

**EPA Superfund
Record of Decision Amendment:**

**COLEMAN-EVANS WOOD PRESERVING CO.
EPA ID: FLD991279894
OU 01
WHITEHOUSE, FL
09/26/1990**

- EXCAVATION OF CONTAMINATED SOILS AND SEDIMENTS WITH PCP LEVELS GREATER THAN 25 MG/KG; APPROXIMATELY 27,000 CUBIC YARDS.
- VOLUME REDUCTION BY SOIL WASHING TO SEPARATE CLEAN FRACTIONS FROM CONTAMINATED SOIL FINES.
- S/S OF SOIL FINES OR SLUDGES EXCEEDING CLEANUP CRITERIA.
- REDISPOSING OF THE CLEAN SOIL FRACTION AND THE "FIXED" S/S SLUDGES ON-SITE.
- DEWATERING AND RECOVERY OF GROUNDWATER TO FACILITATE EXCAVATION; RECOVERED GROUND WATER WOULD BE ANALYZED. IF THE LEVEL OF PCP IS GREATER THAN 1.0 UG/L, THE GROUND WATER WILL BE TREATED BY AN ON-SITE GAC.

ADSORPTION UNIT TO A LEVEL BELOW 1.0 UG/L. BOTH PCP AND METALS CLEANUP CRITERION WOULD BE IN ACCORDANCE WITH FLORIDA WATER QUALITY STANDARDS CHAPTER 17-3.061.3(M) OF THE FLORIDA ADMINISTRATIVE CODE BEFORE DISCHARGE TO AN ON-SITE DRAINAGE DITCH LEADING TO MCGIRT'S CREEK.

- TREATMENT OF THE SOIL WASH WATER BY BIOREMEDIATION FOLLOWED BY A GAC POLISHING UNIT FOR DISCHARGE TO AN ON-SITE DRAINAGE DITCH LEADING TO MCGIRT'S CREEK.
- REMOVAL OF METALS FROM THE GROUND WATER BY CHEMICAL PRECIPITATION.
- INSTALLATION AND MAINTENANCE OF A 6-INCH VEGETATIVE COVER OVER THE SOLIDIFIED MASS (MONOLITH).
- INSTALLATION AND MAINTENANCE OF A FENCE AROUND THE SITE DURING REMEDIAL ACTIVITIES.
- INSTITUTIONAL CONTROLS WOULD INCLUDE DEED RESTRICTIONS.

STATUTORY DETERMINATIONS

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINS FEDERAL AND STATE REQUIREMENTS THAT ARE APPLICABLE OR RELEVANT AND APPROPRIATE FOR THIS REMEDIAL ACTION AND IS COST EFFECTIVE. THIS REMEDY SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT REDUCES MOBILITY, TOXICITY, OR VOLUME (MTV) AS A PRINCIPAL ELEMENT AND UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

BECAUSE THIS REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ON-SITE ABOVE HEALTH-BASED LEVELS, 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.

GREER C. TIDWELL
REGIONAL ADMINISTRATOR

DATE 09/26/90

#INT
INTRODUCTION

EXECUTIVE SUMMARY: RECORD OF DECISION, 1986

THE COLEMAN EVANS WOOD PRESERVING (COLEMAN EVANS) SITE WAS INCLUDED ON THE NATIONAL PRIORITIES LIST (NPL) IN MARCH 1983. IN SEPTEMBER 1984, THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (EPA) TASKED CAMP, DRESSER AND MCKEE, INC. WITH INITIATING A REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) AT THE COLEMAN EVANS SITE. THE RI/FS WAS CONDUCTED TO DETERMINE THE EXTENT OF CONTAMINATION BY IDENTIFYING THE TYPES, QUANTITIES, AND LOCATIONS OF CONTAMINANTS, AND SUBSEQUENTLY, TO EVALUATE ALTERNATIVES FOR SOLVING THOSE PROBLEMS FOUND ASSOCIATED WITH THE SITE.

THE RI REVEALED THAT PENTACHLOROPHENOL (PCP) WAS THE MAIN CONTAMINANT OF CONCERN ASSOCIATED WITH THIS SITE. PCP WAS FOUND PRESENT IN THE FOLLOWING SITE MEDIA:

SEDIMENT
SOIL
SURFACE WATER
GROUNDWATER (UPPER SURFICIAL AQUIFER)

THE FS EVALUATED VARIOUS REMEDIAL ALTERNATIVES BEFORE RECOMMENDING THE PREFERRED ALTERNATIVE FOR REMEDIATION OF THE SITE. SUBSEQUENTLY, IN THE 1986 RECORD OF DECISION (ROD), EPA SELECTED THE PREFERRED ALTERNATIVE FOR REMEDIATING THE COLEMAN EVANS SITE. THE 1986 ROD IS INCLUDED IN APPENDIX A. THE MAJOR COMPONENTS OF THE 1986 ROD INCLUDED:

- EXCAVATION OF SOILS AND SEDIMENTS WITH PCP CONCENTRATION LEVELS GREATER THAN 10 MG/KG, (APPROXIMATELY 9000 CUBIC YARDS).
- INCINERATION OF EXCAVATED SOILS IN A TEMPORARY ON-SITE INCINERATION UNIT. SOILS WOULD BE DECONTAMINATED IN A PRIMARY CHAMBER WHERE PCP AND NO. 2 FUEL OIL WOULD BE DRIVEN OFF IN A GASEOUS PHASE. PCP WOULD THEN BE THERMALLY DESTROYED IN A SECONDARY CHAMBER. INCINERATION WOULD BE UNDERTAKEN IN ACCORDANCE WITH FEDERAL, STATE, AND LOCAL LAWS. A DETAILED QUALITY ASSURANCE/QUALITY CONTROL (QA/QC) PLAN WOULD BE DEVELOPED DURING THE REMEDIAL DESIGN (RD).
- DECONTAMINATED SOILS WOULD BE BACKFILLED ON-SITE.
- DEWATERING WOULD OCCUR TO FACILITATE EXCAVATION. GROUNDWATER RECOVERED DURING THE DEWATERING PROCESS WITH PCP LEVELS GREATER THAN 1.01 MG/L WOULD REQUIRE TREATMENT. UPON REDUCING PCP LEVELS TO 1.01 UG/L, RECOVERED GROUNDWATER WOULD THEN BE STORED AND ANALYZED FOR CONFORMANCE WITH DISCHARGE REQUIREMENTS. IF PCP LEVELS EXCEEDED 1.0 UG/L, THE GROUNDWATER WOULD BE TREATED BY AN ON-SITE GRANULAR ACTIVATED CARBON (GAC) ADSORPTION UNIT TO A LEVEL BELOW 1.0 UG/L PCP IN ACCORDANCE WITH CHAPTER 17-3.061.3(M) OF THE FLORIDA ADMINISTRATIVE CODE BEFORE DISCHARGE TO THE SURFACE WATER ENVIRONMENT VIA THE ONSITE DRAINAGE DITCH. IF EPA PROMULGATED FURTHER REGULATIONS IN THE FUTURE WHICH WERE MORE STRINGENT THAN THOSE OUTLINED IN THIS ROD, THE FUTURE REGULATIONS WOULD BE OBSERVED.
- OTHER INCIDENTAL SITE-SPECIFIC HAZARDOUS SUBSTANCE LIST(HSL) COMPOUNDS IDENTIFIED IN GROUNDWATER DURING THE IMPLEMENTATION OF THIS REMEDY WOULD BE CLEANED UP TO LEVELS WHICH COMPLY WITH FEDERAL DRINKING WATER STANDARDS (DWS). IF THE DWS DID NOT ADDRESS SITE-SPECIFIC COMPOUNDS, CLEAN UP WOULD BE CONSISTENT WITH THE HUMAN HEALTH CRITERIA IDENTIFIED IN THE 1980 WATER QUALITY CRITERIA. CLEAN UP OF COMPOUNDS FOR

WHICH NO STANDARDS EXIST WOULD BE TO NON-DETECTION LEVELS. IN CASES WHERE STANDARDS PROMULGATED BY THE STATE OF FLORIDA WERE MORE STRINGENT, THE STATE STANDARDS WOULD HAVE PRECEDENCE.

- DUE TO THE COMPLETE DESTRUCTION OF SITE-SPECIFIC CONTAMINANTS BY INCINERATION, NO POST-REMEDIAL MONITORING OR OPERATION AND MAINTENANCE ACTIVITY WOULD BE REQUIRED.
- SUBSEQUENT ACTION

ADDITIONAL SAMPLING DURING THE 1988 RD DETERMINED THAT THE REASSESSED AMOUNT OF SOIL REQUIRING REMEDIATION WOULD BE APPROXIMATELY 27,000 CUBIC YARDS. INCINERATION OF THIS VOLUME WOULD RESULT IN A CLEANUP COST OF OVER \$25 MILLION. THIS COST WOULD BE SIX TIMES GREATER THAN THE COST IDENTIFIED IN THE 1986 FS. IN A LETTER DATED SEPTEMBER 6, 1988 TO EPA, THE FLORIDA DEPARTMENT OF ENVIRONMENTAL REGULATION (FDER) RAISED CONCERNS BECAUSE THE STATE'S REMEDIAL ACTION COST SHARE WOULD INCREASE FROM LESS THAN \$400,000 TO OVER \$2,500,000. IN THIS LETTER FDER STATED THAT NOW THE ORIGINAL REMEDY WAS NOT NECESSARILY A COST EFFECTIVE SOLUTION AND DUE TO RECENT ADVANCES IN OTHER TECHNOLOGIES, OTHER ALTERNATIVES MIGHT BE MORE FEASIBLE. THEREFORE, IN LIGHT OF THE CHANGED SITE CONDITIONS, INCREASED COSTS AND LIMITED STATE RESOURCES, EPA AND FDER DECIDED THAT OTHER ALTERNATIVES WOULD BE EVALUATED. IN EARLY 1989, EPA INITIATED A TREATABILITY STUDY (TS) TO DETERMINE WHETHER BIOREMEDIATION AND/OR STABILIZATION AND SOLIDIFICATION (S/S) WOULD BE A VIABLE ALTERNATIVE FOR SITE REMEDIATION. THE TS WAS CONCLUDED IN JUNE 1990. RESULTS OF THE TS SHOWED THAT A TREATMENT TRAIN CONSISTING OF SOIL WASHING, BIOREMEDIATION AND S/S WOULD EFFECTIVELY ACHIEVE THE CLEANUP GOALS FOR THE SITE.

EXPLANATION OF FUNDAMENTAL REMEDY CHANGE FOR SOURCE CONTROL

THE NATIONAL CONTINGENCY PLAN (NCP) REQUIRES THAT IF EPA PROPOSES A FUNDAMENTAL CHANGE TO A ROD, THE ROD MUST BE AMENDED. THE 1986 ROD REQUIRED THAT THE CONTAMINATED SOILS BE INCINERATED. HOWEVER, TREATABILITY STUDIES CONDUCTED BY EPA NOW INDICATE THAT OTHER TECHNOLOGIES MAY BE MORE FEASIBLE FOR THE SITE. THE RESULTS OF THESE STUDIES DEMONSTRATED THAT A TREATMENT TRAIN CONSISTING OF SOIL WASHING, BIOREMEDIATION AND S/S WOULD EFFECTIVELY ACHIEVE THE SPECIFIED CLEAN UP GOALS AT A LOWER COST. COST-EFFECTIVENESS IS DETERMINED BY COMPARING THE COSTS OF ALL ALTERNATIVES BEING CONSIDERED WITH THEIR OVERALL EFFECTIVENESS TO DETERMINE WHETHER THE COSTS ARE PROPORTIONAL TO THE EFFECTIVENESS ACHIEVED. OVERALL EFFECTIVENESS FOR THE PURPOSE OF THIS DETERMINATION INCLUDES LONG-TERM EFFECTIVENESS AND PERMANENCE; REDUCTION OF MOBILITY, TOXICITY, OR VOLUME (MTV) THROUGH TREATMENT; AND SHORT-TERM EFFECTIVENESS. THE TREATMENT TRAIN WOULD AFFORD A COMPATIBLE DEGREE OF LONG-TERM EFFECTIVENESS, MTV, AND SHORT-TERM EFFECTIVENESS TO INCINERATION.

SPECIFICALLY, THE FUNDAMENTAL CHANGE IN THE PREVIOUS 1986 ROD REMEDY AND THE NEW SELECTED REMEDY, DESCRIBED HEREIN, IS AS FOLLOWS:

- THE NEW SELECTED REMEDY UTILIZES AN INNOVATIVE TECHNOLOGY CONSISTING OF SOIL WASHING, BIOREMEDIATION, AND S/S. SOIL WASHING OF THE CONTAMINATED SOILS, PRIOR TO TREATMENT, WILL REDUCE THE FINAL VOLUME OF SOILS TO BE TREATED, DOWN FROM 27,000 CUBIC YARDS, TO APPROXIMATELY 2,700 CUBIC YARDS. APPROXIMATELY 25,000 CUBIC YARDS OF SOILS CONTAINING PCP LEVELS OF LESS THAN 25 MG/KG AFTER SOIL WASHING WILL BE BACKFILLED INTO THE EXCAVATED AREAS. WASHWATER PRODUCED FROM THE SOIL WASHING PROCESS WILL BE BIOREMEDIATED. CONTAMINATED SOIL FINES AND WOODY FRACTIONS WILL BE STABILIZED AND PLACED BACK INTO THE EXCAVATED AREAS. STABILIZATION REAGENTS MAY INCLUDE CEMENT, POZZOLANS (FLYASH, LIME, KILN DUST), ORGANOPHILIC CLAYS, ASPHALT/BITUMEN AND THERMOPLASTICIZERS. THE PILOT STUDY WILL DETERMINE WHICH REAGENT(S) ARE MORE SUITED FOR THE SITE. THE REMEDY SELECTED IN THE 1986 ROD IS SIGNIFICANTLY DIFFERENT IN THAT IT WOULD REQUIRE THERMAL TREATMENT OF THE TOTAL ESTIMATED 27,000 CUBIC YARDS OF CONTAMINATED EXCAVATED SOILS.

- IN THE AMENDED REMEDY ADDITIONAL SOIL/SEDIMENT SAMPLES IN OFF-SITE LOCATIONS (DRAINAGE DITCHES IN PARTICULAR) WILL BE COLLECTED. SOILS EXCEEDING THE CLEANUP LEVELS WILL BE REMEDIATED AS DESCRIBED ABOVE.

THIS FUNDAMENTAL CHANGE WILL PRODUCE AN EFFECTIVE SOLUTION TO CONTAMINANTS PRESENT AT THE SITE. FURTHER, THE FUNDAMENTAL CHANGE MEETS APPLICABLE AND RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) AT A LOWER COST.

#SLD

SITE LOCATION AND DESCRIPTION

THE COLEMAN EVANS SITE IS AN 11-ACRE FACILITY LOCATED IN THE COMMUNITY OF WHITEHOUSE, DUVAL COUNTY, FLORIDA, APPROXIMATELY 8 MILES WEST OF JACKSONVILLE. THE SITE IS BORDERED ON THE NORTH BY THE SEABOARD COASTLINE RAILROAD, ON THE SOUTH BY A RESIDENTIAL AREA, ON THE WEST BY CELERY AVENUE, AND ON THE EAST BY HEAVY VEGETATION (FIGURE 1). RESIDENCES WITH PRIVATE WELL WATER SOURCES ARE LOCATED ALONG BOTH CELERY AVENUE AND GENERAL AVENUE.

THE COLEMAN EVANS SITE IS COMPOSED OF TWO DISTINCT AREAS. THE FIRST AREA COMPRISES THE WOOD TREATMENT FACILITY AND IS LOCATED ON THE WESTERN PORTION OF THE PROPERTY. THE EASTERN PORTION IS A LANDFILL AREA WHICH HAS BEEN USED FOR DISPOSAL OF WOOD CHIPS AND OTHER FACILITY WASTES. SITE SURFACE FEATURES INCLUDE TWO UNLINED DISPOSAL PITS, THE CONTENTS OF WHICH WERE PARTIALLY REMOVED IN JULY 1985, UNDER AN EPA EMERGENCY RESPONSE, AND THE ACTIVE WOOD TREATMENT FACILITY. THE TREATMENT FACILITY IS COMPOSED OF A LARGE PRESSURE FILTER SYSTEM AND SEVERAL STORAGE SHEDS.

THE COLEMAN EVANS SITE IS RELATIVELY FLAT, WITH LESS THAN 10 FEET OF RELIEF OVER THE ENTIRE SITE. THE SITE DRAINS INTO A DITCH WHICH EVENTUALLY ENTERS A SWAMPY AREA TO THE SOUTH, WHICH SUBSEQUENTLY DRAINS INTO MCGIRTS CREEK.

WITHIN A 1-MILE RADIUS OF THE SITE, LAND USE IS PRIMARILY RESIDENTIAL AND LIGHT COMMERCIAL/INDUSTRIAL. OUTSIDE THE 1-MILE RADIUS, THE AREA IS PRIMARILY UNDEVELOPED RURAL LAND UP TO THE OUTSKIRTS OF JACKSONVILLE, ABOUT EIGHT MILES TO THE EAST.

LOCALLY, THERE IS NO MUNICIPAL WATER SUPPLY. THUS, APPROXIMATELY 1000 RESIDENTS RELY ON GROUNDWATER RESOURCES FOR DRINKING WATER. THE TWO GROUNDWATER RESOURCES ARE THE SURFICIAL AQUIFER SYSTEM AND THE FLORIDAN AQUIFER. SURFACE WATERS IN DUVAL COUNTY ARE USED EXCLUSIVELY FOR SPORT FISHING AND RECREATION. AGRICULTURE NEAR THE SITE IS LIMITED TO SMALL GARDENS.

#SOEH

SITE OPERATIONS AND ENFORCEMENT HISTORY

THE COLEMAN EVANS FACILITY PRODUCED PRESERVED WOOD PRODUCTS THAT WERE PRESSURE IMPREGNATED WITH PCP FROM 1954 UNTIL THE LATE 1980S. THE TREATMENT PROCESS INCLUDED STEAMING, DRYING AND PRESSURE SOAKING THE WOOD, ALL OF WHICH WERE CARRIED OUT WITHIN A SINGLE PRESSURE CHAMBER.

DURING THE STEAMING PROCESS, THE WOOD PRODUCTS WERE IMPREGNATED WITH PCP AND NO. 2 FUEL OIL, USING 255 DEGREE FAHRENHEIT STEAM FOR A PERIOD OF EIGHT (8) HOURS. DURING THIS PERIOD, WOOD EXTRACTS WERE DRIVEN FROM THE WOOD PORES, SETTLING ON THE BOTTOM OF THE CHAMBER ALONG WITH PCP AND WASTEWATER FROM THE CONDENSED STEAM.

PRIOR TO 1970, THE EFFLUENT WASTEWATER FROM THE TREATMENT PROCESS WAS PRECIPITATED WITH CAUSTIC SODA AND ALUMINUM SULFATE, PASSED THROUGH A SAND FILTER AND DISCHARGED INTO A DRAINAGE DITCH WHICH CHANNLED THE WATER SOUTH TO MCGIRTS CREEK (FIGURE 2). THE PRECIPITATED SLUDGE WAS DEPOSITED INTO TWO UNLINED PITS OF UNKNOWN DEPTH, EACH APPROXIMATELY 100 FEET BY 50 FEET,

LOCATED ALONG THE SOUTHEASTERN EDGE OF THE SITE. USAGE OF THE SLUDGE DISPOSAL PITS WAS DISCONTINUED IN 1970 WHEN THE COMPANY BEGAN STORING ITS WASTE SLUDGE IN ABOVE GROUND STORAGE TANKS LOCATED ADJACENT TO THE PIT AREA ON THE WEST AND NORTHWEST. ALSO IN 1970, THE COMPANY VOLUNTARILY ENGAGED THE ENGINEERING FIRM OF REYNOLDS, SMITH AND HILL TO DESIGN A WASTEWATER TREATMENT SYSTEM. AS A RESULT OF THE CONSULTANT'S RECOMMENDATIONS, CHLORINATION AND LIME PRECIPITATION WAS INCORPORATED TO PRODUCE A CLEARER WASTEWATER.

GROUNDWATER CONTAMINATION WAS CONFIRMED AT THE COLEMAN EVANS SITE BY THE CITY OF JACKSONVILLE, DEPARTMENT OF HEALTH, WELFARE AND BIO-ENVIRONMENTAL SERVICES (BES) ON SEPTEMBER 9, 1980. AS A RESULT OF THESE FINDINGS, IN 1980 THE COMPANY INCORPORATED ACTIVATED CHARCOAL FILTERS INTO THE WASTEWATER TREATMENT SYSTEM TO IMPROVE THE REMOVAL OF ORGANICS AND, IN 1981 COMPLETED CONSTRUCTION OF A CLOSED-LOOP STEAMING SYSTEM IN THE TREATED CYLINDER THAT RESULTED IN ZERO DISCHARGE. IN 1981 THE COMPANY WAS FOUND IN VIOLATION OF RESOURCE CONSERVATION RECOVERY ACT (RCRA) HAZARDOUS WASTE REPORTING PLANNING AND SAFETY REQUIREMENTS. IN 1983 THE COMPANY WAS FOUND TO BE A GENERATOR AND STORER OF HAZARDOUS WASTES WHICH WAS IN VIOLATION OF RCRA REQUIREMENTS.

IN OCTOBER 1981, THE COLEMAN EVANS SITE WAS PROPOSED FOR INCLUSION ON THE NATIONAL PRIORITIES LIST (NPL) BASED ON A HAZARD RANKING SCORE OF 59.14. THE SITE WAS FINALIZED ON THE NPL IN MARCH 1983.

IN SEPTEMBER 1984, EPA OBLIGATED FUNDS FOR AN RI/FS. BY OCTOBER 1984, EPA HAD TASKED CAMP, DRESSER AND MCKEE, INC., THE REM II CONTRACTOR, TO EXECUTE THE RI/FS. THE FIELD INVESTIGATION WAS DELAYED BY COLEMAN EVANS' REFUSAL TO ALLOW EPA ONSITE TO CONDUCT THE REMOVAL AND REMEDIAL ACTIVITIES. AS A RESULT, EPA AND THE DEPARTMENT OF JUSTICE (DOJ) FILED A MOTION IN FEDERAL COURT TO OBTAIN AN ORDER GRANTING SITE ACCESS. BY JUNE 1985, EPA AND ITS AGENTS WERE GRANTED SITE ACCESS AND FIELD OPERATIONS WERE INITIATED.

IN 1985, EPA ISSUED A COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA) SECTION 106 REMOVAL ORDER TO COLEMAN EVANS. COLEMAN EVANS DID NOT COMPLY WITH THE ORDER. AS A RESULT, IN JUNE AND JULY 1985 AN IMMEDIATE REMOVAL ACTION (IRA) WAS CONDUCTED BY EPA TO CONTROL THE MAJOR SOURCE OF PCP CONTAMINATION IN THE SHALLOW AQUIFER. TWO UNLINED PITS WERE EXCAVATED AND THE CONTAMINATED MATERIAL WAS SHIPPED OFF-SITE TO A HAZARDOUS WASTE MANAGEMENT FACILITY IN EMELLE, ALABAMA. THE PITS WERE BACKFILLED WITH CLEAN MATERIAL AND FRENCH DRAINS WERE INSTALLED.

THE RI REPORT WAS COMPLETED IN APRIL 1986 AND THE DRAFT FS WAS RELEASED TO THE PUBLIC ON JULY 21, 1986.

A PUBLIC MEETING TO PRESENT THE FS WAS HELD ON AUGUST 7, 1986. THE PUBLIC COMMENT PERIOD CLOSED ON AUGUST 28, 1986. THE ROD FOR THE COLEMAN EVANS SITE WAS SIGNED SEPTEMBER 25, 1986.

IN OCTOBER 1986, GENERAL NOTICE WAS GIVEN TO COLEMAN EVANS REGARDING IMPLEMENTATION OF THE RD/RA. CITING FINANCIAL INABILITY, COLEMAN EVANS DECLINED TO IMPLEMENT THE RD/RA. A SPECIAL NOTICE LETTER WAS ISSUED IN DECEMBER 1987 GIVING COLEMAN EVANS THE OPPORTUNITY TO ENTER INTO NEGOTIATIONS WITH EPA TO IMPLEMENT THE RD/RA. COLEMAN EVANS AGAIN DECLINED, CITING FINANCIAL INABILITY. IN APRIL 1988, A CERCLA SECTION 106 ORDER WAS ISSUED TO COLEMAN EVANS TO IMPLEMENT THE RA. IN RESPONSE, COLEMAN EVANS REQUESTED A SETTLEMENT CONFERENCE WITH EPA.

DEMAND LETTERS FOR PAST COSTS INCURRED IN THE 1985 REMOVAL OPERATION WERE ISSUED TO COLEMAN EVANS AND JACK COLEMAN IN APRIL AND MAY 1988, RESPECTIVELY. THE DOJ FILED A CIVIL ACTION AGAINST COLEMAN EVANS IN JULY 1988, SEEKING RECOVERY OF THOSE FUNDS AND PUNITIVE DAMAGES FOR FAILURE TO COMPLY WITH THE ORDER. IN APRIL 1990, COLEMAN EVANS SETTLED THIS MATTER WITH THE UNITED STATES GOVERNMENT FOR \$350,000 AND A COMPLETE COVENANT NOT TO SUE.

IN SEPTEMBER 1988 EPA AND FDER DECIDED THAT BASED ON AN INCREASED SOIL VOLUME TO BE REMEDIATED, A TS TO EVALUATE OTHER REMEDIAL OPTIONS WOULD BE INITIATED. IN MARCH 1989, EPA OBTAINED PCP CONTAMINATED SOIL SAMPLES FROM THE COLEMAN EVANS SITE IN ORDER TO INVESTIGATE THE TECHNICAL EFFECTIVENESS OF TREATABILITY METHODS SUCH AS SOIL WASHING, BIOREMEDIATION AND S/S AT THE SITE. THE TS WAS COMPLETED IN MARCH 1990.

THE COLEMAN EVANS SITE STILL REMAINS ACTIVE. COMMERCIAL ACTIVITIES CONDUCTED ON SITE CONSIST OF SAWING, KILN DRYING AND UNTREATED LUMBER INVENTORY. HOWEVER, THE PCP WOOD TREATMENT OPERATION HAS CEASED.

A PUBLIC MEETING TO PRESENT THE TS RECOMMENDATIONS WAS CONDUCTED ON AUGUST 23, 1990. THE PUBLIC COMMENT PERIOD WAS INITIATED ON AUGUST 9, 1990 AND ENDED ON SEPTEMBER 9, 1990.

#HCP

HIGHLIGHTS OF COMMUNITY PARTICIPATION

THE TS REPORT AND THE PROPOSED PLAN FOR THE COLEMAN EVANS WOOD RESERVING SITE WERE RELEASED TO THE PUBLIC ON AUGUST 9, 1990. THESE TWO DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC FOR REVIEW IN THE ADMINISTRATIVE RECORD, LOCATED AT EPA REGION IV, AND IN AN INFORMATION REPOSITORY MAINTAINED AT THE WHITEHOUSE ELEMENTARY SCHOOL IN WHITEHOUSE, FLORIDA. THE NOTICE OF A PUBLIC MEETING WAS PUBLISHED IN THE FLORIDA TIMES UNION ON AUGUST 9, 1990. A PUBLIC COMMENT PERIOD WAS HELD FROM AUGUST 9 THROUGH SEPTEMBER 9, 1990. IN ADDITION TO INVITATION FOR PUBLIC COMMENTS AND THE ACCESSIBILITY OF THE SITE INFORMATION, A PUBLIC MEETING WAS CONDUCTED ON AUGUST 23, 1990. AT THIS MEETING, REPRESENTATIVES FROM EPA ANSWERED QUESTIONS AND ADDRESSED COMMUNITY CONCERNS. RESPONSES TO COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD ARE INCLUDED IN THE RESPONSIVENESS SUMMARY, APPENDIX B OF THIS AMENDED RECORD OF DECISION (AROD).

REMEDIAL DESIGN STUDIES AND INVESTIGATIONS

SOIL SAMPLING ACTIVITIES AND ANALYSES

ADDITIONAL STUDIES AND INVESTIGATIONS PERFORMED DURING THE RD INCLUDED GROUND SURVEYING, SOIL SAMPLE COLLECTION AND ANALYSES, GEOSTATISTICAL ANALYSES AND THERMAL TREATMENT TESTING. FIELD ACTIVITIES INCLUDED SURFACE SOIL SAMPLING AND BOREHOLE SAMPLING TO OBTAIN 81 SAMPLES TO ADD TO AND COMPARE WITH TWO-YEAR OLD RI DATA. THESE SAMPLES WERE COLLECTED FROM AREAS REQUIRING VERIFICATION OF CONTOURS USING GEOSTATISTICAL TECHNIQUES TO FURTHER DEFINE THE VOLUME NECESSARY FOR CLEANUP. THE LOCATIONS OF THE SAMPLES, WITH THE RESULTS OF THE PCP ANALYSES FROM THE RI AND RD ARE PLOTTED IN FIGURE 3A AND 3B. ANALYTICAL RESULTS BELOW THE PCP CLEANUP LEVEL OF 25 MG/KG ARE NOT SHOWN ON THIS FIGURE BELOW A DEPTH OF 10 FEET. A DETAILED LISTING OF THE COMBINED PCP ANALYTICAL RESULTS FROM THE RI AND RD IS INCLUDED IN APPENDIX C.

TOTAL ORGANIC CARBON (TOC) AND MOISTURE ANALYSES WERE ALSO PERFORMED ON THE SAMPLES PRIOR TO AIR DRYING AND THE THERMAL TREATMENT TEST.

GEOSTATISTICAL ANALYSIS

A GEOSTATISTICAL ANALYSIS WAS PERFORMED ON THE COMBINED ANALYTICAL RESULTS FROM THE RI AND RD SAMPLING EFFORTS. THE PURPOSE OF THE ANALYSIS WAS TO ESTIMATE CONCENTRATIONS OF PCP AT UNSAMPLED LOCATIONS AND DETERMINE THE TOTAL VOLUME OF CONTAMINATED SOIL AND THE ASSOCIATED CONFIDENCE INTERVALS. THE ESTIMATED CONCENTRATIONS AND VOLUMES WERE DETERMINED USING THE GEOSTATISTICAL TECHNIQUE KNOWN AS KRIGING. A MORE EXTENSIVE ANALYSIS AND DISCUSSION ON THE KRIGING TECHNIQUE CAN BE FOUND IN THE RD REPORT.

THE MINIMUM VOLUME OF SOIL TO BE REMEDIATED BASED ON SOIL COLLECTION LOCATIONS IS 16,000 YDS(3).

THIS ESTIMATE ASSUMES LOW MOBILITY OF CONTAMINANTS. USING THE KRIGING METHOD, AN ESTIMATED VOLUME OF 26,800 YD(3) WAS CALCULATED.

TREATABILITY STUDY SUMMARY

BASED UPON THE CHARACTERISTICS OF THE WASTE AND THE REQUIREMENTS OF THE 1986 ROD FOR THE COLEMAN EVANS SITE, BIOREMEDIATION AND S/S TECHNOLOGIES WERE SELECTED FOR BENCH-SCALE ASSESSMENT. THE SOIL WASHING TECHNOLOGY WAS USED AS A PRETREATMENT STEP TO BIOREMEDIATION. REPRESENTATIVE SOIL SAMPLES WERE TREATED USING THE AFOREMENTIONED TECHNOLOGIES. TREATED SAMPLES WERE THEN ANALYZED TO DETERMINE THE EFFECTIVENESS OF THE COMBINED TECHNOLOGIES IN DESTROYING OR STABILIZING THE CONTAMINANT TO THE ESTABLISHED CLEAN-UP LEVEL OF 3.6 PPM OF PCP IN A TOXICITY CHARACTERIZATION LEACHING PROCEDURE (TCLP) LEACHATE TEST. TREATMENT PROCESSES AND OPERATING FEATURES ARE DESCRIBED FOR EACH TECHNOLOGY IN SECTION 5.1 THROUGH 5.3.

SOIL WASHING

THE SOIL WASHING TECHNOLOGY REMOVES ORGANIC CONTAMINANTS FROM THE SOILS BY AN EXTRACTION PROCESS WITH A LEACHING MEDIUM. THE REMOVAL TECHNIQUE CAN BE EMPLOYED EITHER IN-SITU AS A WATER FLUSHING SYSTEM OR BY SCRUBBING THE EXCAVATED SOILS THROUGH A COUNTER CURRENT EXTRACTION SYSTEM. BY USE OF AN INTENSIVE SCRUBBING ACTION, SOIL AGGREGATES ARE BROKEN UP, FREEING THE HIGHLY CONTAMINATED FINE PARTICLES FROM THE COARSER SAND AND GRAVEL. THE FLUID NORMALLY USED IN THE SOIL WASHING IS WATER WHICH MAY CONTAIN VARYING ADDITIVES SUCH AS DETERGENTS, ACIDS AND ALKALIS. DURING THE WASHING PROCESS, ADSORBED CONTAMINANTS ARE MOBILIZED INTO SOLUTION WHICH REQUIRES FURTHER TREATMENT BY MEANS OF BIOLOGICAL TREATMENT, CHEMICAL PRECIPITATION AND CARBON ADSORPTION.

AT THE COLEMAN EVANS SITE, SOIL WASHING WOULD BE CARRIED OUT IN A CONTINUOUS PROCESS IN TREATMENT VESSELS, USING WATER AS THE EXTRACTION SOLVENT.

BIOREMEDIATION

BIOREMEDIATION IS THE USE OF BACTERIA OR OTHER MICRO-ORGANISMS FOR DESTRUCTION OF TARGET COMPOUNDS THROUGH MICROBIAL METABOLISM. BENCH-SCALE AND PILOT-STUDY DEMONSTRATIONS HAVE SHOWN THAT PCP AND A WIDE VARIETY OF OTHER ORGANIC COMPOUNDS CAN BE REMOVED FROM SOIL AND WATER MATRICES. THE ECONOMIC FEASIBILITY AND SUCCESS OF BIOLOGICAL TREATMENT OF SOILS DEPENDS UPON MANY SITE-SPECIFIC FACTORS. THESE INCLUDE THE AMOUNT OF PCP AVAILABLE FOR DEGRADATION BY MICROBES, THE ABILITY OF NATURALLY-OCCURRING OR INTRODUCED MICRO-ORGANISMS TO SURVIVE AND PROLIFERATE UNDER SITE-SPECIFIC CONDITIONS (PRESENCE OF HEAVY METALS, CONTAMINATION BY OTHER ORGANICS, ETC.) AND THE AVAILABILITY OF NUTRIENTS, OXYGEN, SECONDARY CARBON SOURCES, PH, ETC. NECESSARY FOR OPTIMAL MICROBIAL GROWTH AND DEGRADATION.

IN THE BIOTREATMENT STUDY PERFORMED, THE CONTAMINATED SOIL WAS SCREENED TO REMOVE COARSE DEBRIS AND THEN SLURRIED WITH WATER IN A SOIL WASHING CIRCUIT TO TRANSFER THE CONTAMINANTS FROM THE SOIL TO THE AQUEOUS PHASE. FOLLOWING THE SLURRING PHASE, THE CLEAN COARSE SOIL (SAND FRACTION: GT 200 MESH) WAS THEN SEPARATED FROM THE CONTAMINATED WASH WATER AND FINE SOIL PARTICLES. THE WASHWATER AND SOIL FINES WERE THEN SUBJECTED TO BIOTREATMENT.

STABILIZATION/SOLIDIFICATION

STABILIZATION REFERS TO THE CHEMICAL MODIFICATION OF THE SOIL TO RENDER THE CONTAMINANTS OF CONCERN LESS MOBILE OR LEACHABLE. IN THIS PROCESS WASTES (SOILS) AND REAGENTS ARE MIXED TO CHEMICALLY BIND OR ISOLATE THE ENTIRE WASTE WITHIN A SOLID MATRIX. IN SOME CASES, REMEDIATION OF A SITE USING STABILIZATION RESULTS IN A VOLUME INCREASE IN THE AMOUNT OF REMEDIATED SOIL REQUIRING FINAL DISPOSAL. SOLIDIFICATION IS THE CONVERSION OF A WASTE TO A MORE SOLID FORM.

S/S AT THIS SITE WOULD APPLY PRIMARILY TO SOIL FINES AND WOODY FRACTIONS.

TREATABILITY STUDY FINDINGS

BIOREMEDIATION STUDY

RESULTS OF THE TREATABILITY STUDIES WERE EVALUATED AGAINST THE PERFORMANCE CRITERIA OF 25 PART PER MILLION (PPM) OF PCP IN RESIDUAL SOILS FOR ALL BIOREMEDIATION TESTING, AND A MAXIMUM TCLP CONCENTRATION OF 3.6 PPM OF PCP IN THE LEACHATE FROM SAMPLES PRODUCED IN THE STABILIZATION PROCESSES.

CRITICAL ANALYSIS OF THE BIOLOGICAL STUDIES DEMONSTRATED THE FOLLOWING:

- BIOLOGICAL TREATMENT OF SOIL IN A SLURRY REACTOR ACHIEVED CLEANUP LEVELS FROM BELOW DETECTION TO 100 PPM OF PCP DEPENDING UPON SOIL COMPOSITION. SOILS CONTAINING WOODY FINES ACHIEVED THE LESS EFFICIENT LEVELS. REMOVAL RATES OF PCP FROM THE AQUEOUS PHASE WERE DEPENDENT UPON SLURRY CONCENTRATIONS AND TYPE OF INITIAL SOIL FED INTO THE SLURRY.
- MICROBES MORE RAPIDLY DEGRADED PCP IN SOILS CONTAINING WOODY WASTE AND SAWDUST UP TO 2.7 PERCENT BY WEIGHT. THE WOODY COMPONENT OF THIS SOIL COULD BE RESPONSIBLE FOR ENHANCED MICROBIAL DEGRADATION OF PCP. MIXING OF SOILS WITH HIGH WOODY PRESENCE WITH THOSE SOILS THAT EXHIBIT MINIMUM WOODY PRESENCE, SHOWED INCREASED DEGRADATION RATES OF THE PCPS IN ALL SOILS DURING THE SLURRING PROCESS.
- SOIL CONTAINING A WOODY COMPONENT WAS PRESENT IN AT LEAST 1/3 THE TOTAL VOLUME OF SOILS FROM THE SITE. ANALYSIS OF SOIL FRACTIONS; HOWEVER, SHOWED THAT PCP IS PARTITIONED PREFERENTIALLY INTO FRACTIONS OF SOIL ABOVE +10 MESH (WOODY FRACTION) AND 200 MESH (SOIL FINES), WITH THE SANDY FRACTION CONTAINING CONCENTRATIONS NEAR OR BELOW THE SOIL TARGET OF 25 PPM. SOIL WASHING STUDIES USING WATER AS A SOLVENT DEMONSTRATED THAT SOIL FRACTIONS ABOVE -200 MESH COULD BE EFFICIENTLY "CLEANED" TO BELOW 25 PPM PCP IN SOIL WITHOUT WOODY FRACTIONS, AND TO A LEVEL OF APPROXIMATELY 234 PPM PCP IN SOILS WITH A WOODY COMPONENT. THIS EVIDENCE SUGGESTS THAT REMOVAL OF THE WOODY COMPONENT WOULD LEAD TO TOTAL REMOVAL OF PCP FROM THIS FRACTION OF THE SOIL. THIS STUDY SUGGESTED THAT BETWEEN 90 PERCENT AND 95 PERCENT OF THE SITE SOILS (BY WEIGHT) COULD BE REMEDIATED TO THE TARGET CLEANUP LEVEL FOR PCP BY SOIL WASHING ALONE. THE REMAINING 5 PERCENT TO 10 PERCENT OF SITE SOILS (WOODY WASTES AND SOIL FINES) WOULD REQUIRE SOME OTHER FORM OF TREATMENT SUCH AS STABILIZATION. SOME OF THE WOODY FRACTION WASTES WOULD NEED TO BE GROUND OR SHREDDED PRIOR TO STABILIZATION. CHLORINATED DIOXINS, IF PRESENT WOULD ALSO BE EXPECTED TO BE IMMOBILIZED BY THIS PROCESS. HOWEVER, ADDITIONAL TESTING (PILOT STUDY) WOULD BE REQUIRED TO ASSESS THE FULL IMPACT OF STABILIZING DIOXINS.
- OFF-GASES FROM THE BIOREACTOR, WHILE EXPECTED TO BE NEGLIGIBLE, WOULD BE TREATED BY A VAPOR-PHASE GAC ADSORPTION SYSTEM OR ANOTHER PROCESS DETERMINED TO BE EFFECTIVE IN THE DESIGN PHASE IF DEEMED NECESSARY.

STABILIZATION/SOLIDIFICATION STUDY

CRITICAL ANALYSIS OF THE STABILIZATION PROCESS SHOWS THE FOLLOWING:

- USING THE FORMULATIONS SET FORTH BY THE REPRESENTATIVE VENDORS, STABILIZATION OF THE PROVIDED SOIL SAMPLE (WHICH DID NOT CONTAIN A WOODY COMPONENT) WAS ACHIEVED TO THE REQUIRED TCLP CONCENTRATION AND, BASED ON INITIAL TCLP RESULTS, PERCENT REDUCTIONS

RANGED FROM 79.23 TO 98.54.

- MINIMUM STRENGTH PARAMETERS WERE MET FOR ALL VENDOR

TESTS ON FULLY-CURED SAMPLES. TWO SAMPLES EXPERIENCED ACCEPTABLE PROPERTY CHANGES IN IMMERSION TESTING. ONE SAMPLE BROKE UNDER FINGER PRESSURE.

- SOME VENDORS REQUIRE PRESCREENING OR CRUSHING OF SOIL PRIOR TO STABILIZATION.
- THE STABILIZATION REAGENTS USED BY TWO OF THE VENDORS CONTAINED RELATIVELY HIGH LEVELS OF ARSENIC AND BARIUM. IT IS NOT KNOWN WHETHER THE PRESENCE OF THESE ELEMENTS IN THE TREATED WASTE WOULD POSE A HAZARD TO HUMAN HEALTH. FURTHER EVALUATION OF THESE REAGENTS WOULD OCCUR DURING THE PILOT TREATABILITY STUDY.

DETAILED INFORMATION ON THE TS CAN BE FOUND IN THE FINAL TS REPORT.

WASHWATER REMEDIATION TECHNOLOGIES

DURING SOIL REMEDIATION AT THE SITE, CONTAMINATED SOIL WASHWATER FROM THE SOIL WASHING PROCESS WILL BE PRODUCED. CONSIDERING THE ANTICIPATED HIGH PCP CONCENTRATION IN THE SOIL WASHWATER, TWO STAGES OF TREATMENT WERE DETERMINED TO BE REQUIRED DURING THE TS. THE FIRST STAGE OF TREATMENT WILL REDUCE PCP FROM A LEVEL OF APPROXIMATELY 20 PPM DOWN TO 1 PPM PRIOR TO IMPLEMENTING THE SECOND STAGE WHICH WILL REDUCE THE PCP FROM A LEVEL OF APPROXIMATELY 1 PPM TO 1.0 PART PER BILLION (PPB) OR BELOW PRIOR TO SURFACE WATER DISCHARGE. EVALUATION OF SEVERAL TECHNOLOGIES DETERMINED THAT BIOLOGICAL TREATMENT FOLLOWED BY TREATMENT IN AN ON-SITE WATER TREATMENT SYSTEM WILL BE EFFECTIVE IN MEETING THESE CLEANUP LEVELS.

BIOLOGICAL TREATMENT OF CONTAMINATED WASHWATER

THE FUNCTION OF BIOLOGICAL TREATMENT IS TO REMOVE ORGANIC MATTER FROM THE WASTE STREAM THROUGH MICROBIAL DEGRADATION.

TREATABILITY TEST RESULTS INDICATED THAT BIOLOGICAL TREATMENT OF PCP-LADEN PROCESS WATER COULD ACHIEVE REMOVALS OF PCP FROM INFLUENT CONCENTRATIONS AS HIGH AS 25 PPM, DOWN TO LESS THAN 1 PPM. IT WAS ALSO REPORTED THAT PERFORMANCE REMAINED CONSISTENT THROUGHOUT PERIODS OF WIDELY VARYING INFLUENT PCP CONCENTRATION. THIS SUGGESTS THAT THE BIOLOGICAL SYSTEM HAS A CAPABILITY FOR SELF-REGULATION SUCH THAT CYCLES OF HIGH AND LOW ORGANIC LOADING DO NOT NECESSARILY PRODUCE POOR QUALITY EFFLUENT.

THE PROCESS CONSIDERED EMPLOYS A SUBMERGED FIXED-FILM REACTOR IN WHICH AN ACCLIMATED MICROBIAL CONSORTIUM IS IMMOBILIZED. THE BIOLOGICAL PROCESS REQUIRES NO PRETREATMENT OR POST SETTLEMENT FOR SUSPENDED SOLIDS REMOVAL, BECAUSE THE OVERALL MASS BALANCE SHOWED AN EQUIVALENT FLUX OF SOLIDS IN AND OUT OF THE REACTOR.

THE SYSTEM CAN BE OPERATED WITH MINIMUM ATTENTION SINCE THE FIXED-FILM SYSTEM DOES NOT REQUIRE A BIOMASS SEPARATION STEP OR RECIRCULATION.

HOWEVER, BIOLOGICAL REACTORS REQUIRE STABLE OPERATING CONDITIONS. MAINTENANCE OF STABLE LEVELS IS CRUCIAL FOR A NUMBER OF KEY ENVIRONMENTAL PARAMETERS INCLUDING:

- DISSOLVED OXYGEN (2 TO 4 MG/L MINIMUM)
- PH (7.5 TO 9)
- TEMPERATURE (15 DEGREES TO 30 DEGREES C)
- NUTRIENT RATIO (COD/N/P=100/5/1)

- ALKALINITY (PROVIDES BUFFERING CAPACITY).

THE BIOLOGICAL TREATMENT SYSTEM WOULD BE DESIGNED TO TREAT PROCESS WATER WITH 20 MG/L PCP AND 500 MG/L TOTAL SUSPENDED SOLIDS (TSS) AT A FLOW RATE OF 20 GALLONS PER MINUTE (GPM). THE REQUIRED EFFLUENT QUALITY SHOULD CONTAIN LESS THAN 1 MG/L PCP AND NO MORE THAN 500 MG/L TSS. THE BIOLOGICAL TREATMENT SYSTEM IN ITSELF WILL NOT REDUCE THE TSS PRESENT IN THE PROCESS WATER.

BIODEGRADATION OF PCP BY BIOLOGICAL TREATMENT HAS BEEN DEMONSTRATED TO BE EFFECTIVE. THE TS DETERMINED THAT PCP CONCENTRATIONS WERE REDUCED TO UNDETECTABLE LEVELS FROM INITIAL LEVELS RANGING FROM 10 PPB TO 100 PPM WITH 48 HOURS OF BIOLOGICAL TREATMENT. PCP REMOVAL IS MOST EFFECTIVE BETWEEN 15 DEGREES AND 30 DEGREES C AND BETWEEN PH 7.5 AND 9.0. INOCULATION OF WATER WITH AS FEW AS 10(5) CELLS/ML OF FLAVOBACTERIUM RESULTED IN EFFECTIVE PCP REMOVAL. IT WAS ALSO REPORTED THAT MAINTAINING PROPER ALKALINITY IN THE BIOREACTORS MIGHT BE A PROBLEM BECAUSE PCP BIODEGRADATION RELEASES HYDROCHLORIC ACID. THUS, PH ADJUSTMENT IS NEEDED FOR THE TREATMENT SYSTEM.

FOR ON-SITE BIOLOGICAL TREATMENT, MODULAR TREATMENT UNITS ARE AVAILABLE FROM A NUMBER OF VENDORS. AERATION EQUIPMENT AND PLASTIC TOWER PACKING ARE ALSO READILY AVAILABLE FROM NUMEROUS VENDORS. THE CHEMICAL FEED SYSTEMS AND CHEMICALS NEEDED FOR PH ADJUSTMENT AND NUTRIENT ADDITIONS ARE ALSO AVAILABLE IN MODULAR UNITS FOR EASY INSTALLATION. AT LEAST ONE VENDOR COULD SUPPLY PCP-DEGRADING STRAINS OF FLAVOBACTERIUM. THE SYSTEM CAN BE OPERATED WITH MINIMAL ATTENTION. THUS, THE IMPLEMENTATION OF THE BIOLOGICAL TREATMENT AT THE SITE APPEARS PROMISING.

TREATMENT AT THE ON-SITE WATER TREATMENT SYSTEM

TREATED EFFLUENT WOULD BE PUMPED TO AN ON-SITE WATER TREATMENT SYSTEM FOR FURTHER TREATMENT BEFORE DISCHARGE TO THE SURFACE WATER. THE ON-SITE WATER TREATMENT SYSTEM, WOULD BE DESIGNED FOR 120 GPM, WHICH WOULD BE ADEQUATE TO RECEIVE THE 20 GPM SOIL WASH WATER ALONG WITH THE GROUNDWATER FROM RECOVERY AND DEWATERING WELLS. ALSO, THE ON-SITE WATER TREATMENT SYSTEM IS EQUIPPED WITH GAC ADSORPTION UNITS. THUS THE SUFFICIENT REMOVAL OF PCP TO MEET THE SURFACE WATER DISCHARGE CRITERIA WOULD BE ACHIEVABLE WITHOUT SUBSTANTIAL ADDITIONAL CAPITAL EXPENDITURES. HOWEVER, THE DISCHARGE AND TREATMENT OF 20 GPM PCP-LADEN SOIL WASHWATER WOULD CAUSE AN INCREASE IN THE OPERATING AND MAINTENANCE COSTS FOR THE GROUNDWATER TREATMENT SYSTEM.

SUMMARY OF THE PROPOSED REMEDIAL TECHNOLOGIES FOR SOILS AND WASHWATER

THE FOLLOWING DISCUSSION PRESENTS ONE APPROACH TO SITE REMEDIATION CONSISTENT WITH THE TS RESULTS, WHICH IS BASED UPON THE VOLUME OF MATERIAL TO BE TREATED AT THE SITE AND THE CRITERIA SET FORTH IN THE "GUIDE FOR CONDUCTING TREATABILITY STUDIES UNDER CERCLA - INTERIM FINAL." THIS APPROACH INVOLVES A TECHNOLOGY TRAIN INCORPORATING BOTH BIOTREATMENT AND S/S, APPLIED TO THE DIFFERENT FRACTIONS OF THE WASTE AND WASTEWATER AS FOLLOWS:

- SOILS FROM THE SITE WOULD BE PRETREATED USING A SOIL WASHING SYSTEM TO MOVE PCP INTO THE AQUEOUS PHASE. CLEANED SOIL FRACTIONS (ANTICIPATED 95 PERCENT OF THE INITIAL VOLUME) WOULD BE REPLACED INTO THE EXCAVATED AREA.
- PCP IN THE AQUEOUS PHASE FROM THE SOIL WASHING PRETREATMENT SYSTEM WOULD BE TREATED IN BIOREACTORS. STRAINS SPECIFIC TO BIODEGRADATION OF PCP USED AS INOCULUM AND BIOLOGICAL DEGRADATION ALONG WITH POLISHING BY A GAC SYSTEM COULD BE USED TO ACHIEVE CLEANUP CRITERIA.
- RESIDUAL FINES (AND WOODY RESIDUE FROM SOME AREAS) WOULD BE SUBJECTED TO STABILIZATION. CONCENTRATIONS OF PCP IN THIS FRACTION ARE EXPECTED TO BE HIGHER THAN THOSE FOUND IN THE INITIAL FEED SOIL BUT, BASED ON A LINEAR EXTRAPOLATION,

SHOULD MEET THE OVERALL CLEANUP STANDARD IN TERMS OF TCLP TESTING AFTER STABILIZATION. STABILIZATION REAGENTS AND MIXTURES WILL BE OPTIMIZED, DURING THE RD, WITH REGARD TO BOTH THE PHYSICAL PROPERTIES OF THE STABILIZED WASTE, AND ITS LEACHING CHARACTERISTICS. CHLORINATED DIOXIN, IF PRESENT, ARE HIGHLY LIKELY TO BE IMMOBILIZED BY THIS PROCESS. HOWEVER, ADDITIONAL TESTING WOULD BE REQUIRED TO ASSESS BOTH SHORT-TERM AND LONG-TERM EFFECTIVENESS. THIS ADDITIONAL TESTING WOULD BE PERFORMED AS PART OF THE PILOT TREATABILITY STUDY.

#SSRCG

SUMMARY OF SITE RISKS AND CLEANUP GOALS

CERCLA DIRECTS THAT THE AGENCY MUST PROTECT HUMAN HEALTH AND THE ENVIRONMENT FROM CURRENT AND POTENTIAL EXPOSURE TO HAZARDOUS SUBSTANCES AT SUPERFUND SITES. IN ORDER TO ASSESS THE CURRENT AND POTENTIAL RISKS FOR THE COLEMAN EVANS SITE, A RA WAS CONDUCTED AS PART OF THE RI/FS. THIS SECTION SUMMARIZES THE FINDINGS CONCERNING THE RISKS FROM EXPOSURE TO SOIL AND GROUNDWATER RELATED TO THE SITE.

HUMAN HEALTH RISKS

CONTAMINANTS OF CONCERN (INDICATOR CHEMICALS)

A RELATIVELY SMALL NUMBER OF CHEMICALS WERE DETECTED AT HIGHER THAN AMBIENT CONCENTRATIONS AT THE COLEMAN EVANS SITE. THE 1986 RISK ASSESSMENT FOUND PCP TO BE THE ONLY CONTAMINANT OF CONCERN AT THE SITE. RESULTS OF ONSITE SAMPLE ANALYSES REVEALED THE WIDESPREAD OCCURRENCE OF PCP IN THE SOILS AT THE COLEMAN EVANS SITE. ANALYTICAL RESULTS OF ON-SITE SAMPLES REVEALED LEVELS OF PCP IN THE GROUNDWATER THAT EXCEEDED THE 1980 EPA WATER QUALITY CRITERIA (1.01 MG/L) IN ONE BOREHOLE SAMPLE (BH-40) AND TWO EXISTING WELL SAMPLES (EM-25 AND EM-34). GROUNDWATER ASSOCIATED WITH THIS SITE IS IDENTIFIED AS A CLASS II AQUIFER. ANALYSES OF SURFACE WATER AND STREAM SEDIMENT SAMPLES REVEALED THE PRESENCE OF PCP IN THE WATER AND SEDIMENTS OF THE DRAINAGEWAY LEADING FROM THE SITE TO MCGIRTS CREEK.

THE AREAL EXTENT OF PCP CONTAMINATION IN SOIL HAS BEEN IDENTIFIED. THE HIGHEST CONCENTRATIONS OCCUR IN THE VICINITY OF THE CHEMICAL TANKS AND THE PIT AREA, WHICH ARE OR HAVE BEEN USED TO STORE THE PROCESS WASTES.

THE DEPTH OF PCP CONTAMINATION IN THE SOIL IS VARIABLE ACROSS THE SITE. THE HIGHEST LEVELS GENERALLY OCCUR AT THE 3-FOOT DEPTH, WHICH COINCIDES WITH THE TOP OF THE WATER TABLE. IT IS SPECULATED THAT PCP-LADEN FUEL OIL IS FLOATING ON THE WATER TABLE SURFACE, AND IS SPREAD OVER THE 1- TO 5-FOOT DEPTH INTERVAL AS THE WATER TABLE FLUCTUATES SEASONALLY. HOWEVER, PCP CAN BE FOUND TO A DEPTH OF 10 FEET IN THE LANDFILL AREA, AND TO ABOUT 35 FEET IN THE CHEMICAL TANK AND PIT AREAS. THE EXTENT OF OFF-SITE PCP CONTAMINATION WITHIN GROUNDWATER IS LIMITED TO AN AREA APPROXIMATELY 200 FEET SOUTH OF THE SITE, AND OCCURS ONLY WITHIN THE WATER TABLE ZONE AQUIFER (BOREHOLES 49 AND 50). THESE LEVELS OF PCP ARE BELOW FEDERAL WATER QUALITY CRITERIA, AND BECAUSE PCP IS NOT MOBILE IN THE GROUNDWATER ENVIRONMENT, THE POTENTIAL FOR FUTURE MIGRATION IS LOW. NO METALS, POLYCHLORINATED BIPHENYLS (PCBS) OR DIOXINS WERE DETECTED IN OFF-SITE GROUNDWATER IN EITHER THE WATER TABLE ZONE OR LIMESTONE UNIT.

EXPOSURE ASSESSMENT SUMMARY

IDENTIFICATION OF POTENTIAL RECEPTORS

POTENTIAL RECEPTORS OF SITE CONTAMINATION LOCATED IN THE VICINITY OF THE COLEMAN EVANS SITE INCLUDE THE WORKERS AT THE COLEMAN EVANS WOOD PRESERVING COMPANY, THE RESIDENTS OF WHITEHOUSE, FLORIDA, WHO LIVE IN THE VICINITY OF THE SITE, AND USERS OF PRIVATE WATER SUPPLY WELLS LOCATED

DOWNGRADIENT FROM THE SITE.

APPROXIMATELY 15-20 PEOPLE CONTINUE TO WORK ON-SITE AS EMPLOYEES OF COLEMAN EVANS. THEY ARE LIKELY TO COME INTO DAILY CONTACT WITH CONTAMINATED SOILS.

APPROXIMATELY SIX HOUSES IN WHITEHOUSE, FLORIDA, SHARE A COMMON BOUNDARY WITH THE SITE. ALL OF THE RESIDENCES IN THE VICINITY OF THE SITE USE PRIVATE WELLS AS A SOURCE OF DRINKING WATER. IT IS ESTIMATED THAT THERE ARE 180 DOMESTIC WELLS WITHIN ONE MILE OF THE SITE AND 1,620 WELLS WITHIN THREE MILES. SEVERAL HOMES ARE DOWNGRADIENT AND VERY CLOSE TO THE SITE AND THEIR WELLS MAY BE CANDIDATES FOR CONTAMINATION FROM WASTES PERCOLATING INTO THE SURFICIAL AQUIFER SYSTEM WHICH SUPPLIES THESE WELLS. THE FLORIDA DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES (HRS) HAS SCHEDULED SAMPLING OF PRIVATE WELLS WITHIN THE IMMEDIATE VICINITY OF THE SITE.

IDENTIFICATION OF EXPOSURE PATHWAYS

BASED ON CONSIDERATIONS OF POTENTIAL RECEPTORS DISCUSSED ABOVE AND MIGRATION CHARACTERISTICS OF PCP, THE POSSIBLE CURRENT COMPLETE PATHWAYS IDENTIFIED IN THE RA ARE IDENTIFIED BELOW:

1. INGESTION AND DERMAL CONTACT WITH CONTAMINATED SOIL/SAWDUST.
2. INHALATION OF AIRBORNE DUST/SAWDUST.
3. DERMAL CONTACT WITH DRAINAGE DITCH WATER.

IN ADDITION, TWO POTENTIAL FUTURE PATHWAYS WERE IDENTIFIED IN THE RA:

1. INGESTION OF CONTAMINATED GROUND WATER.
2. INGESTION OF VEGETABLES GROWN IN CONTAMINATED SOIL.

POTENTIAL EXPOSURE LEVELS WERE DETERMINED FOR EACH PATHWAY BASED ON THE MEAN AND MAXIMUM CONCENTRATION OF PCP DETECTED IN THE APPROPRIATE MEDIA. ASSUMPTIONS USED IN THE RA FOR EXPOSURE TO SOIL BY INGESTION/DERMAL AND INHALATION PATHWAYS ARE SHOWN IN TABLES 1A AND 1B.

TOXICITY ASSESSMENT

PRIMARY CONTAMINANT-PENTACHLOROPHENOL

COMMERCIAL PCP PREPARATIONS CONTAIN IMPURITIES THAT INCLUDE HEXACHOROBENZENE, POLYCHORINATED DIBENZOFURANS, AND POLYCHORINATED DIBENZO-DIOXINS. IT IS DIFFICULT TO DETERMINE THE EXTENT TO WHICH THE TOXICITY OF THE COMMERCIAL PRODUCTS ARE DUE TO PCP OR TO THE VERY TOXIC IMPURITIES. THE PCP USED IN COMPARATIVE STUDIES IS GENERALLY FREE OF IMPURITIES.

QUALITATIVE DESCRIPTION OF HEALTH EFFECTS

PCP IS RAPIDLY ABSORBED FOLLOWING ORAL, DERMAL OR INHALATION EXPOSURE. ABSORPTION FOLLOWING INGESTION OF DRINKING WATER IS REPORTED TO BE ESSENTIALLY COMPLETE. ABSORPTION FOLLOWING INHALATION HAS BEEN REPORTED TO BE IN THE RANGE OF 76-88 PERCENT.

PCP IS AN UNCOUPLER OF CELLULAR OXIDATION AND PHOSPHORYLATION, RESULTING IN AN INCREASE IN THE BASIC METABOLIC RATE. PCP POISONING IN HUMANS IS CHARACTERIZED BY A PROFUSE SWEATING, OFTEN ACCOMPANIED BY FEVER, WEIGHT LOSS AND GASTROINTESTINAL COMPLAINTS. LIVER AND KIDNEY INVOLVEMENT HAVE BEEN IMPLICATED IN CASES OF FATAL POISONING. THE MAJOR TARGETS OF PCP TOXICITY SEEM TO BE THE LIVER, KIDNEYS, AND CENTRAL NERVOUS SYSTEM.

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

THE RFD FOR PCP THAT WAS USED IN THE RA AND IS INCLUDED IN THE AGENCY'S INTEGRATED RISK INFORMATION SYSTEM (IRIS) DATABASE IS .03 MG/KG DAY.

PCP HAS RECENTLY BEEN CLASSIFIED BY THE AGENCY AS A B2 CARCINOGEN. A CARCINOGENIC POTENCY FACTOR (CPF) HAS NOT YET BEEN VERIFIED. HOWEVER, A CPF OF 0.12 (MG/KG/DAY)(-1) HAS BEEN PROPOSED BY THE AGENCY'S CARCINOGEN RISK ASSESSMENT VERIFICATION ENDEAVOR (CRAVE) WORKGROUP.

RISK CHARACTERIZATION

THE 1986 RA FOR THIS SITE EVALUATED THE RISK FROM PCP EXPOSURE VIA THE FIVE PATHWAYS SHOWN IN SECTION 6.2.2. AT THAT TIME, THE AGENCY HAD CLASSIFIED PCP AS A SYSTEMIC TOXICANT WITH A RFD VALUE OF .03 MG/KG DAY. THIS PCP RFD VALUE IS CURRENTLY IN THE AGENCY'S IRIS DATABASE. THE CALCULATED EXPOSURE DOSAGES FROM EACH PATHWAY WERE COMPARED TO THE RFD.

POTENTIAL CONCERN FOR NONCARCINOGENIC EFFECTS OF A SINGLE CONTAMINANT IN A SINGLE MEDIUM IS EXPRESSED AS THE HAZARD QUOTIENT (HQ) (OR THE RATIO OF THE ESTIMATED INTAKE DERIVED FROM THE CONTAMINANT CONCENTRATION IN A GIVEN MEDIUM TO THE CONTAMINANT'S RFD). BY ADDING THE HQs FOR ALL CONTAMINANTS WITHIN A MEDIUM OR ACROSS ALL MEDIA TO WHICH A GIVEN POPULATION MAY REASONABLY BE EXPOSED, THE HAZARD INDEX (HI) CAN BE GENERATED. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANTS WITHIN A SINGLE MEDIUM OR ACROSS MEDIA. IN THIS CASE, PCP IS THE ONLY SIGNIFICANT CONTAMINANT AND THE HI VALUE WOULD APPLY TO THIS SINGLE COMPOUND. (THE RA ALSO ADDRESSED XYLENE AS A CONTAMINANT AT THIS SITE; INSIGNIFICANT LEVELS OF THIS LESS TOXIC COMPOUND RESULTED IN ITS ELIMINATION FROM FURTHER RISK CONSIDERATIONS).

ALL THREE CURRENT EXPOSURE SCENARIOS YIELDED HI VALUES WELL BELOW 1.0 INDICATING THAT NO HEALTH RISK WOULD BE ANTICIPATED. HOWEVER, BOTH FUTURE EXPOSURE SCENARIOS GAVE UNACCEPTABLE HI VALUES. POTENTIAL FUTURE EXPOSURE (BY INGESTION) TO THE MAXIMUM DETECTED LEVEL OF PCP IN WATER FROM THE SURFICIAL AQUIFER GAVE A HI VALUE OF 12. THE CONSUMPTION OF ROOT CROPS IRRIGATED WITH THIS WATER COULD PRODUCE EXPOSURE TO PCP IN CONSUMERS AT A HI LEVEL OF 4.

THESE POTENTIAL FUTURE EXPOSURES TO UNACCEPTABLE LEVELS OF PCP IN GROUNDWATER PLUS THE EXISTING SOIL SOURCE OF PCP DISCHARGE TO GROUNDWATER REQUIRES REMEDIATION OF THIS SITE.

ENVIRONMENTAL RISKS

POTENTIAL ENVIRONMENTAL EFFECTS MAY ALSO OCCUR FROM CONTAMINANTS OBSERVED IN SURFACE WATERS ASSOCIATED WITH THE SITE. THE SURFACE WATER LEVELS OF PCP INDICATE THAT THE SITE POSES A THREAT TO AQUATIC SPECIES. DURING THE REMEDIATION PROCESS, DRAINAGE DITCH SOILS WHICH EXCEED 25 MG/KG WILL BE EXCAVATED AND TREATED IN ACCORDANCE WITH THE PROPOSED REMEDIATION PLAN. REMEDIATION OF THE SOILS WILL ULTIMATELY PREVENT ANY POTENTIAL ADVERSE ENVIRONMENTAL IMPACT.

CLEANUP CRITERIA

SOILS/SEDIMENTS CLEANUP GOALS

FOLLOWING A REVIEW OF ADDITIONAL DATA GENERATED DURING THE RD PHASE, EPA DETERMINED THAT THE SOIL CLEANUP LEVEL FOR PCP OUTLINED IN THE 1986 ROD COULD BE INCREASED FROM 10 MG/KG TO 25 MG/KG. THE 1986 ROD 10 MG/KG CLEANUP LEVEL WAS BASED ON AN ESTIMATED TOC CONTENT. IN THE RD PHASE, ACTUAL TOC MEASUREMENTS WERE MADE THEREBY ALLOWING THE CLEANUP LEVEL TO BE INCREASED TO 25 MG/KG. THE INCREASED 25 MG/KG CLEANUP LEVEL WAS SELECTED USING THE SAME METHODOLOGY USED TO DEVELOP THE CLEANUP CRITERIA IN THE SEPTEMBER 1986 ROD. SAFE LEVELS OF PCP ARE DETERMINED BY TOC CONTENT (PLANT AND ANIMAL MATTER PRESENT IN THE SOIL). THE TOC CONTENT FOUND WAS FOUR TIMES THE EARLIER ESTIMATE. ON THE BASIS OF THE NEW INFORMATION, MODELING DETERMINED THAT A 25 MG/KG PCP CONCENTRATION WOULD BE PROTECTIVE OF HUMAN HEALTH IF GROUNDWATER AT THE SITE, OR VEGETABLES GROWN IN THE SURROUNDING SOIL WERE CONSUMED.

GROUNDWATER CLEANUP GOALS

THE 1986 ROD THOROUGHLY ADDRESSES THE REMEDIATION OF GROUNDWATER AT THE COLEMAN EVANS SITE. REQUIREMENTS OF THE 1986 SELECTED ACTION INCLUDE TWO APPLICABLE GROUNDWATER CRITERION. THE FIRST CRITERION ESTABLISHED THE CLEANUP LEVEL FOR PCP AND METALS CONTAMINATED GROUNDWATER. THIS 1986 ROD CLEANUP LEVEL SPECIFIES THAT ALL GROUNDWATER WITH PCP CONCENTRATIONS IN EXCESS OF 1.01 MG/L MUST BE RECOVERED AND TREATED IN ORDER TO PROTECT LOCAL DRINKING WATER RESOURCES. THE SECOND CRITERION APPLIES TO DISCHARGE OF TREATED WATER TO THE SURFACE WATER ENVIRONMENT. THIS CLEANUP CRITERION STATES THAT ALL WATER RECOVERED DURING THE REMEDIAL ACTION, INCLUDING WATERS RECOVERED AS A PART OF THE DEWATERING PROGRAM FOR SOILS, WOULD BE ANALYZED PRIOR TO TREATMENT AND DISCHARGE. IF THE OF PCP LEVEL EXCEEDED 1.0 UG/L, THE GROUNDWATER WOULD BE TREATED BY AN ON-SITE GAC ADSORPTION UNIT TO A LEVEL BELOW 1 UG/L. BOTH PCP AND METALS CLEANUP CRITERIA WOULD BE IN ACCORDANCE WITH CHAPTER 17-3.061.3(M) OF THE FLORIDA ADMINISTRATIVE CODE, PRIOR TO DISCHARGE TO THE SURFACE WATER ENVIRONMENT VIA THE ON-SITE DRAINAGE DITCH.

1986 ROD SOIL REMEDIATION ALTERNATIVES CONSIDERED

1986 ROD ALTERNATIVES

SOILS TECHNOLOGIES:

1. EXCAVATION/OFFSITE DISPOSAL
2. EXCAVATION/S/S
3. EXCAVATION/INCINERATION
4. SOLVENT EXTRACTION
5. EXCAVATION/THERMAL TREATMENT
6. LAND TREATMENT*
7. IN-SITU BIODEGRADATION*
8. CONTAMINANT AND ENCAPSULATION
9. SURFACE CAPPING

THE SELECTED 1986 ROD GROUNDWATER REMEDY OF EXTRACTION WITH GAC ADSORPTION WOULD REMAIN UNCHANGED IN THIS AROD, AND THEREFORE WILL NOT BE FURTHER ADDRESSED.

ALTERNATIVE SCREENING

THIS AMENDED ROD WILL NOT ATTEMPT TO RE-EVALUATE EACH REMEDIAL ALTERNATIVE PREVIOUSLY EVALUATED IN THE SEPTEMBER 1986 ROD. TABLE 2 PRESENTS THE REASONS WHY CERTAIN ALTERNATIVES AND TECHNOLOGIES IDENTIFIED IN SECTION 7.1 WERE SCREENED OUT AT THAT TIME. A COMPLETE EVALUATION OF THESE ALTERNATIVES ARE CONTAINED IN THE 1986 ROD FOUND IN APPENDIX A OF THIS AROD.

ALTERNATIVE PREVIOUSLY SELECTED FOR SOIL

THE SELECTED REMEDY FOR SOILS, AS SPECIFIED IN THE 1986 ROD, WAS ALTERNATIVE 3 - EXCAVATION/ INCINERATION. THE SELECTION OF THIS ALTERNATIVE IS NOW BEING REEVALUATED AS A RESULT OF ADDITIONAL INFORMATION REGARDING THE NATURE AND EXTENT OF CONTAMINATION AT THE SITE AND CHANGES IN THE RELATIVE COSTS OF VARIOUS REMEDIES SINCE THE ROD WAS SIGNED IN 1986.

DEVELOPMENT OF REMEDIAL ALTERNATIVES

WHILE BOTH BIOREMEDIATION AND S/S WERE NOT SELECTED AS VIABLE ALTERNATIVES FOR THE SITE IN 1986, THEY NOW APPEAR TO BE VIABLE ALTERNATIVES. THE BASIC RATIONALE FOR THE SCREENING OUT OF BIOREMEDIATION IN THE 1986 ROD WAS BASED ON THE PRODUCTION OF MORE HARMFUL BY-PRODUCTS. IN ADDITION, IT WAS NOTED THAT EXTENSIVE PILOT TESTING AND THE TIME INVOLVED IN EXECUTION OF THIS TECHNOLOGY WAS PROTRACTED. THE TS THAT WAS PERFORMED ON THE CONTAMINATED MEDIA AND WASTE STREAMS AT THIS SITE INDICATED THAT THE CONTAMINATED SOIL WASHWATER WAS AMENABLE TO BIODEGRATION. THE RESULTANT DECREASE IN PCP WAS GREATER THAN 95 PERCENT WITHIN A 48 HOUR REACTION TIME. THE PRODUCTION OF MORE HARMFUL BY-PRODUCTS WAS NOT NOTED IN THE WASHWATER. IT IS VERY LIKELY THAT HARMFUL BY-PRODUCTS SUCH AS DIOXINS WOULD REMAIN BOUND TO THE FINE WOODY SOIL FRACTION ALONG WITH THE PCP. AS STATED EARLIER, THE FINE WOODY FRACTION OF THE WASTES IS ABOUT 5 TO 10 PERCENT OF THE TOTAL CONTAMINATED SOIL VOLUME OR ABOUT 2700 CUBIC YARDS. BASED ON LITERATURE STUDIES, DIOXINS COULD BE IMMOBILIZED EFFECTIVELY IN THE FINE WOODY FRACTION USING A S/S PROCESS SIMILAR TO THAT PROCESS CONDUCTED DURING THE TS. THIS IS DUE TO THEIR LOW SOLUBILITIES AND HIGH CHEMICAL STABILITIES.

SOLIDIFICATION WAS SCREENED FROM CONSIDERATION IN 1986 BASED ON THE FACTS THAT CONTAMINANTS WOULD REMAIN ON-SITE, LONG-TERM MONITORING WOULD BE REQUIRED AND LAND USE LIMITATIONS WOULD BE IN EFFECT. THIS OPTION IS NOW FAVORABLE DUE TO THE SMALLER VOLUME OF SOIL FINES TO BE REMEDIATED AND THE LIMITED OPERATION AND MAINTENANCE ASSOCIATED WITH IT.

INCINERATION IS STILL A VIABLE ALTERNATIVE FOR THE PCP CONTAMINATED SOILS. INCINERATION IS A PROVEN TECHNOLOGY FOR THE DESTRUCTION OF ORGANIC CONTAMINANTS PRESENT IN SOILS.

DESCRIPTION OF REMEDIAL ALTERNATIVES FOR SOILS REMEDIATION

BASED ON THE RESULTS OF ADDITIONAL STUDIES THAT WERE CONDUCTED, THE FOLLOWING ALTERNATIVES WERE RE-EVALUATED FOR THE SITE:

ALTERNATIVE 1 - NO ACTION

ALTERNATIVE 2 - SOIL WASHING/BIOREMEDIATION/ AND S/S

ALTERNATIVE 3 - INCINERATION

ALTERNATIVE 1 - NO ACTION

THE NO ACTION ALTERNATIVE IS REQUIRED BY THE NCP TO BE CONSIDERED WITHIN THE DETAILED ANALYSIS. IT PROVIDES A BASELINE FOR COMPARISON OF OTHER ALTERNATIVES. UNDER THE NO ACTION ALTERNATIVE, NO SOURCE CONTROL REMEDIAL MEASURES WOULD BE UNDERTAKEN AT THE COLEMAN EVANS SITE. GIVEN THE PRESENCE OF THE CONTAMINATED SOURCE, NATURAL SOIL FLUSHING IS NOT EXPECTED TO REDUCE SOIL CONTAMINATION TO BELOW CLEANUP LEVELS.

THE NO ACTION ALTERNATIVE WOULD NOT ELIMINATE EXISTING EXPOSURE PATHWAYS OR REDUCE THE LEVEL OF RISK. ADDITIONALLY, CONTAMINANT LEACHING TO GROUNDWATER WOULD BE ALLOWED TO CONTINUE, THEREFORE EXCEEDING ARARS AND CLEANUP LEVELS.

ALTERNATIVE 2 - SOIL WASHING, BIOREMEDIATION AND STABILIZATION/SOLIDIFICATION

PRE-REMEDIAL ACTION ACTIVITIES WOULD INCLUDE DISMANTLEMENT AND APPROPRIATE DISPOSAL OF ON-SITE STRUCTURES IN THE PROCESSING AREA. REMAINING ON SITE WOOD TREATMENT EQUIPMENT WOULD BE PROPERLY ADDRESSED. THE MAJOR ACTIVITIES IN IMPLEMENTING THIS ALTERNATIVE WOULD INCLUDE:

- EXCAVATION OF 27,000 CUBIC YARDS OF CONTAMINATED SOILS.
- SOIL WASHING FOLLOWED BY PHYSICAL SEPARATION OF THE CLEAN SAND AND THE FINE WOODY WASTES.
- BIOLOGICAL TREATMENT OF THE PCP CONTAMINATED WATER GENERATED FROM THE SOIL WASHING AND FURTHER TREATMENT OF THE BIO-TREATED EFFLUENT AT THE ONSITE GROUNDWATER TREATMENT SYSTEM PRIOR TO SURFACE WATER DISCHARGE.
- S/S OF THE FINE WOODY FRACTION.
- REPLACEMENT OF CLEAN SAND AND THE FINE WOODY WASTES INTO THE EXCAVATED AREA.

ALL SOILS AND SEDIMENTS WITH PCP CONCENTRATIONS EXCEEDING 25 MG/KG WOULD BE EXCAVATED. DURING THE RI AND RD, SOIL CONTAMINATION WAS CHARACTERIZED IN THREE AREAS OF THE SITE INCLUDING: THE LANDFILL AREA, THE WASTE PIT AREA, AND DOWNGRADIENT FROM THE WASTE PIT AREA. THE VOLUME OF SOIL TO BE EXCAVATED FROM THESE AREAS WAS ESTIMATED TO BE 27,000 CUBIC YARDS.

THE EXCAVATED SOILS WOULD BE SCREENED TO REMOVE COARSE DEBRIS AND THEN SLURRIED WITH WATER IN A SOIL WASHING CIRCUIT TO TRANSFER THE CONTAMINANTS FROM THE SOIL TO THE WATER. SOIL WASHING STUDIES INDICATE THAT GREATER THAN 90 PERCENT OF THE TOTAL CONTAMINATED SOLIDS COULD BE CLEANED TO BELOW THE CLEANUP CRITERIA OF 3.6 MG/KG TCLP LEACHATE OF PCP AND COULD BE REPLACED INTO THE EXCAVATED AREA. THE REMAINING LESS THAN 10 PERCENT OF THE FINE WOODY FRACTIONS OF THE SOIL WOULD REQUIRE PRIOR TO BACKFILLING INTO THE EXCAVATED AREA.

S/S WOULD THEN BE USED TO TREAT THE REMAINING FINE/WOODY SOIL FRACTION WHICH SOIL WASHING COULD NOT ADEQUATELY ADDRESS. THE END PRODUCT OF THE S/S WOULD RETARD MIGRATION OF CONTAMINANTS OUT OF WASTES. STABILIZATION REAGENTS MIGHT INCLUDE CEMENT, POZZOLANS, ORGANOPHILIC CLAYS, ASPHALT/BITUMEN AND THERMOPLASTICIZERS. THE RESULTS OF THE TREATABILITY STUDY INDICATED THAT THE STABILIZED PRODUCTS FROM THE CONTAMINATED SOIL SAMPLES MET BOTH THE SPECIFIED STRENGTH PARAMETERS AND TCLP LEACHATE LIMITS SET FOR COLEMAN EVANS WASTES. THE SEPARATED FINE WOODY FRACTION OF SOILS WERE NOT STUDIED DURING THE TS.

THE S/S FORMULATION FOR THE FINE WOODY WASTES WOULD NEED TO BE OPTIMIZED TO ACHIEVE THE BEST RESULTS. THIS WOULD OCCUR DURING THE PILOT TREATABILITY STUDY.

THE FUNCTION OF BIOLOGICAL TREATMENT IS TO REMOVE PCP AND OTHER ORGANIC MATTER FROM THE CONTAMINATED WASTE STREAM THROUGH MICROBIAL DEGRADATION. THE DEMONSTRATED BIOLOGICAL PROCESS FOR EFFECTIVE PCP REMOVAL IS A FIXED-FILL BIOREACTOR WHICH CONSISTS OF SEVERAL BIOLOGICAL CELLS WITH SUBMERGED PACKED BED MATERIALS FOR MICROBIAL ATTACHMENT. MOST OF THE PROCESS WATER USED IN THE SOIL WASHING PROCESS WOULD BE RECIRCULATED FOR REUSE EXCEPT THAT AN ESTIMATED FLOW OF 20 GPM CONTAINING ABOUT 20 PPM PCP WOULD BE CONSTANTLY DRAINED FROM THE SYSTEM. THIS CONTAMINATED PROCESS WATER CAN BE EFFECTIVELY REDUCED TO LESS THAN 1.0 MG/L PCP THROUGH BIOLOGICAL TREATMENT.

THE BIOLOGICALLY TREATED EFFLUENT WOULD BE DISCHARGED TO THE ON-SITE GROUNDWATER TREATMENT SYSTEM FOR FURTHER TREATMENT PRIOR TO SURFACE WATER DISCHARGE. THE ON-SITE GROUNDWATER TREATMENT SYSTEM WILL BE DESIGNED TO REDUCE THE PCP AND OTHER ORGANIC AND INORGANIC COMPOUNDS TO BELOW THE FLORIDA SURFACE WATER DISCHARGE CRITERIA PRIOR TO DISCHARGE TO THE RECEIVING STREAM. ALSO, THE ON-SITE GROUNDWATER TREATMENT SYSTEM WILL BE DESIGNED WITH SUFFICIENT CAPACITY TO ACCEPT THE TREATED SOILS WASHWATER WITHOUT MODIFICATION. THE ON-SITE GROUNDWATER TREATMENT

SYSTEM CONSISTS OF CHEMICAL PRECIPITATION FOLLOWED BY GAC ADSORPTION. THE CHEMICAL PRECIPITATION PROCESS IS USED TO REMOVE METALS AND SUSPENDED SOLIDS, WHILE THE GAC ADSORPTION PROCESS IS USED TO REMOVE ORGANICS CONTAMINANTS INCLUDING OF PCP. FIGURE 4 PRESENTS THE TREATMENT TRAIN PROCESS.

ALTERNATIVE 3 - INCINERATION

THIS ALTERNATIVE REQUIRES THE EXCAVATION AND ON-SITE THERMAL DESTRUCTION OF PCP CONTAMINATED SOILS. APPROXIMATELY 27,000 CUBIC YARDS OF SOIL AND SEDIMENT WITH PCP CONCENTRATIONS GREATER THAN 25 MG/KG WOULD REQUIRE INCINERATION.

A MOBILE INCINERATION UNIT WOULD BE USED ON-SITE TO DESTROY THE PCP FOUND IN SOILS. THE PROCESS WOULD INVOLVE THE USE OF PRIMARY AND SECONDARY INCINERATION CHAMBERS. THE CONTAMINATED SOIL WOULD BE FED INTO THE TREATMENT SYSTEM WHERE IT WOULD BE EXPOSED TO ELEVATED TEMPERATURES AND OXYGEN. THE HIGH TEMPERATURES WOULD DRIVE OFF VOLATILE CONTAMINANTS WHICH WOULD THEN COMBUST IN THE PRESENCE OF AIR. PCP AND DIESEL FUEL WOULD BE CONVERTED TO GASEOUS PHASES IN THE PRIMARY CHAMBER AND THERMAL DESTRUCTION WOULD OCCUR IN THE SECONDARY CHAMBER. THE COMBINATION OF TEMPERATURE AND RESIDENCE TIME TO WHICH THE SOIL WOULD BE EXPOSED WOULD ENSURE A DECONTAMINATED LEACHATE LEVEL OF LESS THAN 3.6 MG/KG IN THE TREATED SOIL. DECONTAMINATED SOILS WOULD RETAIN VIRTUALLY THEIR INITIAL VOLUME AND COULD BE USED TO BACKFILL THE EXCAVATED AREAS.

SIMILARLY, THE COMBINATION OFF-GASES WOULD BE TREATED BEFORE BEING DISCHARGE INTO THE ATMOSPHERE. REGULATIONS REQUIRE THAT EXHAUST STACK GASES HAVE PARTICULATE EMISSIONS NOT EXCEEDING 10 MG/PER DRY STANDARD CUBIC METER, CORRECTED TO 7 PERCENT OXYGEN, AND GASEOUS HYDROGEN CHLORIDE (HCL) EMISSIONS CONTROLLED TO 4 LB/HR OR REMOVED AT 99 PERCENT EFFICIENCY. THE ACID GASES ARE LIKELY TO BE CONTROLLED BY THE USE OF EITHER CALCIUM COMPOUNDS BLENDED WITH THE SOIL FEED OR FROM A FLUE GAS TO FORM A BENIGN PRECIPITATE, IE., CALCIUM CHLORIDE. PARTICULATE EMISSIONS MAY BE CONTROLLED BY SEVERAL DIFFERENT DEVICES, I.E., ELECTROSTATIC PRECIPITATOR, BAGHOUSE, CYCLONE, ETC. THE AIR POLLUTION CONTROL SYSTEM, REGARDLESS OF WHAT METHOD IS USED, WILL PRODUCE EITHER SOLID OR LIQUID WASTE STREAMS, OR BOTH, WHICH MAY REQUIRE TREATMENT BEFORE DISPOSAL.

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

THIS SECTION PROVIDES THE BASIS FOR DETERMINING WHICH ALTERNATIVE PROVIDES THE BEST BALANCE OF TRADE-OFFS WITH RESPECT TO THE EVALUATION CRITERIA. A GLOSSARY OF THE EVALUATION CRITERIA IS PRESENTED IN TABLE 3.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALTERNATIVE 3 WAS CONSIDERED MOST PROTECTIVE SINCE THE PCP CONTAMINATED SOIL WOULD BE THERMAL TREATED ON SITE AND IT WOULD ACHIEVE UNRESTRICTED ACCESS OF THE SITE. ALTERNATIVE 2, WHILE CONSIDERED PROTECTIVE, WOULD REQUIRE LONG-TERM MONITORING OF THE SOLIDIFIED MASS AND VEGETATIVE COVER. BOTH ALTERNATIVE 2 AND 3 ARE WITHIN THE (10-4) TO (10-6) CANCER RISK RANGE AND THEREFORE PROVIDE ADEQUATE PROTECTION BY REDUCING OR CONTROLLING THE THREAT TO HUMAN HEALTH AND THE ENVIRONMENT.

ALTERNATIVE 1 PROVIDES NO ADDITIONAL PROTECTION TO EITHER HUMAN HEALTH OR THE ENVIRONMENT. THIS ALTERNATIVE DOES NOT REDUCE THE ON-SITE PCP CONCENTRATIONS THROUGH ANY REMEDIAL ACTION. THE PCP CONCENTRATIONS WITHIN THE SOILS AND SEDIMENTS WOULD REMAIN ABOVE ACCEPTABLE LEVELS FOR AN INDEFINITE PERIOD OF TIME. THEREFORE, THIS ALTERNATIVE WAS JUDGED TO BE THE LEAST PROTECTIVE.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

BOTH ALTERNATIVES 2 AND 3 WOULD MEET THE RESPECTIVE ARARS AS DEFINED IN SECTION 11.2 OF THIS AROD. HOWEVER, ALTERNATIVE 3 WOULD REQUIRE COMPLIANCE WITH A LARGER RANGE OF ARARS THAN ALTERNATIVE 2, THEREFORE INCREASING THE MONITORING REQUIREMENTS DURING IMPLEMENTATION.

ALTERNATIVE 1 DOES NOT COMPLY WITH ARARS.

LONG-TERM EFFECTIVENESS AND PERFORMANCE

ALTERNATIVE 3 IS CONSIDERED THE MOST EFFECTIVE FROM THE PERSPECTIVE OF THIS EVALUATION CRITERION SINCE THE PCP-CONTAMINATED SOIL WOULD BE PERMANENTLY TREATED. THERE WOULD BE NO OPERATION AND MAINTENANCE ACTIVITY ASSOCIATED WITH THIS REMEDY.

ALTERNATIVE 2 IS CONSIDERED THE NEXT MOST EFFECTIVE IN THE LONG-TERM PERSPECTIVE SINCE ONLY A SMALL VOLUME OF THE SOIL FINES AND WOODY FRACTIONS WOULD REQUIRE S/S. THEREFORE, LONG TERM MONITORING AND MAINTENANCE WOULD BE REQUIRED FOR THE SOLIDIFIED MASS. THE REMAINDER OF THE CLEAN SOILS FROM THE SOIL WASHING PROCEDURE AND BIOLOGICAL TREATMENT WOULD BE PLACED BACK ON SITE. THE SOIL WASHING PROCESS HAS BEEN DEMONSTRATED TO BE A FEASIBLE REMEDIAL ACTION TECHNOLOGY FOR TREATMENT OF PCP CONTAMINATED SOILS AT THIS SITE. IN CONJUNCTION WITH S/S, THE COMBINED TECHNOLOGY WOULD EFFECTIVELY PROVIDE A PERMANENT IMMOBILIZATION REMEDY FOR THE CONTAMINATED SOILS. THE TS DEMONSTRATED THAT THE TREATED PRODUCT FROM THE SITE WOULD MEET BOTH THE SPECIFIED STRENGTH PARAMETERS AND TCLP LEACHATE LIMITS.

ALTERNATIVE 1 WAS THE LEAST EFFECTIVE IN ACHIEVING THE LONG-TERM EFFECTIVENESS AND PERMANENCE CRITERION. NO ACTION LEAVES THE POTENTIAL RISK ASSOCIATED WITH THE SITE SOILS IN AN UNALTERED STATE.

REDUCTION OF MOBILITY, TOXICITY OR VOLUME

ALTERNATIVES 2 AND 3 WERE CONSIDERED EFFECTIVE IN THIS EVALUATION CRITERION SINCE ALL CONTAMINATED SOILS ABOVE THE CONCENTRATION LEVEL OF 25 PPM PCP WOULD REALIZE A REDUCTION IN EITHER MTV.

ALTERNATIVE 1 IS THE LEAST EFFECTIVE SINCE NO REDUCTION IN EITHER MTV IS ACHIEVED.

SHORT-TERM EFFECTIVENESS

ALTERNATIVES 2 AND 3 PROVIDE SHORT TERM POTENTIAL FOR RELEASES OF TOXIC EMISSIONS AND RESIDUES INTO THE ENVIRONMENT. HOWEVER, THE IMPLEMENTATION OF A HEALTH AND SAFETY PLAN WOULD MINIMIZE CONTAMINANT MIGRATION OFF-SITE DURING CONSTRUCTION ACTIVITIES.

IN ADDITION, ALTERNATIVES 2 AND 3 WOULD REQUIRE DUST CONTROL MEASURES DURING EXCAVATION OF SOILS TO MINIMIZE EXPOSURE RISKS TO ONSITE WORKERS.

ALTERNATIVE 1 RATES MOST FAVORABLY FOR THIS SITE CRITERION IN RESPECT TO ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY RESULT DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD SINCE NO CONSTRUCTION ACTIVITIES WOULD OCCUR. HOWEVER, IT IS LEAST EFFECTIVE IN REFERENCE TO THE TIME IN WHICH THE REMEDY WOULD ACHIEVE PROTECTION.

IMPLEMENTABILITY

ALTERNATIVE 3 IS A PROVEN TECHNOLOGY FOR THE TREATMENT OF PCP CONTAMINATED SOILS. IT IS TECHNICALLY AND ADMINISTRATIVELY FEASIBLE TO IMPLEMENT. ALTERNATIVE 2 IS CONSIDERED THE NEXT MOST EFFECTIVE UNDER THIS CRITERION. BASED ON TS'S, THIS TECHNOLOGY HAS A DEMONSTRATED PERFORMANCE RECORD AND SHOULD BE IMPLEMENTABLE. A PILOT STUDY TO OPTIMIZE THE DESIGN OF THIS

SYSTEM WOULD BE CONDUCTED DURING THE RD AND IS INCLUDED AS A COMPONENT OF THIS ALTERNATIVE.

ALTERNATIVE 1 IS EASILY IMPLEMENTED SINCE NO ACTION WOULD BE REQUIRED.

COST

COSTS TO IMPLEMENT ALTERNATIVES 2 AND 3 WERE EVALUATED DURING THE TS. BOTH THE JUNE 1, 1988 CDM COST ESTIMATE LETTER AND THE AUGUST 1990 EBASCO TS ADDENDUM SOIL REMEDIAL COST ESTIMATE WERE REVIEWED TO CALCULATE THE COSTS.

THE COST TO IMPLEMENT ALTERNATIVE 2 INCLUDING GROUND WATER TREATMENT WOULD BE \$5,887,172. THE COST OF ADDING A METAL PRECIPITATION AND GAC ADSORPTION UNIT WOULD BE \$1,300,000. THE COST OF THE ON-SITE TREATMENT SYSTEM WOULD BE \$1,380,134. THE TOTAL COST WOULD THEREFORE BE \$8,567,304.

THE COST TO IMPLEMENT ALTERNATIVE 3 INCLUDING GROUND WATER TREATMENT WOULD BE \$19,050,644. THE COST OF ADDING A METAL PRECIPITATION AND GAC ADSORPTION UNIT WOULD BE \$1,300,000. THE COST OF THE ON-SITE TREATMENT SYSTEM WOULD BE \$5,086,383. THE TOTAL COST WOULD THEREFORE BE \$25,437,027.

STATE ACCEPTANCE

THE STATE OF FLORIDA HAS VERBALLY CONCURRED ON THE SELECTION OF THIS REMEDY. UPON RECEIPT, THE CONCURRENCE LETTER WILL BE INCLUDED IN APPENDIX E.

COMMUNITY ACCEPTANCE

THE JACKSONVILLE COMMUNITY SHOWED VERY LIMITED COMMUNITY INTEREST DURING THE PUBLIC MEETING AND PUBLIC COMMENT PERIOD. RESPONSES TO SPECIFIC COMMENTS ARE AVAILABLE IN THE RESPONSIVENESS SUMMARY LOCATED IN APPENDIX B.

#SAR

SELECTED AMENDED REMEDY

THE SELECTED AMENDED REMEDY ADDRESSES REMEDIATION OF SOIL CONTAMINATION BY ELIMINATING OR REDUCING THE RISK POSED BY THE SITE, THROUGH TREATMENT AND ENGINEERING AND INSTITUTIONAL CONTROLS.

THE MAJOR COMPONENTS OF THE SELECTED AMENDED REMEDY INCLUDE:

- EXCAVATION OF CONTAMINATED SOILS AND SEDIMENTS WITH PCP CONCENTRATIONS GREATER THAN 25 MG/KG; APPROXIMATELY 27,000 CUBIC YARDS.
- VOLUME REDUCTION BY SOIL WASHING TO SEPARATE THE CLEAN SOIL FRACTION FROM CONTAMINATED SOIL FINES.
- S/S OF SOIL FINES OR SLUDGES EXCEEDING THE CLEANUP CRITERIA;
- REDISPOSING OF THE CLEAN SOIL FRACTION AND THE "FIXED" SLUDGES ONSITE.
- DEWATERING AND RECOVERY OF GROUNDWATER TO FACILITATE EXCAVATION; TREATED GROUND WATER WILL BE MONITORED FOR COMPLIANCE WITH 1.01 UG/L PCP AND METALS DISCHARGE CRITERIA IN ACCORDANCE WITH FLORIDA'S CHAPTER 17-3.061.3(M) ADMINISTRATIVE CODE. IF THE LEVEL OF PCP EXCEEDS 1.0 UG/L, THE GROUNDWATER WILL BE TREATED BY AN ON-SITE GAC ADSORPTION UNIT TO A LEVEL BELOW 1.0 UG/L PCP IN ACCORDANCE WITH CHAPTER 17-3.061.3(M) OF THE FLORIDA ADMINISTRATIVE CODE, BEFORE DISCHARGE TO AN ONSITE

DRAINAGE DITCH LEADING TO MCGIRT'S CREEK.

- TREATMENT OF THE SOIL WASH WATER BY BIOREMEDIATION FOLLOWED BY A GAC POLISHING UNIT AND METALS TREATMENT BY CHEMICAL REPRECIPITATION FOR DISCHARGE TO AN ON-SITE DITCH LEADING TO MCGIRT'S CREEK.
- INSTALLATION AND MAINTENANCE OF A 6-INCH VEGETATIVE COVER OVER THE SOLIDIFIED MASS (MONOLITH).
- INSTALLATION AND MAINTENANCE OF A FENCE AROUND THE SITE DURING REMEDIAL ACTIVITIES.
- APPROPRIATE DISPOSAL OF THE ON-SITE STRUCTURES IN THE PROCESSING AREA AND CLOSURE OF THE SAND FILTER UNITS;
- OFF-SITE CONTAMINATED SOILS WOULD BE REMEDIATED IN CONJUNCTION WITH THE ON-SITE REMEDIATION PROCESS.
- INSTITUTIONAL CONTROLS WOULD INCLUDE DEED RESTRICTIONS.

THE TIME TO IMPLEMENT THE SOURCE CONTROL PORTION OF THIS ALTERNATIVE IS EXPECTED TO BE APPROXIMATELY 120 DAYS. WHILE THE GROUNDWATER COMPONENT WAS INCLUDED IN THE AMENDED SELECTED REMEDY IT WILL BE IMPLEMENTED IN ACCORDANCE WITH THE SEPTEMBER 1986 ROD. THE TOTAL COST OF THIS ALTERNATIVE INCLUDING GROUNDWATER RECOVERY AND TREATMENT WOULD BE \$8,567,304.

#SD

STATUTORY DETERMINATION

EPA AND FDER HAS DETERMINED THAT THIS REMEDY WILL SATISFY THE STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA AS IT PROVIDES PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAIN ARARS, IS COST EFFECTIVE AND UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

THE SELECTED AMENDED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT BY ELIMINATING THE SOURCE OF CONTAMINATION AND TREATING GROUNDWATER.

ATTAINMENT OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

RA'S PERFORMED UNDER CERCLA MUST COMPLY WITH ALL ARARS. ALL ALTERNATIVES CONSIDERED FOR THE COLEMAN EVANS WOOD PRESERVING SITE WERE EVALUATED ON THE BASIS OF THE DEGREE TO WHICH THEY COMPLIED WITH THESE REQUIREMENTS. THE SELECTED REMEDY WAS FOUND TO MEET OR EXCEED THE FOLLOWING ARARS, AS DISCUSSED BELOW.

FEDERAL REQUIREMENTS

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)

40 CFR PART 261 LAND BAN - THE RCRA LAND DISPOSAL RESTRICTIONS (LDR) ENACTED IN THE 1984 HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA) REQUIRE THAT RCRA HAZARDOUS WASTES BE TREATED TO BEST DEMONSTRATED ACHIEVABLE TECHNOLOGY (BDAT) STANDARDS PRIOR TO PLACEMENT INTO THE LAND. AT THIS SITE, FURTHER INVESTIGATION MAY DETERMINE THAT RCRA LISTED WASTE, K001 (BOTTOM SEDIMENT SLUDGE FROM THE TREATMENT OF WASTEWATERS FROM WOOD PRESERVING PROCESSES THAT USE PENTACHLOROPHENOL AND/OR F027 (DISCARDED UNUSED FORMULATIONS CONTAINING COMPOUNDS DERIVED FROM

PENTACHLOROPHENOL) ARE PRESENT AT THIS SITE. SINCE THESE WASTES ARE LISTED RCRA HAZARDOUS WASTES, LDR MAY DIRECTLY APPLY. IF THIS IS THE CASE, A TREATABILITY VARIANCE PURSUANT TO RCRA REGULATIONS WILL BE USED TO SET ALTERNATIVE TREATABILITY VARIANCES FOR DIOXIN WASTES. THE CLEANUP METHODOLOGY PROPOSED FOR THIS SITE WILL COMPLY WITH THE LDRS. SAMPLING FOR DIOXIN WILL TAKE PLACE TO ENSURE COMPLIANCE.

CLEAN WATER ACT/SAFE DRINKING WATER ACT

EPA'S DETERMINATION OF APPROPRIATE GROUNDWATER CLEANUP CRITERIA INVOLVED AN EVALUATION OF CONTAMINANT CONCENTRATIONS RELATIVE TO AVAILABLE HEALTH-BASED STANDARDS. SUCH LIMITS, INCLUDING MAXIMUM CONCENTRATION LIMITS (MCLS) AND MAXIMUM CONCENTRATION LIMIT GOALS (MCLGS), FEDERAL AMBIENT WATER QUALITY CRITERIA (AWQC), AND SECTION 304 OF THE CLEAN WATER ACT (CWA) USED AS PRESCRIBED IN SECTION 121(D)(2)(B)(I) OF CERCLA, DEFINES THE SAFE DRINKING WATER ACT (SDWA) RESPECTIVELY AND WILL BE MET AT THIS SITE.

FEDERAL CLEAN AIR ACT

THE CLEAN AIR ACT (CAA) IDENTIFIES AND REGULATES POLLUTANTS THAT COULD BE RELEASED DURING EARTH-MOVING ACTIVITIES ASSOCIATED WITH THE EXCAVATION OF SOILS ON-SITE. THE CAA SECTION 112 IDENTIFIES THOSE SUBSTANCES REGULATED UNDER THE FEDERAL NATIONAL EMISSION STANDARDS FOR HAZARDOUS POLLUTANTS FOR WHICH THERE ARE NO APPLICABLE AMBIENT AIR QUALITY STANDARDS. THE CAA IS AN ARAR AND THE REGULATORY STANDARDS OF THE CAA WILL BE COMPLIED WITH DURING IMPLEMENTATION OF THE REMEDY.

ENDANGERED SPECIES ACT

THE SELECTED REMEDY IS PROTECTIVE OF SPECIES LISTED AS ENDANGERED OR THREATENED UNDER THE ENDANGERED SPECIES ACT. REQUIREMENTS OF THE INTERAGENCY SECTION 7 CONSULTATION PROCESS, 50 CFR PART 402 WILL BE MET. THE DEPARTMENT OF INTERIOR, FISH AND WILDLIFE SERVICE, WILL BE CONSULTED DURING REMEDIAL DESIGN TO ASSURE THAT ENDANGERED OR THREATENED SPECIES ARE NOT ADVERSELY IMPACTED BY IMPLEMENTATION OF THIS REMEDY. THERE IS CURRENTLY NO INFORMATION TO INDICATE THAT THE SITE IS VISITED OR CONTAINS ANY ENDANGERED OR THREATENED SPECIES.

NATIONAL HISTORICAL PRESERVATION ACT (NHPA)

THE NHPA REQUIRES THAT ACTION BE TAKEN TO PRESERVE OR RECOVER HISTORICAL OR ARCHAEOLOGICAL DATA WHICH MIGHT BE DESTROYED AS A RESULT OF SITE ACTIVITIES. NO INFORMATION EXISTS TO INDICATE THAT THE COLEMAN EVANS SITE HAS ANY HISTORIC OR ARCHAEOLOGICAL SIGNIFICANCE.

FEDERAL OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION ACT (OSHA)

THE SELECTED REMEDIAL ACTION CONTRACTOR WILL DEVELOP AND IMPLEMENT A HEALTH AND SAFETY PROGRAM FOR ITS WORKERS. ALL ONSITE WORKERS WILL MEET THE MINIMUM TRAINING AND MEDICAL MONITORING REQUIREMENTS OUTLINED IN 40 CFR 1910.

STATE REQUIREMENTS

FLORIDA ADMINISTRATIVE CODE CHAPTER 17-3

WATER QUALITY STANDARDS FOR SURFACE WATER AND GROUNDWATER AFFECTED BY LEACHATE AND STORM RUNOFF FROM THE SITE WILL BE MET.

FLORIDA ADMINISTRATIVE CODE CHAPTER 17-6

EFFLUENT LIMITATIONS AND OPERATING REQUIREMENTS FOR WASTEWATER FACILITIES TREATING CONTAMINATED GROUNDWATER WILL BE MET.

COST EFFECTIVENESS

COST-EFFECTIVENESS IS DETERMINED BY COMPARING THE COSTS OF ALL ALTERNATIVES BEING CONSIDERED WITH THEIR OVERALL EFFECTIVENESS TO DETERMINE WHETHER THE COSTS ARE PROPORTIONAL TO THE EFFECTIVENESS ACHIEVED. OVERALL EFFECTIVENESS FOR THE PURPOSE OF THIS DETERMINATION INCLUDES LONG-TERM EFFECTIVENESS AND PERMANENCE; REDUCTION OF MTV THROUGH TREATMENT; AND SHORT-TERM EFFECTIVENESS. THE NEW REMEDY WILL AFFORD AN ACCEPTABLE DEGREE OF LONG-TERM EFFECTIVENESS, MTV, AND SHORT-TERM EFFECTIVENESS. THE PRESENT ESTIMATED COST OF EPA'S SELECTED REMEDY IS \$6.2 MILLION DOLLARS. THE SELECTED REMEDY AFFORDS OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COSTS SUCH THAT THE REMEDY REPRESENTS VALUE FOR THE MONEY. WHEN THE RELATIONSHIP BETWEEN THE COST AND OVERALL EFFECTIVENESS OF THE SELECTED REMEDY IS VIEWED IN LIGHT OF THE RELATIONSHIP BETWEEN THE COST AND OVERALL EFFECTIVENESS AFFORDED BY OTHER ALTERNATIVES, THE SELECTED REMEDY APPEARS TO BE THE MOST COST EFFECTIVE.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE

EPA BELIEVES THE SELECTED REMEDY IS THE MOST APPROPRIATE CLEANUP SOLUTION FOR THE COLEMAN EVANS SITE AND PROVIDES THE BEST BALANCE AMONG EVALUATION CRITERIA FOR THE REMEDIAL ALTERNATIVES EVALUATED. THIS REMEDY PROVIDES EFFECTIVE PROTECTION IN BOTH THE SHORT-AND LONG-TERM TO POTENTIAL HUMAN AND ENVIRONMENTAL RECEPTORS; IS READILY IMPLEMENTABLE, AND IS COST EFFECTIVE.

SOIL WASHING AND S/S OF THE SOILS AND BIOREMEDIATION OF THE CONTAMINATED WASHWATER REPRESENTS A PERMANENT SOLUTION (THROUGH TREATMENT) WHICH EFFECTIVELY REDUCES AND/OR ELIMINATES MOBILITY OF HAZARDOUS WASTES AND HAZARDOUS SUBSTANCES INTO THE ENVIRONMENT.

PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

TREATMENT OF THE CONTAMINATED WASHWATER AND SOILS WILL EFFECTIVELY REDUCE THE MOBILITY OF CONTAMINANTS INTO THE ENVIRONMENT. THEREFORE, THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT AS A PRINCIPAL ELEMENT IS SATISFIED.

#RS

RESPONSIVENESS SUMMARY

THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) ESTABLISHED A PUBLIC COMMENT PERIOD FROM AUGUST 9, 1990 THROUGH SEPTEMBER 9, 1990 FOR INTERESTED PARTIES TO COMMENT ON EPA'S PROPOSED REMEDIAL ACTION PLAN (PRAP) FOR THE COLEMAN EVANS WOOD PRESERVING SITE. THE COMMENT PERIOD INCLUDED A PUBLIC MEETING ON AUGUST 23, 1990, CONDUCTED BY THE EPA, HELD AT THE WHITEHOUSE ELEMENTARY SCHOOL IN JACKSONVILLE, FLORIDA. THE MEETING PRESENTED THE RESULTS OF THE STUDIES UNDERTAKEN AND THE PREFERRED REMEDIAL ALTERNATIVE FOR THE SITE.

A RESPONSIVENESS SUMMARY IS REQUIRED BY SUPERFUND POLICY TO PROVIDE A SUMMARY OF CITIZEN COMMENTS AND CONCERNS ABOUT THE SITE, AS RAISED DURING THE PUBLIC COMMENT PERIOD, AND THE RESPONSES TO THOSE CONCERNS. ALL COMMENTS SUMMARIZED IN THIS DOCUMENT HAVE BEEN FACTORED INTO THE FINAL DECISION OF THE PREFERRED ALTERNATIVE FOR CLEANUP OF THE COLEMAN EVANS WOOD PRESERVING SITE.

THIS RESPONSIVENESS SUMMARY FOR THE COLEMAN EVANS WOOD PRESERVING SITE IS DIVIDED INTO THE FOLLOWING SECTIONS.

I. OVERVIEW - THIS SECTION DISCUSSES THE RECOMMENDED ALTERNATIVE FOR REMEDIAL ACTION AND THE PUBLIC REACTION TO THIS ALTERNATIVE.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS - THIS SECTION PROVIDES A BRIEF HISTORY OF COMMUNITY INTEREST AND CONCERNS REGARDING THE COLEMAN EVANS WOOD PRESERVING SITE.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES - THIS SECTION PRESENTS BOTH ORAL AND WRITTEN COMMENTS SUBMITTED DURING THE PUBLIC COMMENT PERIOD, AND PROVIDES THE RESPONSES TO THESE COMMENTS.

IV. REMAINING CONCERNS - THIS SECTION DISCUSSES COMMUNITY CONCERNS THAT EPA SHOULD BE AWARE OF IN DESIGN AND IMPLEMENTATION OF THE REMEDIAL ALTERNATIVE FOR THE SITE.

I. OVERVIEW

AS A RESULT OF RECENT TREATABILITY STUDIES (TS), THE SUBSEQUENT REMEDIAL TECHNOLOGY EVALUATION AND A COST ANALYSIS, A PREFERRED SOIL REMEDIATION ALTERNATIVE HAS BEEN DEVELOPED AND DOCUMENTED IN THE AMENDED RECORD OF DECISION (AROD). THIS FINAL REMEDY ADDRESSES REMEDIATION OF GROUNDWATER AND SOIL CONTAMINATION BY ELIMINATING OR REDUCING THE RISK POSED BY THE SITE, THROUGH TREATMENT, ENGINEERING AND INSTITUTIONAL CONTROLS. THE MAJOR COMPONENTS OF THE SELECTED AMENDED ALTERNATIVE INCLUDE:

- EXCAVATION OF CONTAMINATED SOILS AND SEDIMENTS WITH PENTACHLOROPHENOL (PCP) CONCENTRATIONS GREATER THAN 25 MG/KG; APPROXIMATELY 27,000 CUBIC YARDS.
- VOLUME REDUCTION BY SOIL WASHING TO SEPARATE CLEAN SOIL FRACTIONS FROM CONTAMINATED SOILS FINES.
- STABILIZATION/SOLIDIFICATION (S/S) OF SOIL FINES OR SLUDGES EXCEEDING CLEANUP CRITERIA.
- REDISPOSING OF THE CLEAN SOIL FRACTION AND THE S/S "FIXED" SLUDGES ONSITE.
- DEWATERING AND RECOVERY OF GROUNDWATER TO FACILITATE EXCAVATION; RECOVERED GROUNDWATER WILL BE STORED AND ANALYZED. IF THE LEVEL OF PCP EXCEEDS 1.0 UG/L, THE

GROUNDWATER WILL BE TREATED BY AN ONSITE CARBON ADSORPTION UNIT TO A LEVEL BELOW 1.0 UG/L PCP IN ACCORDANCE WITH CHAPTER 17-3.061(M) OF THE FLORIDA ADMINISTRATIVE CODE, BEFORE DISCHARGE TO AN ONSITE DRAINAGE DITCH LEADING TO MCGIRT'S CREEK.

- TREATMENT OF THE SOIL WASHWATER BY BIOREMEDIATION FOLLOWED BY A GRANULAR ACTIVATED CARBON POLISHING UNIT FOR DISCHARGE TO AN ONSITE DRAINAGE DITCH LEADING TO MCGIRT'S CREEK.
- REMOVAL OF METALS FROM THE GROUNDWATER BY CHEMICAL PRECIPITATION.
- INSTALLATION AND MAINTENANCE OF A SIX-INCH VEGETATIVE COVER OVER THE SOLIDIFIED MASS (MONOLITH).
- INSTALLATION AND MAINTENANCE OF A FENCE AROUND THE SITE DURING REMEDIAL ACTIVITIES.
- INSTITUTION OF CONTROLS WHICH INCLUDE DEED RESTRICTIONS.

THE COMMUNITY, IN GENERAL, FAVORS THE SELECTION OF THE PREFERRED AMENDED ALTERNATIVE.

II. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERN

THE JACKSONVILLE COMMUNITY HAS BEEN AWARE OF THE CONTAMINATION PROBLEM AT THE COLEMAN EVANS WOOD PRESERVING SITE FOR SEVERAL YEARS. THE FIRST PUBLIC MEETING WAS HELD ON AUGUST 7, 1986, TO DISCUSS, WITH THE PUBLIC, THE FINDINGS OF THE REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS). THE PUBLIC MEETING SERVED TO INITIATE A THREE WEEK PUBLIC COMMENT PERIOD WHICH CLOSED ON AUGUST 28, 1986.

DURING THIS PUBLIC COMMENT PERIOD, EPA SUBMITTED A PROPOSAL FOR REMEDIAL ACTION (RA) AT THE SITE. THAT PROPOSAL SUGGESTED TREATMENT OF THE CONTAMINATION BY INCINERATION. AS NOTED IN THIS AROD, THAT ALTERNATIVE WAS REJECTED DUE TO CONCERN OVER THE COST EFFECTIVENESS OF THE ACTION DUE TO A REASSESSED VOLUME INCREASE. SUBSEQUENTLY, THE EPA INITIATED A TS TO EXAMINE BIOREMEDIATION AND/OR S/S AS A VIABLE REMEDY FOR THE COLEMAN EVANS SITE. THE RESULTS OF THE STUDY CONFIRMED THAT THE AMENDED REMEDY DESCRIBED IN THE PREVIOUS SECTION SATISFIES EPA'S GOALS FOR SOURCE CONTROL.

THE TS FOR THE COLEMAN EVANS WOOD PRESERVING SITE WAS RELEASED TO THE PUBLIC ON AUGUST 9, 1990. ALSO, THE MODIFIED PRAP WHICH REVISED THE REMEDY EPA HAD PROPOSED IN ITS INITIAL 1986 RECORD OF DECISION (ROD), WAS PLACED IN THE INFORMATION REPOSITORY MAINTAINED AT THE EPA DOCKET ROOM IN JACKSONVILLE, FLORIDA ON THE SAME DATE.

EPA CONDUCTED THE SECOND PUBLIC MEETING ON AUGUST 23, 1990. THE PURPOSE OF THIS MEETING WAS TO EXPLAIN THE RESULTS OF THE SITE STUDIES, TO PRESENT THE RECOMMENDATIONS OF EPA FOR SITE CLEANUP, AND TO ACCEPT QUESTIONS AND COMMENTS FROM THE PUBLIC ON ANY ASPECT OF THE SITE OR ITS CLEANUP. AT THIS MEETING, THE KEY ISSUES AND CONCERNS IDENTIFIED WERE:

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA'S RESPONSES

PUBLIC MEETING HELD AUGUST 23, 1990

1). THE COMMENTER WAS CONCERNED ABOUT WHERE THE SOLIDIFIED MATERIAL WOULD BE FINALLY LOCATED, AND WHETHER A FORMAL CAP WOULD BE IN THE PLAN.

EPA RESPONSE: THE CONTAMINATED SOIL MATERIAL WILL BE SAMPLED AND SOIL WITH CONCENTRATION LEVELS

GREATER THAN 25 MG/KG PCP WILL BE EXCAVATED AND WASHED. WASH WATER WILL BE PLACED IN A BIOREACTOR AND THE REMAINING CONTAMINANT FINES WILL BE S/S. THE S/S MONOLITH WILL THEN BE PLACED BACK ONTO THE SITE, BACKFILLED, AND COVERED WITH A 6 INCH PROTECTIVE VEGETATIVE COVER.

2). THE COMMENTER EXPRESSED CONCERN REGARDING THE LEACHATE OF THE SOLIDIFIED MONOLITH, AND WHETHER ADDITIONAL TESTING HAD BEEN DONE SINCE THE RA.

EPA RESPONSE: A LEACHATE LEVEL OF 3.6 PARTS PER MILLION (PPM) WAS SET FOR THE MONOLITH THAT WILL BE PLACED BACK ONSITE. THE LEVEL ASSURES THAT NO LEACHATE OF THE MATERIAL INTO THE GROUNDWATER OR SOILS WOULD EXIST ABOVE THE APPLICABLE MAXIMUM CONTAMINANT LIMITS (MCL). THE LEVEL OF 3.6 PPM WAS ACHIEVED IN THE TS AND WILL BE FOLLOWED UP IN THE PILOT STUDY.

3). THE COMMENTER REQUESTED MORE DETAILS REGARDING THE BIOREMEDIATION PROCESS, SPECIFICALLY WHETHER OR NOT IT INVOLVES INSITU TREATMENT.

EPA RESPONSE: EPA PLANS FOR THE CONTAMINATED SOIL MATERIAL TO BE EXCAVATED. THE EXCAVATED MATERIAL WILL BE WASHED. THE WASH WATER WILL BE PLACED INTO A BIOREACTOR FOR PCP DESTRUCTION. SOILS WITH CONCENTRATIONS BELOW 25 PPM PCP WILL BE PLACED BACK ON SITE. BIOREACTED FINES WITH CONCENTRATIONS ABOVE 25 PPM PCP WILL BE S/S IN AN APPROPRIATE MEDIUM. THE S/S MEDIUM WILL BE PLACED BACK ON SITE. THEREFORE, THE BIOREMEDIATION PROCESS WILL NOT BE INSITU DUE TO THE EXCAVATION OF THE CONTAMINATED SOIL BUT THE STABILIZED MEDIUM WILL BE PLACED BACK ON SITE.

4). THE COMMENTER INQUIRED ABOUT THE EXTENT OF MONITORING AFTER THE REMEDIATION IS COMPLETE AND REQUESTS THAT DISCHARGE WATER FROM BIOREMEDIATION BE TESTED IN INSURE DRINKING WATER STANDARDS.

EPA RESPONSE: EPA WILL CONDUCT EXTENSIVE MONITORING AND SAMPLING OF THE MATERIAL PRIOR TO AND AFTER TREATMENT. IN ADDITION, SAMPLING WILL BE CONDUCTED THROUGHOUT THE PROCESS TO ENSURE THAT ACCEPTABLE CLEANUP LEVELS ARE MET. THIS INCLUDES MONITORING OF BOTH SOILS AND GROUNDWATER. EPA IS REQUIRED TO PERFORM A 5 YEAR REVIEW AFTER REMEDIATION BEGINS.

5). THE COMMENTER INQUIRED AS TO WHETHER OR NOT ANY OF THE LOCAL DRINKING WATER WELLS HAVE BEEN AFFECTED.

EPA RESPONSE: BASED ON THE RESULTS OF INITIAL SAMPLING THAT WAS CONDUCTED BY THE STATE OF FLORIDA DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES (HRS), HRS INDICATED THAT NONE OF THE DRINKING WELLS WERE CONTAMINATED.

6). THE COMMENTER REQUESTED AN "ACTION ITEM" TO SEE WHEN THE LAST SAMPLING OF LOCAL WELLS OCCURRED, AND IF AFTER 1985, COULD THE CITY BE PROVIDED WITH A COPY OF THE LAB REPORT FOR THEIR FILES.

EPA RESPONSE: HRS IN NORTH FLORIDA HAS SCHEDULED SAMPLING OCTOBER 2, 1990. UPON RECEIPT OF THE LAB RESULTS, EPA WILL WORK WITH THE CITY OF JACKSONVILLE TO PROVIDE THE REQUESTED INFORMATION.

7). THE COMMENTER EXPRESSED CONCERN OVER THE WAY THE PCP'S WERE GOING TO BE TESTED, THE DOCUMENT WAS UNCLEAR AS TO WHETHER TOTAL ORGANIC CARBON (TOC) CONTENT IS TO BE THE ONLY PROCEDURE USED.

EPA RESPONSE: EPA PLANS TO CONTINUE TESTING FOR PCP USING THE PCP-SPECIFIC METHODS DESCRIBED IN THE 1986 ROD IN CONJUNCTION WITH TOC TESTING FOR MEANS OF EVALUATION.

DEPARTMENT OF HEALTH, WELFARE AND BIO-ENVIRONMENTAL SERVICES (JACKSONVILLE, FLORIDA) DATED SEPTEMBER 11, 1990 COMMENT LETTER

1). THE PURPOSE OF THE TREATABILITY STUDY WAS TO STUDY THE VARIOUS POSSIBILITIES OF TREATING

PENTACHLOROPHENOL. ONE OF THE POSSIBLE TREATMENT METHODS AS SHOWN IN FIGURE 13 IS TO MINE THE CONTAMINATED SOIL, WATER WASH THE SOIL CLEAN AND BIOLOGICALLY TREAT THE WASH WATER. SOIL OF SOME UNDEFINED QUALITY IS TO EXIT THE PROCESS AT THREE SEPARATE STAGES. VERY LITTLE INFORMATION IS AVAILABLE ON THE TECHNIQUES AND WASTE STREAM QUALITY DATA ARE CONTAINED WITHIN THE TS.

EPA RESPONSE: EPA PROVIDED COPIES OF THE FINAL TS TO A REPRESENTATIVE OF THE DEPARTMENT OF HEALTH, WELFARE AND BIO-ENVIRONMENTAL SERVICES (BES) OF JACKSONVILLE FLORIDA. LIQUID/SOLID SEPARATION TECHNIQUES AND WASTE STREAM QUALITY DATA ARE CONTAINED WITHIN THE TS.

2). MOST OF THE PROPOSED FLOWSHEET APPEARS TO BE THEORETICALLY POSSIBLE; HOWEVER, THE WRD CONTENTS THAT EXTENSIVE PILOT PLANT TESTING MUST BE PERFORMED TO DETERMINE ACTUAL FEASIBILITY AND TO PRODUCE ACCEPTABLE DATA ON THE QUALITY OF WASTE STREAMS, OFF GASES, PARTICULATE MATTER AND TREATED SAND.

EPA RESPONSE: EPA PLANS FOR A PILOT STUDY AS A PART OF THE REMEDIAL DESIGN (RD) PHASE. THE PILOT STUDY WILL ADDRESS THE ABOVE ISSUES OF CONCERN.

3). AN EXAMPLE OF THE LACK OF COMPLETION IN THE PROPOSED (A)ROD IS IN THE USE OF A CARBON ADSORPTION SYSTEM TO TREAT THE GASES FROM THE BIO-TREATMENT REACTOR. WHAT IS THE PURPOSE OF TREATING THE GASES AND HOW WILL THE USED CARBON BE TREATED? IN ANOTHER EXAMPLE THE PROPOSED (A)ROD IS CONCERNED WITH DUST EMISSION FROM MINING EQUIPMENT AND MENTIONS TOTAL ENCAPSULATION. IS THIS A GUESS AT THE DUST PROBLEM?

EPA RESPONSE: DURING THE BIOREMEDIATION PHASE, ANY VOLATILES PRESENT WILL VAPORIZE (OFFGAS). THE PURPOSE OF THE CARBON ADSORPTION SYSTEM IS TO CATCH VAPORIZED VOLATILES. MOST CARBON ADSORPTION FILTER VENDERS OFFER THE SERVICE OF COLLECTION AND PROPER DISPOSAL OF THE FILTERS. IF NO SERVICE EXISTS, THE FILTERS WOULD BE DISPOSED OF OFFSITE IN AN APPROVED FACILITY.

DURING THE S/S PHASE, THE ENCAPSULATING AGENTS WOULD MOST LIKELY PRODUCE DUST PARTICLES. FOR THIS PURPOSE, A CLOSED SYSTEM MIXER WOULD BE USED.

4). THE WRD'S MAJOR CONCERN AT THE PRESENT TIME ARE THE PRIVATE WELLS USED FOR RESIDENTIAL DRINKING WATER. LOCAL RECORDS INDICATE THAT THE WELLS HAVE NOT BEEN TESTED FOR FIVE YEARS. THE WRD URGENTLY REQUESTS THE TESTING OF ALL WELLS SUPPLYING RESIDENTIAL DRINKING WATER WITHOUT DELAY AND THAT TESTING BE CONTINUED ON AN ANNUAL BASIS.

EPA RESPONSE: HRS IN NORTH FLORIDA HAS SCHEDULED THE SAMPLING OF PRIVATE WELLS IN THE VICINITY OF THE SITE TO BEGIN OCTOBER 2, 1990. THE HRS HAS IDENTIFIED APPROXIMATELY 16 WELLS TO BE SAMPLED IN THE IMMEDIATE AREA OF THE SITE. HRS PLANS TO SAMPLE OVER A 3 DAY PERIOD. THE SAMPLES WILL BE TESTED FOR PCP AND NO. 2 FUEL OIL. SAMPLE RESULTS ARE EXPECTED TO BE RECEIVED APPROXIMATELY 5-6 WEEKS AFTER SUBMITTAL.

5). BASED UPON THE INFORMATION NOT SUPPLIED, THE WRD REQUESTS AN ADDITIONAL PUBLIC HEARING BE HELD FOR PUBLIC COMMENT BEFORE THE DESIGN PHASE IS COMPLETED.

EPA RESPONSE: EPA IS REQUIRED BY THE NATIONAL CONTINGENCY PLAN (NCP) TO PROVIDE AS APPROPRIATE A PUBLIC BRIEFING UPON COMPLETION OF THE FINAL RD FOR THE SITE. THE PUBLIC BRIEFING WILL PROVIDE THE OPPORTUNITY FOR THE PUBLIC TO COMMENT ON THE DESIGN. EPA WILL PROVIDE THE WRD WITH AS MUCH REQUESTED INFORMATION AS POSSIBLE DURING THE REMEDIAL DESIGN PHASE.

IV. REMAINING CONCERNS

THE COMMUNITY'S CONCERNS SURROUNDING THE COLEMAN EVANS WOOD PRESERVING SITE WILL BE ADDRESSED IN THE FOLLOWING AREAS: COMMUNITY RELATIONS SUPPORT THROUGHOUT RD/RA AND INCORPORATION OF

COMMENTS/SUGGESTIONS FROM THE COMMUNITY INTO THE RD.

COMMUNITY RELATIONS WILL CONSIST OF MAKING AVAILABLE FINAL DOCUMENTS (I.E., RD WORK PLAN, RD REPORTS, ETC.) IN A TIMELY MANNER TO THE LOCAL INFORMATION REPOSITORY FOR THE SITE. EPA WILL ALSO ISSUE FACT SHEETS TO THOSE ON THE MAILING LIST TO PROVIDE FURTHER INFORMATION ON PROGRESS OF THE PROJECT AND SCHEDULES FOR FUTURE ACTIVITIES AT THE SITE. EPA WILL INFORM THE COMMUNITY OF ANY PRINCIPAL DESIGN CHANGES MADE DURING THE PROJECT DESIGN. IF, AT ANY TIME DURING THE RD OR RA, NEW INFORMATION IS REVEALED THAT COULD AFFECT THE IMPLEMENTATION OF THE REMEDY OR IF THE REMEDY FAILS TO ACHIEVE THE NECESSARY DESIGN CRITERIA, THE ROD MAY BE REVISED TO INCORPORATE NEW TECHNOLOGY THAT WILL ATTAIN THE NECESSARY PERFORMANCE CRITERIA.

COMMUNITY RELATIONS ACTIVITIES WILL REMAIN AN ACTIVE ASPECT OF THE RD/RA PHASE OF THE PROJECT.

#TA

TABLE 1A
ASSUMPTIONS USED IN ESTIMATING EXPOSURE
TO CONTAMINANTS VIA DIRECT CONTACT WITH
SOILS OR SAWDUST AT THE COLEMAN EVANS SITE

PARAMETER	MOST PROBABLE A CASE	REALISTIC WORLD B CASE
1. FREQUENCY OF CONTACT (CHRONIC EXPOSURE)	5 DAYS/WEEK 50 WEEKS/YEAR	5 DAYS/WEEK, 50 WEEKS/YEAR
2. RECEPTOR	ON-SITE WORKERS	ON-SITE WORKERS
3. AVERAGE WEIGHT OF EXPOSED INDIVIDUALS	70 KG	70 KG
4. CONCENTRATION OF CONTAMINANTS CONTACTED	5.6 MG/KG PCP 2.9 MG/KG XYLENE	3.1 MG/KG PCP 4.2 MG/KG XYLENE
5. QUANTITY OF SOIL CONTACTING SKIN PER EXPOSURE EVENT	1.5 G	4.4 G
6. PERCENTAGE OF CONTAMINANTS ABSORBED THROUGH THE SKIN	20 PERCENT	20 PERCENT
7. INCIDENTAL INGESTION OF CONTAMINATED SOIL PER EXPOSURE EVENT	50 MG	100 MG
8. PERCENTAGE OF INGESTED CONTAMINANTS ABSORBED	100 PERCENT	100 PERCENT

(A) USING MOST-PROBABLE EXPOSURE SCENARIO PARAMETERS AND MOST-PROBABLE (GEOMETRIC MEAN) CONCENTRATIONS

(B) USING REALISTIC WORST-CASE EXPOSURE SCENARIO PARAMETERS AND MAXIMUM CONCENTRATIONS.

TABLE 1B
ASSUMPTIONS USED IN ESTIMATING EXPOSURE
TO CONTAMINANTS VIA DIRECT CONTACT WITH
SOILS OR SAWDUST AT THE COLEMAN EVANS SITE

PARAMETER	ASSUMPTION
1. FREQUENCY OF CONTACT (CHRONIC EXPOSURE)	8 HR/DAY, 5 DAY/WK, 50 WK/YR
2. RECEPTOR	ON-SITE WORKER
3. AVERAGE WEIGHT OF EXPOSED INDIVIDUALS	70 KG
4. DAILY INHALATION RATE (DURING WORK ONLY)	22 M(3)/DAY
5. PERCENTAGE OF CONTAMINANT IN SOIL DUST ABSORBED	25 PERCENT
6. AIR CONCENTRATIONS OF PARTICULATE MATTER	15 MG/M(3)
7. AVERAGE CONCENTRATIONS OF CONTAMINANTS IN AIRBORNE PARTICULATE MATTER	310 MG/KG PCP 4.2 MG/KG XYLENE

TABLE 2
SUMMARY TABLE OF FEASIBLE ALTERNATIVES
AND COST-EFFECTIVENESS COMPARISON

REMEDIAL ALTERNATIVE	REASON FOR NON-SELECTION	ESTIMATED COST RANGE
1. SURFACE CAPPING	IMPLEMENTATION WOULD NOT DEAL PERMANENTLY WITH THE SITE CONTAMINATION ALTHOUGH IT PROVIDES A HIGH DEGREE OF PROTECTION TO SURFACE WATER AND AIR. GROUNDWATER CONTAMINATION WOULD REMAIN. RESTRICTS SITE USE	0.5 TO 0.9
2. STABILIZATION/ SOLIDIFICATION	THIS IS A VIABLE ALTERNATIVE, BUT CONTAMINATION WOULD REMAIN ON-SITE AND LONG-TERM MONITORING WOULD BE REQUIRED. LAND USE LIMITATIONS.	1.4 TO 1.9
3. CONTAINMENT AND ENCAPSULATION	THIS IS A COST-EFFECTIVE OPTION, BUT CONTAMINATION WOULD REMAIN UNTREATED. GREATER ENVIRONMENTAL RISK ARISES FROM THE POTENTIAL FOR LINEAR FAILURE. LONG TERM MONITORING AND O&M WILL BE REQUIRED	0.7 TO 1.5
4. SOLVENT EXTRACTION	THIS OPTION IS FULLY EFFECTIVE FOR MIGRATION OF ALL THREATS, BUT INCINERATION IS EQUALLY EFFECTIVE WITH A LOWER COST.	4.5 TO 9.6
5. ON-SITE INCINERATION		3.0 TO 3.8
6. OFF-SITE DISPOSAL	DOES NOT REMEDIATE WASTES, ONLY INVOLVES TRANSPORT TO A RCRA-APPROVED FACILITY	2.9 TO 4.2
7. NO ACTION ALTERNATIVE	NO REMEDIATION OF SITE SPECIFIC CONDITIONS POTENTIAL HEALTH AND ENVIRONMENTAL RISKS.	0.0

TABLE 3
GLOSSARY OF EVALUATION CRITERIA

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

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

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

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

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

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

COST - INCLUDES CAPITAL AND OPERATION AND MAINTENANCE COSTS.

STATE ACCEPTANCE - INDICATES WHETHER THE STATE CONCURS WITH, OPPOSES, OR HAS NO COMMENT ON THE PROPOSED PLAN.

COMMUNITY ACCEPTANCE - THE RESPONSIVENESS SUMMARY IN THE APPENDIX OF THE AROD ADDRESSES COMMENTS RECEIVED FROM THE PUBLIC.