A COMBINATION OF AIR STRIPPING AND ACTIVATED CARBON WOULD BE USED TO TREAT A FLOW RATE ESTIMATED AT 5 GALLONS PER MINUTE. TOTAL VOLUME OF CONTAMINATED GROUNDWATER WITH CONTAMINANT CONCENTRATIONS THAT RESULT IN RISK ABOVE THE 1×10^{-6} LEVEL IS (BASED UPON 10% POROSITY) 650,000 GALLONS. THE GROUNDWATER TREATMENT SYSTEM WOULD BE DESIGNED TO PRODUCE EFFLUENT THAT MEETS THE DISCHARGE STANDARDS OF THE REQUIRED NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT. GROUNDWATER AND SURFACE WATER MONITORING WOULD BE PERFORMED. INFLUENT AND TREATED GROUNDWATER EFFLUENT WOULD BE MONITORED REGULARLY AS REQUIRED PER THE NPDES PERMIT.

BASED UPON THE PREDICTED RATE OF CONTAMINANT MOVEMENT AND THE ALIGNMENT OF THE GROUNDWATER COLLECTION SYSTEM, THE TIME REQUIRED TO REDUCE CONTAMINANT LEVELS IN THE GROUNDWATER TO BELOW MCLS IS ESTIMATED TO BE GREATER THAN 50 YEARS.

THE SOIL COVER WOULD CONSIST OF A WELL-COMPACTED, LOW-PERMEABILITY COVER AT LEAST 24 INCHES THICK. THE SOIL COVER WOULD BE PLACED OVER THE SAME AREA OF CONTAMINATED SOILS AS PREVIOUSLY DESCRIBED IN ALTERNATIVE 3A. THIS TOP SOIL LAYER WOULD BE PLANTED WITH GRASS. HOWEVER, THE SOIL COVER WOULD NOT MEET OHIO CLOSURE REQUIREMENTS FOR SOLID WASTE LANDFILLS.

THE COSTS AND TIME TO IMPLEMENT ALTERNATIVE 3B ARE LISTED BELOW:

CAPITAL COST:	\$ 8,700,000
PRESENT WORTH O&M COSTS:	\$ 2,100,000
TOTAL COSTS:	\$11,000,000
TIME TO IMPLEMENT:	2 YEARS

8.5 ALTERNATIVE 4A

ALTERNATIVE 4A IS IDENTICAL TO ALTERNATIVE 3A, EXCEPT THAT A VOLUME OF HIGHLY CONTAMINATED SOIL IS THERMALLY TREATED ALONG WITH THE DIOXIN-CONTAMINATED MATERIAL. CONTAMINATED SOILS THAT EXCEED 10^{-3} EXCESS CANCER RISK LEVELS, APPROXIMATELY EQUIVALENT TO 3,000 C.Y., WOULD BE THERMALLY TREATED.

CONTAMINATED SOILS IN EXCESS OF 10(-3) EXCESS CANCER RISK WERE DEFINED IN THE RI. THESE SOILS ARE CONTAMINATED PRIMARILY WITH PAHS, PCBS, AND LEAD. INCINERATION WOULD BE EFFECTIVE IN DESTROYING THE ORGANIC CONTAMINANTS IN SOIL. HOWEVER, INCINERATION WOULD NOT ADDRESS THE LEAD OR ANY HEAVY METALS CONTAINED IN SOILS.

THE RESIDUE ASH WOULD BE TESTED FOR HAZARDOUS CONSTITUENTS, AND HAZARDOUS CHARACTERISTICS (RCRA CHARACTERISTIC WASTE TESTS). ANALYTICAL RESULTS WOULD BE COMPARED TO THE US EPA'S DELISTING CRITERIA. IF LEVELS DO NOT EXCEED THE DELISTING CRITERIA, THE RESIDUE ASH WOULD BE DISPOSED OF ON-SITE BENEATH THE CAP. IF THE ASH DOES NOT MEET THE DELISTING CRITERIA, THE ASH WOULD BE DISPOSED OF OFF-SITE IN A RCRA HAZARDOUS WASTE FACILITY. THE ASH WOULD BE REQUIRED TO MEET THE TREATMENT STANDARDS SPECIFIED IN THE LAND DISPOSAL RESTRICTIONS (40 CFR PART 268) FOR ANY RCRA-LISTED WASTE (INCLUDING, BUT NOT LIMITED TO, K035, F001, AND F005) IT CONTAINED PRIOR TO DISPOSAL OFF-SITE. OFF-SITE DISPOSAL OF 3000 C.Y. OF RESIDUE ASH WOULD INCREASE THE TOTAL COST OF THIS ALTERNATIVE BY \$1,200,000. AS IN ALTERNATIVE 3, ASH RESULTING FROM THE INCINERATION OF DIOXIN-CONTAMINATED SOIL, ASH, AND DEBRIS MAY REQUIRE DISPOSAL TO AN OFF-SITE RCRA HAZARDOUS WASTE FACILITY (IF NOT DELISTABLE). OFF-SITE DISPOSAL WOULD COST AN ADDITIONAL \$120,000.

THE COSTS AND TIME TO IMPLEMENT ALTERNATIVE 4A ARE AS FOLLOWS:

CAPITAL COSTS:	\$ 12,000,000
PRESENT WORTH O&M COSTS:	\$ 1,300,000
TOTAL COSTS:	\$ 13,000,000
TIME TO IMPLEMENT:	2 YEARS

8.6 ALTERNATIVE 4B

ALTERNATIVE 4B IS IDENTICAL TO ALTERNATIVE 3B, EXCEPT THAT A VOLUME OF HIGHLY CONTAMINATED SOIL IS THERMALLY TREATED ALONG WITH THE DIOXIN-CONTAMINATED MATERIAL. CONTAMINATED SOILS THAT EXCEED 10(-3) EXCESS CANCER RISK LEVELS, APPROXIMATELY EQUIVALENT TO 3,000 C.Y., WOULD BE THERMALLY TREATED.

THE COSTS AND IMPLEMENTATION TIME FOR ALTERNATIVE 4B ARE AS FOLLOWS:

CAPITAL COSTS:	\$ 11,000,000
PRESENT WORTH O&M COSTS:	\$ 2,100,000
TOTAL COSTS:	\$ 13,000,000
TIME TO IMPLEMENT:	2 YEARS

8.7 ALTERNATIVE 5A

ALTERNATIVE 5A IS IDENTICAL TO ALTERNATIVE 4A, EXCEPT THAT A GREATER VOLUME OF SOIL WOULD BE INCINERATED. ALTERNATIVE 5A DEFINES A VOLUME OF SOIL EQUIVALENT TO THE 10(-4) EXCESS CANCER RISK LEVEL. THIS RESULTS IN A VOLUME EQUIVALENT TO APPROXIMATELY 37,000 C.Y.

AS IN ALTERNATIVE 4, RESIDUE ASH HAS THE POTENTIAL OF NOT PASSING THE US EPA'S DELISTING CRITERIA FOR HAZARDOUS WASTE. UNDER ALTERNATIVE 5A, APPROXIMATELY 6,000 C.Y. HAS THE POTENTIAL OF EXCEEDING THE DELISTING CRITERIA. THIS AMOUNT OF RESIDUE ASH WOULD STILL BE CONSIDERED HAZARDOUS WASTE AND THEREFORE WOULD REQUIRE OFF-SITE DISPOSAL TO A RCRA HAZARDOUS WASTE FACILITY. OFF-SITE DISPOSAL OF 6,000 C.Y. WOULD INCREASE THE TOTAL COST OF THE ALTERNATIVE BY ABOUT \$2,400,000. THE REMAINING 31,000 C.Y. WOULD MOST LIKELY PASS THE DELISTING CRITERIA AND THEN QUALIFY FOR ON-SITE DISPOSAL BENEATH THE CAP.

THE COSTS AND IMPLEMENTATION TIME FOR ALTERNATIVE 5A ARE AS FOLLOWS:

CAPITAL COSTS:	\$ 32,000,000
PRESENT WORTH O&M COSTS:	\$ 1,300,000
TOTAL COSTS:	\$ 33,000,000
TIME TO IMPLEMENT:	3 YEARS

8.7 ALTERNATIVE 5B

ALTERNATIVE 5B IS IDENTICAL TO 4B EXCEPT THAT A GREATER VOLUME (37,000 C.Y.) OF CONTAMINATED SOILS IS TREATED AS IN ALTERNATIVE 5A.

THE COSTS ASSOCIATED WITH ALTERNATIVE 5B ARE AS FOLLOWS:

CAPITAL COSTS:	\$ 31,000,000
PRESENT WORTH O&M COSTS:	\$ 2,100,000
TOTAL COSTS:	\$ 33,000,000
TIME TO IMPLEMENT:	3 YEARS

8.8 ALTERNATIVE 6

THIS ALTERNATIVE WOULD INCINERATE ALL SOILS EXCEEDING THE 10(-6) EXCESS CANCER RISK LEVEL, EQUIVALENT TO APPROXIMATELY 57,000 C.Y. RETENTION AND FRESH WATER PONDS WOULD BE DRAINED AND BACK FILLED WITH CLEAN SOIL MATERIAL AS DESCRIBED IN ALTERNATIVE 2. SURFACE WATER FROM THE PONDS WOULD BE DISCHARGED TO CEMETERY CREEK. ALL CONTAMINATED STRUCTURES ON-SITE WOULD BE DEMOLISHED, DECONTAMINATED OR THERMALLY TREATED, AND DISPOSED OF OFF-SITE IN A SANITARY LANDFILL. DIOXIN-CONTAMINATED STRUCTURES WOULD BE DECONTAMINATED AND DISPOSED OF OFF-SITE IN A SANITARY LANDFILL. THOSE MATERIALS WHICH CAN NOT BE DECONTAMINATED OR TREATED WOULD BE DISPOSED IN AN ON-SITE CONCRETE VAULT AND CAPPED IN ACCORDANCE TO RCRA STORAGE REQUIREMENTS FOR HAZARDOUS WASTE.

INCINERATED DIOXIN-CONTAMINATED SOIL, ASH, AND DEBRIS, WOULD BE DISPOSED OF ON-SITE, ASSUMING ASH IS DELISTABLE. IF ASH IS NOT DELISTABLE, THE ASH WOULD BE DISPOSED IN AN OFF-SITE RCRA HAZARDOUS WASTE FACILITY AT AN ADDITIONAL COST OF \$120,000.

ALTERNATIVE 6 PROPOSES THAT ALL SOILS EXCEEDING THE 10(-6) EXCESS CANCER RISK LEVEL, APPROXIMATELY 57,000 C.Y., BE REMOVED AND THERMALLY TREATED ON-SITE. RESIDUE ASH WOULD BE DISPOSED OF ON-SITE ASSUMING THE ASH IS DELISTABLE AND RENDERED NON-HAZARDOUS. IF ASH IS NOT DELISTABLE, THEN ASH WOULD BE DISPOSED IN AN OFF-SITE RCRA HAZARDOUS WASTE FACILITY. AS IN ALTERNATIVE 4, APPROXIMATELY 6,000 C.Y. OF RESIDUE ASH HAS THE POTENTIAL OF FAILING THE US EPA'S DELISTING CRITERIA FOR THE EXTRACTION PROCEDURE TOXICITY TEST DUE TO THE LEAD CONTENT IN SOILS. HOWEVER, AN ADDITIONAL 9000 C.Y. OF RESIDUE ASH HAS THE POTENTIAL OF EXCEEDING THE STANDARD FOR DIRECT CONTACT AND INCIDENTAL INGESTION FOR LEAD. THUS 15,000 C.Y. OF ASH MAY REQUIRE CONTAINMENT OR OFF-SITE DISPOSAL. THIS ALTERNATIVE DOES NOT PROVIDE A COVER, THEREFORE OFF-SITE DISPOSAL WOULD BE REQUIRED FOR THE ASH. THE OFF-SITE DISPOSAL OF ABOUT 15,000 C.Y. OF RESIDUE ASH WOULD INCREASE THE TOTAL COSTS OF THIS ALTERNATIVE BY APPROXIMATELY \$6,000,000.

UNDER ALTERNATIVE 6 THE SITE WOULD BE REGRADED WITH CLEAN MATERIAL TO ALLOW PROPER SITE RE-VEGETATION AND DRAINAGE. NO GROUNDWATER DIVERSION OR COLLECTION TRENCH WOULD BE REQUIRED SINCE ALL SOURCES OF CONTAMINATION WOULD BE REMOVED. HOWEVER, GROUNDWATER ENCOUNTERED OR COLLECTED DURING THE EXCAVATION OF SOILS WOULD BE TREATED AND THEN DISCHARGED TO CEMETERY CREEK.

THIS ALTERNATIVE ALLOWS GROUNDWATER TO FLOW UNRESTRICTED TOWARDS CEMETERY CREEK. GROUNDWATER AND SURFACE WATER MONITORING WOULD BE CONDUCTED TO ASSESS QUALITY OF GROUNDWATER DISCHARGING INTO CEMETERY CREEK.

INSTITUTIONAL CONTROLS AND ACCESS RESTRICTIONS WOULD BE IMPOSED ON THE PROPERTY UNTIL DIOXIN-CONTAMINATED MATERIAL IN VAULT IS REMOVED FOR FINAL TREATMENT AND DISPOSAL. THE ESTIMATED COSTS FOR THIS ALTERNATIVE ARE AS FOLLOWS:

CAPITAL COST:	\$ 41,000,000
PRESENT WORTH O&M COSTS:	\$ 1,000,000
TOTAL COSTS:	\$ 42,000,000
TIME TO IMPLEMENT:	4 YEARS

#SCAA

9.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

THE US EPA USED THE FOLLOWING NINE CRITERIA TO EVALUATE EACH OF THE ALTERNATIVES IDENTIFIED IN THE FS REPORT.

THE REMEDIAL ALTERNATIVE SELECTED FOR THE SITE MUST REPRESENT THE BEST BALANCE AMONG THE EVALUATION CRITERIA.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER A REMEDY ADEQUATELY PROTECTS HUMAN HEALTH AND THE ENVIRONMENT AND WHETHER RISKS ARE PROPERLY ELIMINATED, REDUCED, OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS.
2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS ADDRESSES WHETHER A REMEDY MEETS ALL STATE AND FEDERAL LAWS AND REQUIREMENTS THAT APPLY TO SITE CONDITIONS AND CLEANUP OPTIONS.
3. LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF A REMEDY TO RELIABLY PROTECT HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEANUP GOALS HAVE BEEN MET.
4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME ARE THREE PRINCIPAL MEASURES OF THE OVERALL PERFORMANCE OF AN ALTERNATIVE. THE 1986 SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) EMPHASIZES THAT, WHENEVER POSSIBLE, THE US EPA SHOULD SELECT A REMEDY THAT WILL PERMANENTLY REDUCE THE LEVEL OF TOXICITY OF THE CONTAMINANTS AT THE SITE, THE SPREAD OF CONTAMINANTS AWAY FROM THE SITE, AND THE VOLUME, OR AMOUNT, OF CONTAMINANTS AT THE SITE.
5. SHORT-TERM EFFECTIVENESS REFERS TO THE LIKELIHOOD OF ANY ADVERSE IMPACTS TO HUMAN HEALTH OR THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEANUP GOALS ARE ACHIEVED.
6. IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE REMEDY.
7. COST INCLUDES CAPITAL AND OPERATION AND MAINTENANCE COSTS OF IMPLEMENTING A REMEDY.
8. STATE ACCEPTANCE INDICATES WHETHER, BASED ON ITS REVIEW OF THE RI, EA, FS, AND PROPOSED PLAN, THE STATE OF OHIO (OEPA) CONCURS WITH, OPPOSES, OR HAS NO COMMENT ON THE ALTERNATIVE THE US EPA IS PROPOSING AS THE REMEDY FOR THE SITE.
9. COMMUNITY ACCEPTANCE INDICATES WHETHER THE PUBLIC CONCURS WITH THE REMEDY PRESENTED IN THE US EPA'S PROPOSED PLAN.

9.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

WITH THE EXCEPTION OF THE NO-ACTION ALTERNATIVE (ALTERNATIVE 1), EACH ALTERNATIVE WOULD PROTECT HUMAN HEALTH AND THE ENVIRONMENT.

ALTERNATIVE 6 WOULD ELIMINATE KNOWN RISKS IDENTIFIED IN THE RI. IT WOULD PREVENT EXPOSURE TO THE CONTAMINATED SOIL AND PREVENT OR MINIMIZE FUTURE RELEASE OF CONTAMINANTS TO GROUNDWATER AND THE CREEK. THE THERMAL TREATMENT TECHNOLOGIES TO BE EMPLOYED WOULD BE VERY RELIABLE. USE RESTRICTIONS WOULD NOT BE REQUIRED TO ACHIEVE PROTECTION GOALS OVER THE LONG TERM. HOWEVER, USE RESTRICTIONS WOULD BE NECESSARY PRIOR TO REMOVAL OF THE CONCRETE VAULT.

ALTERNATIVES 3A, 4A, AND 5A WOULD PREVENT DIRECT CONTACT WITH OR INGESTION OR INHALATION OF CONTAMINATED SOIL BY CONTAINING IT WITH A MULTI-LAYER CAP, WHEREAS ALTERNATIVES 2, 3B, 4B, AND 5B WOULD PROVIDE THAT PROTECTION USING A SOIL COVER. ALTERNATIVES 3, 4, 5, AND 6 WOULD TREAT INCREMENTALLY GREATER AMOUNTS OF SOIL. ALTERNATIVES THAT TREAT GREATER AMOUNTS OF SOIL (4, 5, AND 6) WOULD BE NO MORE PROTECTIVE GIVEN THAT RESTRICTIONS ON LAND USE ARE STILL REQUIRED.

THE LEVEL OF PROTECTION AGAINST CONTAMINATED GROUNDWATER IS DIFFERENTIATED BETWEEN ALTERNATIVES THAT INCLUDE GROUNDWATER CONTROL ("A" ALTERNATIVES), THOSE THAT INCLUDE GROUNDWATER COLLECTION ("B" ALTERNATIVES), AND THOSE WITH NO ACTION TAKEN ON GROUNDWATER OTHER THAN USE RESTRICTIONS (ALTERNATIVES 2 AND 6). ASSUMING NO ACTION WERE TAKEN OTHER THAN USE RESTRICTIONS, THE REMAINING POTENTIAL RISK WOULD BE MINOR SINCE THE AQUIFER HAS POOR CHARACTERISTICS FOR USE AS A DRINKING WATER SOURCE AND BECAUSE LOCAL RESIDENTS USE MUNICIPAL WATER. ALTERNATIVES THAT INCLUDE GROUNDWATER CONTROL WOULD PROVIDE ADDITIONAL PROTECTION FROM CONTAMINANTS IN GROUNDWATER BY ELIMINATING GROUNDWATER ABOVE THE UNWEATHERED SHALE. GROUNDWATER COLLECTION ALTERNATIVES WOULD PROVIDE ADDITIONAL PROTECTION BY COLLECTING AND TREATING ALL GROUNDWATER. OVER TIME THIS WOULD ALSO REDUCE THE LEVELS OF CONTAMINANTS IN THE SOILS ON-SITE.

ALTERNATIVE 2 WOULD MANAGE MOST OF THE RISKS IDENTIFIED IN THE RI, BUT WOULD NOT BE FULLY PROTECTIVE BECAUSE THE GROUNDWATER WOULD NOT BE CONTROLLED OR COLLECTED AND TREATED. THE COVER WOULD PREVENT EXPOSURE TO THE CONTAMINATED SOIL. DRAINING AND BACK-FILLING THE PONDS WOULD REDUCE FUTURE RELEASE OF CONTAMINANTS TO GROUNDWATER BY REDUCING INFILTRATION. INSTITUTIONAL CONTROLS AND ACCESS RESTRICTIONS WOULD PREVENT EXCAVATION OF CONTAMINATED SOIL AND DEBRIS. THE CONCRETE VAULT WOULD REDUCE DIRECT CONTACT WITH DIOXIN-CONTAMINATED SOIL AND DEBRIS.

UNDER ALTERNATIVE 1, NO REMEDIAL ACTION WOULD BE CONDUCTED AT THE SITE, AND THEREFORE RISK TO HUMAN HEALTH AND THE ENVIRONMENT AS IDENTIFIED IN THE RISK ASSESSMENT WOULD NOT BE REDUCED. AS THIS ALTERNATIVE IS JUDGED TO NOT BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ALTERNATIVE 1 WILL BE DROPPED FROM FURTHER CONSIDERATION OR DISCUSSION.

9.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

ALTERNATIVES 2, 3A, 3B, 4A, 4B, 5A, AND 5B WOULD ACHIEVE THE REQUIREMENTS OF HEALTH-BASED TBC CRITERIA FOR SOIL BY USING A COVER TO PREVENT DIRECT CONTACT WITH CONTAMINATED MATERIAL. THE SOIL COVER IN ALTERNATIVES 2, 3B, 4B, AND 5B WOULD NOT COMPLY WITH RCRA REQUIREMENTS OR OEPA REQUIREMENTS FOR A CLOSURE CAP BECAUSE OF THE POTENTIAL HIGHER PERMEABILITY OF THE COVER SOIL THAN THE UNDERLYING SOIL. THE MULTI-LAYER CAP IN ALTERNATIVES 3A, 4A, AND 5A WOULD BE DESIGNED TO ACHIEVE THE CAP REQUIREMENTS OF RCRA AND THE OHIO HAZARDOUS WASTE REGULATIONS.

THE DIOXIN VAULT USED IN ALL ALTERNATIVES WOULD BE DESIGNED TO ACHIEVE RCRA TANK AND STORAGE CRITERIA. ALL ALTERNATIVES WOULD MEET ARARS RELATED TO FLOOD PLAINS AND WETLANDS, AND FUGITIVE EMISSIONS FROM GRADING AND EXCAVATION WOULD BE CONTROLLED SO THAT OHIO AIR QUALITY STANDARDS ARE NOT EXCEEDED.

ALTERNATIVE 3A, 4A, AND 5A WOULD MEET GROUNDWATER QUALITY ARARS BY ISOLATING THE CONTAMINANTS FROM THE UNCONTAMINATED GROUNDWATER AND EVENTUALLY ELIMINATING THE CONTAMINATED GROUNDWATER BY DEWATERING THE SITE.

ALTERNATIVES 3B, 4B, AND 5B WOULD MEET ARARS PERTAINING TO GROUNDWATER QUALITY BY COLLECTING AND TREATING THE CONTAMINATED GROUNDWATER. THESE ALTERNATIVES WOULD INCORPORATE A GROUNDWATER TREATMENT SYSTEM WHICH WOULD BE DESIGNED TO PRODUCE EFFLUENT THAT MEETS THE DISCHARGE STANDARDS OF THE NPDES PERMIT AND THE OHIO WATER QUALITY STANDARDS. AIR STRIPPER EMISSIONS WOULD BE LIMITED TO LEVELS THAT WOULD MEET OHIO AIR QUALITY STANDARDS.

ALTERNATIVE 6 WOULD ACHIEVE ARARS PERTAINING TO GROUNDWATER QUALITY BY REMOVING THE SOURCES OF GROUNDWATER CONTAMINATION AND ALLOWING EXISTING CONTAMINATED GROUNDWATER TO ATTENUATE NATURALLY.

OHIO WATER QUALITY STANDARDS WOULD BE MET AT THE COMPLETION OF THE REMEDIATION UNDER ALL ALTERNATIVES EVALUATED.

BECAUSE ALTERNATIVES 3A, 3B, 4A, 4B, 5A, 5B, AND 6 WOULD PROVIDE ON-SITE THERMAL TREATMENT, THE THERMAL

TREATMENT UNIT WOULD HAVE TO COMPLY WITH THE TECHNICAL REQUIREMENTS FOR A RCRA HAZARDOUS WASTE INCINERATOR (RCRA SUBPART O: 40 CFR 264.343 TO 264.351) AND WITH OHIO HAZARDOUS WASTE REGULATIONS PERTAINING TO DESIGN AND OPERATION OF THE SYSTEM. DESTRUCTION AND REMOVAL EFFICIENCIES (DRES) OUTLINED IN 40 CFR SS 264.343 WOULD HAVE TO BE MET FOR SOLVENTS (99.99%), MIXED ORGANICS (99.99%) AND DIOXIN (99.9999%). IN ADDITION, EMISSIONS WOULD HAVE TO COMPLY WITH STANDARDS FOR HAZARDOUS AIR POLLUTANTS AND THE OHIO AMBIENT AIR QUALITY STANDARDS.

SOME OF THE RESIDUE FROM THE THERMAL TREATMENT OPERATIONS MIGHT HAVE TO BE DISPOSED OF OFF-SITE AT A RCRA LANDFILL. ANY CONTAMINATED WASTEWATERS GENERATED FROM THE OPERATION THAT COULD NOT BE TREATED WOULD HAVE TO BE TAKEN TO A RCRA FACILITY. THIS RESIDUE AND ANY WASTEWATERS TO BE DISPOSED OF IN A RCRA LANDFILL MUST MEET TREATMENT STANDARDS FOR ANY RCRA-LISTED WASTE (INCLUDING, BUT NOT LIMITED TO, K035, F001, AND F005) THEY CONTAIN AS DEFINED UNDER THE LAND DISPOSAL RESTRICTIONS (40 CFR PART 268). RESIDUE WHICH FAILS TO PASS THE RCRA CHARACTERISTIC WASTE TESTS MUST UNDERGO FURTHER TREATMENT TO ELIMINATE THE HAZARDOUS CHARACTERISTIC PRIOR TO LAND DISPOSAL. TRANSPORT AND DISPOSAL OF THESE WASTES WOULD HAVE TO COMPLY WITH RCRA REGULATIONS FOR HAZARDOUS WASTE GENERATORS AND US DEPARTMENT OF TRANSPORTATION REGULATIONS FOR TRANSPORTING HAZARDOUS WASTE AND WITH THE US EPA'S OFF-SITE DISPOSAL POLICY.

ALTERNATIVE 6 WOULD MEET LOCAL ZONING REQUIREMENTS FOR REDEVELOPMENT AND ACHIEVE RCRA CRITERIA FOR A CLEAN CLOSURE ONCE THE DIOXIN-CONTAMINATED MATERIAL IS REMOVED FROM THE ON-SITE VAULT AND THE VAULT IS DISMANTLED.

BECAUSE IT INCORPORATES NO GROUNDWATER TREATMENT OR CONTROL, ALTERNATIVE 2 WOULD NOT ACHIEVE ARARS FOR GROUNDWATER QUALITY; I.E., SDWA MCLS, STATE MCLS, OR HEALTH-BASED CRITERIA THAT ARE CLASSIFIED AS TO-BE-CONSIDERED (TBCS). AS THIS ALTERNATIVE WOULD NOT COMPLY WITH ARARS, AND DOES NOT PROVIDE GROUNDS FOR AN ARAR WAIVER, ALTERNATIVE 2 WILL BE DROPPED FROM FURTHER CONSIDERATION OR DISCUSSION.

ARARS FOR EACH ALTERNATIVE ARE SUMMARIZED IN TABLE 9-1.

9.3 LONG-TERM EFFECTIVENESS AND PERMANENCE

WITH THE EXCEPTION OF ALTERNATIVE 6, ALL ALTERNATIVES WOULD RETAIN SOME RESIDUAL RISK BY RELYING ON THE MULTI-LAYER CAP OR SOIL COVER TO PREVENT DIRECT CONTACT WITH CONTAMINATED SOIL CONTAINED ON-SITE. WHILE BOTH TECHNOLOGIES WOULD BE RELIABLE IF MAINTAINED AND IF USED IN CONJUNCTION WITH INSTITUTIONAL CONTROLS AND ACCESS RESTRICTIONS, THE POTENTIAL FOR INFILTRATION WOULD BE LESS FOR MULTI-LAYER CAP ALTERNATIVES SINCE THE GEOMEMBRANE AND GEOTEXTILE BARRIER LAYER, IF PROPERLY INSTALLED, IS NEARLY IMPERMEABLE. A DRAINAGE LAYER PRESENT IN THE MULTI-LAYER CAP ALLOWS FREE DRAINAGE OF WATER THAT INFILTRATES THE TOP LAYER, ALLOWING SEEPING WATER TO BE REMOVED, REDUCING THE POSSIBILITY THAT THE WATER WOULD PENETRATE THE BARRIER LAYER.

ALTERNATIVES THAT INCLUDE GROUNDWATER COLLECTION AND TREATMENT WOULD REQUIRE LONG-TERM OPERATION AND MAINTENANCE OF A COLLECTION/TREATMENT SYSTEM AND ENFORCEMENT OF AQUIFER USE RESTRICTIONS TO PROVIDE LONG-TERM PROTECTION FROM CONSUMPTION OF CONTAMINATED GROUNDWATER. ALTHOUGH IT APPEARS UNLIKELY THAT THE SHALLOW AQUIFER GROUNDWATER WOULD BE USED, THE ALTERNATIVES THAT INCLUDE GROUNDWATER CONTROL WOULD AVOID THE NEED FOR LONG-TERM AQUIFER USE RESTRICTIONS ALTOGETHER. THE RELIABILITY OF THE "B" ALTERNATIVES IN PREVENTING OFF-SITE MIGRATION OF CONTAMINATED GROUNDWATER WOULD DEPEND UPON MAINTENANCE OF THE GROUNDWATER COLLECTION AND TREATMENT SYSTEM.

ALTERNATIVES 3A, 3B, 4A, 4B, 5A, AND 5B LIE BETWEEN ALTERNATIVES 2 AND 6 IN TERMS OF LONG-TERM EFFECTIVENESS AND RELIABILITY, SINCE THEY WOULD ACHIEVE REMOVAL AND TREATMENT OF SOME CONTAMINATED SOIL. BECAUSE THESE ALTERNATIVES WOULD PROVIDE ADEQUATE PROTECTION OVER THE LONG TERM, THE MOST SIGNIFICANT DIFFERENCES BETWEEN ALTERNATIVES 3A, 3B, 4A, 4B, 5A, AND 5B RELATE TO THEIR LONG-TERM RELIABILITY. ALTERNATIVES 3A AND 3B WOULD PROVIDE ONLY SLIGHTLY GREATER RELIABILITY SINCE ONLY A VERY SMALL PORTION OF THE TOTAL MASS OF CONTAMINANTS WOULD BE TREATED. ALTERNATIVES 4A AND 4B WOULD BE NEARLY AS RELIABLE AS ALTERNATIVES 5A AND 5B, SINCE THE CONTAMINATED SOIL NEAR THE GROUND SURFACE WOULD BE REMOVED AND TREATED. ALTERNATIVE 6 WOULD PROVIDE THE HIGHEST DEGREE OF LONG-TERM EFFECTIVENESS SINCE NO CONTAMINATED MEDIA WOULD BE LEFT AT THE SITE FOLLOWING COMPLETION OF THE WORK (INCLUDING THE REMOVAL OF THE DIOXIN-CONTAMINATED MATERIAL IN THE VAULT). ALTERNATIVE 6 IS THE ONLY ALTERNATIVE THAT DOES NOT RELY ON LONG-TERM MAINTENANCE OR MONITORING.

9.4 REDUCTION OF TOXICITY, MOBILITY, OR VOLUME

ALTERNATIVE 6 WOULD ACHIEVE THE GREATEST LEVEL OF TOXICITY REDUCTION BY TREATING ALL CONTAMINATED SOIL. IT SHOULD BE NOTED, HOWEVER, THAT THE MASS OF CONTAMINANTS REMOVED IS NOT DIRECTLY PROPORTIONAL TO THE VOLUME OF SOIL TREATED. FOR EXAMPLE, THE INCREMENTAL MASS OF CONTAMINANTS REMOVED IN ALTERNATIVE 6 IS ONLY 20 PERCENT MORE THAN THE CONTAMINANT MASS REMOVED IN ALTERNATIVES 5A OR 5B, ALTHOUGH ALTERNATIVE 6 TREATS OVER 54 PERCENT MORE SOIL (BY VOLUME) THAN ALTERNATIVES 5A OR 5B.

UNDER ALTERNATIVES 3B, 4B, AND 5B, GROUNDWATER TREATMENT WOULD NOT ACHIEVE A MAJOR REDUCTION IN THE TOXICITY OF CONTAMINANTS ON-SITE. LESS THAN 10 PERCENT OF THE MASS OF CONTAMINANTS ON-SITE ARE ESTIMATED TO BE PRESENT IN THE SATURATED SOIL AND GROUNDWATER. MUCH MORE SIGNIFICANT REDUCTIONS IN THE TOXICITY OF THE CONTAMINANTS ON-SITE WOULD BE ACHIEVED WITH SOIL THERMAL TREATMENT. IT IS ESTIMATED THAT ALTERNATIVES 4A AND 4B WOULD ACHIEVE A 5 PERCENT REDUCTION IN THE VOLUME OF CONTAMINATED SOIL, AND THAT ALTERNATIVES 5A AND 5B WOULD ACHIEVE A 60 PERCENT REDUCTION.

ALTERNATIVE 3A WOULD USE THE LEAST AMOUNT OF TREATMENT BY THERMALLY TREATING 300 C.Y. OF CONTAMINATED SOIL AND AN UNDETERMINED AMOUNT OF DEBRIS.

9.5 SHORT-TERM EFFECTIVENESS

ALTERNATIVES 3A AND 3B WOULD PROVIDE THE MOST IMMEDIATE BENEFITS AND LEAST SHORT-TERM RISK TO THE COMMUNITY. ALL ALTERNATIVES WOULD RESULT IN A SMALL, TEMPORARY INCREASE IN RISK TO THE COMMUNITY FROM GENERATION OF CONTAMINATED DUST. THIS POTENTIAL RISK WOULD BE SLIGHTLY GREATER FOR ALTERNATIVES THAT INVOLVE EXCAVATION AND THERMAL TREATMENT BECAUSE OF MORE EXTENSIVE SOIL HANDLING AND THE POTENTIAL RELEASE OF VOCS DURING EXCAVATION. THESE RISKS WOULD BE MITIGATED USING COMMON CONSTRUCTION TECHNIQUES TO MINIMIZE DUST. AMBIENT AIR MONITORING DURING CONSTRUCTION WOULD INDICATE WHETHER THERE WAS ANY NEED FOR ADDITIONAL MITIGATIVE MEASURES.

ALTERNATIVES THAT PROVIDE GROUNDWATER CONTROL WOULD ACHIEVE THEIR GOAL MUCH FASTER (APPROXIMATELY 2 YEARS FOLLOWING IMPLEMENTATION) THAN GROUNDWATER COLLECTION AND TREATMENT (MORE THAN 50 YEARS). RESTRICTIONS ON GROUNDWATER USE WOULD PREVENT DIRECT EXPOSURE DURING DE-WATERING OF THE SITE AQUIFER.

TO ASSESS POTENTIAL AQUATIC IMPACTS DURING DEWATERING OF THE SITE AQUIFER, ESTIMATED CONCENTRATIONS IN THE SURFACE WATER WERE COMPARED TO FEDERAL AWQCS AND TO BOTH PROPOSED AND EXISTING OHIO WATER QUALITY STANDARDS. COMPARISONS WERE MADE BOTH INSIDE AND OUTSIDE THE MIXING ZONE. THE PREDICTED SURFACE WATER CONCENTRATIONS OUTSIDE THE MIXING ZONE WERE MADE BY DILUTING THE HIGHEST GROUNDWATER CONTAMINANT CONCENTRATIONS WITH THE CREEK FLOW ESTIMATES. AS GROUNDWATER DISCHARGES TO THE CREEK, THERE WOULD BE APPROXIMATELY A 60 TO 1 DILUTION RATIO OF CREEK WATER TO GROUNDWATER. MOST OF THE CHEMICALS IN THE GROUNDWATER ARE VOCS AND WOULD BE EXPECTED TO VOLATILIZE ONCE THEY ARE DISCHARGED TO THE CREEK. THEREFORE, THE PREDICTED SURFACE WATER CONCENTRATIONS ARE SEEN TO BE CONSERVATIVE ESTIMATES. NONE OF THE ESTIMATED SURFACE WATER CONCENTRATIONS OUTSIDE THE MIXING ZONE EXCEEDED ANY OF THE FEDERAL AWQCS.

INSIDE THE MIXING ZONE, THE SURFACE WATER CONTAMINANT CONCENTRATIONS WERE ASSUMED TO BE THE MAXIMUM GROUNDWATER CONTAMINANT CONCENTRATIONS TO PRECLUDE ANY ASSUMPTIONS ABOUT DILUTION EFFECTS (ACTUAL CONTAMINANT LEVELS SHOULD BE LOWER DUE TO DILUTION). SEPARATE FEDERAL MIXING ZONE CRITERIA WERE NOT AVAILABLE, SO THE MIXING ZONE CONCENTRATIONS WERE COMPARED DIRECTLY TO FEDERAL AWQCS. MIXING ZONE CONCENTRATIONS EXCEEDED THE FEDERAL AWQCS FOR DDT AND HEXAVALENT CHROMIUM. NO OTHER CHEMICALS EXCEEDED THE FEDERAL AWQCS.

THE OHIO WATER QUALITY STANDARDS CONTAIN ACUTE CRITERIA WITHIN THE MIXING ZONE. NO MIXING ZONE CONCENTRATIONS EXCEEDED ANY OF THESE ACUTE STANDARDS.

IT IS IMPORTANT TO NOTE THE VERY CONSERVATIVE ASSUMPTIONS USED IN THIS DETERMINATION. THE ASSUMPTIONS ARE AS FOLLOWS:

- * DDT WAS ONLY DETECTED IN ONE MONITORING WELL ON-SITE, BUT IT WAS ASSUMED THE CONTAMINANT EXISTED AT THIS CONCENTRATION IN A MUCH LARGER AREA (THE ENTIRE FLOW TUBE) FOR THE PURPOSES OF THE RISK ASSESSMENT.

- * ANALYSIS OF GROUNDWATER WAS PERFORMED FOR TOTAL CHROMIUM (HEXAVALENT AND TRIVALENT) CONCENTRATION, BUT THE RISK ASSESSMENT ASSUMED THE CHROMIUM CONCENTRATION WAS ENTIRELY DUE TO HEXAVALENT CHROMIUM.

- * THE MAXIMUM CHEMICAL CONCENTRATION DETECTED IN EACH FLOW TUBE IS CONSIDERED TO REPRESENT THE CHEMICAL CONCENTRATION OF THE ENTIRE FLOW TUBE.

THE RESULT OF THE CONSERVATIVE APPROACH TO THE WATER QUALITY INVESTIGATION WAS THE FINDING THAT EVEN IN THE WORST POSSIBLE CASE, AWQCS WOULD ONLY BE EXCEEDED FOR TWO CONTAMINANTS, THE PERIOD OF EXCEEDENCE WOULD BE BRIEF, AND THE WATER QUALITY STANDARDS WILL NOT BE EXCEEDED AT THE COMPLETION OF THE REMEDY (WHEN THE AQUIFER IS DE-WATERED).

ALTERNATIVES THAT INCLUDE THERMAL TREATMENT POSE A POSSIBLE INCREASED RISK TO THE COMMUNITY FROM THERMAL TREATMENT EMISSIONS. PROPER OPERATION OF THERMAL TREATMENT UNIT WILL NOT POSE A SIGNIFICANT INCREASE IN RISK TO THE COMMUNITY. ALTERNATIVES 3A AND 3B WOULD EXPOSE THE PUBLIC TO THIS POSSIBLE RISK FOR THE SHORTEST AMOUNT OF TIME.

ALTERNATIVES THAT INCLUDE THERMAL TREATMENT OF SOIL WOULD NOT ACHIEVE REMEDIAL ACTION GOALS AS QUICKLY AS CONTAINMENT-ONLY ALTERNATIVES. THE INCREASED TIME REQUIRED FOR THERMAL TREATMENT WOULD BE 4 MONTHS FOR ALTERNATIVES 3A AND 3B, 8 MONTHS FOR ALTERNATIVE 4A AND 4B, 20 MONTHS FOR ALTERNATIVE 5A AND 5B, AND 30 MONTHS FOR ALTERNATIVE 6.

9.6 IMPLEMENTABILITY

OF THE ALTERNATIVES INVOLVING THERMAL TREATMENT, ALTERNATIVE 3A WOULD BE THE EASIEST ALTERNATIVE TO IMPLEMENT, REQUIRING A CAP AND CONSTRUCTION OF THE DIVERSION TRENCH BUT NOT REQUIRING PERMITS FOR DISCHARGE OF TREATED GROUNDWATER TO THE CREEK. IMPLEMENTATION OF ALTERNATIVE 3A WOULD BE COMPLICATED BY THE NEED FOR MOBILIZING, STARTUP, AND TESTING OF AN ON-SITE INCINERATOR, BUT THIS REQUIREMENT HOLDS TRUE FOR ALL ALTERNATIVES OTHER THAN ALTERNATIVES 1 OR 2.

ADDITIONAL OBSTACLES TO IMPLEMENTING ALTERNATIVE 3B INCLUDE THE PERMITTING, CONSTRUCTION, AND OPERATION OF THE GROUNDWATER COLLECTION AND TREATMENT SYSTEM. AN NPDES PERMIT WOULD BE REQUIRED FOR DISCHARGE OF TREATED EFFLUENT TO CEMETERY CREEK. ALTERNATIVES 4A AND 4B, 5A AND 5B, AND 6 WOULD BE PROGRESSIVELY MORE DIFFICULT TO IMPLEMENT, REQUIRING TREATMENT OF INCREMENTALLY GREATER QUANTITIES OF SOIL. OTHER THAN THE TIME REQUIRED TO COMPLETE THE TREATMENT ACTION, THERE ARE FEW DIFFERENCES BETWEEN THE IMPLEMENTABILITY ASPECTS OF ALTERNATIVES 4A AND 4B, 5A AND 5B, AND 6.

9.7 COST

THE MOST SIGNIFICANT FACTOR AFFECTING CAPITAL COST IS THE QUANTITY OF SOIL TREATED. SOME ECONOMY OF SCALE WOULD BE ACHIEVED FOR THERMAL TREATMENT OF GREATER VOLUMES OF SOIL SINCE MOBILIZATION AND DEMOBILIZATION COSTS WOULD BE ESSENTIALLY THE SAME BETWEEN ALTERNATIVES. USE OF AN INCINERATOR ALREADY MOBILIZED ON-SITE (LIKE THE ONE REQUIRED FOR THE SOURCE REMOVAL OPERABLE UNIT) WOULD SIGNIFICANTLY REDUCE COST OF THESE TWO ALTERNATIVES. AN ESTIMATED \$3 MILLION TO \$4 MILLION OF THE CAPITAL COST ASSOCIATED WITH THE MOBILIZATION, STARTUP, TESTING, AND DEMOBILIZATION OF THE ON-SITE INCINERATOR COULD BE DEDUCTED FROM THE ESTIMATED CAPITAL COST IF THE TREATMENT UNIT FOR THE SOURCE REMOVAL OPERABLE UNIT REMEDIAL ACTION WERE ALREADY ON-SITE, TESTED, AND AVAILABLE.

BECAUSE THE COST OF CAPPING IS GREATER THAN THE COST OF A SOIL COVER, THE "A" ALTERNATIVES HAVE A HIGHER CAPITAL COST THAN THE "B" COUNTERPARTS. "B" ALTERNATIVES HAVE A HIGHER O&M COST BECAUSE OF OPERATION OF THE GROUNDWATER TREATMENT FACILITY.

9.8 STATE ACCEPTANCE

THE STATE OF OHIO DOES NOT CONCUR WITH THE US EPA'S SELECTION OF ALTERNATIVE 3A AS THE PREFERRED REMEDIAL

ALTERNATIVE FOR THE LASKIN POPLAR OIL SITE. THE STATE HAS EXPRESSED A PREFERENCE FOR ALTERNATIVE 6.

9.9 COMMUNITY ACCEPTANCE

THE US EPA'S PREFERRED REMEDIAL ALTERNATIVE FOR THE LASKIN POPLAR OIL SITE WAS PRESENTED AT THE START OF THE PUBLIC COMMENT PERIOD THROUGH DISTRIBUTION OF A FACT SHEET, PUBLICATION OF DISPLAY ADVERTISEMENTS IN THE ASHTABULA COUNTY SENTINEL, ON APRIL 17 AND 24; THE JEFFERSON GAZETTE, ON APRIL 20; THE VALLEY NEWS, ON APRIL 12 AND 19; AND THE PYMA NEWS, ON APRIL 12 AND 19. THE ADVERTISEMENT INFORMED THE PUBLIC OF THE PLACEMENT OF THE PROPOSED PLAN AND PUBLIC COMMENT FS IN THE SITE INFORMATION REPOSITORIES. A FORMAL PUBLIC MEETING TO DISCUSS THE PROPOSED PLAN WAS HELD IN JEFFERSON, OHIO ON APRIL 26, 1989. COMMENTS RECEIVED INDICATE THAT MOST RESIDENTS ARE SUPPORTIVE OF THE US EPA'S PREFERRED ALTERNATIVE.

SEVERAL RESIDENTS EXPRESSED CONCERN ABOUT THE US EPA'S PROPOSED INCINERATION OF WASTES AND CONTAMINATED SOILS. CITIZENS ARE CONCERNED THAT THE US EPA PROVIDE CLOSE INSPECTION AND OVERSIGHT DURING THE ACTUAL INCINERATION PROCESS AT THE SITE. CITIZENS ARE MAINLY CONCERNED ABOUT EMISSIONS FROM THE INCINERATOR STACK ENTERING THE AIR, AND NOISE DURING INCINERATOR OPERATIONS. RESIDENTS REQUESTED THAT A STRICT MONITORING PROGRAM BE ENFORCED AND THAT THE US EPA MAKE SURE THAT THE RESULTS ARE PROVIDED TO THE PUBLIC. IT IS RECOMMENDED THAT THE US EPA FACILITATE A MEANS OF INFORMAL CONTACT WITH THE LOCAL COMMUNITY BY SETTING UP A NETWORK WITH COMMUNITY REPRESENTATIVES. FURTHER, THE US EPA WILL REQUIRE THAT CORRECTIVE ACTION PROGRAM OPTIONS BE DEVELOPED AS PART OF THE MONITORING PROGRAM. THIS WILL ALLOW PROMPT RESPONSE IF EMISSIONS EXCEED LEVELS AT ANY COMPLIANCE POINT IN THE MONITORING SYSTEM.

FINALLY, SEVERAL RESIDENTS EXPRESSED CONCERN THAT THE US EPA'S PREFERRED ALTERNATIVE REPRESENTS A CONCEPTUAL DESIGN, SPECIFIC ELEMENTS OF WHICH WILL BE DETERMINED LATER WITH LIMITED INPUT FROM LOCAL RESIDENTS. TO ADDRESS THIS CONCERN, THE US EPA WILL CONSIDER EXTENDING THE LASKIN POPLAR OIL INFORMATION COMMITTEE THROUGH THE REMEDIAL DESIGN/REMEDIAL ACTION PHASE OF THIS PROJECT.

PUBLIC COMMENTS ON THE PROPOSED PLAN AND THE FS ARE ADDRESSED IN THE RESPONSIVENESS SUMMARY, ATTACHED TO THIS DOCUMENT.

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10.0 THE SELECTED REMEDY

BASED ON THE FINDINGS OF THE REMEDIAL INVESTIGATION AND THE FEASIBILITY STUDY, AND THE EVALUATION OF THE NINE CRITERIA FOR THE LASKIN POPLAR OIL SITE, THE US EPA HAS SELECTED ALTERNATIVE 3A. IN THE JUDGEMENT OF THE US EPA, ALTERNATIVE 3A REPRESENTS THE BEST BALANCE AMONG THE EVALUATION CRITERIA AND SATISFIES THE STATUTORY REQUIREMENTS OF PROTECTIVENESS, COMPLIANCE WITH ARARS, COST-EFFECTIVENESS, THE UTILIZATION OF PERMANENT SOLUTIONS AND TREATMENT TO THE MAXIMUM EXTENT PRACTICABLE.

THE MAJOR COMPONENTS OF THE SELECTED REMEDY CONSIST OF THE FOLLOWING:

- * DRAIN RETENTION AND FRESHWATER PONDS. DISCHARGE SURFACE WATER FROM PONDS TO CEMETERY CREEK, WITH TREATMENT IF REQUIRED. BACKFILL FRESHWATER POND WITH CLEAN FILL AND GRADE RETENTION POND AREA.
- * THERMALLY TREAT CONTAMINATED SOIL, ASH, AND DEBRIS FROM THE BOILER HOUSE AREA AND DISPOSE OF ASH ON-SITE (IF DELISTABLE) OR OFF-SITE IN A RCRA LANDFILL.
- * DEMOLISH AND THERMALLY TREAT OR DECONTAMINATE DIOXIN-CONTAMINATED STRUCTURES. IF MATERIAL CAN NOT BE DECONTAMINATED OR THERMALLY TREATED, CONTAIN MATERIAL IN AN ON-SITE CONCRETE VAULT AND PLACE BENEATH THE CAP FOR TEMPORARY STORAGE UNTIL PROPER EFFECTIVE DISPOSAL CAN BE SECURED FOR THE MATERIAL.

- * CONSTRUCT A GROUNDWATER DIVERSION TRENCH UP-GRADIENT OF THE CONTAMINATED SOIL AND GROUNDWATER.
- * CONSTRUCT A MULTI-LAYER CAP OVER SOILS IN EXCEEDANCE OF 10(-6) EXCESS LIFETIME CANCER RISK LEVEL OR TOTAL HAZARD INDEX OF 1.
- * DE-WATER SITE BY NATURAL GROUNDWATER FLOW TO CEMETERY CREEK.
- * CONDUCT GROUNDWATER AND SURFACE WATER MONITORING TO ASSESS QUALITY OF GROUNDWATER MIGRATING TOWARDS CEMETERY CREEK.
- * IMPOSE ACCESS AND USE RESTRICTIONS.

ALTERNATIVE 3A PROVIDES TREATMENT OF CONTAMINATED MATERIAL FROM THE BOILER HOUSE AREA. WHILE THIS TREATMENT MAY NOT BE CONSIDERED A PRIMARY COMPONENT OF ALTERNATIVE 3A, THE PRINCIPAL THREAT OF THE LASKIN POPLAR OIL SITE IS BEING ADDRESSED WITH THE THERMAL TREATMENT OF WASTE OILS, SLUDGE, AND SATURATED SOILS IN THE SOURCE REMOVAL OPERABLE UNIT.

ALTERNATIVE 3A ADDRESSES ALL REMAINING PUBLIC HEALTH AND ENVIRONMENTAL THREATS POSED BY CONTAMINATED MEDIA AT THE SITE NOT ADDRESSED BY THE SOURCE REMOVAL OPERABLE UNIT.

10.1 DRAIN FRESHWATER AND RETENTION PONDS

THE FRESHWATER AND RETENTION PONDS ON-SITE WOULD BE DRAINED TO CEMETERY CREEK TO REDUCE INFILTRATION TO GROUNDWATER, AND THE FRESHWATER POND WOULD BE FILLED WITH CLEAN FILL. THE RETENTION POND WOULD BE REGRADED. SAMPLING OF SURFACE WATER WOULD BE CONDUCTED PRIOR TO DISCHARGING SURFACE WATER INTO CEMETERY CREEK. IF LEVELS DETECTED EXCEED THE OHIO WATER QUALITY STANDARDS, OR THE FEDERAL AWQCS, TREATMENT WILL BE REQUIRED PRIOR TO DISCHARGING WATER. FURTHER ANALYSIS FOR WATERS OF BOTH PONDS WILL BE REQUIRED AT THE TIME OF DISCHARGE TO VERIFY THAT THE DISCHARGE WILL CAUSE NO VIOLATION OF NPDES REQUIREMENTS.

10.2 STRUCTURES

THE BOILER HOUSE WILL BE DEMOLISHED AND DECONTAMINATED OR THERMALLY TREATED. IF THE DIOXIN-CONTAMINATED STRUCTURES CANNOT BE DECONTAMINATED OR THERMALLY TREATED, THEY WILL BE DISPOSED OF IN A CONCRETE VAULT ON-SITE. ANY UNTREATED CONTAMINATED SOILS, ASH, AND DEBRIS FROM WITHIN IN THE BOILER HOUSE WILL ALSO BE DISPOSED OF IN THE CONCRETE VAULT ON-SITE. THE CONCRETE VAULT WILL BE PLACED ON-SITE BENEATH THE SOIL COVER. THE STORAGE OF DIOXIN MATERIAL IS A TEMPORARY MEASURE UNTIL A TECHNOLOGY IS DEVELOPED AND PROVEN TO ADDRESS DIOXIN MATERIAL. THIS DIOXIN-CONTAMINATED MATERIAL WILL BE REMOVED AND DISPOSED OF WHEN APPROPRIATE TREATMENT IS AVAILABLE, AND THE STORAGE VAULT WILL BE MONITORED AND MAINTAINED IN THE INTERIM.

THE GREENHOUSE STRUCTURES WOULD BE DISMANTLED AND DECONTAMINATED. CONTAMINATED SOILS FROM WITHIN THE GREENHOUSE AREA WOULD BE CONSOLIDATED WITH CONTAMINATED SOILS NEAR THE PITS AND TANKS, TO BE PLACED UNDER THE CAP. THE GREENHOUSE AREA WOULD THEN BE REGRADED AND VEGETATED TO ALLOW FOR PROPER DRAINAGE.

10.3 MULTI-LAYER CAP

CONTAMINATED SOILS FROM THE GREENHOUSE (APPROXIMATELY 500 C.Y.) WOULD BE CONSOLIDATED WITH APPROXIMATELY 57,000 C.Y. OF CONTAMINATED SOILS THAT EXCEED A 1X10(-6) EXCESS CANCER RISK AND TOTAL HAZARD INDEX GREATER THAN 1.0. THE CONTAMINATED SOILS WOULD BE CONTAINED BENEATH A SOIL/GEOMEMBRANE MULTI-LAYER CAP APPROXIMATELY 3.5 ACRES IN SIZE. THE CAP COVER WOULD PREVENT DIRECT CONTACT WITH CONTAMINATED SOILS AND THE GEOMEMBRANE/GEOTEXTILE LINER WOULD SIGNIFICANTLY REDUCE THE INFILTRATION OF SURFACE WATER THROUGH THE COVER. THE CAP WOULD MEET THE STATE OF OHIO REQUIREMENTS FOR LANDFILL CLOSURE AND THOSE OUTLINED UNDER 40 CFR SS 264.310.

WHILE THE CAP SPECIFICATIONS WILL BE FINALIZED IN THE DESIGN PROCESS, IT IS ANTICIPATED THAT THE CAP WILL CONSIST OF A GEOMEMBRANE/GEOTEXTILE LINER OVERLAIN BY A DRAINAGE LAYER, A GEOTEXTILE FILTER, A LAYER OF FILL

SOIL, AND A LAYER OF TOPSOIL. INFILTRATION COLLECTED BY THE DRAINAGE LAYER WILL BE DISCHARGED TO CEMETERY CREEK. TO PROVIDE A STABLE SLOPE FOR THE CAP, ABOUT 26,000 C.Y. OF CONTAMINATED SOIL WOULD BE MOVED TO ACHIEVE THE DESIRED GRADING. AN ESTIMATED 50,000 C.Y. OF CLEAN SOIL WOULD BE IMPORTED TO CONSTRUCT THE CAP. THE CAP WOULD NOT EXTEND INTO THE FLOODPLAIN AREA AROUND CEMETERY CREEK.

10.4 GROUNDWATER CONTROL

GROUNDWATER FLOWING TOWARD THE SITE WOULD BE DIVERTED TO CEMETERY CREEK. A DIVERSION TRENCH WOULD BE CONSTRUCTED UP-GRADIENT OF THE CAPPED AREA, IN ORDER TO INTERCEPT ALL GROUNDWATER FLOW IN THE SHALLOW AQUIFER MOVING NORTHWARD TOWARD THE SITE. A DRAIN IN THE TRENCH WOULD CONDUCT THE INTERCEPTED FLOW DIRECTLY TO CEMETERY CREEK. TREATMENT WOULD NOT BE REQUIRED BECAUSE THE UPGRADIENT GROUNDWATER IS NOT CONTAMINATED. ALTHOUGH THE TRENCH AND CAP WOULD DE-WATER THE SITE, GROUNDWATER AND SURFACE WATER MONITORING WOULD STILL BE PROVIDED BECAUSE HAZARDOUS SUBSTANCES WOULD BE CONTAINED ON-SITE. SDWA MCLS WOULD NOT APPLY DUE TO THE DEWATERING OF THE AQUIFER BENEATH THE SITE.

UNDER ALTERNATIVE 3A, A LONG-TERM MONITORING PROGRAM WOULD BE IMPLEMENTED TO MONITOR CONTAMINANT CONCENTRATIONS AND MIGRATION. THIS PROGRAM WOULD INCLUDE THE INSTALLATION OF ADDITIONAL MONITORING WELLS NORTH OF THE LASKIN POPLAR OIL SITE. THE MONITORING PROGRAM WOULD BE DESIGNED TO ASSESS THE QUALITY OF GROUNDWATER REACHING CEMETERY CREEK. ADDITIONALLY, THE PROGRAM WOULD SAMPLE WATER FROM THE UPPER AND LOWER AQUIFERS THAT MAY FLOW UNDER CEMETERY CREEK AND JOIN REGIONAL GROUND-WATER FLOW. AT A MINIMUM, THE PROGRAM WOULD MEET THE SUBSTANTIVE REQUIREMENTS FOR GROUND-WATER MONITORING UNDER THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) AS DESCRIBED IN 40 CFR PART 264, SUBPART F.

WATER IN CEMETERY CREEK WILL BE MONITORED TO ENSURE NO SHORT TERM ACUTE HEALTH RISK TO EXPOSED INDIVIDUALS OR AQUATIC ORGANISMS DURING THE DEWATERING OF THE SHALLOW AQUIFER BENEATH THE SITE.

ALTERNATIVE 3A RELIES MAINLY ON CONTAINMENT, INSTITUTIONAL CONTROLS, AND MONITORING. CONTAINMENT OF SOIL PREVENTS EXPOSURE TO CONTAMINATED SOILS. RESTRICTING GROUND-WATER USE ON-SITE WOULD BE EFFECTIVE IN ELIMINATING RISKS FROM DRINKING THIS GROUND WATER. FENCING WOULD RESTRICT ACCESS TO THE SITE. POTENTIAL FUTURE RISKS, AS DESCRIBED IN SECTION 10.8, WOULD BE REDUCED.

THE TRENCH WOULD CONSIST OF A BIODEGRADABLE SLURRY LINED WITH A GEOTEXTILE FILTER. THE TRENCH WOULD BE APPROXIMATELY 1,170 FEET LONG, AND WOULD BE EXCAVATED TO A DEPTH RANGING BETWEEN 26 AND 40 FEET. THE TRENCH WOULD BE BACK FILLED WITH GRAVEL TO A DEPTH OF ABOUT 5 FEET BELOW THE EXISTING GROUND SURFACE. CLEAN FILL WOULD BE PLACED ABOVE THE GRAVEL.

10.5 INCINERATION OF CONTAMINATED MATERIAL

ALTERNATIVE 3A PROPOSES TO INCINERATE APPROXIMATELY 300 C.Y. OF CONTAMINATED MATERIAL FROM THE BOILER HOUSE AREA. THIS CONTAMINATED MATERIAL WOULD BE IN ADDITION TO THE EXISTING VOLUME OF CONTAMINATED MATERIAL TO BE INCINERATED IN THE SROU. THE RESIDUE ASH WOULD BE TESTED FOR HAZARDOUS CONSTITUENTS, AND HAZARDOUS CHARACTERISTICS (RCRA CHARACTERISTIC WASTE TESTS). ANALYTICAL RESULTS WOULD BE COMPARED TO THE US EPA'S DELISTING CRITERIA. IF LEVELS DO NOT EXCEED THE DELISTING CRITERIA, THE RESIDUE ASH WOULD BE DISPOSED OF ON-SITE BENEATH THE CAP. IF THE ASH DOES NOT MEET THE DELISTING CRITERIA, THE ASH WOULD BE DISPOSED OF OFF-SITE IN A RCRA HAZARDOUS WASTE FACILITY. THE ASH RESIDUE MUST MEET THE RCRA TREATMENT STANDARDS FOR INCINERATION OF SOIL CONTAINING HAZARDOUS WASTE OUTLINED IN 40 CFR 264.343. THESE STANDARDS INCLUDE A DRE OF 99.99% FOR SOLVENTS AND MIXED ORGANICS, AND A DRE OF 99.9999% FOR DIOXIN. 40 CFR 761.70 SPECIFIES A REQUIRED DRE OF 99.9999% FOR INCINERATION OF PCBS IN CONCENTRATIONS GREATER THAN 50 PARTS PER MILLION (PPM).

10.6 CONCRETE VAULT

DIOXIN-CONTAMINATED DEBRIS THAT CAN NOT BE DECONTAMINATED OR TREATED WOULD BE DISMANTLED AND PLACED IN A CONCRETE VAULT MEETING RCRA TANK AND STORAGE REQUIREMENTS. THE CONCRETE VAULT WOULD HAVE TO CONTAIN APPROXIMATELY 600 C.Y. OF MATERIAL (BASED ON A CONSERVATIVE ESTIMATE) AND WOULD BE PLACED BENEATH THE CAP. CONTAINMENT OF THESE MATERIALS WOULD BE TEMPORARY UNTIL TREATMENT OR DISPOSAL TECHNOLOGIES BECOME AVAILABLE FOR DIOXIN-CONTAMINATED MATERIALS.

10.7 GROUNDWATER AND LAND USE RESTRICTIONS

RESTRICTIONS ON GROUNDWATER USE FOR DRINKING WATER PURPOSES WOULD BE PLACED ON THE LASKIN POPLAR OIL SITE. CURRENTLY THERE ARE NO RESIDENTIAL WELLS LOCATED ON THE STRIP OF LAND BETWEEN THE SITE AND CEMETERY CREEK. ALTHOUGH GROUNDWATER BENEATH THE AREA BETWEEN THE SITE AND CEMETERY CREEK IS NOT CONTAMINATED, GROUNDWATER SHOULD NOT BE USED FOR DRINKING WATER. AFTER THE SITE IS DE-WATERED, THERE WILL BE ESSENTIALLY NO GROUNDWATER AVAILABLE FOR ANY PURPOSE.

RESTRICTIONS WOULD BE PLACED ON FUTURE USE OF THE SITE TO MAINTAIN THE INTEGRITY AND PERFORMANCE OF THE REMEDIAL ALTERNATIVE. THE RESTRICTIONS WOULD BE IMPOSED TO PROHIBIT SITE USE, LAND DEVELOPMENT, AND GROUNDWATER EXTRACTION. FOR EXAMPLE, A RESTRICTIVE COVENANT OR SIMILAR PROVISION WOULD BE IMPOSED ON THE PROPERTY, PLACING FUTURE OWNERS ON NOTICE OF SITE CONDITIONS AND BARRING THEM FROM CONSTRUCTION OR EXCAVATION THAT WOULD DAMAGE THE REMEDY. ACCESS RESTRICTIONS WOULD ALSO BE ENFORCED TO PREVENT ANY INTERFERENCE OR VANDALISM AT THE SITE.

10.8 REDUCTION OF SITE RISKS

STRINGENT HEALTH AND SAFETY MEASURES WILL BE TAKEN DUE TO THE HEAVY EQUIPMENT AND INTENSE CLEAN-UP OPERATIONS DURING CONSTRUCTION OF THE REMEDIAL ALTERNATIVE. MEASURES WILL BE TAKEN TO ENSURE THE HEALTH AND SAFETY OF WORKERS ON-SITE AS WELL AS THE LOCAL RESIDENTS NEAR THE SITE. THE US EPA RECOMMENDS THAT ON-SITE RESIDENTS TEMPORARILY RELOCATE DURING CONSTRUCTION OF THE REMEDY FOR SAFETY REASONS.

10.9 COST

THE TOTAL ESTIMATED PRESENT WORTH OF ALTERNATIVE 3A IS \$11,000,000 WHICH INCLUDES AN ANNUAL OPERATION AND MAINTENANCE PRESENT WORTH OF APPROXIMATELY \$1,000,000. THESE COSTS ARE BASED ON A PRESENT WORTH VALUE OF 30 YEARS AND DISCOUNT RATE OF 5%. BASED ON THE ASSUMPTION THAT AN INCINERATOR WOULD BE OPERATING ON-SITE PRIOR TO THE IMPLEMENTATION OF THIS ALTERNATIVE, THE ESTIMATED ACTUAL PRESENT WORTH OF ALTERNATIVE 3A IS LESS THAN \$11,000,000. THE COSTS ASSOCIATED WITH SITE PREPARATION, MOBILIZATION, AND DEMOBILIZATION FOR THE INCINERATOR RANGE BETWEEN \$3,000,000 AND \$4,000,000. THE BURNING OF THE CONTAMINATED MATERIAL FROM THE BOILER HOUSE AREA WOULD BE ABOUT \$400,000. IF THE INCINERATOR IS ALREADY OPERATING AND COULD BE USED IN THE FINAL REMEDIAL ACTION, THE TOTAL ESTIMATED PRESENT WORTH FOR ALTERNATIVE 3A COULD BE \$7,000,000 TO \$8,000,000. THE ESTIMATED TIME TO COMPLETE ALTERNATIVE 3A IS 2 YEARS. FIGURE 10-1 DISPLAYS THE DIVERSION TRENCH, MULTI-LAYER CAP, AND DIOXIN VAULT COMPONENTS OF ALTERNATIVE 3A.

#SD

11.0 STATUTORY DETERMINATIONS

11.1 THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT

THE REMEDIAL ALTERNATIVE SELECTED FOR THE LASKIN POPLAR OIL SITE WILL ELIMINATE CURRENT AND POTENTIAL FUTURE RISKS TO HUMAN HEALTH AND THE ENVIRONMENT BY THE FOLLOWING MEANS:

- * INCINERATING CONTAMINATED ASH, SOIL, AND DEBRIS FROM THE BOILER HOUSE AREA.
- * PREVENTING EXPOSURE TO CONTAMINATED SOILS BY CAPPING CONTAMINATED SOILS WITH AN IMPERMEABLE MULTI-LAYER CAP, AND WITH RESTRICTIONS ON FUTURE USE.
- * PREVENTING EXPOSURE TO CONTAMINATED GROUND WATER BY RESTRICTING GROUNDWATER USE AND DEWATERING THE SITE AQUIFER.
- * LIMITING FUTURE GROUND-WATER CONTAMINATION BY SIGNIFICANTLY REDUCING INFILTRATION THROUGH CONTAMINATED SOILS. THE EFFECTIVENESS OF THE CAP WILL BE EVALUATED BY A LONG-TERM GROUNDWATER MONITORING PROGRAM. THE PROGRAM WILL REQUIRE

REGULAR AND SYSTEMATIC SAMPLING OF MONITORING WELLS NORTH OF THE SITE.

11.2 THE SELECTED REMEDY ATTAINS ARARS

THE SELECTED REMEDY WILL MEET OR ATTAIN ALL APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL AND STATE REQUIREMENTS. THESE REQUIREMENTS ARE LISTED BELOW.

CHEMICAL SPECIFIC

- * SINCE THE AQUIFER WILL BE DE-WATERED AT THE COMPLETION OF THE REMEDIAL ACTION, MCLS PROMULGATED UNDER THE SDWA WILL NOT APPLY UPON COMPLETION OF THE REMEDY. ADMINISTRATIVE CONTROLS WILL BE USED TO PREVENT USE OF GROUNDWATER IN THE INTERIM.
- * OHIO WATER QUALITY STANDARDS LISTED IN OAC CHAPTER 3745. DISCHARGES TO CEMETERY CREEK FROM THE ON-SITE AQUIFER PRIOR TO COMPLETION OF THE DEWATERING PROCESS ARE NOT ANTICIPATED TO CAUSE THESE STANDARDS TO BE VIOLATED. THE WATER IN THE CREEK WILL BE MONITORED TO VERIFY NO ACUTE RISK TO HUMAN HEALTH AND THE ENVIRONMENT. THE STANDARDS WILL BE MET UPON COMPLETION OF THE DE-WATERING PROCESS.
- * HEALTH-BASED SOIL TO-BE-CONSIDERED (TBC) CRITERIA WILL BE MET BY PREVENTING DIRECT CONTACT WITH THE SOIL BY USE OF A MULTI-MEDIA CAP.

LOCATION SPECIFIC

- * FILL MATERIAL MAY BE PLACED IN THE FLOOD PLAIN OF CEMETERY CREEK DURING THE CONSTRUCTION PHASE OF THE REMEDY. MITIGATING MEASURES WILL BE USED TO ENSURE NO VIOLATION OF 40 CFR SS 264.18 OR EXECUTIVE ORDER 11988.
- * FILL MATERIAL MAY BE PLACED IN A WETLAND DURING THE CONSTRUCTION PHASE OF THE REMEDY. MITIGATING MEASURES WILL BE USED TO ENSURE NO VIOLATION OF EXECUTIVE ORDER 11990.
- * THE REMEDY WILL MEET THE INTENT OF THE GREAT LAKES WATER QUALITY AGREEMENT IN SECTION 118 OF THE CLEAN WATER ACT.

ACTION SPECIFIC

- * THE THERMAL TREATMENT UNIT WILL MEET THE SUBSTANTIVE AIR EMISSION REQUIREMENTS IN SECTION 101 OF THE CLEAN AIR ACT, 40 CFR PART 52, AND THE EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS OUTLINED IN 40 CFR SS 61. THE UNIT MUST FURTHER MEET THE SUBSTANTIVE AIR EMISSIONS REQUIREMENTS OF OAC 3745-15-06, 3745-15-07, 3745-16, 3745-17-02, 3745-17-05, 3745-17-07, 3745-17-08, 3745-17-09, 3745-18-02, 3745-18-04, 3745-18-06, 3745-21-02, 3745-21-03, 3745-21-05, AND 3745-21-07.
- * THE THERMAL TREATMENT UNIT WILL MEET THE SUBSTANTIVE REQUIREMENTS OF RCRA SUBPART O FOR INCINERATION OF HAZARDOUS WASTE OUTLINED IN 40 CFR SS 264.340 THROUGH

264.351. THESE INCLUDE THE DESTRUCTION AND REMOVAL EFFICIENCY (DRE) REQUIREMENTS FOR SOLVENTS AND MIXED ORGANICS (99.99%) AND DIOXIN (99.9999%). TOXIC SUBSTANCES CONTROL ACT (TSCA) STANDARDS FOR INCINERATION OF PCBS WITH CONCENTRATIONS GREATER THAN 50 PPM ARE OUTLINED IN 40 CFR SS 761.70 (DRE OF 99.9999% REQUIRED).

- * TEMPORARY STORAGE OF CONTAMINATED MATERIAL STOCKPILED FOR TREATMENT WILL MEET THE SUBSTANTIVE REQUIREMENTS OF 40 CFR SS 264.171 THROUGH 264.178. THE MATERIAL STOCKPILED FOR STORAGE AND THE VAULT USED TO STORE THE DIOXIN-CONTAMINATED MATERIAL UNDERNEATH THE CAP WILL ALSO MEET THE SUBSTANTIVE REQUIREMENTS OF 40 CFR SS 264.191 THROUGH 264.198.
- * OHIO REQUIREMENTS FOR THE CLOSURE OF SOLID WASTE LANDFILLS (OAC 3745-27-09 AND OAC 3745-27-10). THE MULTIMEDIA CAP WILL EXCEED THE REQUIRED THICKNESS OF 2 FEET AND WILL MEET ALL OTHER SUBSTANTIVE REQUIREMENTS WITHIN THESE REGULATIONS.
- * RELEVANT AND APPROPRIATE PORTIONS OF RCRA REQUIREMENTS FOR CLOSURE OF HAZARDOUS WASTE LANDFILLS WITH WASTES IN PLACE. THE LOW-PERMEABILITY CAP WILL COMPLY WITH THE REQUIREMENTS FOR LANDFILL CLOSURE OUTLINED IN 40 CFR SS 264.310. THE GROUND-WATER MONITORING PROGRAM WILL MEET THE SUBSTANTIVE REQUIREMENTS OF 40 CFR SS 264.90 THROUGH 264.101 (SUBPART F). THE PROGRAM WILL INCLUDE A CORRECTIVE ACTION COMPONENT THAT WILL BE TRIGGERED IF GROUND-WATER PROTECTION STANDARDS ARE EXCEEDED AT ANY POINT OF COMPLIANCE IN THE MONITORING SYSTEM.
- * THE SURFACE IMPOUNDMENTS WILL BE CLOSED IN ACCORDANCE WITH THE REQUIREMENTS OF 40 CFR SS 264.221, AND 264.226 THROUGH 264.228.
- * DISPOSAL OF RESTRICTED RCRA-LISTED WASTE (INCLUDING, BUT NOT LIMITED TO, K035, F001, AND F005) BOTH ON-SITE AND OFF-SITE MUST MEET THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF THE LAND DISPOSAL RESTRICTIONS OUTLINED IN 40 CFR PART 268.
- * ANY INCINERATED MATERIAL THAT IS NOT DELISTABLE WILL BE TAKEN TO A RCRA-PERMITTED FACILITY IN COMPLIANCE WITH THE REQUIREMENTS OF 40 CFR SS 264.301 THROUGH 264.304, 264.310, AND 264.314.

11.3 THE SELECTED REMEDY IS COST-EFFECTIVE

ALTERNATIVE 3A REPRESENTS A COST-EFFECTIVE REMEDIAL ALTERNATIVE FOR THE LASKIN POPLAR OIL SITE. THIS ALTERNATIVE ATTAINS THE SAME REDUCTIONS IN CURRENT RISKS FROM SOIL INGESTION AND GROUND-WATER INGESTION AS ALTERNATIVES 3B THROUGH 6, WHICH ARE CONSIDERABLY MORE EXPENSIVE AND/OR REQUIRE HIGHER O&M EXPENDITURES. ALTERNATIVE 3A ALSO PROVIDES AN ADEQUATE DEGREE OF LONG-TERM PROTECTION, COMPARED TO THESE MORE EXPENSIVE ALTERNATIVES. ALTHOUGH ALTERNATIVES 3B THROUGH 6 MAY OFFER SLIGHTLY INCREASED LONG-TERM RELIABILITY, THE RELATIVE COST INCREASES OUTWEIGH THE EXPECTED BENEFITS. ADDITIONAL COMPONENTS OF THESE ALTERNATIVES, SUCH AS GROUNDWATER TREATMENT AND INCREASED INCINERATION ACTIVITY, DO NOT INCREASE THE EFFECTIVENESS OF THESE ALTERNATIVES IN PROPORTION TO THE INCREASED COSTS. THESE ADDITIONAL MEASURES ARE NOT JUSTIFIED BASED ON CURRENT SITE CONDITIONS AND CONTAMINATION LEVELS.

11.4 THE SELECTED REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

THE REMEDIAL ACTION SELECTED FOR IMPLEMENTATION AT THE LASKIN POPLAR OIL SITE SATISFIES THE STATUTORY REQUIREMENTS OF CERCLA SECTION 121. THE SELECTED REMEDY IS CONSISTENT WITH THE NCP, PROTECTS HUMAN HEALTH AND ENVIRONMENT, ATTAINS ARARS, AND IS COST-EFFECTIVE. THE US EPA HAS DETERMINED THAT THE SELECTED REMEDY REPRESENTS THE MAXIMUM EXTENT TO WHICH PERMANENT SOLUTIONS AND TREATMENT TECHNOLOGIES CAN BE UTILIZED IN A COST-EFFECTIVE MANNER FOR THE FINAL OPERABLE UNIT AT THE LASKIN POPLAR OIL SITE. OF THOSE ALTERNATIVES THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND COMPLY WITH ARARS, THE US EPA HAS DETERMINED THAT THIS SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADEOFFS IN TERMS OF LONG-TERM EFFECTIVENESS AND PERMANENCE, REDUCTION IN TOXICITY, MOBILITY, OR VOLUME ACHIEVED THROUGH TREATMENT, SHORT-TERM EFFECTIVENESS, IMPLEMENTABILITY, COST, ALSO CONSIDERING THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT AND CONSIDERING STATE AND COMMUNITY ACCEPTANCE.

THE SELECTED REMEDY IS JUDGED TO PROVIDE THE SAME DEGREE OF PROTECTIVENESS AS THE ALTERNATIVES THAT INCINERATE GREATER AMOUNTS OF SOIL. THE SELECTED REMEDY OFFERS THIS PROTECTIVENESS AT A SUBSTANTIALLY LOWER COST, WHICH IS MORE COST-EFFECTIVE.

THE SELECTED REMEDY TREATS CONTAMINATED SOIL FROM THE BOILER HOUSE AREA. THE SELECTED REMEDY IS MORE EFFECTIVE IN THE SHORT-TERM, CAUSING LESS OF AN IMPACT ON THE LOCAL COMMUNITY, AND REQUIRING ONLY 2 YEARS TO IMPLEMENT, AS COMPARED TO THE 4 YEARS REQUIRED FOR THE ALTERNATIVE THAT INCORPORATES INCINERATION OF ALL SOILS ABOVE THE 10-6 RISK LEVEL. THE SELECTED REMEDY ALSO ACHIEVES GROUNDWATER REMEDIATION IN THIS 2 YEARS, WHILE GROUNDWATER TREATMENT ALTERNATIVES WOULD REQUIRE AN ESTIMATED 50 YEARS TO COMPLETE.

WHILE THE SELECTED REMEDY DOES NOT OFFER AS HIGH A DEGREE OF LONG-TERM RELIABILITY AND PERMANENCE AS THE OPTIONS WHICH INCINERATE A GREATER AMOUNT OF SOIL, IT WILL SIGNIFICANTLY REDUCE THE INHERENT HAZARDS POSED BY THE CONTAMINATED SOILS THROUGH CONTAINMENT UNDER A MULTI-LAYER CAP AND DEWATERING OF THE SHALLOW AQUIFER ON-SITE. IN THE JUDGEMENT OF THE US EPA, THE PRINCIPAL THREAT AT THE SITE (THE WASTE OIL, SLUDGE, AND SATURATED SOILS NEAR THE PITS AND TANKS) IS BEING ADDRESSED BY THE TREATMENT PORTION OF THE SOURCE REMOVAL OPERABLE UNIT. THEREFORE, THIS FINAL OPERABLE UNIT FOLLOWS-UP THE TREATMENT INCORPORATED IN THE SOURCE REMOVAL OPERABLE UNIT WITH A REMEDIAL ACTION THAT PRIMARILY CONTAINS THE REMAINING CONTAMINANTS.

THE SELECTED REMEDY DOES NOT SATISFY THE STATUTORY PREFERENCE FOR A PERMANENT SOLUTION IN THAT IT LEAVES CONTAMINATED SOILS ON-SITE. HOWEVER, SOURCE CONTROL AND CONTAINMENT COMPONENTS OF THE SELECTED REMEDY SHOULD SIGNIFICANTLY REDUCE THE MOBILITY OF CONTAMINANTS CONTAINED IN THE SOILS.

BECAUSE THE SELECTED ALTERNATIVE IS NOT A PERMANENT SOLUTION AND WILL LEAVE WASTES IN PLACE AT THE LASKIN POPLAR OIL SITE, THE EFFECTIVENESS OF THIS REMEDIAL ACTION MUST BE REVIEWED AT LEAST ONCE EVERY 5 YEARS.

11.5 THE SELECTED REMEDY REDUCES TOXICITY, MOBILITY, OR VOLUME OF WASTE MATERIALS AS A PRINCIPAL ELEMENT

ALTERNATIVE 3A WILL REDUCE THE TOXICITY AND VOLUME OF CONTAMINANTS WITHIN LASKIN POPLAR OIL SITE. THIS REDUCTION WILL BE ACCOMPLISHED THROUGH THERMAL TREATMENT OF THE CONTAMINATED MATERIAL FROM THE BOILER HOUSE AREA. BY TREATING THIS MATERIAL, THE SELECTED REMEDY ADDRESSES ONE OF THE PRINCIPAL THREATS POSED BY THE SITE THROUGH THE USE OF TREATMENT TECHNOLOGIES. THEREFORE, THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT AS A PRINCIPAL ELEMENT OF THE FINAL REMEDY IS SATISFIED THROUGH THE COMBINATION OF THIS SECOND AND FINAL REMEDIAL ACTION AND THE SOURCE REMOVAL OPERABLE UNIT.

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 TABLES, ATTACHMENTS

TABLE 5-1 HAZARDOUS SUBSTANCE LIST COMPOUNDS DETECTED AT THE LASKIN
 POPLAR OIL SITE
 (PAGE 1 OF 3)

MSL COMPOUNDS DETECTED AT THE LASKIN POPLAR OIL SITE

CHEMICAL	SURFACE SOIL	SUBSURF. SOIL	GROUNDWATER SEDIMENT WELLS	SURFACE WATER
POLY AND BICYCLIC AROMATIC	X	X	X	
HYDROCARBONS	X	X	X	
BENZO (A) ANTHRACENE	X	X	X	
BENZO (A) PYRENE	X	X	X	
BENZO (B) FLUORANTHENE	X	X	X	
BENZO (K) FLUORANTHENE	X	X	X	
CHRYSENE	X	X	X	
DIBENZO (AH) ANTHRACENE	X	X	X	
INDENO (1,2,3 - CD) PYRENE	X	X	X	
ACENAPHTHENE	X	X	X	
ACENAPHTHYLENE	X	X	X	
ANTHRACENE	X	X	X	
BENZO (GHI) ENRYLENE	X	X	X	
FLUORANTHENE	X	X	X	
FLUORENE	X	X	X	
2-METHYLNAPHTHALENE	X	X	X	
NAPHTHALENE	X	X	X	
PHENANTHRENE	X	X	X	
PYRENE	X	X	X	
PHENOLIC COMPOUNDS				
2-CHLOROPHENOL				
4-CHLOROPHENYL PHENYL ETHER				
2,4-DICHLOROPHENOL		X		
2,4-DIMETHYLPHENOL	X	X		
2,4-DINITROPHENOL		X		
4,6-DINITRO-2-METHYLPHENOL		X		
2-METHYLPHENOL (O-CRESOL)	X	X		
4-METHYLPHENOL (P-CRESOL)	X	X		
4-NITROPHENOL		X		
N-NITROSODI-PHENYLAMINE	X	X		
PENTACHLOROPHENOL	X	X	X	
PHENOL	X	X	X	
2,4,6-TRICHLOROPHENOL		X		
2,4,5-TRICHLOROPHENOL		X		

PHTHLATES

BIS(2-EHTYLHEXYL)PHTHLATE	X	X	X	X	X
BUTYL BENZYL PHTHLATE	X	X	X		
DIETHYLPHTHLATE		X		X	
DIMETHYLPHTHLATE			X		
DI-N-BUTYL PHTHLATE	X	X	X	X	X
DI-N-OCTYL PHTHLATE	X	X			

OTHER SEMI-VOLATILE COMPOUNDS

BENZOIC ACID	X	X			
BIS(2-CHLOROETHYL)ETHER				X	
CHLOROBENZENE			X		
DIBENZOFURAN	X	X	X		
1,2-DICHLOROBENZENE		X			
ISOPHORAN	X	X		X	X
1,2,4-TRICHLOROBENZENE	X	X			

TABLE 5-1 (CONTINUED)

HSL COMPOUNDS DETECTED AT THE LASKIN POPLAR OIL SITE

CHEMICAL	SURFACE SOIL	SUBSURF. SOIL	GROUNDWATER SEDIMENT	WELLS	SURFACE WATER
POLYCHLORINATED BIPHENYLS					
POLYCHLORINATED BIPHENYLS	X	X	X		
PESTICIDES					
BETA BHC (HCCH)		X			
CHLORDANE	X		X		
4,4'-DDD	X				
4,4'-DDE	X	X	X		
4,4'-DDT	X	X		X	
DELTA BHC (HCCH)	X		X		
DIELDRIN	X		X		
ENDOSULFAN I	X				
ENDOSULFAN II	X				
ENDOSULFAN SULFATE	X				
ENDRIN			X		
GAMMA BHC (LINDANE)					
HEPTACHLOR		X	X		
HEPTACHLOR EPOXIDE		X	X		
BENZENE/TOLUENE/XYLENE					
BENZENE		X	X	X	
ETHYLBENZENE	X	X	X	X	
STYRENE	X	X			
TOLUENE	X	X		X	
XYLENES	X	X	X	X	X
HALOGENATED ALKENES AND ALKANES					
CARBON DISULFIDE		X			X
CHLOROFORM	X	X		X	
1,1-DICHLOROETHANE	X	X		X	
1,2-DICHLOROETHANE (EDC)	X	X		X	
1,2-DICHLOROETHENE		X			
1,2-DICHLOROETHYLENE (TRANS)	X	X			
1,2-DICHLOROPROPANE		X			
FLUOROTRICHLOROMETHANE	X		X		
METHYLENE CHLORIDE	X	X			
TETRACHLOROETHENE	X	X	X		
1,1,2-TRICHLOROETHANE	X				
1,1,1-TRICHLOROETHANE	X	X	X	X	
TRICHLOROETHENE	X	X		X	
VINYL CHLORIDE		X		X	
KETONES					
ACETONE	X	X	X	X	
2-BUTANONE (MEK)	X	X	X		
2-HEXANONE (BUTYLMETHYLKETONE)					
4-METHYL-2-PENTANONE (MIBK)	X	X		X	X

TABLE 5-1 (CONTINUED)

HSL COMPOUNDS DETECTED AT THE LASKIN POPLAR OIL SITE

CHEMICAL	SURFACE SOIL	SUBSURF. SOIL	SEDIMENT	GROUNDWATER WELLS	SURFACE WATER
INORGANIC CHEMICALS					
ALUMINUM	X	X	X	X	X
ANTIMONY	X	X			
ARASENIC	X	X	X	X	X
BARIUM	X	X	X	X	X
BERYLLIUM	X	X	X	X	
CADMIUM	X	X	X	X	X
CALCIUM	X	X	X		X
CHROMIUM	X		X	X	
COBALT	X	X	X		
COPPER	X	X	X		X
CYANIDE	X	X	X		X
IRON	X	X	X		X
LEAD	X	X	X		X
MAGNESIUM	X	X	X		X
MANGANESE	X	X	X	X	X
MERCURY	X	X	X		X
NICKEL	X	X		X	
POTASIUM	X	X	X		
SELENIUM		X			X
SILVER	X				
SODIUM	X	X	X		X
THALIUM	X	X	X	X	X
VANDIUM	X	X	X		X
ZINC	X	X	X	X	X

TABLE 6-1

POTENTIAL CONTAMINANTS OF CONCERN AT THE LASKIN POPLAR OIL SITE

ACETONE	GAMMA HCCH (LINDANE)
ANTIMONY	HEPTACHLOR
ARSENIC	HEPTACHLOR EPOXIDE
BARIUM	INDENO(1,2,3-CD)PYRENE
BENZENE	ISOPHORONE
BENZO(A)ANTHRACENE	LEAD
BENZO(A)PYRENE	MANGANESE
BENZO(B)FLUORANTHENE	MERCURY
BENZO(K)FLUORANTHENE	METHYLPHENOL (CRESOL)
BERYLLIUM	METHYLENE CHLORIDE
BETA HCCH	4-METHYL-2-PENTANONE (MIBK)
BIS(2-CHLOROETHYL)ETHER	NICKEL
BIS(2-ETHYLHEXYL)PHTHALATE	N-NITROSODIPHENYLAMINE
2-BUTANONE (MEK)	PCB
CADMIUM	PENTACHLOROPHENOL
CARBON DISULFIDE	PHENOL
CHLORDANE	SELENIUM
CHLOROBENZENE	SILVER
CHLOROFORM	STYRENE
CHROMIUM	2,3,7,8-TCDD (DIOXIN)
CHRYSENE	TETRACHLOROETHENE
COPPER	THALLIUM
DDT	TOLUENE
DIBENZO(A,H)ANTHRACENE	1,2,4-TRICHLOROBENZENE
DIBUTYL PHTHALATE	1,1,1-TRICHLOROETHANE
1,1-DICHLOROETHANE	1,1,2-TRICHLOROETHANE
1,2-DICHLOROETHANE (EDC)	TRICHLOROETHENE
2,4-DICHLOROPHENOL	TRICHLOROFLUOROMETHANE
DIELDRIN	2,4,5-TRICHLOROPHENOL
DIETHYL PHTHALATE	2,4,6-TRICHLOROPHENOL
2,4-DINITROPHENOL	VANADIUM
ENDOSULFAN	VINYL CHLORIDE
ETHYLBENZENE	XYLENES
CYANIDE	ZINC

(A) POTENTIAL CHEMICALS OF CONCERN IDENTIFIED BASED ON AVAILABILITY OF CANCER POTENCY FACTOR, REFERENCE DOSE, DRINKING WATER CRITERIA OR STANDARD, OR ENVIRONMENTAL CRITERIA.

TABLE 6-3

SUMMARY OF GROUNDWATER CONCENTRATIONS THAT EXCEED
 DRINKING WATER STANDARDS
 AT THE LASKIN POPLAR OIL SITE

WELL LOCATION	CHEMICAL	CONCENTRATION UG/L	CRITERIA(A) EXCEEDED	CRITERIA LEVEL
GW87	ARSENIC	17	WQC-RISK	0.0025
	1,2-DICHLOROETHANE	3	MCLG	0
			WQC-RISK	0.94
	TRICHLOROETHANE	4	MCLG	0
			WQC-RISK	2.8
NICKEL	20	WQC-TOX	15.4	

(A) CRITERIA:

- MCL - MAXIMUM CONTAMINANT LEVEL
- MCLG - MAXIMUM CONTAMINANT LEVEL GOAL
- WQC-RISK - WATER QUALITY CRITERIA FOR HUMAN HEALTH
 (DRINKING WATER ONLY) AT 10(-6) CANCER RISK LEVEL
- WQC-TOX - WATER QUALITY CRITERIA FOR HUMAN HEALTH--
 TOXICITY PROTECTION FOR NONCARCINOGENS
- DWHA - DRINKING WATER HEALTH ADVISORIES--LIFETIME

TABLE 6-4

SUMMARY OF HAZARDOUS SUBSTANCES LIST CHEMICAL CONCENTRATIONS
AND ASSOCIATED HUMAN RISKS IN GROUNDWATER
AT THE LAKIN POPLAR OIL SITE

WELL			(A)	(B)	(C)
LOCATION	CHEMICAL	CONCENTRATION UG/L	EXCESS LIFE CANCER RISK	INFANT: HAZARD INDEX	ADULT: HAZARD INDEX
GW002-87	ARSENIC	48	2X10(-3)	-	-
	DOT	0.11	1X10(-6)	-	-
	ACETONE	24000	-	24	7
	MANGANESE	8320	-	4	1
	4-METHYL-2-PENTANONE	2800	-	6	2
	METHYL PHENOL	1970	-	4	1
	TOTAL (WITH ARSENIC)	-	2X10(-3)	NA	NA
	TOTAL (WITHOUT ARSENIC)	-	1X10(-6)	40	11

GW004-87	1,2-DICHLOROETHANE	19	5X10(-5)	-	-
	TOTAL		5X10(-5)	-	-
GW008-87	VINYL CHLORIDE	350	2X10(-2)	-	-
	1,2-DICHLOROETHANE	200	5X10(-4)	-	-
	BENZENE	100	8X10(-5)	-	-
	ACETONE	10000	-	10	3
	METHYLPHENOL	2360	-	5	1
	PHENOL	720	-	2	0.5
	TOTAL	-	2X10(-2)	17	5
GW009-87	ARSENIC	35	2X10(-3)	-	-
	METHYLENE CHLORIDE	3000	6X10(-4)	-	-
	ACETONE	55000	-	55	15
	METHYLPHENOL	2150	-	4	1
	TOTAL (WITH ARSENIC)	-	2X10(-3)	NA	NA
	TOTAL (WITHOUT ARSENIC)	-	7X10(-4)	61	17
GW011-87	1,2-DICHLOROETHANE	4	1X10(-5)	-	-
	TOTAL	-	1X10(-5)	-	-
GW87-05	1,2-DICHLOROETHANE	4	1X10(-5)	-	-
	TOTAL	-	1X10(-5)	-	-
GW87-08	ACETONE	6500	-	7	2
	TOTAL	-	-	7	2
GW87-13	CHLOROFORM	13	2X10(-5)	-	-
	1,2-DICHLOROETHANE	3	8X10(-6)	-	-
	TRICHLOROETHANE	4	1X10(-6)	-	-
	TOTAL	-	3X10(-5)	1	0.2

(A) MONITORING WELLS WITH NO CARCINOGENS NOT LISTED.
(B) CHEMICAL WITH HAZARD INDEXES LESS THAN ONE NOT LISTED.
HOWEVER, THE TOTAL HAZARD INDEX LISTED REPRESENTS ALL THE
CHEMICALS WITH A HAZARD INDEX.

TABLE 6-7
CARCINOGENIC POTENCY FACTORS FOR CHEMICALS DETECTED
AT THE LASKIN POPLAR OIL SITE

CHEMICAL	(A)	INGESTION	(B)
	U.S EPA CARCINOGEN CLASSIFICATION	CARCINOGENIC POTENCY FACTOR (KG-DAY/MG)	SOURCE
ARSENIC	A	1.75	HEA/HEED(6-1-88)
BENZENE	A	0.029	IRIS(3-1-88)
BENZO(A)PYRENE	B2	11.5	SPHEM(10-1-86)
BERYLLIUM	-	-	-
BIS(2-CHLORO- ETHYL)ETHER	B2	1.1	IRIS(3-1-88)
BIS(2-ETHYL- HEXYL)PHTHALATE	B2	0.014	IRIS(9-7-88)
CADMIUM	-	-	-
CHLORDANE	B2	1.3	IRIS(3-1-88)
CHLORFORM	B2	0.061	HEA/HEED(6-1-88)
CHROMIUM- (HEXAVALENT)	-	-	-
DDT	B2	0.34	IRIS(8-22-88)
1,2-CHLORO- ETHANE(EDC)	B2	0.091	IRIS(3-1-88)
DIELDRIN	B2	16	IRIS(9-7-88)
HEPTACHLOR	B2	4.5	IRIS(3-1-88)
HEPTACHLOR- EPOXIDE	B2	9.1	IRIS(3-1-88)
BETA HCCH (BHC)	C	1.8	IRIS(3-1-88)
GAMMA HCCH- (LINDANE)	B2/C	1.33	SPHEM(10-1-86)
METHYLENE- CHLORIDE	B2	0.0075	IRIS(5-21-87)
NICKEL	-	-	-
N-NITROSODI- PHENYLAMINE	B2	0.0049	IRIS(3-1-88)
PCB	B2	7.7	HEA/HEED(6-1-88)
PAHS	B2/C	11.5	SPHEM(10-1-86)
2,3,7,8,-TCDD- (DIOXIN)	B2	156000	SPHEM(10-1-86)
TETRACHLORO- ETHENE	B2	0.051	SPHEM(10-1-86)
1,1,2-TRICHLORO- ETHANE	C	0.057	IRIS(3-1-88)
TRICHLOROETHENE	B2	0.011	IRIS(3-1-88)
2,4,6-TRICHLORO- PHENOL	B2	0.02	IRIS(3-1-88)
VINYL CHLORIDE	A	2.3	SPHEM(10-1-86)

TABLE 6-7 (CONTINUED)
CARCINOGENIC POTENCY FACTORS FOR CHEMICALS DETECTED
AT THE LASKIN POPLAR OIL SITE

CHEMICAL	INHALATION		(B) SOURCE
	(A) U.S EPA CARCINOGEN CLASSIFICATION	CARCINOGENIC POTENCY FACTOR (KG-DAY/MG)	
ARSENIC	A	15	IRIS(3-1-88)
BENZENE	A	0.029	SPHEM(10-1-86)
BENZO(A)PYRENE	B2	8.4	HEA/HEED(6-1-88)
BERYLLIUM	B1	4.86	SPHEM(10-1-86)
BIS(2-CHLORO- ETHYL)ETHER	B2	1.1	IRIS(3-1-88)
BIS(2-ETHYL- HEXYL)PHTHALATE	-	-	-
CADMIUM	B1	6.1	IRIS(3-1-88)
CHLORDANE	B2	1.3	IRIS(3-1-88)
CHLORFORM	-	-	-
CHROMIUM- (HEXAVALENT)	A	41	IRIS(3-1-88)
DDT	B2	0.34	IRIS(8-22-88)
1,2-CHLORO- ETHANE(EDC)	B2	0.091	IRIS(3-1-88)
DIELDRIN	B2	16	IRIS(9-7-88)
HEPTACHLOR	B2	4.5	IRIS(3-1-88)
HEPTACHLOR- EPOXIDE	B2	9.1	IRIS(3-1-88)
BETA HCCH (BHC)	C	1.8	IRIS(3-1-88)
GAMMA HCCH- (LINDANE)	-	-	-
METHYLENE- CHLORIDE	B2	0.14	IRIS(5-21-87)
NICKEL	A	1.19	SPHEM(10-1-86)
N-NITROSODI- PHENYLAMINE	-	-	-
PCB	-	-	-
PAHS	B2/C	6.11	SPHEM(10-1-86)
2,3,7,8,-TCDD- (DIOXIN)	B2	-	-
TETRACHLORO- ETHENE	B2	0.033	HEA/HEED(6-1-88)
1,1,2-TRICHLORO- ETHANE	C	0.057	IRIS(3-1-88)
TRICHLOROETHENE	B2	0.013	IRIS(3-1-88)
2,4,6-TRICHLORO- PHENOL	B2	0.02	IRIS(3-1-88)
VINYL CHLORIDE	A	0.295	SPHEM(10-1-86)

(A) U.S EPA CARCINOGEN CLASSIFICATION (IRIS DATA BASE 2-10-1988)

A: HUMAN CARCINOGEN.

B1 PROBABLE HUMAN CARCINOGEN, LIMITED HUMAN EVIDENCE.

B2: PROBABLE HUMAN CARCINOGEN, SUFFICIENT EVIDENCE IN ANIMALS
INADEQUATE OR NO EVIDENCE IN HUMANS.

C: POSSIBLE HUMAN CARCINOGEN.

(B) SOURCES: SPHEM - 'SUPERFUND PUBLIC HEALTH EVALUATION MANUAL,' TABLE C-4, (US EPA, 1986)

IRIS - US EPA INTEGRATED RISK INFORMATION SYSTEM (U.S EPA, 1988D)

HEA/HEED - QUARTERLY UPDATE FOR HEA AND HEED CHEMICALS (U.S EPA, 1988D)

TABLE 6-8
REFERENCE DOSE FACTORS FOR CHEMICALS DETECTED
AT THE LASKIN POPLAR OIL SITE

INGESTION

CHEMICAL	REFERENCE DOSE (RFD) MG/KG/DAY	(A) SOURCE
ACETONE	0.1	IRIS(3-01-88)
ANTIMONY	0.0004	IRIS(3-01-88)
BARIUM	0.05	IRIS(3-01-88)
BERYLLIUM	0.005	IRIS(3-01-88)
BIS(2-ETHYLHEXYL) PHTHALATE	0.02	IRIS(3-01-88)
2-BUTANONE (MEK)	0.05	IRIS(3-01-88)
CADMIUM	0.0005	HEA/HEED(6-1-88)
CARBON DISULFIDE	0.1	IRIS(3-01-88)
CHLORDANE	0.00005	IRIS(3-01-88)
CHLOROBENZENE	0.027	SPHEM(10-1-86)
CHLOROFORM	0.01	IRIS(3-01-88)
CHROMIUM (HEXAVALENT)	0.005	IRIS(3-01-88)
COPPER	0.037	SPHEM(10-1-86)
FREE CYANIDE	0.02	IRIS(11-16-86)
DDT	0.0005	IRIS(3-01-88)
DIBUTYL PHTHALATE	0.1	IRIS(1,31-86)
1,1-DICHLOROETHANE	0.12	SPHEM(10-1-86)
2,4-DICHLOROPHENOL	0.003	IRIS(3-01-88)
DIETHYL PHTHALATE	0.8	IRIS(3-01-88)
2,4-DINITROPHENOL	0.002	IRIS(3-01-88)
ENDOSULFAN	0.00005	IRIS(3-01-88)
ETHYLBENZENE	0.1	IRIS(3-01-88)
HEPTACHLOR	0.0005	IRIS(3-01-88)
HEPTACHLOR EPOXIDE	0.000013	IRIS(3-01-88)
ISOPHORONE	0.15	IRIS(6-30-88)
LEAD	0.0014	SPHEM(10-1-86)
GAMMA HCCH (LINDANE)	0.0003	IRIS(3-01-88)
MANGANESE	0.22	SPHEM(10-1-86)
MERCURY (INORGANIC)	0.002	SPHEM(10-1-86)
METHYLENE CHLORIDE	0.06	IRIS(5-21-87)
4-METHYL-2-PENTANONE	0.05	IRIS(3-01-88)
METHYLPHENOL	0.05	SPHEM(10-1-86)
NICKEL	0.02	IRIS(3-01-88)
PENTACHLOROPHENOL	0.03	IRIS(6-30-88)
PHENOL	0.04	IRIS(3-01-88)
SELENIUM	0.003	SPHEM(10-01-86)
SILVER	0.003	IRIS(6-30-88)
STYRENE	0.2	IRIS(6-30-88)
TETRACHLOROETHENE	0.01	IRIS(3-01-86)
THALLIUM	0.0004	SPHEM(10-01-86)
TOLUENE	0.3	IRIS(3-01-88)
1,2,4-TRICHLOROENZENE	0.02	IRIS(3-01-88)
1,1,1-TRICHLOROETHANE	0.09	IRIS(3-01-88)
1,1,2-TRICHLOROETHANE	0.2	IRIS(3-01-88)
TRICHLOROFLUOROMETHANE	0.3	IRIS(3-01-88)
2,4,5-TRICHLOROPHENOL	0.1	IRIS(3-01-88)
VANADIUM	0.02	IRIS(11-16-86)
XYLENES	2	IRIS(3-01-88)
ZINC	0.21	SPHEM(10-1-86)

TABLE 6-8 (CONTINUED)
REFERENCE DOSE FACTORS FOR CHEMICALS DETECTED
AT THE LASKIN POPLAR OIL SITE

CHEMICAL	INHALATION	
	REFERENCE DOSE (RFD) MG/KG/DAY	(A) SOURCE
ACETONE	3	SPHEM(10-1-86)
ANTIMONY	-	-
BARIUM	0.0001	HEA/HEED(6-1-88)
BERYLLIUM	-	-
BIS(2-ETHYLHEXYL) PHTHALATE	-	-
2-BUTANONE (MEK)	0.09	HEA/HEED(6-1-88)
CADMIUM	-	-
CARBON DISULFIDE	-	-
CHLORDANE	-	-
CHLOROBENZENE	0.0057	HEA/HEED(6-1-88)
CHLOROFORM	-	-
CHROMIUM (HEXVALENT)	-	-
COPPER	0.01	SPHEM(10-1-86)
FREE CYANIDE	-	-
DDT	-	-
DIBUTYL PHTHALATE	-	-
1,1-DICHLOROETHANE	0.138	SPHEM(10-1-86)
2,4-DICHLOROPHENOL	-	-
DIETHYL PHTHALATE	-	-
2,4-DINITROPHENOL	-	-
ENDOSULFAN	-	-
ETHYLBENZENE	-	-
HEPTACHLOR	-	-
HEPTACHLOR EPOXIDE	-	-
ISOPHORONE	-	-
LEAD	-	-
GAMMA HCCH (LINDANE)	-	-
MANGANESE	0.0003	SPHEM(10-1-86)
MERCURY (INORGANIC)	0.000051	SPHEM(10-1-86)
METHYLENE CHLORIDE	-	-
4-METHYL-2-PENTANONE	-	-
METHYLPHENOL	0.1	SPHEM(10-1-86)
NICKEL	-	-
PENTACHLOROPHENOL	-	-
PHENOL	-	-
SELENIUM	0.001	SPHEM(10-1-86)
SILVER	-	-
STYRENE	-	-
TETRACHLOROETHENE	-	-
THALLIUM	-	-
TOLUENE	1.5	SPHEM(10-1-86)
1,2,4-TRICHLOROETHANE	0.003	HEA/HEED(6-1-88)
1,1,1-TRICHLOROETHANE	0.3	HEA/HEED(6-1-88)
1,1,2-TRICHLOROETHANE	-	-
TRICHLOROFLUOROMETHANE	0.2	HEA/HEED(6-1-88)
2,4,5-TRICHLOROPHENOL	-	-
VANADIUM	-	-
XYLENES	0.4	SPHEM(10-1-86)
ZINC	0.01	SPHEM(10-1-86)

(A) SOURCES: SPHEM - "SUPERFUND PUBLIC HEALTH EVALUATION MANUAL," TABLE C-6, (US EPA, 1986)
IRIS - US EPA INTEGRATED RISK INFORMATION SYSTEM (US EPA, 1988B)
HEA/HEED - QUARTERLY UPDATE FOR HEA AND HEED CHEMICALS (US EPA, 1988D)