EPA/ROD/R01-90/047
1990

EPA Superfund
Record of Decision:

COAKLEY LANDFILL
EPA ID: NHD064424153
OU 01
NORTH HAMPTON, NH
06/28/1990

This ROD has an associated ESD.

#SP
STATEMENT OF PURPOSE

THIS DECISION DOCUMENT REPRESENTS THE SELECTED REMEDIAL ACTION FOR THE COAKLEY LANDFILL SITE IN NORTH HAMPTON, NEW HAMPSHIRE, DEVELOPED IN ACCORDANCE WITH THE COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT OF 1980 (CERCLA), AS AMENDED BY THE SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986, AND TO THE EXTENT PRACTICABLE, THE NATIONAL OIL AND HAZARDOUS SUBSTANCES CONTINGENCY PLAN (NCP), 40 CFR PART 300 ET SEQ., AS AMENDED. THE REGION 1 ADMINISTRATOR HAS BEEN DELEGATED THE AUTHORITY TO APPROVE THIS RECORD OF DECISION.

THE STATE OF NEW HAMPSHIRE HAS CONCURRED ON THE SELECTED REMEDY.

#SB
STATEMENT OF BASIS

THIS DECISION IS BASED ON THE ADMINISTRATIVE RECORD WHICH HAS BEEN DEVELOPED IN ACCORDANCE WITH SECTION 113 (K) OF CERCLA AND WHICH IS AVAILABLE FOR PUBLIC REVIEW AT THE NORTH HAMPTON PUBLIC LIBRARY IN NORTH HAMPTON, NEW HAMPSHIRE AND AT THE REGION I WASTE MANAGEMENT DIVISION RECORDS CENTER IN BOSTON, MASSACHUSETTS. THE ADMINISTRATIVE RECORD INDEX (APPEND E TO THE ROD) IDENTIFIES EACH OF THE ITEMS COMPRISING THE ADMINISTRATIVE RECORD UPON WHICH THE SELECTION OF THE REMEDIAL ACTION IS BASED.

#AS
ASSESSMENT OF THE SITE

ACTUAL OF THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THIS ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO THE PUBLIC HEALTH OR WELFARE OR TO THE ENVIRONMENT.

#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 FOR THIS REMEDIAL ACTION AND IS COST-EFFECTIVE. THIS REMEDY SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT UTILIZE TREATMENT AS A PRINCIPAL ELEMENT TO REDUCE THE TOXICITY, MOBILITY, OR VOLUME OF HAZARDOUS SUBSTANCES. IN ADDITION, THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

AS THIS REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ONSITE 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.

DATE 06/28/90

JULIE BELAGA
REGIONAL ADMINISTRATOR

#SNLD

1. SITE NAME, LOCATION AND DESCRIPTION

A. GENERAL DESCRIPTION

THE COAKLEY LANDFILL SITE (THE SITE) IS SITUATED ON APPROXIMATELY 92 ACRES LOCATED WITHIN THE TOWNS OF GREENLAND AND NORTH HAMPTON, ROCKINGHAM COUNTY, NEW HAMPSHIRE (APPENDIX A, FIGURE 1). THE ACTUAL LANDFILL AREA COVERS APPROXIMATELY 27 ACRES OF THIS PROPERTY. THE SITE LOCATED ABOUT 400 TO 800 FEET WEST OF LAFAYETTE ROAD (US ROUTE 1), DIRECTLY SOUTH OF BREAKFAST HILL ROAD, AND ABOUT 2.5 MILES NORTHEAST OF THE CENTER OF THE TOWN OF NORTH HAMPTON. VEHICLES ACCESS THE SITE THROUGH AN ENTRANCE GATE LOCATED ON BREAKFAST HILL ROAD, APPROXIMATELY 600 FEET NORTHWEST OF THE INTERSECTION OF LAFAYETTE AND BREAKFAST HILL ROADS. THE GREENLAND-RYE TOWN LINE FORMS A MAJOR PORTION OF THE EASTERN BOUNDARY OF THE SITE. A MORE DETAILED SITE MAP IS SHOWN ON APPENDIX A, FIGURE 2. THERE IS A MORE COMPLETE DESCRIPTION OF THE SITE IN THE REMEDIAL INVESTIGATION REPORT IN CHAPTER 2, PAGES 2-1 TO 2-6.

BREAKFAST HILL ROAD FORMS THE NORTHERN BOUNDARY OF THE SITE. PRIVATELY OWNED PROPERTIES BORDER THE SITE TO THE WEST AND NORTH AND INCLUDE BOTH FARMLAND AND UNDEVELOPED WOODLANDS AND WETLANDS. PROPERTIES ABUTTING EAST AND SOUTH OF THE SITE ARE GENERALLY COMMERCIAL OR RESIDENTIAL. THE RYE LANDFILL, WHICH WAS CLOSED IN 1987, ABUTS THE SITE DIRECTLY TO THE NORTHEAST. THE LAFAYETTE TERRACE HOUSING DEVELOPMENT IS DIRECTLY SOUTHEAST OF THE SITE. THE GRANITE POST GREEN MOBILE HOME PARK LIES APPROXIMATELY 500 FEET TO THE SOUTH OF THE SITE, WEST OF LAFAYETTE TERRACE. THE BOSTON & MAINE RAILROAD, WHICH RUNS NORTH-SOUTH, FORMS THE WESTERN BORDER OF THE SOUTHERN HALF OF THE SITE.

THE LANDFILL IS SITUATED WITHIN THE SOUTHERNMOST PORTION OF THE SITE, ALMOST COMPLETELY WITHIN THE TOWN OF NORTH HAMPTON. THE COAKLEY LANDFILL COVERS APPROXIMATELY 27 ACRES, CONSTITUTING THE MAJOR PORTION OF THE SOUTHERN SECTION OF THE SITE. GENERALLY RECTANGULAR IN SHAPE, WITH AN AVERAGE WIDTH OF APPROXIMATELY 900 FEET AND AN AVERAGE LENGTH OF APPROXIMATELY 1,300 FEET, THE LANDFILL EXTENDS TO THE WESTERN, SOUTHERN, AND EASTERN BOUNDARIES IN THE SOUTH DIRECTION.

THE LANDFILL FORMS A HILL RISING APPROXIMATELY 10 TO 60 FEET ABOVE THE SURROUNDING AREA. AT ITS HIGHEST POINT THE ELEVATION IS ABOUT 137 FEET ABOVE MEAN SEA LEVEL. GROUND SURFACE IN THE LANDFILL AREA ORIGINALLY SLOPED GENTLY WESTWARD. THE LANDFILL NOW FORMS A PROMINENT RAISED PLATEAU IN THAT AREA, WITH A GENERALLY FLAT UPPER SURFACE. THE LANDFILL HAS MODERATELY STEEP SLOPES ALONG ITS WESTERN, EASTERN, AND SOUTHERN SIDES, AND A GENTLE SLOPE ALONG THE NORTHERN SIDE.

FINE, SANDY SOIL OF VARIABLE THICKNESS COVERS MOST OF THE LANDFILL, AND VEGETATIVE COVER IS ESSENTIALLY NONEXISTENT. ALONG THE TOP OF THE NORTHERN AND WESTERN SLOPES, INCINERATOR RESIDUE IS VISIBLE IN BANKS WHERE WIND AND WATER ACTION APPARENTLY REMOVED THE SAND COVER. A DRAINAGE BOUNDS THE SOUTHERN AND WESTERN SIDES OF THE LANDFILL, CHANNELING SURFACE WATER RUNOFF INTO A WETLAND AREA SITUATED IMMEDIATELY TO THE NORTH-NORTHWEST OF THE LANDFILL. THE WETLAND AREA GENERALLY EXTENDS FROM THE NORTHWEST CORNER OF THE LANDFILL AREA, ALONG BOTH SIDES OF THE B&M RAILROAD, TO A POINT APPROXIMATELY 500 FEET SOUTH OF BREAKFAST HILL ROAD, THE MARGINS OF THE WETLANDS ADJACENT TO THE LANDFILL HAVE BEEN PARTIALLY FILLED WITH ROCK REMOVED FROM THE QUARRY AND SOME NATIVE SAND AND GRAVEL. WETLANDS WEST OF THE RAILROAD TRACK DRAIN BOTH THE NORTH AND THE SOUTH. THE LANDFILL IS LOCATED ON A SUBREGIONAL DRAINAGE DIVIDE AND CONTRIBUTES RUNOFF IN A GENERALLY RADIAL PATTERN INTO THE WATERSHEDS OF FOUR NEARBY STREAMS WEST OF THE SITE; LITTLE RIVER, BERRY'S BROOK, NORTH BROOK, AND BAILEY BROOK (APPENDIX A, FIGURE 2).

NATURAL RESOURCES IN THE AREA INCLUDE THE AGRICULTURAL LANDS, WOODLANDS, AND WETLANDS WHICH SURROUND THE SITE. SURFACE WATER BODIES FEED THE WETLAND AREA. THE GROUNDWATER IS AVAILABLE IN AQUIFERS FORMED BY WATER SATURATED PORTIONS OF SAND AND GRAVEL DEPOSITS AND IN FRACTURED BEDROCK. SAND AND GRAVEL DEPOSITS ARE FOUND THROUGHOUT THE SITE. SOME BEDROCK OUTCROPS WERE MINED FOR CRUSHED AGGREGATE IN A QUARRY OPERATION. IT IS REASONABLE TO EXPECT THAT WETLAND AND STREAM AREAS RECEIVE SOME HUNTING AND FISHING ACTIVITY. THIS IS CONSIDERED MINOR RECREATIONAL USE. THERE IS ALSO OCCASIONAL USE OF ALL-TERRAIN RECREATIONAL VEHICLES ON AND AROUND THE SITE.

B. GEOLOGIC CHARACTERISTICS

PORTIONS OF THE LANDFILL SITE DIRECTLY ON FRACTURED BEDROCK OF THE RYE FORMATION OR ON AN UNDETERMINED THICKNESS OF UNCONSOLIDATED SEDIMENTS OF THE PLEISTOCENE AGE. BEDROCK CONSISTS OF DEFORMED IGNEOUS AND METAMORPHIC METASEDIMENTS OF THE PRECAMBRIAN TO ORDOVICIAN AGE INTRUDED LOCALLY BY PEGMITITES OF THE HILLSBORO PLUTONIC SERIES.

ONSITE DRILLING AND GEOPHYSICAL WORK INDICATED THE BEDROCK SURFACE IS IRREGULAR AND APPEARS TO FORM A NORTHEAST/SOUTHWEST RIDGE BENEATH THE LANDFILL.

SURFICIAL GEOLOGY IN THE SITE VICINITY VARIES FROM ICE CONTACT SAND AND GRAVEL DEPOSIT ON THE EASTERLY SIDE OF THE LANDFILL TO MARINE SANDY SILT ON THE WESTERLY SIDE. ICE CONTACT DEPOSITS ALSO APPEAR TO OVERLIE THE MARINE SEDIMENTS ON THE NORTHEASTERN SIDE OF THE LANDFILL.

THE OVERBURDEN MATERIALS ONSITE VARY IN THICKNESS FROM THREE FEET TO ALMOST FIFTY FEET AND GRADE FROM HIGHLY PERMEABLE SANDS AND GRAVELS TO STIFF, LOW PERMEABILITY SANDY SILT.

C. HYDROGEOLOGICAL CHARACTERISTICS

THE GENERALIZED GROUNDWATER HYDRAULICS OF THE COAKLEY LANDFILL SITE ARE PRESENTED IN APPENDIX A, FIGURE 3. BOTH THE DIRECTION AND MAGNITUDE OF THE HYDRAULIC GRADIENTS APPEARS TO BE SIMILAR IN THE OVERBURDEN AND BEDROCK UNITS. IN ADDITION, THE DATA SUGGEST THAT THE OVERBURDEN IS RECHARGING BEDROCK OVER THE TOPOGRAPHIC HIGH AREA EAST OF THE COAKLEY LANDFILL, AND THAT BEDROCK IS DISCHARGING INTO THE OVERBURDEN IN THE WETLANDS AREA.

THE PRIMARY DIRECTIONS OF GROUNDWATER FLOW FROM THE COAKLEY LANDFILL ARE SOUTHWEST, WEST AND NORTHWEST TOWARD THE WETLANDS. IN THE WETLANDS, AN INFERRED EAST TO WEST GROUNDWATER DIVIDE DIRECTLY WEST OF THE LANDFILL CAUSES GROUNDWATER TO FLOW SOUTH TOWARD NORTH ROAD AND PRESUMABLY NORTH TOWARD BREAKFAST HILL ROAD. RESIDENTIAL AND COMMERCIAL PUMPING, OCCURRING PRIOR TO THE INSTALLATION OF PUBLIC WATER SUPPLIES, ALTERED THE NATURAL HYDRAULIC SYSTEM SHOWN IN APPENDIX A, FIGURE 3. EPA INTERPRETS THIS PUMPING TO BE THE PRIMARY REASON FOR CONTAMINANT MIGRATION SOUTH, EAST, AND NORTHEAST OF THE LANDFILL. AS OF THE LAST ROUND OF WATER LEVEL MEASUREMENTS ON SEPTEMBER 1987, ESSENTIALLY NO HYDRAULIC GRADIENT WAS PRESENT FROM THE COAKLEY LANDFILL TOWARD THE SOUTH, EAST, OR NORTHEAST, INCLUDING TOWARD OR FROM THE RYE LANDFILL.

OVERBURDEN GROUNDWATER FLOW APPEARS TO BE RADIAL FROM THE COAKLEY LANDFILL AND VERTICALLY DOWNWARD INTO THE BEDROCK AQUIFER. SURFACE DRAINAGE IS ALSO MULTIDIRECTIONAL SINCE THE LANDFILL IS NEAR THE HEADWATERS OF BERRY'S BROOK TO THE NORTH AND THE LITTLE RIVER TO THE SOUTH. FLOW WITHIN THE BEDROCK AQUIFER IS A FUNCTION OF INTERCONNECTED FRACTURES AND IS AFFECTED LOCALLY BY HYDRAULIC GRADIENTS INDUCED BY BEDROCK WATER WELL USAGE WITHIN THE AREA. AT LEAST ONE MAJOR FRACTURE SYSTEM POSITIONED IN A SOUTH/SOUTHEAST DIRECTION HAS BEEN DOCUMENTED TO INTERCONNECT WITH THE COAKLEY LANDFILL. THIS IS LOCATED IN THE SOUTH/SOUTHWEST BOUNDARY WHERE SUBSTANTIAL RECHARGE TO THE BEDROCK AQUIFER MAY BE OCCURRING.

GROUNDWATER RECHARGE FROM THE OVERBURDEN TO THE BEDROCK AQUIFER OCCURS WHERE OVERBURDEN WATER LEVELS ARE HIGHER IN ELEVATION THAN THOSE IN BEDROCK AND FINE GRAINED MATERIALS DO NOT PROHIBIT THIS RECHARGE. DIRECT LEACHATE DISCHARGE TO THE BEDROCK MAY TAKE PLACE BENEATH PARTS OF THE LANDFILL, SINCE THE REFUSE IS IN DIRECT CONTACT WITH BEDROCK IN AREAS WHERE ROCK QUARRYING HAD PREVIOUSLY OCCURRED.

#SHEA

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

A. LAND USE

IN APPROXIMATELY 1965 SAND AND GRAVEL OPERATIONS BEGAN ON THE COAKLEY PROPERTY, WHICH HAD PREVIOUSLY CONSISTED OF WOODED AREAS AND OPEN FIELDS AS EVIDENCED BY AERIAL PHOTOGRAPHS. THESE OPERATIONS CONTINUED INTO THE LATE 1970S.

PERMITTING FOR A LANDFILL BEGAN IN 1971 WHEN THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC HEALTH GRANTED THE TOWN OF NORTH HAMPTON A PERMIT TO OPERATE A LANDFILL ON THE COAKLEY SITE. EARLY IN 1972, COAKLEY LANDFILL, INC. AND THE TOWNS OF NORTH HAMPTON AND THE CITY OF PORTSMOUTH ENTERED INTO AN AGREEMENT WHICH PROHIBITED THE DUMPING OF SHOP AND ORDNANCE WASTE FROM PEASE AIR FORCE BASE, LOCATED IN NEWINGTON, NH, AS WELL AS DEMOLISHED BUILDINGS, JUNK AUTOS, MACHINERY, AND LARGE TREE STUMPS OR BUTTS.

LANDFILL OPERATIONS BEGAN IN 1972, WITH THE SOUTHERN PORTION OF THE SITE USED FOR REFUSE FROM THE MUNICIPALITIES OF PORTSMOUTH, NORTH HAMPTON, NEWINGTON, AND NEW CASTLE, ALONG WITH PEASE AIR FORCE BASE. COINCIDENT WITH LANDFILL OPERATIONS, ROCK QUARRYING WAS CONDUCTED AT THE SITE FROM APPROXIMATELY 1973 THROUGH 1977. MUCH OF THE REFUSE DISPOSED OF AT COAKLEY LANDFILL WAS PLACED IN OPEN (SOME LIQUID-FILLED) TRENCHES CREATED BY ROCK QUARRYING SAND AND GRAVEL MINING.

IN 1978 AND 1979 OIL-SOAKED DEBRIS FROM ACCIDENTS IN PORTSMOUTH AND NEWINGTON, WAS PLACED IN WHAT IS KNOWN AS THE OILY DEBRIS AREA IN THE NORTHERN SECTION OF THE COAKLEY SITE (APPENDIX A, FIGURE 2). THE PRECISE VOLUME OF THIS MATERIAL IS UNKNOWN.

IN 1981, THE STATE OF NEW HAMPSHIRE GRANTED THE TOWN OF NORTH HAMPTON PERMISSION TO DISPOSE OF PESTICIDE WASTE CONTAINERS AT THE COAKLEY LANDFILL SITE.

AFTER THE CITY OF PORTSMOUTH BEGAN OPERATING A REFUSE-TO-ENERGY PLANT ON LEASED PROPERTY AT PEASE AIR FORCE BASE IN 1982. FROM JULY 1982 THROUGH JULY 1985, PEASE AIR FORCE BASE AND THE MUNICIPALITIES OF RYE, NORTH HAMPTON, PORTSMOUTH, NEW CASTLE, AND DERRY BEGAN TRANSPORTING THEIR REFUSE TO THIS PLANT FOR INCINERATION. AFTER THAT TIME, THE COAKLEY LANDFILL GENERALLY ACCEPTED ONLY INCINERATOR RESIDUE FROM THE NEW PLANT. IN MARCH 1983, THE BUREAU OF SOLID WASTE MANAGEMENT ORDERED AN END TO THE DISPOSAL OF UNBURNED RESIDUE AT THE COAKLEY LANDFILL.

PRIOR TO INCINERATION, THE NEW HAMPSHIRE WASTE MANAGEMENT DIVISION ESTIMATED THAT APPROXIMATELY 120 TONS PER DAY WERE DISPOSED OF AT THE LANDFILL. THE DAILY WEIGHT OF INCINERATOR RESIDUE WAS ESTIMATED TO BE APPROXIMATELY 90 TONS. A MORE DETAILED DESCRIPTION OF THE SITE HISTORY CAN BE FOUND IN THE REMEDIAL INVESTIGATION REPORT AT PAGES 1-6 THROUGH 1-10.

B. RESPONSE HISTORY

IN 1979, THE NEW HAMPSHIRE WASTE MANAGEMENT DIVISION RECEIVED A COMPLAINT CONCERNING LEACHATE BREAKOUTS IN THE AREA. A SUBSEQUENT INVESTIGATION BY THE BUREAU OF SOLID WASTE MANAGEMENT RESULTED IN THE DISCOVERY OF ALLEGEDLY EMPTY DRUMS WITH MARKINGS INDICATIVE OF CYANIDE WASTE.

A SECOND COMPLAINT WAS RECEIVED IN EARLY 1983 BY THE NEW HAMPSHIRE WATER SUPPLY AND POLLUTION CONTROL COMMISSION (WSPCC) REGARDING THE WATER QUALITY FROM A DOMESTIC DRINKING WATER WELL. TESTING REVEALED THE PRESENCE OF FIVE DIFFERENT VOCS.

A SUBSEQUENT CONFIRMATORY SAMPLING BEYOND THESE INITIAL WELLS DETECTED VOC CONTAMINATION TO THE SOUTH, SOUTHEAST, AND NORTHEAST OF THE COAKLEY LANDFILL. AS A RESULT, THE TOWN OF NORTH HAMPTON EXTENDED PUBLIC WATER TO LAFAYETTE TERRACE IN 1983 AND TO BIRCH AND NORTH ROADS IN 1986. PRIOR TO THIS TIME, COMMERCIAL AND RESIDENTIAL WATER SUPPLY CAME FROM PRIVATE WELLS.

ALSO IN 1983, THE RYE WATER DISTRICT COMPLETED A WATER MAIN EXTENSION ALONG WASHINGTON ROAD FROM THE CORNER OF LAFAYETTE ROAD AND ALONG DOW LANE. THIS EXTENSION BROUGHT THE PUBLIC WATER SUPPLY INTO THE AREA DUE EAST AND SOUTHEAST OF THE RYE LANDFILL. THE WSPCC SUBMITTED PROPOSALS TO THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) IN MAY AND OCTOBER OF 1983 RECOMMENDING THAT THE COAKLEY SITE BE INCLUDED ON THE NATIONAL PRIORITY LIST (NPL). IN DECEMBER 1983, THE COAKLEY LANDFILL WAS LISTED ON THE NPL, AND RANKED AS NO. 689.

IN JULY 1985, AFTER ADDITIONAL INVESTIGATION CONDUCTED BY THE EPA AND THE WSPCC, THE COAKLEY LANDFILL CEASED OPERATIONS. THE NEARBY RYE LANDFILL CEASED OPERATIONS IN 1987.

A COOPERATIVE AGREEMENT WAS SIGNED WITH THE STATE OF NEW HAMPSHIRE ON AUGUST 12, 1985 TO CONDUCT A REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS). THE CONTRACTOR, ROY F. WESTON, INC., COMPLETED THE RI AND THE FS WHICH WERE RELEASED FOR PUBLIC COMMENT ON OCTOBER 31, 1988 AND MARCH 2, 1990, RESPECTIVELY. THE PROPOSED PLAN WHICH CONTAINS EPA'S PREFERRED ALTERNATIVE WAS RELEASED WITH THE FS.

C. ENFORCEMENT HISTORY

THE STATE OF NEW HAMPSHIRE BEGAN DISCUSSIONS CONCERNING THE SITE WITH COAKLEY, THE OWNER, AND WITH THE MUNICIPALITIES AS EARLY AS DECEMBER, 1983. INFORMATION REQUEST LETTERS WERE SENT BY EPA TO THESE PARTIES IN SEPTEMBER AND OCTOBER, 1987. ADDITIONAL INFORMATION REQUEST LETTERS WERE SENT TO APPROXIMATELY 300 PARTIES DURING 1988.

ON FEBRUARY 2, 1990, EPA NOTIFIED APPROXIMATELY 59 PARTIES WHO EITHER OWNED OR OPERATED THE FACILITY, GENERATED WASTES THAT WERE SHIPPED TO THE FACILITY, ARRANGED FOR THE DISPOSAL OF WASTES AT THE FACILITY, OR TRANSPORTED WASTES TO THE FACILITY OF THEIR POTENTIAL LIABILITY WITH RESPECT TO THE SITE. THE PRPS FORMED A STEERING COMMITTEE AND INITIAL NEGOTIATIONS ARE TAKING PLACE. ON MARCH 14, 1990 EPA MET WITH THE POTENTIAL RESPONSIBLE PARTIES (PRPS) TO DISCUSS THEIR POTENTIAL LIABILITY AT THE SITE.

SOON AFTER THE PRPS WERE NOTICED THE CITY OF PORTSMOUTH, THE TOWN OF NORTH HAMPTON AND THE TOWN OF NEWINGTON NOTIFIED THE EPA OF THEIR SUSPICIONS THAT ADDITIONAL PARTIES ALSO DUMPED AT THE COAKLEY SITE. THESE ADDITIONAL 126 PARTIES WERE INFORMED BY LETTER THAT EPA MAY NOTICE THEM IN THE FUTURE. COPIES OF THE PROPOSED PLAN WAS SENT TO PARTIES TO PROVIDE THEM WITH AN OPPORTUNITY TO COMMENT ON THE EPA'S PREFERRED REMEDIAL ALTERNATIVE.

THE PRPS HAVE BEEN ACTIVE IN THE REMEDY SELECTION PROCESS FOR THIS SITE. THE STEERING COMMITTEE RETAINED A TECHNICAL CONSULTANT TO REVIEW THE RI/FS AND TO EVALUATE EPA'S PREFERRED ALTERNATIVE. THE COAKLEY LANDFILL STEERING COMMITTEE SUBMITTED TECHNICAL COMMENTS TO THE EPA DURING THE PUBLIC COMMENT PERIOD. RESPONSES TO THESE COMMENTS AS WELL AS COMMENTS FROM OTHER MEMBERS OF THE PUBLIC ARE SUMMARIZED IN THE ATTACHED RESPONSIVENESS SUMMARY.

#CR
III. COMMUNITY RELATIONS

THROUGHOUT THE SITE'S HISTORY, COMMUNITY CONCERN AND INVOLVEMENT HAS BEEN HIGH. EPA AND THE STATE HAVE KEPT THE COMMUNITY AND OTHER INTERESTED PARTIES APPRAISED OF THE SITE ACTIVITIES THROUGH INFORMATIONAL MEETINGS, FACT SHEETS, PRESS RELEASES AND PUBLIC MEETINGS.

DURING JANUARY 1986, EPA RELEASED A COMMUNITY RELATIONS PLAN WHICH OUTLINED A PROGRAM TO ADDRESS COMMUNITY CONCERNS AND KEEP CITIZENS INFORMED ABOUT AND INVOLVED IN ACTIVITIES DURING REMEDIAL ACTIVITIES. ON MAY 14, 1986, EPA HELD AN INFORMATIONAL MEETING AT THE NORTH HAMPTON TOWN HALL, NORTH HAMPTON, NEW HAMPSHIRE TO DESCRIBE THE PLAN FOR THE RI/FS. ON NOVEMBER 3, 1988, EPA HELD AN INFORMATIONAL MEETING AT NORTH HAMPTON TOWN HALL, NORTH HAMPTON, NEW HAMPSHIRE TO DISCUSS THE RESULTS OF THE REMEDIAL INVESTIGATION (RI).

ON MAY 10, 1988, EPA MADE THE ADMINISTRATIVE RECORD AVAILABLE FOR PUBLIC REVIEW AT EPA'S OFFICES IN BOSTON AND AT THE NORTH HAMPTON PUBLIC LIBRARY. ADDITIONAL MATERIALS WERE ADDED TO THE ADMINISTRATIVE RECORD ON OCTOBER 31, 1988 WITH RELEASE OF THE RI AND ON MARCH 2, 1990 WITH RELEASE OF THE FS AND THE PROPOSED PLAN. COMMENTS ON THE RI WERE RECEIVED FROM COAKLEY, THE TOWN OF NEWCASTLE AND THE CITY OF PORTSMOUTH. EPA PUBLISHED A NOTICE AND BRIEF ANALYSIS OF THE PROPOSED PLAN IN FOSTER'S DAILY DEMOCRAT AND IN THE PORTSMOUTH HERALD ON MARCH 9, 1990 AND MADE THE PLAN AVAILABLE TO THE PUBLIC AT THE NORTH HAMPTON PUBLIC LIBRARY.

ON MARCH 15, 1990, EPA HELD AN INFORMATIONAL MEETING AT THE NORTH HAMPTON ELEMENTARY SCHOOL TO DISCUSS THE RESULTS OF THE REMEDIAL INVESTIGATION AND THE CLEANUP ALTERNATIVES PRESENTED IN THE FEASIBILITY STUDY AND TO PRESENT THE AGENCY'S PROPOSED PLAN. ALSO DURING THIS MEETING, THE AGENCY ANSWERED QUESTIONS FROM THE PUBLIC. FROM MARCH 16 TO MAY 14, 1990, THE AGENCY HELD A 60-DAY PUBLIC COMMENT PERIOD TO ACCEPT PUBLIC COMMENT ON THE ALTERNATIVES PRESENTED IN THE FEASIBILITY STUDY AND THE PROPOSED PLAN AND ON ANY OTHER DOCUMENTS PREVIOUSLY RELEASED TO THE PUBLIC. ON APRIL 3, 1990, THE AGENCY HELD A PUBLIC MEETING AT THE NORTH HAMPTON ELEMENTARY SCHOOL TO DISCUSS THE PROPOSED PLAN AND TO ACCEPT ANY ORAL COMMENTS. A TRANSCRIPT OF THIS MEETING AND COMMENTS FROM THE GENERAL PUBLIC AND FROM THE COAKLEY LANDFILL STEERING COMMITTEE ALONG WITH THE AGENCY'S RESPONSE TO COMMENTS ARE INCLUDED IN THE ATTACHED RESPONSIVENESS SUMMARY.

EPA HAS MET WITH THE POTENTIALLY RESPONSIBLE PARTIES AT VARIOUS TIMES DURING THE PROCESS TO DISCUSS THE SITE. MORE SPECIFICALLY, EPA MET WITH THE CITY OF PORTSMOUTH IN FEBRUARY, 1988, WITH SEVERAL MUNICIPALITIES INVOLVED WITH THE SITE IN THE FALL OF 1989, AND WITH THE COAKLEY LANDFILL STEERING COMMITTEE CHAIRS IN APRIL, 1990.

#SRRA
IV. SCOPE AND ROLE OF THE RESPONSE ACTION

THE SELECTED REMEDY IS THE FIRST OPERABLE UNIT OF AT LEAST A TWO OPERABLE UNIT APPROACH TO THE REMEDIATION OF THE SITE AND PROVIDES FOR THE REMEDIATION OF THE SOURCE AT THE COAKLEY SITE INCLUDING THE CONTAMINATED GROUNDWATER BENEATH AND IN THE VICINITY OF THE LANDFILL (I.E., SOURCE CONTROL). THE SECOND OPERABLE UNIT WILL ADDRESS ANY GROUNDWATER CONTAMINATION WHICH HAS MIGRATED FROM THE LANDFILL AND BEYOND THE PROPERTY BOUNDARY (I.E., MANAGEMENT OF MIGRATION). DURING THIS PHASE ADDITIONAL STUDIES WILL BE UNDERTAKEN TO BETTER CHARACTERIZE THE NATURE AND EXTENT OF THIS OFFSITE GROUNDWATER CONTAMINATION AND TO DEVELOP AND EVALUATE ALTERNATIVES FOR REMEDIATION SHOULD IT BE REQUIRED. THE PRESENCE OF A PLUME OF LOW LEVEL CONTAMINATION CURRENTLY EXISTS IN THE BEDROCK UNDER THE WETLANDS BEYOND THE PROPERTY BOUNDARY TO THE WEST OF THE SITE. AN ENVIRONMENTAL ASSESSMENT WILL BE PERFORMED AT THAT TIME.

THIS FIRST OPERABLE UNIT WILL ADDRESS THE FOLLOWING PRINCIPAL THREATS TO HUMAN HEALTH AND THE ENVIRONMENT POSED BY THE SITE:

1. THE OFFSITE MIGRATION OF CONTAMINANTS;

2. THE FUTURE INGESTION OF CONTAMINATED GROUNDWATER OFFSITE; AND

3. THE DIRECT CONTACT WITH CONTAMINATED SOILS, SEDIMENTS AND SOLID WASTE.

#SC
V. SITE CHARACTERISTICS

CHAPTER 1.0 OF THE "DRAFT FEASIBILITY STUDY, COAKLEY LANDFILL", MAY 1989, CONTAINS AN OVERVIEW OF THE REMEDIAL INVESTIGATION (RI). THE STUDY AREA, AS DEFINED IN THE RI, INCLUDES THE LAND FROM ABOUT 1,600 FEET TO THE SOUTH OF NORTH ROAD TO ABOUT 1,600 FEET NORTH OF BREAKFAST HILL ROAD AND ABOUT 4,000 FEET TO

THE EAST AND WEST OF LAFAYETTE ROAD. THIS STUDY AREA IS SUBSTANTIALLY LARGER THAN THE COAKLEY LANDFILL SITE ITSELF IN ORDER TO EVALUATE THE EXTENT OF THE CONTAMINANT MIGRATION. THE SIGNIFICANT FINDINGS OF THE RI ARE SUMMARIZED BELOW. ALSO SHOWN IS A SUMMARY OF THE HAZARDOUS SUBSTANCES FOUND AT THE SITE WHICH ARE SUBJECT TO SUPERFUND REMEDIAL ACTIONS. A COMPLETE DISCUSSION OF SITE CHARACTERISTICS CAN BE FOUND IN THE REMEDIAL INVESTIGATION REPORT AT PAGES 7-1 THROUGH 7-44.

A. AIR

QUALITATIVE OUTDOOR AIR SAMPLING DONE AT THE SITE DETECTED LOW CONCENTRATIONS OF SOME VOLATILE ORGANIC COMPOUNDS (VOCS). OBSERVED CONCENTRATIONS RANGED FROM `NOT DETECTED' TO 48 PARTS PER BILLION (PPB OR UG/L). ALSO, DATA OBTAINED FROM ANOTHER SURVEY INSTRUMENT, AN AID MODEL 580 ORGANIC VAPOR METER, DURING THE INITIAL SITE WALKOVER OF THE RI DID NOT INDICATE VOCS ABOVE THE BACKGROUND LEVEL THAT WAS SET APPROXIMATELY ½ MILE FROM THE SITE.

IN 1986, THE WSPCC CONDUCTED INDOOR AIR MONITORING OF THREE HOMES AT LAFAYETTE TERRACE. SEVERAL VOC'S WERE DETECTED, BUT THE CONCENTRATIONS WERE TYPICAL OF THOSE FOUND IN RESIDENTIAL DWELLINGS. NEVERTHELESS, THE CONCENTRATIONS OF VOCS RANGED FROM BELOW MEASURABLE LIMITS UP TO APPROXIMATELY 22 PPB. THESE RESULTS ARE BELOW THE OUTDOOR AIR VOC CONCENTRATIONS AT THE LANDFILL PERIMETER.

B. SOIL

IN SOILS BELOW THE SURFACE OF THE LANDFILL, LABORATORY AND FIELD ANALYSES FOUND VOCS, PESTICIDES, METALS AND ACID AND BASE/NEUTRAL EXTRACTABLE COMPOUNDS (ABNS), ABOVE DETECTION LIMITS. SOIL SAMPLES WERE SCREENED FROM NINE TEST PITS LOCATED AT THE LANDFILL (APPENDIX A, FIGURE 4). SPECIFIC DETECTED VOC'S INCLUDE TETRACHLOROETHYLENE, ETHYLBENZENE, ACETONE, CHLOROMETHANE, AND DICHLOROMETHANE. TOTAL VOCS IN THE SAMPLES FROM THE NINE TEST PITS RANGED FROM MINIMAL DETECTION TO 178 PPB. PHENANTHRENE, ANTHRACENE, FLOUROANTHRENE, BENZO (A) ANTHRACENE, CHRYSENE, BENZO (K)-FLORANTHRENE, BENZO (A) PYRENE, FLUORENE, NAPHTHALENE, 4-METHYLPHENOL, AND VARIOUS PHTHALATES WERE AMONG THE ABNS DETECTED IN SEVERAL OF THE TEST PIT SAMPLES, PARTICULARLY AT TEST PITS TP-11 AND TP-18. PESTICIDE COMPOUNDS IDENTIFIED ABOVE THEIR DETECTION LIMITS INCLUDED 4,4-DDD AND 4,4-DDT. NO PCBS WERE OBSERVED AT LEVELS ABOVE THE DETECTION LIMITS OF THE INSTRUMENTS USED. ARSENIC, CADMIUM, LEAD, MERCURY, IRON, MANGANESE, AND ZINC WERE AMONG THE TRACE METALS THAT EXCEEDED BACKGROUND LEVELS AT VARIOUS TEST PITS WITHIN THE LANDFILL.

TWELVE (12) SOIL BORINGS WERE SAMPLED AND SCREENED FOR VOC'S IN AND AROUND THE LANDFILL. THE HIGHEST CONCENTRATION WAS OBSERVED IN GZ-106 WHICH WAS BORED IN THE LANDFILL WITH A TOTAL VOC CONCENTRATION OF 17 PPM. THE VOC'S OBSERVED INCLUDE: TETRAHYDROFURAN, BENZENE, METHYL ETHYL KETONE (MEK), TOLUENE, XYLENES AND CHLOROBENZENE.

THE PRINCIPAL ROUTE OF OFFSITE MIGRATION OF THESE CONTAMINANTS IS FROM SOIL LEACHING INTO THE GROUNDWATER. BECAUSE SOILS WERE SAMPLED BELOW THE SURFACE, MIGRATION FROM VOLATILIZATION OF CHEMICAL COMPOUNDS AND FROM WIND AND WATER EROSION IS UNLIKELY.

C. SEDIMENTS

SEDIMENT SAMPLES WERE OBTAINED FOR QUANTITATIVE CHEMICAL ANALYSES AT NINE SAMPLING POINTS (APPENDIX A, FIGURE 5). LABORATORY AND FIELD ANALYSES PERFORMED WERE VOCS, PESTICIDES/PCB, METALS AND ACID AND BASE/NEUTRAL EXTRACTABLE COMPOUNDS (ABNS). SEDIMENTS WITH DETECTABLE LIMITS OF CONTAMINANTS WERE OBSERVED WITHIN THE LITTLE RIVER WETLANDS, AND WITHIN THE BERRY'S BROOK WETLAND AND AT A LOCATION DOWNSTREAM IN BERRY'S BROOK.

THE HIGHEST MEASURED TOTAL VOC CONCENTRATION IN A SURFACE SEDIMENT SAMPLE WAS LOCATED IN THE WETLANDS IMMEDIATELY ADJACENT TO THE NORTHWEST CORNER OF THE SITE WHICH IS CONSIDERED PART OF BERRY'S BROOK WETLAND. LEACHATE BREAKOUT AND ERODED SOILS FROM THE TEMPORARY CAP OF THE LANDFILL CAN BE SEEN AT THIS LOCATION. THE PREDOMINANT VOC'S DETECTED WERE ACETONE (300 PPB), ETHYLBENZENE (240 PPB), XYLENE (140 PPB), AND CHLOROBENZENE (89 PPB). THE TOTAL ABN CONCENTRATION WITHIN THIS SEDIMENT SAMPLE WAS LESS THAN 123 PPB. THE METALS DETECTED AT THIS LOCATION INCLUDED ARSENIC (46 PPM), CHROMIUM (57 PPM) AND NICKEL (33 PPM).

D. SURFACE WATER

TWO ROUNDS OF SURFACE WATER SAMPLES WERE TAKEN AT EIGHT SAMPLING STATION LOCATIONS DURING THE RI (APPENDIX A, FIGURE 5). LABORATORY AND FIELD ANALYSES WERE PERFORMED FOR VOCS, PESTICIDES/PBCS, METALS AND ACID AND BASE/NEUTRAL EXTRACTABLE COMPOUNDS (ABN'S).

SURFACE WATERS SAMPLED IN THE VICINITY OF THE COAKLEY LANDFILL INDICATED THE PRESENCE OF VOCS AND ELEVATED LEVELS OF METALS. OVERALL, VOCS WERE DETECTED IN SURFACE WATER SAMPLES AT TWO OF THE EIGHT

LOCATIONS, NAMELY S-10 (BERRY'S BROOK AT BREAKFAST HILL ROAD) AND S-11 (BERRY'S BROOK, AT THE NORTHWEST CORNER OF THE SITE). THESE VOCS, ALSO DETECTED IN THE LANDFILL LEACHATE, CONSIST OF SIX VOCS: TOLUENE, MEK, MIBK, DIETHYL ETHER, TETRAHYDROFURAN, AND ACETONE.

THE HIGHEST TOTAL VOC CONCENTRATIONS WERE OBSERVED IN BERRY'S BROOK, IMMEDIATELY NORTHWEST OF THE COAKLEY LANDFILL (SAMPLE LOCATION S-11), WHERE TOTAL VOCS IN THE RANGE OF 459 PPB WERE DETECTED. DATA FROM THE MARCH 1987 SAMPLING ROUND INDICATE THAT TETRAHYDROFURAN WAS DETECTED AT S-10 AND S-11 AT CONCENTRATIONS OF 12 PPB AND ABOUT 50 PPB, RESPECTIVELY. DATA FROM THE 1984 SAMPLING ROUND INDICATE THAT TOLUENE, ACETONE, TETRAHYDROFURAN, MEK AND MIBK WERE DETECTED AT S-10 AND S-11 AT LESS THAN 10 PPB AND 29 PPB, 89 PPB AND 185 PPB, 11 PPB AND 31 PPB, 130 PPB AND 176 PPB, AND 10 PPB AND 19 PPB, RESPECTIVELY.

SOUTHWEST OF COAKLEY LANDFILL, SURFACE WATER SAMPLES OBTAINED FROM THE LITTLE RIVER (SAMPLE LOCATION S-1) BY NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (NH DES) IN 1983 ALSO INDICATED THE PRESENCE OF SIX VOCS CONSISTING OF TOLUENE, ACETONE, TRICHLOROMETHANE, TRICHLOROETHYLENE, TETRACHLOROETHYLENE, AND TETRACHLOROETHANE, WITH A MAXIMUM OBSERVED TOTAL VOC CONCENTRATION OF 102 PPB.

NUMEROUS METALS AT OR ABOVE ANTICIPATED BACKGROUND LEVELS WERE DETECTED IN SAMPLES OBTAINED AT STATIONS S-10 AND S-11. ELEVATED LEVELS OF ALUMINUM WERE DETECTED IN A SAMPLE OBTAINED FROM STATION S-16 LOCATED APPROXIMATELY 4,000 FEET DOWNSTREAM OF STATION S-10. THE METAL CONTAMINANTS DETECTED INCLUDE IRON, ALUMINUM, BARIUM, MANGANESE AND POTASSIUM. MEASURED MAXIMUM LEVEL OF THESE CONTAMINANTS ARE 100 PPM, 2.1 PPM, 0.23 PPM, 29.7 PPM AND 25 PPM, RESPECTIVELY. INORGANIC PARAMETERS INCLUDED; IRON (100 PPM), MANGANESE (5.8 PPM), COD (40.6 PPM) AND CHLORIDE (185 PPM). SINCE ALUMINUM CONCENTRATIONS WERE HIGH AT STATIONS LOCATED AT HEADWATERS OF LITTLE RIVER (S-7 AND S-17), THESE ELEVATED LEVELS COULD BE FROM NATURALLY HIGH ALUMINUM LEVELS OR AN ALTERNATE SOURCE.

E. GROUNDWATER

OBSERVED CONTAMINANTS IN THE OVERBURDEN HYDROGEOLOGICAL UNIT

GROUNDWATER SAMPLES WERE OBTAINED FROM 23 OVERBURDEN MONITORING WELLS IN THE STUDY AREA (APPENDIX A, FIGURE 6). CONCENTRATIONS OF TOTAL VOCS DETECTED IN SEVEN MONITORING WELLS LOCATED WITHIN AND ALONG THE BORDER OF THE COAKLEY LANDFILL RANGED FROM 600 PPB (MW-1, MW-2) TO 10,000 PPB (MW-3D). COMMONLY OBSERVED VOCS DETECTED IN THESE OVERBURDEN WELLS AND THE OBSERVED CONCENTRATION RANGES DETECTED WERE AS FOLLOWS:

COMPOUND	CONCENTRATION (PPB)
BENZENE	6-60.6
ETHYL BENZENE	18-499
CHLOROBENZENE	LESS THAN 5-182
TOLUENE	21-1200
ACETONE	14-2800
METHYL ETHYL KETONE	17-2700
METHYL ISOBUTYL KETONE	11-1130
TETRAHYDROFURAN	16-1650
DIETHYL ETHER	12-198.8
1,1-DICHLOROETHANE	7.3-20.8
1,2-DICHLOROETHANE	LESS THAN 5-72
1,2-DICHLOROPROPANE	30
TRANS-1,2-DICHLOROETHYLENE	11-16

METALS DETECTED IN THESE SAME SEVEN OVERBURDEN WELLS AND THEIR DETECTED CONCENTRATION RANGES ARE PRESENTED BELOW.

COMPOUND	CONCENTRATION
ALUMINUM	152-337 PPB
BARIUM	243-368 PPB
CHROMIUM	330 PPB
IRON	21,000-280,000 PPB
MANGANESE	2,620-27,000 PPB
NICKEL	122-200 PPB
POTASSIUM	16,000-480,000 PPB
SODIUM	1,000,000-1,460,000 PPB
ARSENIC	10-89 PPB
VANADIUM	23-45 PPB

OBSERVED CONTAMINANTS IN THE BEDROCK HYDROGEOLOGICAL UNIT

GROUNDWATER SAMPLES WERE OBTAINED FROM 37 BEDROCK MONITORING AND BEDROCK DOMESTIC WELLS WITHIN THE STUDY AREA. BEDROCK MONITORING WELLS ARE THOSE INSTALLED OUTSIDE OF THE LANDFILL ITSELF BY EPA AND THE STATE OF NEW HAMPSHIRE. BEDROCK DOMESTIC WELLS ARE ALSO LOCATED OFFSITE AND ARE EITHER CURRENT OR PAST COMMERCIAL AND RESIDENTIAL DRINKING WATER SOURCES. HIGHEST MEASURED TOTAL VOC CONCENTRATIONS WITHIN THE BEDROCK WELLS WERE DETECTED IN SAMPLES OBTAINED FROM MW-5, MW-6 AROUND THE SOUTHERN PERIMETER OF THE LANDFILL AND IN GZ-105 LOCATED APPROXIMATELY 800 FEET OFFSITE IN A WESTERLY DIRECTION. MAXIMUM TOTAL VOC CONCENTRATIONS WERE LESS THAN 2,400 PPB, 97 PPB AND LESS THAN 807 PPB, RESPECTIVELY. INDIVIDUAL COMPOUNDS COMPRISING THE BULK OF THE OBSERVED CONSTITUENTS IN BOTH THE MONITORING AND DOMESTIC BEDROCK WELLS AND THE OBSERVED CONCENTRATION RANGES DETECTED WERE AS FOLLOWS:

COMPOUND	CONCENTRATION
BENZENE	5.2-12.8 PPB
CHLOROETHANE	294 PPB
TOLUENE	125-1,340 PPB
DIETHYL ETHER	180-350 PPB
METHYL ETHYL KETONE	170-407 PPB
METHYL ISOBUTYL KETONE	85-96 PPB
TETRAHYDROFURAN	238-715 PPB
ACETONE	16-437 PPB
XYLENE	21-87 PPB
ETHYL BENZENE	LESS THAN 34 PPB
1,1-DICHLOROETHANE	7-47 PPB

VOCS WERE DETECTED IN BEDROCK DOMESTIC WELLS LOCATED OFFSITE TO THE SOUTHEAST AT LAFAYETTE TERRACE (R-25, R-26 AND R-28). OBSERVED TOTAL VOCS CONCENTRATIONS RANGED FROM NONE DETECTED (R-28) TO LESS THAN 1,445 PPB (R-25). OBSERVED COMPOUNDS IN THESE WELLS WERE SIMILAR TO THOSE OBSERVED WITHIN THE OFFSITE BEDROCK WELLS.

METALS DETECTED IN THE BEDROCK MONITORING AND DOMESTIC WELLS LOCATED THROUGHOUT THE STUDY AREA OF THE COAKLEY LANDFILL AND THE OBSERVED CONCENTRATION RANGES DETECTED WERE AS FOLLOWS:

COMPOUND	CONCENTRATION
ALUMINUM	119-200 PPB
BARIUM	12-269 PPB
IRON	14-140,000 PPB
MANGANESE	100-120,000 PPB
NICKEL	8-65 PPB
POTASSIUM	2500-190,000 PPB
SODIUM	15,000-720,000 PPB
ARSENIC	5-9.6 PPB
VANADIUM	5-49 PPB

MONITORING REPORTS PREVIOUS TO THE RI

GROUNDWATER SAMPLES COLLECTED PRIOR TO THE RI FROM ONSITE MONITORING WELLS IN BEDROCK, OVERBURDEN AND FROM OFFSITE RESIDENTIAL DRINKING WATER SUPPLY WELLS INDICATED THE PRESENCE OF VOCS AND ARE REPORTED IN THE NEW HAMPSHIRE WATER SUPPLY AND POLLUTION CONTROL COMMISSION (NHWS&PCC), "HYDROGEOLOGICAL INVESTIGATION OF THE COAKLEY LANDFILL SITE". TEN VOCS WERE FREQUENTLY DETECTED IN ONSITE AND OFFSITE WELLS, (TOLUENE, MEK, DIETHYL ETHER, TETRAHYDROFURAN, XYLENES, ETHYLBENZENE, DICHLOROBENZENE, BENZENE, 1,1-DICHLOROETHANE AND 1,2-DICHLOROETHYLENE).

F. SUMMARY OF CONTAMINATION AND AFFECTED MEDIA

SAMPLES OF SURFACE WATER, STREAM SEDIMENT, SOIL, GROUNDWATER AND AIR WERE OBTAINED FROM THE STUDY AREA FOR EVALUATION OF POSSIBLE CHEMICAL CONTAMINATION. FIVE BASIC TYPES OF CHEMICAL ANALYSES WERE PERFORMED ON SAMPLES FROM VARIOUS ENVIRONMENTAL MEDIA (EXCLUDING AIR). THESE ANALYSES INCLUDED METHODS FOR THE DETECTION OF VOCS ABNS, METALS, PCBS AND PESTICIDES AND ANALYSES FOR SEVERAL OTHER PARAMETERS CONSIDERED TO BE INDICATORS OF LANDFILL LEACHATE.

IN GENERAL, VOCS AND METALS WERE OBSERVED TO BE THE PREDOMINANT CONTAMINANTS IN THE STUDY AREA. THE HIGHEST CONTAMINANT CONCENTRATIONS WERE TYPICALLY DETECTED WITHIN SAMPLES OBTAINED FROM TEST PITS, SURFACE WATER/SEDIMENT STATIONS, AND MONITORING WELLS LOCATED WITHIN THE COAKLEY LANDFILL OR IN THE PORTION OF THE LITTLE RIVER AND BERRY'S BROOK WETLANDS IMMEDIATELY WEST OF THE LANDFILL. ANALYSES OF ENVIRONMENTAL SAMPLES OBTAINED ELSEWHERE IN THE STUDY AREA TYPICALLY INDICATED SIGNIFICANTLY DIMINISHED

CONTAMINANT LEVELS.

HYDROGEOLOGICAL AND WATER QUALITY DATA INDICATE THAT CONTAMINATED GROUNDWATER HAS MIGRATED RADIALLY FROM THE COAKLEY LANDFILL IN BOTH OVERBURDEN AND BEDROCK HYDROGEOLOGIC UNITS. ALTHOUGH CONTAMINANTS DETECTED WITHIN SAMPLES OBTAINED IN THE SITE STUDY AREA INCLUDE VOCS, ABNS, PCBS, METALS AND INORGANIC; VOCS AND METALS WERE GENERALLY OBSERVED WITH THE GREATEST FREQUENCY AND DISTRIBUTION.

IN GENERAL, VOCS ARE FAIRLY MOBILE IN GROUNDWATER AND CAN EXPECT TO BE TRANSPORTED IN THE NATURAL FLOW OF THE OVERBURDEN AND BEDROCK GROUNDWATER. ALTHOUGH METALS ARE USUALLY CONSIDERED FAIRLY IMMOBILE THEY CAN BECOME DISSOLVED IN THE GROUNDWATER ESPECIALLY WHERE BIOCHEMICAL CHANGES IN WASTE MATERIALS PRODUCE GROSS CHANGES IN GROUNDWATER GEOCHEMISTRY. THEREFORE, METAL CONSTITUENTS IN THE GROUNDWATER BENEATH THE SITE CAN BE TRANSPORTED WITH THE NATURAL FLOW OF THE OVERBURDEN AND BEDROCK GROUNDWATER.

CURRENTLY, THE MAJORITY OF THIS GROUNDWATER CONTAMINATION IS LOCALIZED UNDER THE LANDFILL IN THE OVERBURDEN AND BEDROCK HYDROGEOLOGICAL UNITS. HOWEVER, PRIOR TO THE INTRODUCTION OF PUBLIC WATER, SIGNIFICANT LEVELS OF CONTAMINANTS, PARTICULARLY VOC'S, WERE FOUND IN THE PRIVATE WATER SUPPLY WELLS IN THE VICINITY OF THE COAKLEY LANDFILL AND PARTICULARLY IN THE LAFAYETTE TERRACE AREA. THIS SUGGESTS THAT IF THE PUMPING WELLS FOR PRIVATE WATER SUPPLY WERE REINTRODUCED INTO THIS AREA, CONTAMINANTS WOULD ONCE AGAIN BE DRAWN OUT FROM UNDER THE LANDFILL, POTENTIALLY EXCEEDING SAFE DRINKING WATER STANDARDS.

ALTHOUGH NUMEROUS CONTAMINANTS WERE IDENTIFIED THROUGHOUT THE LANDFILL, NO AREAS WERE IDENTIFIED WHICH COULD BE CONSIDERED "HOT SPOTS" (AREAS OF HIGH CONCENTRATIONS OF CONTAMINANTS) WHERE SPECIAL SOURCE CONTROL MEASURES COULD BE WARRANTED.

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VI. SUMMARY OF SITE RISKS

A RISK ASSESSMENT (RA) WAS PERFORMED TO ESTIMATE THE PROBABILITY AND MAGNITUDE OF POTENTIAL ADVERSE HUMAN HEALTH EFFECTS FROM EXPOSURE TO CONTAMINANTS ASSOCIATED WITH THE SITE. THE PUBLIC HEALTH RISK ASSESSMENT FOLLOWED A FOUR STEP PROCESS; 1) CONTAMINANT IDENTIFICATION, WHICH IDENTIFIED THOSE HAZARDOUS SUBSTANCES WHICH, GIVEN THE SPECIFICS OF THE SITE, WERE OF SIGNIFICANT CONCERN; 2) EXPOSURE ASSESSMENT, WHICH IDENTIFIED ACTUAL OR POTENTIAL EXPOSURE PATHWAYS, CHARACTERIZED THE POTENTIALLY EXPOSED POPULATIONS, AND DETERMINED THE EXTENT OF POSSIBLE EXPOSURE; 3) TOXICITY ASSESSMENT, WHICH CONSIDERED THE TYPES AND MAGNITUDE OF ADVERSE HUMAN EFFECTS ASSOCIATED WITH EXPOSURE TO HAZARDOUS SUBSTANCES, AND 4) RISK CHARACTERIZATION, WHICH INTEGRATED THE THREE EARLIER STEPS TO SUMMARIZE THE POTENTIAL AND ACTUAL RISKS POSED BY HAZARDOUS SUBSTANCES AT THE SITE, INCLUDING CARCINOGENIC AND NONCARCINOGENIC RISKS. THE RESULTS OF THE PUBLIC HEALTH RISK ASSESSMENT FOR THE COAKLEY LANDFILL SITE ARE DISCUSSED BELOW.

SEVENTEEN CONTAMINANTS OF CONCERN, LISTED IN APPENDIX B, TABLES 1 THROUGH 5, WERE SELECTED FOR EVALUATION IN THE RA. THESE CONTAMINANTS CONSTITUTE A REPRESENTATIVE SUBSET OF THE MORE THAN THIRTY-TWO CONTAMINANTS IDENTIFIED AT THE SITE DURING THE REMEDIAL INVESTIGATION. AS SHOWN IN THESE TABLES, THE SEVENTEEN CONTAMINANTS OF CONCERN WERE SELECTED TO REPRESENT POTENTIAL SITE-RELATED HAZARDS BASED ON TOXICITY, CONCENTRATION, FREQUENCY OF DETECTION, AND MOBILITY AND PERSISTENCE IN THE ENVIRONMENT. A SUMMARY OF THE HEALTH EFFECTS OF EACH OF THE CONTAMINANTS OF CONCERN CAN BE FOUND IN SECTION 8, PAGES 8-1 TO 8-18 OF THE RISK ASSESSMENT.

POTENTIAL HUMAN HEALTH EFFECTS ASSOCIATED WITH EXPOSURE TO THE CONTAMINANTS OF CONCERN WERE ESTIMATED QUANTITATIVELY THROUGH THE DEVELOPMENT OF SEVERAL HYPOTHETICAL EXPOSURE PATHWAYS. THESE PATHWAYS WERE DEVELOPED TO REFLECT THE POTENTIAL FOR EXPOSURE TO HAZARDOUS SUBSTANCES BASED ON THE PRESENT USES, POTENTIAL FUTURE USES, AND LOCATION OF THE SITE. THE FOLLOWING IS A BRIEF SUMMARY OF THE EXPOSURE PATHWAYS EVALUATED. A THOROUGH DISCUSSION OF EXPOSURE PATHWAYS AND PARAMETERS CAN BE FOUND IN SECTION 7.3 AND 8.3 OF THE RISK ASSESSMENT. FOR INCIDENTAL INGESTION AND DIRECT CONTACT OF CONTAMINATED SOIL, THE HEALTH RISK WAS EVALUATED FOR A CHILD BETWEEN THE AGES OF FIVE AND 18 YEARS OLD WHO MAY BE EXPOSED TO CONTAMINATED SOILS TEN TIMES PER YEAR FOR 14 YEARS. FOR INGESTION OF GROUNDWATER USED AS A DRINKING WATER SUPPLY, THE HEALTH RISK WAS EVALUATED FOR AN ADULT WHO MAY CONSUME TWO LITERS PER DAY FOR SEVENTY YEARS. FOR INCIDENTAL INGESTION AND DERMAL ABSORPTION OF SURFACE WATER, THE HEALTH RISK WAS EVALUATED FOR A CHILD BETWEEN THE AGES OF FIVE AND 18 YEARS OLD WHO MAY ACCIDENTLY INGEST OR BATHE IN CONTAMINATED SURFACE WATER ONCE EACH YEAR. FOR INCIDENTAL INGESTION AND DERMAL ABSORPTION OF SEDIMENTS, THE HEALTH RISK WAS EVALUATED FOR A CHILD BETWEEN THE AGES OF FIVE AND 18 YEARS OLD WHO MAY ACCIDENTLY INGEST OR COVER HIS OR HER SELF IN CONTAMINATED SEDIMENT ONCE A YEAR. FOR EACH PATHWAY EVALUATED, AN EXPOSURE ESTIMATE WAS GENERATED CORRESPONDING TO EXPOSURE TO THE AVERAGE CONCENTRATION DETECTED IN THAT PARTICULAR MEDIUM.

EXCESS LIFETIME CANCER RISKS WERE DETERMINED FOR EACH EXPOSURE PATHWAY BY MULTIPLYING THE EXPOSURE LEVEL WITH THE CHEMICAL SPECIFIC CANCER POTENCY FACTOR. CANCER POTENCY FACTORS HAVE BEEN DEVELOPED BY EPA FROM EPIDEMIOLOGICAL OR ANIMAL STUDIES TO REFLECT A CONSERVATIVE "UPPER BOUND" OF THE RISK POSED BY

POTENTIALLY CARCINOGENIC COMPOUNDS. THAT IS, THE TRUE RISK IS VERY UNLIKELY TO BE GREATER THAN THE RISK PREDICTED. THE RESULTING RISK ESTIMATES ARE EXPRESSED IN SCIENTIFIC NOTATION AS A PROBABILITY (E.G. 1 X (10-6) FOR 1/1,000,000)) AND INDICATE (USING THIS EXAMPLE), THAT AN INDIVIDUAL IS NOT LIKELY TO HAVE GREATER THAN A ONE IN A MILLION CHANCE OF DEVELOPING CANCER OVER 70 YEARS AS A RESULT OF SITE-RELATED EXPOSURE AS DEFINED TO THE COMPOUND AT THE STATED CONCENTRATION. CURRENT EPA PRACTICE CONSIDERS CARCINOGENIC RISKS TO BE CUMULATIVE WHEN ASSESSING EXPOSURE TO A MIXTURE OF HAZARDOUS SUBSTANCES.

THE HAZARD INDEX WAS ALSO CALCULATED FOR EACH PATHWAY AS EPA'S MEASURE OF THE POTENTIAL FOR NONCARCINOGENIC HEALTH EFFECTS. THE HAZARD INDEX IS CALCULATED BY DIVIDING THE EXPOSURE LEVEL BY THE REFERENCE DOSE (RFD) OR OTHER SUITABLE BENCHMARK FOR NONCARCINOGENIC HEALTH EFFECTS. REFERENCE DOSES HAVE BEEN DEVELOPED BY EPA TO PROTECT SENSITIVE INDIVIDUALS OVER THE COURSE OF A LIFETIME. THEY REFLECT A DAILY EXPOSURE LEVEL THAT IS LIKELY TO BE WITHOUT AN APPRECIABLE RISK OF AN ADVERSE HEALTH EFFECT. RFDS ARE DERIVED FROM EPIDEMIOLOGICAL OR ANIMAL STUDIES AND INCORPORATE UNCERTAINTY FACTORS TO HELP ENSURE THAT ADVERSE HEALTH EFFECTS WILL NOT OCCUR. THE HAZARD INDEX IS OFTEN EXPRESSED AS A SINGLE VALUE (EG 0.3) INDICATING THE RATIO OF THE STATED EXPOSURE AS DEFINED TO THE REFERENCE DOSE VALUE (FOR THIS EXAMPLE OF 0.3, THE EXPOSURE AS CHARACTERIZED IS APPROXIMATELY ONE THIRD OF AN ACCEPTABLE EXPOSURE LEVEL FOR THE GIVEN COMPOUND). THE HAZARD INDEX IS ONLY CONSIDERED CUMULATIVE FOR COMPOUNDS THAT HAVE THE SAME OR SIMILAR TOXIC ENDPOINTS (THE HAZARD INDEX FOR A COMPOUND KNOWN TO PRODUCE LIVER DAMAGE SHOULD NOT BE ADDED TO A SECOND WHOSE TOXIC ENDPOINT IS KIDNEY DAMAGE).

TABLE 6 BELOW, DEPICTS THE CUMULATIVE RISK SUMMARY FOR THE CARCINOGENIC AND NON-CARCINOGENIC CONTAMINANTS OF CONCERN FOR EACH EXPOSURE PATHWAYS ANALYZED. FOR A MORE DETAILED ANALYSIS ON THE RISK FOR EACH CONTAMINANT OF CONCERN, SEE TABLES 79 THROUGH 87 OF THE REMEDIAL INVESTIGATION.

TABLE 6
CUMULATIVE CARCINOGENIC RISK ESTIMATES
AND CUMULATIVE HAZARD INDICES BY EXPOSURE PATHWAY

EXPOSURE PATHWAY	CUMULATIVE EXCESS LIFETIME CANCER RISK MAXIMUM	CUMULATIVE EXCESS LIFETIME CANCER RISK AVERAGE	CUMULATIVE HAZARD INDEX MAXIMUM	CUMULATIVE HAZARD INDEX AVERAGE
INCIDENTAL INGESTION OF SOILS	9 X 10-9		8 X10-5	
DIRECT CONTACT (DC) WITH SOILS	4 X 10-7		3 X10-3	
INGESTION OF GROUNDWATER (GW)	1 X 10-3	2 X 10-4	2 X 10-1	5X10-2
INGESTION OF GW WELL 43		1 X 10-4		1 X 10-1
INGESTION OF GW LAFAYETTE TERRACE		5 X 10-4		2 X10-6
DC WITH SURFACE WATER (SW)		5X10-9		7X10-5
INCIDENTAL INGESTION OF SW		3X10-10		2X10-4
DC WITH SEDIMENT		4X10-8		2X10-1
INCIDENTAL INGESTION OF SEDIMENT		4X10-9		6X10-4

CUMULATIVE POTENTIAL CANCER RISKS ASSOCIATED WITH INCIDENTAL INGESTION AND DIRECT CONTACT WITH ONSITE SOILS, SURFACE WATER, AND SEDIMENTS DID NOT EXCEED EPA'S TARGET CANCER RISK RANGE OF (10-4) TO (10-6). SIMILARLY, CUMULATIVE HAZARD INDICES AS A MEASURE OF THE POTENTIAL FOR NON-CARCINOGENIC EFFECTS FOR EACH OF THE ABOVE EXPOSURE PATHWAYS DID NOT EXCEED UNITY (1.0).

POTENTIAL RISKS ASSOCIATED WITH THE INGESTION OF GROUNDWATER AS A DRINKING WATER SUPPLY WERE ESTIMATED BASED ON DATA FROM OVERBURDEN/BEDROCK MONITORING WELLS AND DOMESTIC WELLS AT LAFAYETTE TERRACE AND DOMESTIC WELL NO. 43. THESE WELLS WERE LOCATED WITHIN THE SAME HYDROGEOLOGIC REGIME (I.E., BETWEEN THE SAME GROUNDWATER DIVIDES). THE CUMULATIVE EXCESS LIFETIME CANCER RISK PREDICTED FOR THE CONSUMPTION OF GROUNDWATER MOVING FROM OVERBURDEN AND BEDROCK MONITORING WELLS EXCEEDED EPA'S TARGET RISK RANGE OF (10-4) TO (10-6). THE PRINCIPLE CONTRIBUTION TO THESE RISK ESTIMATES WAS POSED BY ARSENIC WHOSE MAXIMUM CONCENTRATION 89 UG/L EXCEEDED THE MAXIMUM CONTAMINANT LEVELS OF THE SAFE DRINKING WATER ACT (MCLS) OF 50

UG/L. ARSENIC WAS ALSO THE MAJOR CONTRIBUTOR TO POSSIBLE CANCER RISKS FOR THE INGESTION OF GROUNDWATER FROM MONITORING WELLS IN THE VICINITY OF WELL 43 AND MONITORING WELLS IN THE VICINITY OF LAFAYETTE TERRACE. PREDICTED CANCER RISK FOR CONSUMPTION OF GROUNDWATER FROM MONITORING WELLS IN THE VICINITY OF LAFAYETTE TERRACE ALSO EXCEEDED THE (10-4) TO (10-6) CANCER RISK RANGE.

THE CUMULATIVE HAZARD INDICES FOR EACH OF THE GROUNDWATER PATHWAYS EVALUATED WERE LESS THAN ONE INDICATING THAT THE POTENTIAL FOR NON-CANCER HEALTH EFFECTS RESULTING FROM EXPOSURE TO CONTAMINANTS IN GROUNDWATER IS UNLIKELY.

RISKS FROM THE AIR PATHWAY OF EXPOSURE WERE NOT QUANTIFIED BECAUSE OBSERVED CONTAMINANT LEVELS WERE FOUND TO BE LESS THAN THE OCCUPATIONAL THRESHOLD LIMIT VALUE (TLV) ADJUSTED TO ACCOUNT FOR CONTINUOUS EXPOSURE.

BASED ON THE FINDINGS IN THE BASE LINE RISK ASSESSMENT, EPA HAS CONCLUDED THAT THE RISKS POSED BY THE INGESTION OF GROUNDWATER EXCEED THE ACCEPTABLE RISK RANGE (10-4) TO (10-6). THE PRINCIPLE CONTRIBUTION TO THE CARCINOGENIC GROUNDWATER RISK WAS POSED BY ARSENIC. IN ADDITION, MAXIMUM CONCENTRATIONS OF THE FOLLOWING COMPOUNDS EXCEED THEIR RESPECTIVE MCLS, STATE DRINKING WATER STANDARDS OR HEALTH ADVISORIES: ARSENIC, BENZENE, CHLOROBENZENE, CHROMIUM, 1,2-DICHLOROETHYLENE, NICKEL, 2-BUTANONE, AND TETRACHLOROETHYLENE. CONSEQUENTLY, THE CLEANUP AT THE COAKLEY LANDFILL SITE WILL BE BASED ON PROTECTION OF THE GROUNDWATER BEYOND THE COMPLIANCE BOUNDARY AS A FUTURE DRINKING WATER SUPPLY. ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES IN GROUNDWATER FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THIS ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT.

#DNSC

VII. DOCUMENTATION OF NO SIGNIFICANT CHANGES

EPA PRESENTED A PROPOSED PLAN (PREFERRED ALTERNATIVE) FOR REMEDIATION OF THE SITE ON MARCH 2, 1990. THE SOURCE CONTROL PREFERRED ALTERNATIVE INCLUDED:

1. CONSOLIDATION OF SEDIMENTS IN THE WETLANDS;
2. CONSOLIDATION OF SOLID WASTE;
3. CAPPING OF THE LANDFILL;
4. COLLECTION AND TREATMENT OF LANDFILL GASES;
5. GROUNDWATER EXTRACTION AND TREATMENT;
6. LONG-TERM ENVIRONMENTAL MONITORING; AND
7. INSTITUTIONAL CONTROLS WHERE POSSIBLE.

NO SIGNIFICANT CHANGES FROM THE PROPOSED PLAN BRIEFLY DESCRIBED ABOVE HAVE BEEN MADE TO THE SELECTED REMEDY AS DETAILED IN THE RECORD OF DECISION. HOWEVER, AT THE TIME OF THE ISSUANCE OF THE PROPOSED PLAN, EPA HAD NOT SPECIFICALLY IDENTIFIED THE CONSTRUCTION OF A FENCE AROUND THE SITE. THE CHAIN LINK FENCE WAS IDENTIFIED AS PART OF THE REMEDY IN THE FS AND THE COSTS ASSOCIATED WERE INCLUDED IN THE COST ESTIMATE IN THE FS AND PROPOSED PLAN.

THE CLEANUP LEVEL FOR ARSENIC HAS BEEN REVISED TO 50 UG/L FROM 30 UG/L TO REFLECT CONSISTENCY WITH MCLS SET FORTH IN THE SAFE DRINKING WATER ACT. THIS REVISION REMAINS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND DOES NOT IMPACT THE SELECTION OF THE REMEDY. THE GROUNDWATER EXTRACTION AND TREATMENT COMPONENT OF THE REMEDY REMAINS NECESSARY SINCE LEVELS OF ARSENIC DETECTED AT THE COMPLIANCE BOUNDARY EXCEED 50 UG/L.

AS STATED IN THE PROPOSED PLAN, THE PREFERRED ALTERNATIVE DOES NOT INCLUDE ANY ACTION INVOLVING REMEDIATION OF THE OILY DEBRIS AREA IDENTIFIED AT THE SITE (APPENDIX A, FIGURE 2). HOWEVER, COSTS FOR REMEDIATING THIS DEBRIS WERE INCLUDED IN THE TOTAL COST FOR EACH ALTERNATIVE IN BOTH THE FEASIBILITY STUDY AND THE PROPOSED PLAN. THESE AMOUNTS HAVE BEEN DEDUCTED IN THIS ROD. FOR ALTERNATIVES SC-3 AND SC-4, THE TOTAL COST REMAINS THE SAME AFTER ROUNDING THE FIGURES. FOR SC-5 THE COST IS REDUCED BY $800,000; FOR SC-6 THE COST IS REDUCED BY $500,000. GIVEN THE OVERALL COST OF EACH ALTERNATIVE, THESE AMOUNTS WERE INSIGNIFICANT TO THE REMEDY SELECTION PROCESS.

THE FOLLOWING IS PRESENTED AS A POINT OF CLARIFICATION. IN THE PROPOSED PLAN EPA IDENTIFIED APPROXIMATELY 2000 CUBIC YARDS OF "CONTAMINATED" SEDIMENTS LOCATED IN THE WETLANDS ADJACENT TO THE NORTHWEST SIDE OF THE LANDFILL. THE RI IDENTIFIED AN AREA OF WETLANDS ADJACENT TO THE NORTHWEST CORNER OF THE SITE AS NEEDING REMEDIATION DUE TO LANDFILL OPERATIONS AND LANDFILL TEMPORARY CAP EROSION, WHICH CAUSED SUBSEQUENT FILLING AND SEDIMENTATION IN THE WETLANDS. SEDIMENTS IN THE WETLAND, ESTIMATED TO BE APPROXIMATELY 2,000 CUBIC YARDS, WOULD NEED TO BE EXCAVATED AND REDEPOSITED IN THE EXISTING LANDFILL AREA TO RESTORE THE WETLANDS TO ITS BENEFICIAL USE.

ALTHOUGH RESULTS FROM A SEDIMENT SAMPLE TAKEN DURING THE RI DID NOT EXCEED THE CLEANUP LEVEL DISCUSSED ABOVE, THIS ACTION IS JUSTIFIED ON THE BASIS OF RESTORING THE WETLANDS WHICH WERE FILLED AS A RESULT OF THE LANDFILL OPERATION AND TEMPORARY CAP EROSION. DURING EXCAVATION AND RESTORATION, APPROPRIATE STEPS WILL BE TAKEN SUCH AS USING CLEAN AND APPROPRIATE FILL AND INSTALLING SILT BARRIERS TO PREVENT DAMAGE TO THE WETLANDS DOWNSTREAM OF THE WORK AREA. SEDIMENT SAMPLES WILL BE TAKEN IN AND AROUND THE PERIMETER OF THE EXCAVATED AREA TO CONFIRM THAT THE REMAINING SEDIMENTS IN THE WETLAND ARE BELOW CLEANUP LEVELS. TO PROMOTE WETLAND REVEGETATION, SOILS SIMILAR TO THOSE OF THE NATURAL WETLANDS WILL BE USED, AND SEDGES AND OTHER SPECIES WILL BE PLANTED.

#DSA

VIII. DEVELOPMENT AND SCREENING OF ALTERNATIVES

A. STATUTORY REQUIREMENTS/RESPONSE OBJECTIVES

UNDER ITS LEGAL AUTHORITIES, EPA'S PRIMARY RESPONSIBILITY AT SUPERFUND SITES IS TO UNDERTAKE REMEDIAL ACTIONS THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. IN ADDITION, SECTION 121 OF COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT OF 1980, (AS AMENDED BY SUPERFUND AND REAUTHORIZATION ACT OF 1986) (CERCLA) ESTABLISHES SEVERAL OTHER STATUTORY REQUIREMENTS AND PREFERENCES, INCLUDING: A REQUIREMENT THAT EPA'S REMEDIAL ACTION, WHEN COMPLETE, MUST COMPLY WITH ALL FEDERAL AND MORE STRINGENT STATE ENVIRONMENTAL STANDARDS, REQUIREMENTS, CRITERIA OR LIMITATIONS, UNLESS A WAIVER IS INVOKED; A REQUIREMENT THAT EPA SELECT A REMEDIAL ACTION THAT IS COST EFFECTIVE AND THAT UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE; AND A PREFERENCE FOR REMEDIES IN WHICH TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE VOLUME, TOXICITY OR MOBILITY OF THE HAZARDOUS SUBSTANCES IS A PRINCIPAL ELEMENT OVER REMEDIES NOT INVOLVING SUCH TREATMENT. RESPONSE ALTERNATIVES WERE DEVELOPED TO BE CONSISTENT WITH THESE CONGRESSIONAL MANDATES.

BASED ON PRELIMINARY INFORMATION RELATING TO TYPES OF CONTAMINANTS, ENVIRONMENTAL MEDIA OF CONCERN, PRIOR AND POTENTIAL USE AS A DRINKING WATER SOURCE AND POTENTIAL EXPOSURE PATHWAYS, REMEDIAL ACTION OBJECTIVES WERE DEVELOPED TO AID IN THE DEVELOPMENT AND SCREENING OF ALTERNATIVES. THESE REMEDIAL ACTION OBJECTIVES WERE DEVELOPED TO MITIGATE EXISTING AND FUTURE POTENTIAL THREATS TO PUBLIC HEALTH AND THE ENVIRONMENT. THESE RESPONSE OBJECTIVES WERE:

1. PREVENT INGESTION OF GROUNDWATER CONTAINING CONTAMINATION IN EXCESS OF FEDERAL AND STATE DRINKING WATER STANDARDS OR CRITERIA, OR THAT POSES A THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT.

2. PREVENT THE PUBLIC FROM DIRECT CONTACT WITH CONTAMINATED SOILS, SEDIMENTS, SOLID WASTE AND SURFACE WATER WHICH MAY PRESENT A HEALTH RISK.

3. ELIMINATE OR MINIMIZE THE MIGRATION OF CONTAMINANTS FROM THE SOIL INTO GROUNDWATER.

4. PREVENT THE OFFSITE MIGRATION OF CONTAMINANTS ABOVE LEVELS PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT.

5. RESTORE GROUNDWATER, SURFACE WATER, SOILS AND SEDIMENTS TO THE LEVELS WHICH ARE PROTECTIVE OF THE PUBLIC HEALTH AND THE ENVIRONMENT.

B. TECHNOLOGY AND ALTERNATIVE DEVELOPMENT AND SCREENING

CERCLA AND THE NATIONAL OIL AND HAZARDOUS SUBSTANCES POLLUTION CONTINGENCY PLAN (NCP) SET FORTH THE PROCESS BY WHICH REMEDIAL ACTIONS ARE EVALUATED AND SELECTED. IN ACCORDANCE WITH THESE REQUIREMENTS, A RANGE OF ALTERNATIVES WAS DEVELOPED FOR THE SITE.

WITH RESPECT TO SOURCE CONTROL, WHICH INCLUDES THE GROUNDWATER UNDER THE LANDFILL, THE RI/FS DEVELOPED A RANGE OF ALTERNATIVES IN WHICH TREATMENT THAT REDUCES THE TOXICITY, MOBILITY, OR VOLUME OF THE HAZARDOUS SUBSTANCES IS A PRINCIPAL ELEMENT. THIS RANGE INCLUDED AN ALTERNATIVE THAT REMOVES OR DESTROYS HAZARDOUS SUBSTANCES TO THE MAXIMUM EXTENT FEASIBLE, ELIMINATING OR MINIMIZING TO THE DEGREE POSSIBLE THE NEED FOR LONG TERM MANAGEMENT. THIS RANGE ALSO INCLUDED ALTERNATIVES THAT TREAT THE PRINCIPAL THREATS POSED BY THE SITE BUT VARY IN THE DEGREE OF TREATMENT EMPLOYED AND THE QUANTITIES AND CHARACTERISTICS OF THE TREATMENT RESIDUALS AND UNTREATED WASTE THAT MUST BE MANAGED; ALTERNATIVE(S) THAT INVOLVE LITTLE OR NO TREATMENT BUT PROVIDE PROTECTION THROUGH ENGINEERING OR INSTITUTIONAL CONTROLS; AND A NO ACTION ALTERNATIVE.

SECTION 2 OF THE FEASIBILITY STUDY (FS) IDENTIFIED, ASSESSED AND SCREENED TECHNOLOGIES BASED ON IMPLEMENTABILITY, EFFECTIVENESS, AND COST. THESE TECHNOLOGIES WERE COMBINED INTO SOURCE CONTROL (SC) AND

MANAGEMENT OF MIGRATION (MM) ALTERNATIVES. SECTION 3 OF THE FS PRESENTED THE REMEDIAL ALTERNATIVES DEVELOPED BY COMBINING THE TECHNOLOGIES IDENTIFIED IN THE PREVIOUS SCREENING PROCESS IN THE CATEGORIES IDENTIFIED IN SECTION 300.430(E) (3) OF THE NCP. THE PURPOSE OF THE INITIAL SCREENING WAS TO NARROW THE NUMBER OF POTENTIAL REMEDIAL ACTIONS FOR FURTHER DETAILED ANALYSIS WHILE PRESERVING A RANGE OF OPTIONS. EACH ALTERNATIVE WAS THEN EVALUATED AND SCREENED IN SECTION 4 OF THE FS.

IN SUMMARY, OF THE APPROXIMATELY 17 SOURCE CONTROL REMEDIAL ALTERNATIVES SCREENED IN SECTION 2, FIVE WERE RETAINED FOR DETAILED ANALYSIS. FIGURE 3-1 IN SECTION 3 OF THE FEASIBILITY STUDY IDENTIFIES THE FIVE ALTERNATIVES THAT WERE RETAINED THROUGH THE SCREENING PROCESS, AS WELL AS THOSE THAT WERE ELIMINATED FROM FURTHER CONSIDERATION. MANAGEMENT OF MIGRATION ALTERNATIVES, ALTHOUGH EVALUATED IN THE FS, WILL BE REEVALUATED PENDING FURTHER STUDIES OF OFFSITE GROUNDWATER MIGRATION.

#DA

IX. DESCRIPTION OF ALTERNATIVES

THIS SECTION PRESENTS A NARRATIVE SUMMARY OF EACH ALTERNATIVE EVALUATED. A DETAILED TABULAR ASSESSMENT OF EACH ALTERNATIVE CAN BE FOUND IN TABLE 3-1 IN SECTION 3 OF THE FEASIBILITY STUDY.

A. SOURCE CONTROL (SC) ALTERNATIVES ANALYZED

THE SOURCE CONTROL ALTERNATIVES ANALYZED FOR THE SITE INCLUDE THE FOLLOWING ALTERNATIVES:

SC-1: NO-ACTION ALTERNATIVE;

SC-3: CAPPING INCLUDING CONSOLIDATION (NO GROUNDWATER TREATMENT);

SC-4: CAPPING/ONSITE GROUNDWATER TREATMENT;

SC-5: CAPPING/ONSITE GROUNDWATER PRETREATMENT AND OFFSITE TREATMENT AND DISPOSAL; AND

SC-6: ONSITE SOLID WASTE/GROUNDWATER TREATMENT AND DISPOSAL/CAPPING.

SC-1
NO-ACTION

THIS ALTERNATIVE IS INCLUDED IN THE FEASIBILITY STUDY (FS), AS REQUIRED BY CERCLA, TO SERVE AS A BASIS FOR COMPARISON WITH THE OTHER SOURCE CONTROL ALTERNATIVES BEING CONSIDERED.

THIS SOURCE CONTROL ALTERNATIVE WOULD INVOLVE NO REMEDIAL ACTION ON THE CONTAMINATED SOIL, SOLID WASTE OR GROUNDWATER. HOWEVER, THE NO-ACTION ALTERNATIVE WOULD ENTAIL SOME ACTIVITY IN ORDER TO PROVIDE MINIMAL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. A CHAIN-LINK FENCE WOULD BE INSTALLED AROUND THE LANDFILL AREA TO PREVENT ALL NON-AUTHORIZED PERSONNEL FROM ENTERING THE SITE. INSTITUTIONAL CONTROLS WOULD BE ESTABLISHED IN ORDER TO RESTRICT FUTURE LAND USE. THE LANDFILL WOULD BE LOAMED AND SEEDED TO CONTROL DUST AND EROSION FROM WIND AND RAIN. A LONG TERM MONITORING PROGRAM WOULD BE INSTITUTED THAT WOULD INVOLVE PERIODIC COLLECTION OF AIR, SURFACE WATER AND GROUNDWATER SAMPLES TO EVALUATE POTENTIAL EXPOSURE ROUTES.

THIS ALTERNATIVE DOES NOT MEET ANY IDENTIFIED ARARS, PARTICULARLY SINCE MCLS ARE ALREADY EXCEEDED AT THE SITE.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 MONTHS
ESTIMATED TIME FOR OPERATION:	30 YEARS
ESTIMATED CAPITAL COST:	$ 820,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 1,300,000
ESTIMATED TOTAL COST (PRESENT WORTH):	$ 2,120,000

SC-3
CAPPING INCLUDING CONSOLIDATION

THIS ALTERNATIVE INVOLVES CONSOLIDATING APPROXIMATELY 2000 CUBIC YARDS OF ERODED SEDIMENT IN THE WETLAND UNDER A NEW MULTI-LAYER CAP TO BE INSTALLED ON THE LANDFILL. ADDITIONALLY, APPROXIMATELY 30,000 CUBIC YARDS OF MATERIAL FROM THE EAST, WEST AND SOUTH SIDES OF THE LANDFILL WOULD BE EXCAVATED TO REDUCE THE AREA NEEDING TO BE COVERED BY THE CAP (APPENDIX A, FIGURES 7 AND 8). THE EXCAVATED MATERIAL WOULD THEN BE MIXED WITH SAND AS NEEDED AND USED IN THE CAP CONSTRUCTION. EMISSIONS CREATED BY EXCAVATION WILL BE MINIMIZED BY WETTING DOWN THE SOIL WITH WATER OR FOAM. AIR MONITORING WILL ENSURE COMPLIANCE WITH EMISSION STANDARDS.

THE MULTI-LAYER CAP SYSTEM WILL BE CONSTRUCTED OVER THE LANDFILL AND WILL INCLUDE A VEGETATIVE LAYER, A DRAINAGE LAYER AND IMPERMEABLE BARRIER (LOW PERMEABILITY BARRIER OF CLAY OR SYNTHETIC LINER MATERIAL). THE CAP WILL REDUCE THE POTENTIAL FOR DIRECT CONTACT WITH THE CONTAMINATED MATERIALS ONSITE AND WILL CONTROL FURTHER MIGRATION OF CONTAMINANTS BY REDUCING PRECIPITATION COULD FILTERING THROUGH AND AWAY FROM THE SITE. THIS CAP WILL CONFORM WITH STATE AND RCRA SOLID WASTE REQUIREMENTS. A TYPICAL CAP CONSTRUCTION DIAGRAM CAN BE FOUND AS APPENDIX A, FIGURE 9. A CHAIN-LINK FENCE WOULD BE INSTALLED AROUND THE LANDFILL AREA TO PREVENT ACCESS TO ALL NON-AUTHORIZED PERSONNEL. A GAS COLLECTION AND TREATMENT SYSTEM WOULD ALSO BE INSTALLED TO COLLECT THE GASES COMING OFF THE LANDFILL. THESE GASES WOULD BE TREATED ONSITE BY A THERMAL DESTRUCTION PROCESS SUCH AS INCINERATION. A LONG TERM MONITORING PROGRAM WOULD BE INSTITUTED INVOLVING PERIODIC COLLECTION OF AIR, SURFACE WATER AND GROUNDWATER SAMPLES TO EVALUATE POTENTIAL EXPOSURE ROUTES.

BECAUSE THIS ALTERNATIVE DOES NOT INCLUDE A GROUNDWATER TREATMENT SYSTEM, IT WILL NOT MEET MCLS AND OTHER GROUNDWATER STANDARDS.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	9 MONTHS
ESTIMATED TIME FOR OPERATION:	30 YEARS
ESTIMATED CAPITAL COSTS:	$ 8,800,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 2,400,000
ESTIMATED TOTAL COST (NET PRESENT WORTH):	$ 11,200,000

SC-4
CAPPING/ONSITE GROUNDWATER TREATMENT

THIS ALTERNATIVE INVOLVES CONSOLIDATION OF THE SOLID WASTE FOLLOWED BY CAPPING THE LANDFILL AND EXTRACTING AND TREATING ONSITE GROUNDWATER. THE TREATED GROUNDWATER WOULD EITHER BE RECHARGED INTO THE AQUIFER AND/OR DISCHARGED TO ONSITE SURFACE WATER. RECHARGE TRENCHES WILL BE INSTALLED TO ALLEVIATE DRAINING THE WETLANDS. THE CAP WOULD BE SIMILAR TO THE ONE DESCRIBED IN ALTERNATIVE SC-3. THIS ALTERNATIVE WOULD ALSO BE SIMILAR TO SC-3 IN THAT IT INCLUDES FENCING, EXCAVATING 30,000 CUBIC YARDS OF MATERIAL FROM THE LANDFILL, 2,000 CUBIC YARDS FROM THE WETLANDS AND INSTALLING A GAS COLLECTION AND TREATMENT SYSTEM.

THE GROUNDWATER EXTRACTION SYSTEM WOULD CONSIST OF SEVERAL OVERBURDEN AND BEDROCK WELLS LOCATED ALONG THE SOUTHERN AND EASTERN PERIMETERS OF THE LANDFILL AND A DRAINAGE SYSTEM AROUND THE PERIMETER OF THE LANDFILL. RECHARGE TRENCHES WILL BE LOCATED ON THE TOE OF THE SLOPE ON THE NORTHWEST AND WESTERLY EDGES OF THE LANDFILL ADJACENT TO THE WETLANDS. GROUNDWATER WOULD BE TREATED ONSITE TO REMOVE METALS, VOCS AND BIOLOGICAL OXYGEN DEMAND (BOD) AND AMMONIA THROUGH A SERIES OF TECHNOLOGIES INVOLVING CHEMICAL, PHYSICAL AND BIOLOGICAL PROCESSES TO COMPLY WITH FEDERAL AND STATE DRINKING WATER AND DISCHARGE STANDARDS. THE EXACT TREATMENT WILL BE DETERMINED DURING THE DESIGN PHASE AFTER ADDITIONAL STUDIES. A CONCEPTUAL TREATMENT PROCESS DIAGRAM IS SHOWN IN APPENDIX A, FIGURE 10. THE PROCESSES ARE SUMMARIZED BELOW.

- CHEMICAL PROCESS: METALS REMOVED BY ADDING LIME OR CAUSTIC TO FORM A SLUDGE FOR OFFSITE DISPOSAL
- PHYSICAL PROCESS: VOCS REMOVED BY AIR STRIPPING. OFF-GASES REMOVED BY INCINERATION OR ACTIVATED CARBON FILTRATION.
- BIOLOGICAL PROCESS: BOD, AMMONIA AND REMAINING VOCS REMOVED BY ROTATING BIOLOGICAL CONTACTORS (RBC) OR ACTIVATED CARBON FILTRATION TO MEET DISCHARGE REQUIREMENTS.

A LONG TERM MONITORING PROGRAM WOULD BE INSTITUTED INVOLVING PERIODIC COLLECTION OF AIR, SURFACE WATER AND GROUNDWATER SAMPLES TO EVALUATE POTENTIAL EXPOSURE ROUTES.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 YEARS
ESTIMATED TIME FOR OPERATIONS:	10 YEARS GROUNDWATER EXTRACTION AND TREATMENT; 30 YEARS FOR CAP MAINTENANCE AND MONITORING.
ESTIMATED CAPITAL COST:	$ 12,800,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH):	$ 7,400,000
ESTIMATED TOTAL COST (NET PRESENT WORTH):	$ 20,200,000

SC-5

CAPPING/ONSITE GROUNDWATER PRETREATMENT AND OFFSITE TREATMENT AND DISPOSAL.

THIS ALTERNATIVE INVOLVES CAPPING OF THE LANDFILL AND GROUNDWATER COLLECTION FOLLOWED BY ONSITE PRETREATMENT AND OFFSITE DISPOSAL. FENCING, CAPPING AND GROUNDWATER COLLECTION WOULD BE ACCOMPLISHED AS DESCRIBED IN ALTERNATIVES SC-3 AND SC-4.

GROUNDWATER WOULD BE PUMPED TO PUBLICLY OWNED TREATMENT WORKS (POTW). ONSITE PRETREATMENT WOULD OCCUR TO MEET MUNICIPAL REQUIREMENTS. SUBSEQUENT TREATMENT WOULD OCCUR AT THE MUNICIPAL PLANT IN THE TOWN OF HAMPTON. THE EXTENT OF PRETREATMENT COULD INCLUDE METALS REMOVAL BY PRECIPITATION AND/OR VOC REMOVAL BY AIR STRIPPING AS DISCUSSED FOR THE PREVIOUS ALTERNATIVE (SC-4). TO IMPLEMENT OFFSITE TREATMENT AND DISPOSAL OF GROUNDWATER, A PUMPING STATION AND A NEW SEWER MAIN EXTENDING ALONG US ROUTE 1 TO JUST SOUTH OF THE HAMPTON-NORTH HAMPTON TOWN LINE WOULD BE CONSTRUCTED.

A LONG TERM MONITORING PROGRAM WOULD BE INSTITUTED INVOLVING PERIODIC COLLECTION OF AIR, SURFACE WATER AND GROUNDWATER SAMPLES TO EVALUATE POTENTIAL EXPOSURE ROUTES.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 YEARS
ESTIMATED TIME FOR OPERATION:	10 YEARS FOR GROUNDWATER EXTRACTION; 30 YEARS FOR CAP MAINTENANCE AND MONITORING.
ESTIMATED CAPITAL COST:	$ 13,200,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH)	$ 5,700,000
ESTIMATED TOTAL COST	$ 18,900,000

SC-6

ONSITE SOLID WASTE/GROUNDWATER TREATMENT AND DISPOSAL/CAPPING

THIS ALTERNATIVE INVOLVES EXCAVATION OF THE ENTIRE LANDFILL AND TREATMENT OF CONTAMINATED WASTES AND SOLIDS BY INCINERATION AND/OR SOLIDIFICATION. EMISSIONS CREATED BY THE EXTENSIVE EXCAVATION WILL BE MINIMIZED BY WETTING DOWN THE SOIL WITH WATER OR FOAM. FENCING, REGRADING AND CAPPING OF THE LANDFILL AREA AS IN ALTERNATIVE SC-3, AS WELL AS COLLECTION AND TREATMENT OF THE GROUNDWATER UNDERLYING THE SITE AS IN ALTERNATIVE SC-4 WOULD ALSO BE REQUIRED. SAMPLES OF SOILS AND SOLID WASTE IN THE LANDFILL WOULD BE COLLECTED AND ANALYZED TO DETERMINE WHICH AREAS SHOULD BE REMOVED FOR SOLIDIFICATION AND/OR INCINERATION TO ACHIEVE THE DESIRED CLEANUP GOALS. MATERIAL CONTAINING HIGH LEVELS OF ORGANIC COMPOUNDS WOULD BE INCINERATED ONSITE THROUGH THE USE OF A MOBILE INCINERATOR. EMISSIONS WOULD BE DIRECTLY MONITORED TO EVALUATE INCINERATOR PERFORMANCE.

MATERIAL CONTAINING HIGH LEVELS OF METALS, WHICH COULD INCLUDE THE INCINERATOR ASH, WOULD BE SOLIDIFIED AND PLACED BACK INTO THE LANDFILL ALONG WITH THE MATERIALS THAT MEET CLEANUP GOALS. SOLIDIFICATION OF METALS WOULD BE ACHIEVED BY MIXING THE WASTE WITH A LIME OR CONCRETE BASED MATERIAL THAT SETS INTO AN EASILY HANDLED SOLID PRODUCT WITH REDUCED PERMEABILITY. INCINERATOR ASH CONTAINING METALS AT LEVELS THAT COULD LEACH INTO THE GROUNDWATER WOULD ALSO BE SOLIDIFIED AND PLACED IN THE LANDFILL.

A LONG TERM MONITORING PROGRAM WOULD BE INSTITUTED INVOLVING PERIODIC COLLECTION OF AIR, SURFACE WATER AND GROUNDWATER SAMPLES TO EVALUATE POTENTIAL EXPOSURE ROUTES.

ESTIMATED TIME FOR DESIGN AND CONSTRUCTION:	2 YEARS
ESTIMATED TIME FOR OPERATION:	SOLID WASTE EXCAVATION AND TREATMENT, 20 MONTHS; GROUNDWATER, 10 YEARS; CAP MAINTENANCE AND MONITORING, 30 YEARS.
ESTIMATED CAPITAL COST:	$ 45,300,000
ESTIMATED OPERATION AND MAINTENANCE (PRESENT WORTH)	$ 8,600,000
ESTIMATED TOTAL COST (NET PRESENT WORTH)	$ 53,900,000

B. MANAGEMENT OF MIGRATION (MM) ALTERNATIVES

THE FEASIBILITY STUDY (FS) ANALYZED MANAGEMENT OF MIGRATION ALTERNATIVES TO CLEANUP THE CONTAMINANTS THAT MIGRATED OFFSITE. HOWEVER, EPA BELIEVES THAT INSUFFICIENT DATA EXIST TO PROPERLY CHARACTERIZE THE EXTENT AND CHEMICAL MAKEUP OF THE OFFSITE GROUNDWATER. ADDITIONALLY, SINCE THE PLUME IS PRIMARILY IN OR UNDER A MAJOR WETLAND, THE IMPLEMENTATION OF A CONVENTIONAL GROUNDWATER EXTRACTION SYSTEM WOULD BE EXTREMELY DIFFICULT, VERY COSTLY AND COULD RESULT IN EXTENSIVE AND IRREVERSIBLE DAMAGE TO THE WETLAND. THE EXISTENCE OF A CONTAMINANT PLUME IN THE BEDROCK AQUIFER WILL FURTHER COMPLICATE ANY CLEANUP EFFORT FOR THE OFFSITE GROUND.

AS PART OF THE IMPLEMENTATION OF THE SOURCE CONTROL REMEDY, EPA PROPOSES TO EXPAND THE OFFSITE GROUNDWATER MONITORING SYSTEM AND UNDERTAKE AN INVESTIGATION TO BETTER CHARACTERIZE THE NATURE AND EXTENT OF CONTAMINATION IN THE OFFSITE GROUNDWATER. THE INVESTIGATION WILL ALSO INCLUDE AN EVALUATION OF POSSIBLE REMEDIATION TECHNOLOGIES AND THEIR IMPACT ON THE WETLANDS. AN ENVIRONMENTAL ASSESSMENT WILL ALSO BE PERFORMED. EPA WILL DESIGN THE ONSITE REMEDY TO CAPTURE AS MUCH AS PRACTICABLE OF THE CONTAMINATION THAT HAS ALREADY MIGRATED FROM THE LANDFILL.

THE EXPANDED MONITORING PROGRAM, WHICH INCLUDES MONITORING RESIDENTIAL WELLS IN THE COAKLEY LANDFILL AREA, AND THE GROUNDWATER INVESTIGATION OF THE OFFSITE CONTAMINATION WILL BE ONE OF THE FIRST ACTIONS TAKEN AS PART OF THE COAKLEY LANDFILL REMEDIATION. THE INVESTIGATION WILL CONTINUE UNTIL SUFFICIENT DATA IS OBTAINED FOR EPA TO MAKE A DECISION REGARDING THE REMEDIATION OF OFFSITE GROUNDWATER. THAT DECISION WILL BE INCORPORATED IN A SECOND RECORD OF DECISION (ROD).

INSTALLING A WELL-DESIGNED SOURCE CONTROL REMEDY AT THE PRESENT TIME WILL MINIMIZE OFFSITE MIGRATION OF CONTAMINANTS. ACCORDINGLY, A LESS EXTENSIVE MANAGEMENT OF MIGRATION REMEDY WILL BE NECESSARY IN THE FUTURE. AN EFFECTIVE SOURCE CONTROL REMEDY WILL RESULT IN LOWER COSTS AND LESS TIME TO ACHIEVE OFFSITE GROUNDWATER CLEANUP GOALS.

#SCAA
X. SUMMARY OF THE COMPARATIVE ANALYSIS OF ALTERNATIVES

SECTION 121(B)(1) OF CERCLA PRESENTS SEVERAL FACTORS THAT AT A MINIMUM EPA IS REQUIRED TO CONSIDER IN ITS ASSESSMENT OF ALTERNATIVES. BUILDING UPON THESE SPECIFIC STATUTORY MANDATES, THE NCP ARTICULATES NINE EVALUATION CRITERIA TO BE USED IN ASSESSING THE INDIVIDUAL REMEDIAL ALTERNATIVES.

A DETAILED ANALYSIS WAS PERFORMED ON THE FIVE ALTERNATIVES USING THE NINE EVALUATION CRITERIA IN ORDER TO SELECT A SITE REMEDY. THE FOLLOWING IS A SUMMARY OF THE COMPARISON OF EACH ALTERNATIVE'S STRENGTH AND WEAKNESS WITH RESPECT TO THE NINE EVALUATION CRITERIA. THESE CRITERIA AND THEIR DEFINITIONS ARE AS FOLLOWS:

THRESHOLD CRITERIA

AN ALTERNATIVE MUST MEET THE TWO THRESHOLD CRITERIA DESCRIBED BELOW IN ORDER TO BE ELIGIBLE FOR SELECTION IN ACCORDANCE WITH THE NCP.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE 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.

2. COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) ADDRESSES WHETHER OR NOT A REMEDY MEETS ALL ARARS OR OTHER FEDERAL AND STATE ENVIRONMENTAL LAWS AND/OR PROVIDES GROUNDS FOR INVOKING A WAIVER.

PRIMARY BALANCING CRITERIA

THE FOLLOWING FIVE CRITERIA ARE USED TO COMPARE AND EVALUATE ELEMENTS OF ALTERNATIVES WHICH HAVE MET THE THRESHOLD CRITERIA TO EACH OTHER.

3. LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY OF A REMEDY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME, ONCE CLEAN-UP GOALS HAVE BEEN MET.

4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT ADDRESSES THE DEGREE TO WHICH ALTERNATIVES EMPLOY RECYCLING OR TREATMENT THAT REDUCES TOXICITY, MOBILITY, OR VOLUME INCLUDING HOW TREATMENT IS USED TO ADDRESS THE PRINCIPAL THREATS POSED BY THE SITE.

5. SHORT TERM EFFECTIVENESS ADDRESSES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD, UNTIL CLEAN-UP GOALS ARE ACHIEVED.

6. IMPLEMENTABILITY ADDRESSES THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT A PARTICULAR OPTION.

7. COST INCLUDES ESTIMATED CAPITAL AND OPERATION & MAINTENANCE (O&M) COSTS, AS WELL AS PRESENT-WORTH COSTS.

MODIFYING CRITERIA

THE MODIFYING CRITERIA ARE FACTORED INTO THE FINAL BALANCING OF REMEDIAL ALTERNATIVES. THIS GENERALLY OCCURS AFTER EPA HAS RECEIVED PUBLIC COMMENT ON THE RI/FS AND PROPOSED PLAN.

8. STATE ACCEPTANCE ADDRESSES THE STATE'S POSITION AND KEY CONCERNS RELATED TO THE PREFERRED ALTERNATIVE AND OTHER ALTERNATIVES; AND THE STATE'S COMMENTS ON ARARS OR THE PROPOSED USE OF WAIVERS.

9. COMMUNITY ACCEPTANCE ADDRESSES PUBLIC GENERAL RESPONSE TO THE ALTERNATIVES DESCRIBED IN THE PROPOSED PLAN AND RIFS REPORT.

A DETAILED TABULAR ASSESSMENT OF THE NINE CRITERIA APPLIED TO EACH ALTERNATIVE CAN BE FOUND IN SECTION 4 IN TABLES 4-2 TO 4-6 OF THE FEASIBILITY STUDY.

FOLLOWING THE DETAILED ANALYSIS OF EACH INDIVIDUAL ALTERNATIVE, A COMPARATIVE ANALYSIS, FOCUSING ON THE RELATIVE PERFORMANCE OF EACH ALTERNATIVE AGAINST THE NINE CRITERIA, WAS CONDUCTED. THIS COMPARATIVE ANALYSIS CAN BE FOUND IN TABLE 4-12 OF THE FEASIBILITY STUDY.

THE FOLLOWING SECTION BALANCES THE STRENGTHS AND WEAKNESSES OF THE FIVE ALTERNATIVES UNDER EACH OF THE NINE CRITERIA SET OUT ABOVE.

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

ALTERNATIVES SC-4, SC-5 AND SC-6 USE TECHNOLOGIES THAT WILL BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT BY REDUCING CONTAMINATION. THESE TECHNOLOGIES INCLUDE CAPPING, GAS COLLECTION AND GROUNDWATER TREATMENT. ALTERNATIVE SC-1 IS NOT PROTECTIVE SINCE IT ANTICIPATES NO ACTION ONSITE. ALTERNATIVE SC-3 IS NOT PROTECTIVE BECAUSE IT DOES NOT INCORPORATE GROUNDWATER TREATMENT, ONLY GAS COLLECTION AND TREATMENT AND CAPPING.

THE COMBINED CAPPING AND GAS AND GROUNDWATER TREATMENT COMPONENTS OF SC-4, SC-5 AND SC-6 WOULD TREAT ALREADY CONTAMINATED GROUNDWATER TO FEDERAL AND STATE DRINKING WATER STANDARDS AT THE SITE COMPLIANCE BOUNDARY. FURTHER, DOWNWARD AND OFFSITE MIGRATION OF CONTAMINANTS IN THE GROUNDWATER CAUSED BY PRECIPITATION AND SOIL LEACHATE WOULD BE CONTROLLED. DUST EROSION, SURFACE RUNOFF AND DIRECT CONTACT WITH CONTAMINATED SOILS, WASTES AND SEDIMENTS WOULD ALSO BE MINIMIZED BY CAPPING, REMOVING AND CONSOLIDATING THE SEDIMENTS IN THE WETLAND INTO THE LANDFILL AND FENCING THE LANDFILL AREA.

CAPPING AND GAS TREATMENT ALONE, WITHOUT A GROUNDWATER TREATMENT SYSTEM AS IN SC-3, WOULD ALLOW CONTAMINANTS TO CONTINUE TO MIGRATE DOWNWARD INTO THE GROUNDWATER AND OFFSITE. CONTAINMENT ALONE IS NORMALLY USED AS A REMEDY AT SITES WHICH HAVE NATURALLY OCCURRING CLAY OR TILL LAYERS UNDER THE GROUNDWATER FLOW ZONE WHICH ACT AS A CAP UNDER THE SITE TO CONTAIN THIS DOWNWARD MIGRATION. THE COAKLEY LANDFILL SITE HAS NO CLAY OR TILL UNDER THE GROUNDWATER FLOW ZONE; RATHER THE LANDFILL IS SITUATED ON BEDROCK. WITHOUT GROUNDWATER TREATMENT, SC-3 WILL NOT MEET MCLS AT THE SITE COMPLIANCE BOUNDARY. SIMILARLY, ALTERNATIVE SC-1 WILL NOT MEET MCLS AT THE SITE BOUNDARY.

2. COMPLIANCE WITH ARARS

EACH ALTERNATIVE WAS EVALUATED FOR COMPLIANCE WITH ARARS, INCLUDING CHEMICAL-SPECIFIC, ACTION-SPECIFIC AND LOCATION SPECIFIC ARARS. THESE ALTERNATIVE SPECIFIC ARARS ARE PRESENTED IN APPENDIX B, TABLES 7 THROUGH 16. ALTERNATIVES SC-4 AND SC-6 MEET THEIR RESPECTIVE ARARS. SC-5 MAY NOT MEET EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS) BECAUSE OF THE NEGATIVE IMPACT GROUNDWATER PUMPING AND OFFSITE TREATMENT MAY HAVE ON THE WETLANDS. SC-4 HAS LESS IMPACT ON THE WETLANDS IN THAT TREATED GROUNDWATER IS RECHARGED TO THE AQUIFERS OR DISCHARGED DIRECTLY TO SURFACE WATER. SC-1 AND SC-3 DO NOT ATTAIN THE FOLLOWING APPLICABLE FEDERAL AND STATE ARARS FOR GROUNDWATER: SAFE DRINKING WATER ACT (SDWA), WS 410 NH GROUNDWATER QUALITY CRITERIA, WS 300 NH DRINKING WATER STANDARDS, AND FEDERAL AMBIENT WATER QUALITY CRITERIA.

3. LONG-TERM EFFECTIVENESS AND PERMANENCE

ALTERNATIVE SC-6 OFFERS THE GREATEST DEGREE OF LONG-TERM EFFECTIVENESS AND PERMANENCE. THIS ALTERNATIVE PROVIDES FOR ONSITE INCINERATION AND/OR SOLIDIFICATION OF CONTAMINATED SOIL AND WASTES, ONSITE EXTRACTION AND TREATMENT OF CONTAMINATED GROUNDWATER AND CAPPING OF THE LANDFILL. INCINERATION AND/OR SOLIDIFICATION DESTROYS AND/OR IMMOBILIZES THE SOURCE OF CONTAMINATION AND MEETS CLEANUP GOALS FOR VOCS AND METALS. HOWEVER, SHOULD SUBSURFACE CONDITIONS CHANGE SIGNIFICANTLY, METALS BOUND INTO THE SOLIDIFICATION MATRIX MAY AGAIN BECOME MOBILE AND BE RELEASED TO THE GROUNDWATER.

ALTERNATIVE SC-4 AND SC-5 ALSO PROVIDE FOR LONG-TERM EFFECTIVENESS AND PERMANENCE IN THAT THEY INCLUDE CAPPING AND GROUNDWATER TREATMENT. CAPPING WILL MEET RCRA CLOSURE REQUIREMENTS; HOWEVER, THE DESIGN LIFE OF A CAP IS SUBJECT TO SOME UNCERTAINTY. WHILE CAP REPLACEMENT IN THE FUTURE IS POSSIBLE, PROPER INSTALLATION AND MAINTENANCE WILL EXTEND THE CAP'S LIFE SIGNIFICANTLY. A LONG-TERM MONITORING PROGRAM, SUCH AS THE PROGRAMS INCLUDED IN SC-4, SC-5 AND SC-6, WOULD PROVIDE SUFFICIENT WARNING OF A POTENTIAL CAP FAILURE. ALTHOUGH SC-4 AND SC-5 DO NOT PROVIDE FOR DIRECT TREATMENT OF THE SOILS AND WASTES, THE WASTE MATERIAL UNDER THE CAP SHOULD DEGRADE NATURALLY, OVER TIME, TO LEVELS WHICH NO LONGER POSE A THREAT TO PUBLIC HEALTH AND THE ENVIRONMENT.

GROUNDWATER TREATMENT WILL MEET CLEANUP GOALS AT THE SITE COMPLIANCE BOUNDARY AS LONG AS THE CAP INTEGRITY IS MAINTAINED. CAPPING AND REMOVING THE GROUNDWATER FROM THE SITE AS REQUIRED BY SC-4, SC-5 AND SC-6 ARE MOST EFFECTIVE IN MINIMIZING THE POTENTIAL FOR FURTHER MIGRATION OF CONTAMINATED GROUNDWATER. SINCE SC-3 DOES NOT INCLUDE GROUNDWATER EXTRACTION AND TREATMENT, ONLY THE LONG-TERM EFFECTIVENESS AND PERMANENCE ASSOCIATED WITH CAPPING WOULD APPLY TO THIS ALTERNATIVE. CONTAMINATED GROUNDWATER WOULD CONTINUE TO MIGRATE OFFSITE FOR A SIGNIFICANT PERIOD OF TIME. ALTERNATIVES SC-1, IS THE NO-ACTION ALTERNATIVE, AND AS SUCH PROVIDES VERY LITTLE, IF ANY, LONG-TERM EFFECTIVENESS AND PERMANENCE.

4. REDUCTION OF TOXICITY, MOBILITY, OR VOLUME THROUGH TREATMENT

ALTERNATIVES SC-4, SC-5, AND SC-6 PROVIDE FOR SOME REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT. SC-6 PROVIDES FOR THE MOST REDUCTION OF TOXICITY, MOBILITY AND VOLUME IN SOIL AND IN GROUNDWATER THROUGH INCINERATION AND/OR SOLIDIFICATION OF CONTAMINATED SOIL AND WASTE, EXTRACTION AND TREATMENT OF CONTAMINATED GROUNDWATER UNDER THE SITE, AND COLLECTION AND TREATMENT OF GASES GENERATED IN THE LANDFILL.

ALTERNATIVES SC-4 AND SC-5, ALTHOUGH THEY DO NOT INCLUDE INCINERATION/SOLIDIFICATION, WILL ALSO REDUCE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINANTS THROUGH GROUNDWATER EXTRACTION AND TREATMENT. CAPPING, WHICH ALTERNATIVES SC-3, SC-4, SC-5 AND SC-6 INCORPORATE TO VARYING EXTENTS, REDUCES ONLY MOBILITY OF THE SOIL CONTAMINANTS AND DOES NOT INVOLVE TREATMENT. THE CAP WILL LIMIT INFILTRATION OF PRECIPITATION AND CONTROL LEACHING OF SOIL CONTAMINATION INTO THE GROUNDWATER. HOWEVER, CAPPING WITHOUT GROUNDWATER TREATMENT AS IN SC-3, DOES NOT REDUCE TOXICITY AND VOLUME OF CONTAMINANTS.

ALTERNATIVE SC-3 WILL ONLY REDUCE CONTAMINATION ASSOCIATED WITH THE TREATMENT OF THE LANDFILL GASES. ALTERNATIVE SC-1 PROVIDES NO REDUCTION IN TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT SINCE NO TREATMENT IS INCLUDED.

5. SHORT-TERM EFFECTIVENESS

WITH RESPECT TO PROTECTION OF THE COMMUNITY, ALTERNATIVES SC-4 AND SC-5 POSE A SLIGHT POTENTIAL FOR ADVERSE IMPACT TO COMMUNITY HEALTH FROM EMISSIONS DURING EXCAVATION AND CONSOLIDATION OF WASTE MATERIAL AND SEDIMENTS IN THE LANDFILL PRIOR TO CAPPING. HOWEVER, STRICT ENGINEERING CONTROLS, WETTING THE SOIL AND MONITORING THE AIR WILL BE IN EFFECT TO INSURE THAT NEGATIVE IMPACTS DO NOT OCCUR. ALTERNATIVE SC-6 COULD PROLONG COMMUNITY EXPOSURE TO AIR EMISSIONS BECAUSE, UNLIKE SC-4 AND SC-5, MOST OF THE LANDFILL WILL BE EXCAVATED AND TREATED THROUGH SOLIDIFICATION AND/OR INCINERATION. EXCAVATION AND TREATMENT OF WASTE AND SOILS FOR SC-6 WILL LAST APPROXIMATELY 20 MONTHS. EXCAVATION AND CONSOLIDATION FOR SC-4 AND SC-5 WILL LAST ONLY THREE MONTHS. THEREFORE, IN ADDITION TO EMISSIONS FROM THE EXTENSIVE EXCAVATION, SC-6 MAY POTENTIALLY EXPOSE THE COMMUNITY TO INCINERATION EMISSIONS FROM THE WASTES AS WELL AS THE CAPTURED GAS EMISSIONS. THE EMISSIONS FROM THE GAS TREATMENT SYSTEMS OF SC-4 AND SC-5 ARE MINIMAL.

RISK TO WORKERS DURING REMEDIAL ACTIONS IN ALTERNATIVES SC-4 TO SC-6 WILL BE CONTROLLED WITH SAFE WORKING PRACTICES. SC-6 MAY EXPOSE WORKERS TO POTENTIAL EMISSIONS AS DESCRIBED ABOVE.

WITH RESPECT TO LONG-TERM ENVIRONMENTAL IMPACTS, SC-4 THROUGH SC-6 COULD POTENTIALLY RELEASE CONTAMINANTS TO THE WETLANDS DURING EXCAVATION. REMOVING GROUNDWATER FROM THE SITE, AS REQUIRED IN SC-5, COULD TEMPORARILY DRY UP MAJOR PORTIONS OF THE WETLANDS. WHILE GROUNDWATER WILL ALSO BE REMOVED FOR ONSITE TREATMENT IN SC-4 AND SC-6, IMPACTS TO THE WETLANDS WILL BE MINIMIZED BY RECHARGE TO THE AQUIFER OR BY DISCHARGE TO ONSITE SURFACE WATER.

FOR ALTERNATIVES SC-4, SC-5, AND SC-6 CONSTRUCTION WILL BE COMPLETED IN TWO YEARS; GROUNDWATER WILL MEET CLEANUP LEVELS IN 10 YEAR. ALTERNATIVES SC-1 AND SC-3 WILL NOT BE PROTECTIVE SINCE MIGRATION OF CONTAMINATION IS NOT ADDRESSED.

6. IMPLEMENTABILITY

WHILE ALL OF THE ALTERNATIVES CAN BE IMPLEMENTED, SOME ALTERNATIVES ARE TECHNICALLY EASIER TO IMPLEMENT THAN OTHERS, BASED ON THEIR DESIGN AND COMPLEXITY.

SC-3, CAPPING, WOULD BE IMPLEMENTABLE SINCE THE REMEDY IS TECHNICALLY EASY TO DESIGN AND CONSTRUCT. SC-4 CAPPING AND ONSITE GROUNDWATER TREATMENT, IS THE SIMPLEST TREATMENT ALTERNATIVE TO IMPLEMENT. THIS TECHNOLOGY, USED ON OTHER SUPERFUND SITES, IS NOT DIFFICULT TO DESIGN AND CONSTRUCT.

SC-5, CAPPING WITH OFFSITE GROUNDWATER TREATMENT, MAY BE VERY DIFFICULT TO IMPLEMENT SINCE ACCEPTANCE BY A MUNICIPAL WASTEWATER TREATMENT FACILITY OF PARTIALLY TREATED GROUNDWATER IS REQUIRED. WHETHER A MUNICIPALITY WOULD BE WILLING TO ACCEPT TREATED GROUNDWATER IS UNCERTAIN.

SC-6 WOULD BE THE MOST DIFFICULT TO IMPLEMENT SINCE IT INVOLVES EXTENSIVE EXCAVATION OF THE SOLID WASTE AND TREATMENT, INCINERATION AND/OR SOLIDIFICATION, OF THE SOLID WASTE.

THE NO-ACTION ALTERNATIVE WOULD BE DIFFICULT TO IMPLEMENT EFFECTIVELY SINCE THERE IS NO GUARANTEE THAT THE INSTITUTIONAL CONTROLS WILL BE COMPLIED WITH IN THE FUTURE.

7. COST

THE ESTIMATED PRESENT WORTH VALUE OF EACH ALTERNATIVE AND THE OPTIONS ARE AS FOLLOWS:

COST COMPARISON OF SOURCE CONTROL ALTERNATIVES

	CAPITAL COSTS	O&M COSTS ($/YR)	*PRESENT WORTH
SC-1 NO ACTION	$820,000	43,000	2,120,000
SC-3 CAPPING INCLUDING CONSOL-IDATION	8,800,000	80,000	11,200,000
SC-4 CAPPING/ONSITE GROUND WATER TREATMENT	12,800,000	245,000	20,200,000
SC-5 CAPPING/OFFSITE TREAT-MENT AND DISPOSAL	13,200,000	190,000	18,900,000
SC-6 ONSITE SOLID WASTE/ TREATMENT AND DISPOSAL/ CAPPING	45,300,000	285,000	53,900,000

8. STATE ACCEPTANCE

THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (DES) HAS BEEN INVOLVED WITH THE SITE FROM THE BEGINNING AS SUMMARIZED IN SECTION II OF THIS DOCUMENT "SITE HISTORY AND ENFORCEMENT ACTIVITIES". THE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY WAS PERFORMED AS A STATE LEAD THROUGH A COOPERATIVE AGREEMENT BETWEEN THE STATE AND THE EPA. THE NEW HAMPSHIRE DES AND THE ATTORNEY GENERALS OFFICE HAVE REVIEWED THIS DOCUMENT AND CONCUR WITH THE ALTERNATIVE SELECTED FOR A SOURCE CONTROL REMEDY AS DOCUMENTED IN THE ATTACHED DECLARATION OF CONCURRENCE.

9. COMMUNITY ACCEPTANCE

THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND THE DISCUSSIONS DURING THE PROPOSED PLAN AND FS PUBLIC MEETING ARE SUMMARIZED IN THE ATTACHED DOCUMENT ENTITLED "THE RESPONSIVENESS SUMMARY" (APPENDIX C). VARIED COMMENTS WERE RECEIVED FROM RESIDENTS LIVING NEAR THE SITE, ENVIRONMENTAL CITIZEN GROUPS, AND FROM THE COAKLEY LANDFILL STEERING COMMITTEE. THE CITIZENS GENERALLY DESIRE THE EPA TO CHOOSE THE MOST STRINGENT REMEDY, SC-6, OR ELSE EXCAVATE AND REMOVE ONSITE WASTE. THE STEERING COMMITTEE GENERALLY WANTS THE EPA TO CHOOSE THE MINIMAL REMEDY WHICH IS SIMILAR TO SC-3.

#SR

XI. THE SELECTED REMEDY

EPA HAS SELECTED ALTERNATIVE SC-4, CAPPING/ONSITE GROUNDWATER TREATMENT, FOR THE FIRST OPERABLE UNIT AT THE COAKLEY LANDFILL SITE. MANAGING OFFSITE MIGRATION OF CONTAMINATED GROUNDWATER, THE SECOND OPERABLE UNIT, WILL BE ADDRESSED IN A LATER RECORD OF DECISION. A DETAILED DESCRIPTION OF THE SELECTED REMEDY ALONG WITH CLEANUP LEVELS IS PRESENTED BELOW.

A. CLEANUP LEVELS

CLEANUP LEVELS HAVE BEEN ESTABLISHED FOR CONTAMINANTS OF CONCERN IDENTIFIED IN THE BASELINE RISK ASSESSMENT WHICH HAVE BEEN FOUND TO POSE AN UNACCEPTABLE RISK TO PUBLIC HEALTH. CLEANUP LEVELS HAVE BEEN SET BASED ON THE APPROPRIATE ARARS (E.G. DRINKING WATER MCLGS AND MCLS) IF AVAILABLE. IN THE ABSENCE OF A CHEMICAL SPECIFIC ARAR OR OTHER SUITABLE CRITERIA TO BE CONSIDERED, A (10-6) EXCESS CANCER RISK LEVEL FOR CARCINOGENIC EFFECTS OR A CONCENTRATION CORRESPONDING TO A HAZARD INDEX OF ONE FOR COMPOUNDS WITH NONCARCINOGENIC EFFECTS WAS USED TO SET CLEANUP LEVELS. PERIODIC ASSESSMENTS OF THE PROTECTION AFFORDED BY REMEDIAL ACTIONS WILL BE MADE AS THE REMEDY IS BEING IMPLEMENTED AND AT THE COMPLETION OF THE REMEDIAL ACTION. IF THE REMEDIAL ACTION IS NOT FOUND TO BE PROTECTIVE OR FAILS TO MEET THE CLEANUP LEVELS ESTABLISHED IN THIS RECORD OF DECISION, FURTHER ACTION SHALL BE REQUIRED.

1. GROUNDWATER

BECAUSE THE AQUIFER AT AND BEYOND THE COMPLIANCE BOUNDARY OF THE SITE IS A POTENTIAL SOURCE OF DRINKING WATER, IT IS A CLASS IIA AQUIFER AND THE MCLS AND NON-ZERO MCLGS ESTABLISHED UNDER THE SAFE DRINKING WATER ACT ARE ARARS. THE COMPLIANCE BOUNDARY ESTABLISHED FOR GROUNDWATER CLEANUP LEVELS IS THE PERIMETER OF THE SITE WHICH RUNS CLOSE TO THE CURRENT PROPERTY BOUNDARY OF THE COAKLEY LANDFILL ON THE SOUTH, WEST AND EAST SIDES AND APPROXIMATELY 200 FEET FROM THE CURRENT TOE OF THE SLOPE OF THE LANDFILL TO THE NORTH AND NORTHEAST WITHIN THE SITE BOUNDARY. EPA HAS NO REASON TO BELIEVE THAT WASTE WAS DISPOSED OF BEYOND THE PROPERTY BOUNDARIES OF THE COAKLEY LANDFILL SITE. HOWEVER, THE COMPLIANCE BOUNDARY EXTENDS 200 FEET BEYOND THE EDGE OF THE APPARENT LANDFILL TO ENSURE THAT ALL WASTES ARE INCORPORATED IN THE REMEDY SINCE THE EXACT LOCATION OF WASTE DISPOSED OF IN THIS NORTH AND NORTHEAST AREA HAS NOT BEEN FULLY DOCUMENTED. THIS POINT OF COMPLIANCE IS PROTECTIVE OF THE PUBLIC HEALTH AND THE ENVIRONMENT IN THAT IT MINIMIZES THE POSSIBILITY OF OFFSITE MIGRATION OF CONTAMINATION FROM WASTE WHICH MAY EXTEND BEYOND THE APPARENT EDGE OF THE LANDFILL.

CLEANUP LEVELS FOR KNOWN AND PROBABLE CARCINOGENIC COMPOUNDS (CLASS A & B) HAVE BEEN SET AT THE APPROPRIATE MCL OR NON-ZERO MCLG. CLEANUP LEVELS FOR THE CLASS C, D AND E COMPOUNDS (POSSIBLE CARCINOGENS NOT CLASSIFIED AND NO EVIDENCE OF CARCINOGENICITY) HAVE BEEN SET AT THE MCLG. IN THE ABSENCE OF A MCLG, A MCL, OR A PROPOSED DRINKING WATER STANDARD OR OTHER SUITABLE CRITERIA TO BE CONSIDERED (I.E. HEALTH ADVISORY, STATE STANDARD), A CLEANUP LEVEL WAS DERIVED FOR CARCINOGENIC EFFECTS BASED ON A (10-6) EXCESS CANCER RISK LEVEL CONSIDERING THE INGESTION OF GROUNDWATER.

CLEANUP LEVELS FOR COMPOUNDS IN GROUNDWATER EXHIBITING NONCARCINOGENIC EFFECTS HAVE BEEN SET AT THE MCLG. IN THE ABSENCE OF A MCLG OR A PROPOSED DRINKING WATER STANDARD OR OTHER SUITABLE CRITERIA TO BE CONSIDERED (I.E. HEALTH ADVISORY, STATE STANDARD), CLEANUP LEVELS FOR NONCARCINOGENIC EFFECTS HAVE BEEN SET AT A LEVEL THOUGHT TO BE WITHOUT APPRECIABLE RISK OF AN ADVERSE EFFECT WHEN EXPOSURE OCCURS OVER LIFETIME (HAZARD INDEX EQUALS 1).

TABLE 12 BELOW SUMMARIZES THE CLEANUP LEVELS FOR CARCINOGENIC AND NONCARCINOGENIC CONTAMINANTS OF CONCERN IDENTIFIED IN GROUNDWATER.

TABLE 12: GROUNDWATER CLEANUP LEVELS

CARCINOGENIC CONTAMINANTS OF CONCERN	CLEANUP LEVEL (UG/L)	BASIS-A	RISK LEVEL
BENZENE	5	MCL	7X10-6
TETRACHLOROETHENE	3.5	NH	5X10-6
ARSENIC	50	MCL	2X10-4*

NONCARCINOGENIC CONTAMINANTS OF CONCERN	CLEANUP LEVEL (UG/L)	BASIS-A	HI INDEX
2-BUTANONE (MEK)	200	HA	0.1
PHENOL	280	HA	0.01
DIETHYL PHTHALATE	2,800	HA	0.1
CHLOROBENZENE	100	PMCLG	0.1
TRANS-1,2-DICHLOROETHENE	100	PMCLG	0.1
CHROMIUM	50	MCL	0.3
NICKEL	100	HA	0.1

KEY

A
HA = HEALTH ADVISORY.
NH = NH DRINKING WATER STANDARD.
MCL = MAXIMUM CONTAMINANT LEVEL, SAFE DRINKING WATER ACT.
PMCLG = PROPOSED MAXIMUM CONTAMINANT LEVEL GOAL, SAFE DRINKING WATER ACT

* THE CLEANUP LEVEL FOR ARSENIC HAS BEEN SET AT THE MCL OF 50 UG/L. THE CARCINOGENIC RISK POSED BY ARSENIC AT 50 UG/L IN GROUNDWATER WILL APPROXIMATE 2 IN 1,000. HOWEVER, IN LIGHT OF RECENT STUDIES INDICATING THAT MANY SKIN TUMORS ARISING FROM ORAL EXPOSURE TO ARSENIC ARE NON-LETHAL IN NATURE AND IN LIGHT OF THE POSSIBILITY THAT THE DOSE-RESPONSE CURVE FOR THE SKIN CANCERS MAY BE SUBLINEAR (IN WHICH CASE THE CANCER POTENCY FACTOR USED TO GENERATE RISK ESTIMATES WILL BE OVERSTATED), IT IS AGENCY POLICY TO MANAGE THESE RISKS DOWNWARD BY AS MUCH AS AN ORDER OF MAGNITUDE (X-10)2. AS A RESULT, THE CARCINOGENIC RISKS FOR ARSENIC AT THIS SITE HAVE BEEN MANAGED AS IF THEY WERE 2 IN 10,000.

THESE CLEANUP LEVELS MUST BE MET AT THE COMPLETION OF THE REMEDIAL ACTION AT THE COMPLIANCE BOUNDARY. EPA HAS ESTIMATED THAT THESE LEVELS WILL BE ATTAINED WITHIN APPROXIMATELY TEN YEARS.

THE HAZARD INDEX FOR THE REMAINING COMPOUNDS WERE EACH SIGNIFICANTLY LESS THAN 1. CONSEQUENTLY, THE STATED LEVELS SHOULD BE WITHOUT APPRECIABLE RISK OF NON-CARCINOGENIC HEALTH EFFECTS.

WHEN ACHIEVED, THE STATED CLEANUP LEVELS FOR THESE 10 CONTAMINANTS SHALL BE PROTECTIVE OF PUBLIC HEALTH CONSIDERING A LIFETIME OF CONSUMPTION OF 2 LITERS PER DAY OF GROUNDWATER. EPA WILL REVIEW PERFORMANCE DATA PERIODICALLY AFTER THE REMEDY IS IMPLEMENTED TO INSURE THAT THE REMEDY REMAINS PROTECTIVE.

2.SOIL

CLEANUP LEVELS FOR THE ORGANIC COMPOUNDS IN SOILS WERE ESTABLISHED TO MEASURE CONTAMINANT LEVELS IN THE REMAINING SEDIMENTS IN THE WETLANDS AFTER EXCAVATION. THESE CLEANUP LEVELS ARE NECESSARY TO PROTECT HUMAN HEALTH AND THE AQUIFER FROM POTENTIAL SOIL LEACHATE AT THE COMPLIANCE BOUNDARY AT THE COAKLEY LANDFILL SITE. THE REMAINING SEDIMENTS IN THE WETLANDS WILL MEET THESE CLEANUP LEVELS AFTER EXCAVATION. DIRECT PHYSICAL CONTACT OR THE ACCIDENTAL INGESTION OF SOILS WAS NOT FOUND TO POSE A SIGNIFICANT HEALTH RISK.

THE ORGANIC LEACHING MODEL (OLM), 51 FED REG 41082, (1986), WAS USED TO ESTIMATE RESIDUAL SOIL LEVELS THAT ARE NOT EXPECTED TO IMPAIR FUTURE GROUNDWATER QUALITY. ARARS IN GROUNDWATER (MCLGS AND MCLS) WERE USED AS INPUT INTO THE LEACHING MODEL. IN THE ABSENCE OF AN ARAR, THE LEVEL CORRESPONDING TO A (10-6) RISK LEVEL (FOR CARCINOGENS) OR A HAZARD INDEX OF ONE (NONCARCINOGENIC EFFECTS) WAS UTILIZED. IF THE

VALUES DESCRIBED ABOVE WERE INCAPABLE OF BEING DETECTED OR WERE BELOW REGIONAL BACKGROUND VALUES, THEN EITHER THE DETECTION LIMIT OR BACKGROUND VALUES WAS SUBSTITUTED. TABLE 13 BELOW SUMMARIZES THE SOIL CLEANUP VALUES FOR THE CONTAMINANTS OF CONCERN DEVELOPED TO PROTECT PUBLIC HEALTH AND THE AQUIFER.

TABLE 13: SOIL CLEANUP LEVELS
FOR THE PROTECTION OF HUMAN HEALTH AND THE AQUIFER BASED
ON THE ORGANIC LEACHING MODEL

CARCINOGENIC CONTAMINANTS OF CONCERN	SOIL CLEANUP LEVEL (MG/KG)	BASIS FOR MODEL INPUT-A	RESIDUAL GROUNDWATER RISK
BENZENE	0.055	MCL	7X10-6
TETRACHLOROETHENE	0.13	NH	5X10-6

NONCARCINOGENIC CONTAMINANTS OF CONCERN	SOIL CLEANUP LEVEL (MG/KG)	BASIS FOR MODEL INPUT-A	RESIDUAL GROUNDWATER HAZARD INDEX
2-BUTANONE (MEK)	0.8	HA	0.1
PHENOL	2.3	NH	0.01
DIETHYL PHTHALATE	900	HA	0.1
CHLOROBENZENE	9.4	PMCLG	0.1
TRANS-1,2-DICHLOROETHENE	2.2	PMCLG	0.1

KEY

HA = HEALTH ADVISORY.
NH = NH DRINKING WATER STANDARD.
MCL = MAXIMUM CONTAMINANT LEVEL, SAFE DRINKING WATER ACT
PMCLG = PROPOSED MAXIMUM CONTAMINANT LEVEL GOAL, SAFE DRINKING WATER ACT

THESE CLEANUP LEVELS FOR ORGANIC CONSTITUENTS IN SOILS ARE CONSISTENT WITH ARARS FOR GROUNDWATER AND ATTAIN EPA'S GOAL FOR REMEDIAL ACTIONS. SOILS EXCEEDING THESE LEVELS AFTER TESTING WILL BE EXCAVATED.

B. DESCRIPTION OF REMEDIAL COMPONENTS

CAPPING/ONSITE GROUNDWATER TREATMENT

ALTERNATIVE SC-4, CAPPING/ONSITE GROUNDWATER TREATMENT, INVOLVES CONSOLIDATING SEDIMENTS AND SOLID WASTE FOLLOWED BY CAPPING THE LANDFILL AND EXTRACTING AND TREATING OF ONSITE GROUNDWATER AND LANDFILL GASES. BELOW IS A LIST OF THE MAJOR COMPONENTS OF THE REMEDY;

1. CONSOLIDATION OF SEDIMENT IN THE WETLANDS
2. CONSOLIDATION OF SOLID WASTE;
3. CAPPING OF THE LANDFILL;
4. FENCING OF THE LANDFILL;
5. COLLECTION AND TREATMENT OF LANDFILL GASES;
6. GROUNDWATER EXTRACTION AND TREATMENT;
7. LONG-TERM ENVIRONMENTAL MONITORING; AND
8. INSTITUTIONAL CONTROLS WHERE POSSIBLE.

APPROXIMATELY 2,000 CUBIC YARDS OF SEDIMENT IN THE WETLANDS ADJACENT TO THE NORTHWEST CORNER OF THE SITE WILL BE EXCAVATED AND REDEPOSITED INTO THE EXISTING LANDFILL AREA BEFORE THE NEW CAP IS INSTALLED. DURING EXCAVATION AND RESTORATION OF THE WETLANDS, APPROPRIATE STEPS SUCH AS USING CLEAN AND APPROPRIATE FILL AND INSTALLING SILT BARRIERS TO PREVENT DAMAGE TO THE WETLANDS DOWNSTREAM OF THE WORK AREA WILL BE TAKEN. SEDIMENT SAMPLES IN AND AROUND THE PERIMETER OF THE EXCAVATED AREA WILL ALSO BE TAKEN TO CONFIRM THAT THE REMAINING SEDIMENTS ARE BELOW CLEANUP LEVELS. TO PROMOTE WETLAND REVEGETATION, SOILS SIMILAR TO THOSE OF THE NATURAL WETLANDS WILL BE USED, AND SEDGES AND OTHER SPECIES WILL BE PLANTED.

IN ADDITION, APPROXIMATELY 30,000 CUBIC YARDS OF MATERIAL FROM THE EAST, WEST AND SOUTH SIDES OF THE LANDFILL WILL BE EXCAVATED TO REDUCE THE AREA TO BE CAPPED. THIS MATERIAL WILL BE MIXED WITH SAND AS NEEDED AND USED TO CONSTRUCT THE SUB-BASE LAYER WHICH LIES BELOW THE IMPERMEABLE LAYER OF THE CAP TO ENSURE PROPER GRADING OF THE LANDFILL.

THE LANDFILL CAP DESIGN WILL BE CONSISTENT WITH NH DES AND RCRA CLOSURE REQUIREMENTS. AT A MINIMUM, THE CAP WOULD CONSIST OF A MULTI-LAYER SYSTEM COMPOSED OF A VEGETATIVE TOPSOIL LAYER AND A SUBSURFACE DRAINAGE LAYER OVERLYING A LOW-PERMEABILITY BARRIER OF CLAY OR SYNTHETIC LINER MATERIAL. THE DETAILS OF THE MATERIALS OF CONSTRUCTION AND THE THICKNESS OF THE LAYERS WILL BE LEFT TO THE REMEDIAL DESIGN PHASE. THIS WILL GIVE THE DESIGNERS THE ABILITY TO INCORPORATE STATE OF THE ART CONSTRUCTION MATERIALS AND TECHNOLOGY FOR SITE SPECIFIC CONDITIONS AS REQUIRED BY THE EPA. A TYPICAL DIAGRAM OF CAP CONSTRUCTION CAN BE FOUND AS APPENDIX A, FIGURE 9.

CAPPING ALSO INVOLVES COLLECTING AND TREATING LANDFILL GASES, SUCH AS METHANE, GENERATED BELOW THE CAP. METHANE AND OTHER DECOMPOSING GASES WILL BE VENTED BY MEANS OF AN ACTIVE INTERIOR GAS COLLECTION/RECOVERY SYSTEM. THE GAS COLLECTION SYSTEM WILL CONSIST OF SMALL-DIAMETER PVC PIPE PLACED IN A NETWORK OF SHALLOW TRENCHES BACKFILLED WITH CRUSHED STONE. THE TRENCHES WILL BE LOCATED WITHIN THE INTERMEDIATE COVER LAYER BELOW THE FINAL COVER. THE COLLECTED GASES WILL BE TREATED ONSITE BY A THERMAL DESTRUCTION PROCESS. EMISSIONS GENERATED BY THIS PROCESS WILL BE MINIMIZED BY USING BEST AVAILABLE DEMONSTRATED TECHNOLOGY AND BY MONITORING. THE TECHNOLOGY USED FOR THIS PROCESS WILL BE EVALUATED DURING THE DESIGN PHASE, WHICH MAY INCLUDE TREATABILITY STUDIES.

A 6 FOOT CHAIN LINK FENCE TOPPED WITH BARBED WIRE WILL ENCOMPASS THE LANDFILL AREA WHICH WILL BE ACCESSIBLE ONLY TO AUTHORIZED PERSONNEL. APPROXIMATELY 6,000 LINEAR FEET OF FENCING WILL BE REQUIRED. KEYS TO THE GATES WILL BE AVAILABLE TO OPERATORS OF THE TREATMENT PLANT AND TO REGULATING AUTHORITIES.

THE GROUNDWATER EXTRACTION SYSTEM WILL CONSIST OF OVERBURDEN AND BEDROCK WELLS LOCATED WITHIN AND ALONG THE PERIMETER OF THE LANDFILL. A DRAINAGE SYSTEM WILL ALSO BE LOCATED AROUND THE PERIMETER (APPENDIX A, FIGURE 11). GROUNDWATER WILL BE TREATED ONSITE TO REMOVE METALS AND ORGANICS (BOTH VOCS AND SEMI-VOCS) THROUGH A SERIES OF TECHNOLOGIES INVOLVING CHEMICAL, PHYSICAL AND BIOLOGICAL PROCESSES. THE EXACT TREATMENT WILL BE DETERMINED DURING THE DESIGN PHASE AFTER ADDITIONAL STUDIES, WHICH MAY INCLUDE ADDITIONAL GROUNDWATER SAMPLING AND PILOT AND/OR TREATABILITY WORK. THE TREATED GROUNDWATER WILL BE RECHARGED INTO THE AQUIFER OR DISCHARGED TO ONSITE SURFACE WATER DURING PERIODS OF HIGH GROUNDWATER. ANY DRYING EFFECT ON THE WETLANDS WILL BE MINIMIZED BY RECHARGING THE TREATED GROUNDWATER TO THE AQUIFER OR DISCHARGING IT TO ONSITE SURFACE WATER.

A CONCEPTUAL TREATMENT PROCESS DIAGRAM IS SHOWN AS APPENDIX A, FIGURE 10 AND DESCRIBED IN MORE DETAIL BELOW.

EXTRACTED GROUNDWATER WILL FIRST UNDERGO REMOVAL OF METALS. ADDING LIME OR CAUSTIC CAUSES IRON, ARSENIC AND OTHER METALS TO COAGULATE AND SETTLE INTO A SLUDGE AT THE BOTTOM OF THE TANK. THE SLUDGE WILL BE TESTED AND PROPERLY DISPOSED OF AT AN APPROPRIATE OFFSITE TREATMENT OR DISPOSAL FACILITY.

THE GROUNDWATER IS THEN PASSED THROUGH AN AIR STRIPPING CHAMBER TO REMOVE VOCS BY FORCING AIR UP THROUGH THE WATER. THIS CAUSES THE ORGANIC CONTAMINANTS TO BE CARRIED FROM THE WATER INTO THE AIR STREAM. SINCE AIR LEAVING THE STRIPPER WILL CONTAIN SMALL QUANTITIES OF VOCS, IT WILL THEN BE TREATED THROUGH INCINERATION OR ACTIVATED CARBON FILTRATION PRIOR TO RELEASE TO THE ATMOSPHERE. THE COMBINED PROCESSES WILL EFFECTIVELY REMOVE APPROXIMATELY 99 PERCENT OF VOCS FROM THE GROUNDWATER AND AIR STREAM.

AFTER TREATMENT THE WATER WILL BE DISCHARGED TO A SERIES OF TEN RECHARGE STRUCTURES LOCATED ALONG THE SERVICE ROAD WEST AND NORTH OF THE LANDFILL WHENEVER FEASIBLE. ALTERNATIVELY, DURING PERIODS OF HIGH GROUNDWATER, SOME OR ALL OF THE TREATED WATER MAY NEED TO BE DISCHARGED TO THE SURFACE WATER. SHOULD THIS OCCUR, THE TREATED GROUNDWATER WILL NOT ONLY MEET FEDERAL AND STATE DRINKING WATER AND DISCHARGE STANDARDS BUT ALSO AMBIENT WATER QUALITY CRITERIA THROUGH ADDITIONAL TREATMENT SUCH AS ACTIVATED CARBON FILTRATION OR BIOLOGICAL TREATMENT. BIOLOGICAL TREATMENT WILL EFFECTIVELY REMOVE BOD AND AMMONIA. ACTIVATED CARBON FILTRATION MAY EFFECTIVELY REMOVE BOD AND AMMONIA.

PERIODIC REVIEW AND MODIFICATION OF THE DESIGN, CONSTRUCTION, MAINTENANCE AND OPERATION OF THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WILL BE NECESSARY. PERFORMANCE OF THE SYSTEM WILL BE EVALUATED ANNUALLY, OR MORE FREQUENTLY, TO DETERMINE IF THE GOALS AND STANDARDS OF THE DESIGN CRITERIA ARE BEING MET. IF NOT, ADJUSTMENT OR MODIFICATION MAY BE NECESSARY. THESE ADJUSTMENTS OR MODIFICATIONS MAY INCLUDE RELOCATING OR ADDING EXTRACTION WELLS OR ALTERING PUMPING RATES. SWITCHING FROM CONTINUOUS PUMPING TO PULSED PUMPING MAY IMPROVE THE EFFICIENCY OF CONTAMINANT RECOVERY AND SHOULD BE EVALUATED SHOULD MODIFICATION BE NECESSARY. SHOULD NEW INFORMATION REGARDING THE EXTRACTION AND TREATMENT TECHNOLOGY EXIST, IT WILL BE EVALUATED AND APPLIED AS APPROPRIATE.

AFTER THE CLEANUP LEVELS HAVE BEEN MET AND THE REMEDY IS DETERMINED TO BE PROTECTIVE, THE GROUNDWATER SYSTEM WILL BE SHUT DOWN. A GROUNDWATER MONITORING SYSTEM WILL THEN BE UTILIZED TO COLLECT INFORMATION QUARTERLY FOR THREE YEARS TO ENSURE THAT THE CLEANUP LEVELS HAVE BEEN MET AND THE REMEDY IS PROTECTIVE. ONCE THESE LEVELS ARE MAINTAINED AND THE REMEDY IS PROTECTIVE FOR THIS PERIOD OF TIME, AN ADDITIONAL MONITORING PROGRAM FOR THE SITE IN ACCORDANCE WITH NEW HAMPSHIRE HAZARDOUS AND SOLID WASTE RULES WILL BE IMPLEMENTED.

TO THE EXTENT REQUIRED BY LAW, EPA WILL REVIEW THE SITE AT LEAST ONCE EVERY FIVE YEARS AFTER THE INITIATION OF REMEDIAL ACTION AT THE SITE IF ANY HAZARDOUS SUBSTANCES, POLLUTANTS OR CONTAMINANTS REMAIN AT THE SITE TO ASSURE THAT THE REMEDIAL ACTION CONTINUES TO PROTECT HUMAN HEALTH AND THE ENVIRONMENT. IF AFTER 5 YEARS THERE IS NO PROGRESS OR, IF AFTER 10 YEARS CLEANUP LEVELS ARE NOT ATTAINED, THE GROUNDWATER REMEDY SHALL BE RECONSIDERED. EPA WILL ALSO EVALUATE RISK POSED BY THE SITE AT THE COMPLETION OF THE REMEDIAL ACTION (I.E., BEFORE THE SITE IS PROPOSED FOR DELETION FROM THE NPL).

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XII. STATUTORY DETERMINATIONS

THE REMEDIAL ACTION SELECTED FOR THE COAKLEY LANDFILL SITE IS CONSISTENT WITH CERCLA AND, TO THE EXTANT PRACTICABLE, THE NCP. THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, ATTAINS ARARS, AND IS COST-EFFECTIVE. THE SELECTED REMEDY ALSO SATISFIES THE STATUTORY PREFERENCE FOR TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE TOXICITY, MOBILITY OR VOLUME OF HAZARDOUS SUBSTANCES AS A PRINCIPAL ELEMENT. ADDITIONALLY, THE SELECTED REMEDY UTILIZES ALTERNATIVE TREATMENT TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE.

A. THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT

THE REMEDY AT THIS SITE PERMANENTLY REDUCES THE RISKS POSED TO HUMAN HEALTH AND THE ENVIRONMENT BY REDUCING AND CONTROLLING EXPOSURE TO HUMAN AND ENVIRONMENTAL RECEPTORS THROUGH TREATMENT, ENGINEERING CONTROLS, AND INSTITUTIONAL CONTROLS. MORE SPECIFICALLY, CAPPING THE LANDFILL WILL ELIMINATE EXPOSURE TO CONTAMINANTS BY DIRECT CONTACT AND WILL CONTROL EXPOSURE FROM DUST EROSION AND SURFACE RUNOFF. CAPPING WILL ALSO LIMIT INFILTRATION OF PRECIPITATION AND CONTROL LEACHING OF SOIL CONTAMINANTS INTO THE GROUNDWATER. COLLECTING AND TREATING GAS AND PUMPING AND TREATING THE GROUNDWATER WILL CONTROL POTENTIAL EXPOSURE TO VOCS AND SEMI-VOCS FROM THE LANDFILL. THE SELECTED REMEDY WILL ATTAIN REMEDIATION LEVELS SET IN ACCORDANCE WITH HEALTH-BASED ARARS. MOREOVER, THE SELECTED REMEDY WILL RESULT IN HUMAN EXPOSURE LEVELS THAT ARE BELOW THE HAZARD INDEX OF ONE FOR NONCARCINOGENS. CAPPING THE LANDFILL WILL ELIMINATE FURTHER GROUNDWATER CONTAMINATION FROM SOIL LEACHATE. GROUNDWATER AND GAS TREATMENT WILL REDUCE THE TOXICITY AND CONCENTRATION OF CONTAMINANTS AND WILL CONTAIN CONTAMINANTS LANDFILL TO ELIMINATE CONTAMINATION OF THE AQUIFER. EXTRACTING AND TREATING GROUNDWATER REDUCES CANCER AND CHEMICAL HAZARD RISKS. A LONG-TERM MONITORING PROGRAM WILL INSURE THE REMEDY REMAINS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. FINALLY, IMPLEMENTATION OF THE SELECTED REMEDY WILL NOT POSE UNACCEPTABLE SHORT-TERM RISKS OR CROSS-MEDIA IMPACTS SINCE THE LANDFILL WILL ONLY BE MINIMALLY DISTURBED DURING CAP CONSTRUCTION AND RELOCATING OF SEDIMENT IN THE WETLAND.

B. THE SELECTED REMEDY ATTAINS ARARS

THIS REMEDY WILL MEET OR ATTAIN ALL APPLICABLE OR RELEVANT AND APPROPRIATE FEDERAL AND STATE REQUIREMENTS THAT APPLY TO THE SITE. SUBSTANTIVE PORTIONS OF ENVIRONMENTAL LAWS IDENTIFIED AS ARARS FOR THE SELECTED REMEDIAL ACTION INCLUDE:

<u>CHEMICAL SPECIFIC</u>

NEW HAMPSHIRE SURFACE WATER QUALITY STANDARDS (WS 430)
NEW HAMPSHIRE AIR QUALITY RULES (RSA CHAPTER 125-C)
SAFE DRINKING WATER ACT - MAXIMUM CONTAMINANT LEVELS (SDWA)
FEDERAL AMBIENT WATER QUALITY CRITERIA
NATIONAL AMBIENT AIR QUALITY STANDARDS
NEW HAMPSHIRE DRINKING WATER STANDARDS

<u>LOCATION SPECIFIC</u>

CLEAN WATER ACT (CWA)
FISH AND WILDLIFE COORDINATION ACT
EXECUTIVE ORDER 11990 (PROTECTION OF WETLANDS)
NEW HAMPSHIRE SOLID WASTE REGULATIONS (HE-P 1901)
NEW HAMPSHIRE WETLANDS REGULATIONS (WS 300 AND 400)
NEW HAMPSHIRE HAZARDOUS WASTE REGULATIONS (HE-P 1905)
NEW HAMPSHIRE HAZARDOUS WASTE REGULATIONS

<u>ACTION SPECIFIC</u>

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA)**1**
OSHA GENERAL INDUSTRY STANDARDS
OSHA SAFETY AND HEALTH STANDARDS

OSHA RECORDKEEPING, REPORTING AND RELATED REGULATIONS
DOT RULES FOR TRANSPORTATION OF HAZARDOUS MATERIALS

TO BE CONSIDERED

NEW HAMPSHIRE PROTECTION OF GROUNDWATER REGULATIONS (WS 410)
EPA RISK REFERENCE DOSES
EPA CARCINOGEN ASSESSMENT GROUP POTENCY FACTORS
THRESHOLD LIMIT VALUES
US EPA OFFSITE POLICY
OSWER DIRECTIVE 9355.0-28

1 NEW HAMPSHIRE IS A RCRA AUTHORIZED STATE PROGRAM.

TABLES 2-1 THROUGH 2-3 IN SECTION 2.0 OF THE FS, LISTS ALL ARARS IDENTIFIED FOR THE SITE AND WHETHER THEY ARE APPLICABLE, RELEVANT AND APPROPRIATE OR TO BE CONSIDERED (SEE APPENDIX B, TABLES 9, AND 14 THROUGH 18). APPENDIX F OF THE FS CONTAINS A LIST OF IDENTIFIED ARARS FOR ALL THE ALTERNATIVES. APPENDIX F ALSO PRESENTS A BRIEF SYNOPSIS OF THE REQUIREMENTS AND NOTES WHETHER OR NOT THEY WILL BE ATTAINED AND WHAT ACTION, IF ANY, IS NECESSARY TO MEET THE ARAR (SEE APPENDIX B, TABLE 9). ANY CHANGES TO APPLICABILITY OR APPROPRIATENESS OR RELEVANCE ARE DISCUSSED BELOW.

THE REMEDIAL ACTION INVOLVES INSTALLING GROUNDWATER COLLECTION WELLS AND TRENCHES, CONSTRUCTING A GROUNDWATER TREATMENT FACILITY AND PLACING A MULTI-LAYER CAP WITH A GAS COLLECTION RECOVERY SYSTEM INCORPORATED OVER THE SOURCE. AN ONSITE THERMAL DESTRUCTION UNIT WILL BE CONSTRUCTED TO TREAT THE GAS. DURING ALL CONSTRUCTION AND OPERATION ACTIVITIES, OSHA REQUIREMENTS ARE APPLICABLE .

1. CHEMICAL SPECIFIC

A. FEDERAL AND STATE DRINKING WATER STANDARDS

THE GROUNDWATER IN THE AQUIFER AT AND BEYOND THE COMPLIANCE BOUNDARY OF THE LANDFILL WOULD BE A POSSIBLE DRINKING WATER SOURCE WERE IT NOT CONTAMINATED BY LEACHATE FROM THE LANDFILL. MAXIMUM CONTAMINANT LEVELS (MCLS) PROMULGATED UNDER THE SAFE DRINKING WATER ACT WHICH REGULATE PUBLIC DRINKING WATER SUPPLIES, ARE APPLICABLE TO DRINKING WATER AT THE TAP AND ARE NOT APPLICABLE TO GROUNDWATER. HOWEVER, BECAUSE THE

GROUNDWATER MAY BE USED AS A POTENTIAL DRINKING WATER SOURCE, MCLS ARE RELEVANT AND APPROPRIATE.

NEW HAMPSHIRE'S PROTECTION OF THE GROUNDWATER OF THE STATE REGULATIONS DO NOT ESTABLISH GROUNDWATER QUALITY STANDARDS, BUT DO ESTABLISH GROUNDWATER CRITERIA. INCLUDED IN THIS CRITERIA IS THE REQUIREMENT THAT NO PERSON SHALL CAUSE THE GROUNDWATER TO CONTAIN A SUBSTANCE AT A LEVEL THAT THE STATE DETERMINES MAY BE POTENTIALLY HARMFUL TO HUMAN HEALTH OR TO THE ENVIRONMENT. BECAUSE NEW HAMPSHIRE'S REGULATIONS DO NOT CONTAIN A STANDARD OR LEVEL OF CONTROL AS REQUIRED BY S 121(D)(2)(A)(II) OF CERCLA, THEY WILL NOT BE AN ARAR. THEY ARE, HOWEVER, TO BE CONSIDERED (TBCS) AND WILL BE MET. IN ADDITION, THE STATE OF NEW HAMPSHIRE DEPARTMENT OF PUBLIC HEALTH SERVICE CONSUMPTION ADVISORIES FOR WATER SUPPLIES HAVE BEEN DETERMINED TO BE CONSIDERED (TBCS) AND WERE USED IN ABSENCE OF AN MCLS IN SETTING SITE CLEANUP LEVELS FOR: PHENOL, 280 PPB AND TETRACHLOROETHENE, 3.5 PPB.

THIS REMEDY WILL ATTAIN THESE ARARS BY MEETING THE GROUNDWATER CLEANUP GOALS AT THE COMPLIANCE BOUNDARY THROUGH THE GROUNDWATER TREATMENT SYSTEM AND BY CAPPING THE SOURCE OF CONTAMINATION. CAPPING WILL CONTROL FURTHER LEACHATE OF CONTAMINANTS INTO THE GROUNDWATER FROM THE LANDFILL ITSELF. TREATING THE GROUNDWATER WILL REDUCE LEVELS OF CONTAMINATION AT THE COMPLIANCE BOUNDARY TO THE CLEANUP GOALS. ANY LEACHATE MIGRATING FROM THE LANDFILL WILL NOT CONTAMINATE THE GROUNDWATER AT LEVELS EXCEEDING THE ARARS. TREATED GROUNDWATER WILL ALSO MEET FEDERAL STANDARDS AND STATE CRITERIA FOR DRINKING WATER.

2. LOCATION SPECIFIC

A. FEDERAL AND STATE SURFACE WATER STANDARDS

THE EFFLUENT STANDARDS OF TITLE III OF THE FEDERAL WATER POLLUTION CONTROL ACT, AS AMENDED BY THE CLEAN WATER ACT OF 1977 (CWA) AND STATE SURFACE WATER DISCHARGE STANDARDS ARE APPLICABLE TO THE ACTION SINCE THE SELECTED REMEDY MAY INVOLVE DIRECT DISCHARGE TO SURFACE WATER RATHER THAN RECHARGE INTO THE AQUIFER. THE STATE'S WATER QUALITY STANDARDS ESTABLISH STANDARDS FOR SURFACE WATER QUALITY BASED ON THREE USE CLASSIFICATIONS. THESE STANDARDS INCORPORATE BY REFERENCE THE FEDERAL AMBIENT WATER QUALITY CRITERIA. THE SURFACE WATERS IN AN AROUND THE SITE ARE CLASSIFIED AS CLASS B WATERS WHICH ARE ACCEPTABLE FOR SWIMMING AND OTHER RECREATION, FISH HABITAT AND, AFTER ADEQUATE TREATMENT, USE AS WATER SUPPLIES.

TITLE III, ALONG WITH EXECUTIVE ORDERS 11990 (PROTECTION OF WETLANDS) AND STATE WETLAND STANDARDS ARE APPLICABLE TO THAT PORTION OF THE ACTION INVOLVING CONSOLIDATION OF 2,000 CUBIC YARDS OF SEDIMENT IN THE WETLAND UNDER THE CAP. THESE RULES PROHIBIT ACTIVITY ADVERSELY AFFECTING A WETLAND IF A PRACTICABLE ALTERNATIVE WHICH HAS LESS AFFECT IS AVAILABLE. CONSOLIDATING SEDIMENT IN THE WETLAND IS NECESSARY BECAUSE SOILS HAVE ERODED FROM THE TEMPORARY CAP ON THE LANDFILL AND FROM LANDFILL OPERATION ACTIVITIES, THEREBY DAMAGING PORTIONS OF THE WETLANDS. LEAVING THE WETLANDS IN THEIR PRESENT CONDITION FAILS TO RESTORE WETLANDS TO THEIR ORIGINAL BENEFICIAL USE AND FAILS TO MAINTAIN THE ADJACENT WETLANDS' WATER STORAGE CAPABILITIES. REMOVING LESS THAN 2,000 CUBIC YARDS FAILS TO CAPTURE ALL OF THE ERODED SEDIMENT PRESENTLY IN THE WETLANDS. CONSOLIDATION WILL BE CONDUCTED TO AVOID OR MINIMIZE THE DESTRUCTION, LOSS AND DEGRADATION OF SITE WETLANDS.

AFTER REVIEWING THE FEDERAL EMERGENCY MANAGEMENT AGENCY, FLOODPLAIN INSURANCE RATE MAPS FOR TOWNS OF NORTH HAMPTON, GREENLAND AND RYE, EPA HAS DETERMINED THAT THE SITE IS NOT LOCATED IN A 100-YEAR FLOODPLAIN. EXECUTIVE ORDER 11988 (FLOODPLAIN MANAGEMENT) IS THEREFORE NOT AN ARAR FOR THE COAKLEY LANDFILL SITE.

B. FEDERAL CLEAN AIR ACT AND NEW HAMPSHIRE AIR POLLUTION REGULATIONS

THE NATIONAL AMBIENT AIR QUALITY STANDARDS PROMULGATED UNDER THE CLEAN AIR ACT ARE RELEVANT AND APPROPRIATE TO THE CONTROL OF PARTICULATE MATTER DURING EXCAVATION, GROUNDWATER TREATMENT AND ACTIVE GAS COLLECTION AND TREATMENT. THE NEW HAMPSHIRE AIR QUALITY STANDARDS ARE SLIGHTLY MORE STRINGENT THAN FEDERAL REGULATIONS AND ARE THEREFORE APPLICABLE TO THE REMEDY. ALTHOUGH INITIAL AIR SAMPLING OFFSITE INDICATED AIRBORNE VOCS WERE BELOW THRESHOLD LIMIT VALUES, CONTROLS MAY BE NECESSARY TO PREVENT FUGITIVE DUST AND CHEMICAL EMISSIONS DURING REMEDIAL ACTION. THE USE OF BEST AVAILABLE CONTROL TECHNOLOGY WILL MEET THESE ARARS.

IN ADDITION, EPA GUIDANCE ON CONTROL OF AIR EMISSIONS (OSWER DIRECTIVE 9355.0-28, JUNE 15, 1989) IS TO BE CONSIDERED FOR THE SITE, WHICH IS IN AN NON-ATTAINMENT AREA. FOR SUCH AN AREA, THE DIRECTIVE INDICATES THE NEED FOR CONTROL OF VOC EMISSIONS FROM SUPERFUND AIR STRIPPERS AND SOIL VAPOR EXTRACTION SYSTEMS BASED UPON ACTUAL EMISSION RATES OF VOCS. GASES GENERATED BY AIR STRIPPING DURING THE GROUNDWATER TREATMENT PHASE AND GASES GENERATED BY THE LANDFILL WILL BE TREATED BY EITHER A CARBON ADSORPTION UNIT OR A THERMAL DESTRUCTION UNIT.

3. ACTION SPECIFIC

A. FEDERAL HAZARDOUS AND SOLID WASTE AMENDMENTS TO THE RESOURCE CONSERVATION AND RECOVERY ACT AND NEW HAMPSHIRE HAZARDOUS AND SOLID WASTE REGULATIONS.

THE STATE OF NEW HAMPSHIRE HAS BEEN AUTHORIZED BY EPA TO ADMINISTER AND ENFORCE RCRA PROGRAMS IN LIEU OF THE FEDERAL AUTHORITY. THE AUTHORIZED STATE HAZARDOUS WASTE REGULATIONS ARE EQUIVALENT TO OR MORE STRINGENT THAN THE FEDERAL RCRA REGULATIONS. COMPLIANCE WITH NEW HAMPSHIRE'S RCRA REGULATIONS IS DISCUSSED BELOW.

COMPLIANCE WITH RCRA DEPENDS ON WHETHER THE WASTES ARE RCRA HAZARDOUS WASTES AS DEFINED UNDER NEW HAMPSHIRE'S RCRA PROGRAM. WASTES AT THE SITE ARE SIMILAR ENOUGH TO RCRA WASTE TO MAKE THESE REGULATIONS APPROPRIATE AND RELEVANT TO THIS SITE.

THESE STANDARDS ARE APPROPRIATE AND RELEVANT TO THE DESIGN, MONITORING AND PERFORMANCE OF THE GROUNDWATER EXTRACTION AND TREATMENT SYSTEM, WHICH WILL HANDLE, TREAT AND DISPOSE OF HAZARDOUS MATERIALS. CLOSURE STANDARDS ARE ALSO APPROPRIATE AND RELEVANT TO CAPPING OF THE SITE. ONSITE HAZARDOUS AND SOLID WASTES WILL BE MANAGED IN ACCORDANCE WITH THESE ARARS, INCLUDING ADEQUATE SECURITY AND ADMINISTRATIVE MEASURES, INCLUDING INSPECTIONS, A GROUNDWATER MONITORING PROGRAM, A SITE CLOSURE AND POST CLOSURE PLAN AND A PUBLIC NOTIFICATION PLAN. SPECIFICALLY, THIS REMEDY WILL COMPLY WITH THE PROVISIONS OF NEW HAMPSHIRE'S HAZARDOUS WASTE MANAGEMENT ACT AT NH ADMIN. CODE HE-P CH. 1905 AND OF THE SOLID WASTE MANAGEMENT ACT, RSA CH. 149-M AND THE SOLID WASTE MANAGEMENT RULES, NH ADMIN. RULES HE-P CH. 1901 LISTED IN APPENDIX B, TABLES 17 AND 18.

SLUDGE GENERATED BY THE GROUNDWATER TREATMENT UNIT WILL BE TREATED AND/OR DISPOSED OF AT AN OFFSITE RCRA FACILITY IN ACCORDANCE WITH FEDERAL AND STATE REQUIREMENTS.

RCRA INCLUDES SPECIFIC PROVISIONS RESTRICTING THE PLACEMENT OF HAZARDOUS WASTE INTO A LAND-BASED UNIT, WHICH INCLUDES A LANDFILL. THE LAND DISPOSAL RESTRICTIONS (LDRS) ARE NOT ARARS FOR THE CONSOLIDATED SEDIMENT IN THE WETLAND UNDER THE CAP SINCE THIS ACTION DOES NOT INVOLVE PLACING HAZARDOUS WASTE IN A LAND-BASED UNIT. THE AREA OF CONTAMINATION AT COAKLEY IS COMPRISED OF THE SOUTHERN END OF THE LANDFILL AS WELL AS ADJOINING WETLANDS LOCATED AT THE NORTHWESTERN PART OF THE SITE. THE SEDIMENTS IN THE WETLANDS TO BE CONSOLIDATED ARE CONTIGUOUS TO THE SITE, UNINTERRUPTED BY ROADS, PATHS, RAILROAD TRACKS OR OTHER EASEMENTS OR RIGHTS OF WAYS. SEDIMENTS IN THE WETLAND RESULT PRIMARILY FROM THE EXISTING TEMPORARY

COVER WHICH HAS ERODED FROM THE SLOPES OF THE LANDFILL AND HAS FILLED IN THE WETLAND. GIVEN THE CONTIGUOUS LOCATION OF THE WETLANDS TO THE LANDFILL SUBJECTING IT TO EROSION, THE LANDFILL AND WETLANDS CONSTITUTE ONE AREA OF CONTAMINATION FOR CERCLA PURPOSES AND THUS ONE UNIT FOR LAND DISPOSAL PURPOSES. THEREFORE, MOVEMENT OF THE SEDIMENT IN THE WETLAND TO THE LANDFILL DOES NOT QUALIFY AS PLACEMENT BUT IS MERELY MOVEMENT WITHIN THE UNIT.

C. THE SELECTED REMEDIAL ACTION IS COST-EFFECTIVE

IN THE AGENCY'S JUDGMENT, THE SELECTED REMEDY, SC-4, IS COST EFFECTIVE, I.E., THE REMEDY AFFORDS OVERALL EFFECTIVENESS PROPORTIONAL TO ITS COSTS. ONCE EPA IDENTIFIED ALTERNATIVES THAT WERE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT AND THAT EITHER ATTAIN OR WAIVE ARARS, EPA EVALUATED THE OVERALL EFFECTIVENESS OF EACH ALTERNATIVE BY ASSESSING THE RELEVANT THREE CRITERIA - LONG TERM EFFECTIVENESS AND PERMANENCE; REDUCTION IN TOXICITY, MOBILITY, AND VOLUME THROUGH TREATMENT; AND SHORT TERM EFFECTIVENESS. THE RELATIONSHIP OF THE OVERALL EFFECTIVENESS OF THIS REMEDIAL ALTERNATIVE WAS DETERMINED TO BE PROPORTIONAL TO ITS COSTS.

A SUMMARY OF THE COSTS ASSOCIATED WITH EACH OF THE SOURCE CONTROL REMEDIES ARE PRESENTED BELOW. ALL COSTS ARE PRESENTED IN NET PRESENT COSTS.

COST COMPARISON OF SOURCE CONTROL ALTERNATIVES

	CAPITAL COSTS	O&M COSTS ($/YR)	*PRESENT WORTH
SC-1 NO ACTION	$820,000	43,000	2,120,000
SC-3 CAPPING INCLUDING CONSOLIDATION	8,800,000	80,000	11,200,000
SC-4 CAPPING/ONSITE GROUNDWATER TREATMENT	12,800,000	245,000	20,200,000
SC-5 CAPPING/OFFSITE TREATMENT AND DISPOSAL	13,200,000	190,000	18,900,000
SC-6 ONSITE SOLID WASTE/ TREATMENT AND DISPOSAL/ CAPPING	45,300,000	285,000	53,900,000

OF THE THREE ALTERNATIVES THAT ARE PROTECTIVE AND ATTAIN ARARS, SC-4, SC-5 AND SC-6, EPA'S SELECTED REMEDY, SC-4, COMBINES MOST COST-EFFECTIVE REMEDIAL ALTERNATIVE COMPONENTS THAT WERE EVALUATED. THE REMEDY PROVIDES A DEGREE OF PROTECTIVENESS PROPORTIONATE TO ITS COSTS. GROUNDWATER EXTRACTION AND TREATMENT WAS ESTIMATED TO BE SIGNIFICANTLY LESS COSTLY THAN INCINERATION AND/OR SOLIDIFICATION OF THE LANDFILL WASTE WHICH WOULD COST APPROXIMATELY 265 PERCENT MORE. TWO OF THE LESS EXPENSIVE ALTERNATIVES, SC-1 (NO-ACTION) AND SC-3 (CAPPING WITH CONSOLIDATION), DID NOT MEET ARARS SINCE CONTAMINATION ABOVE DRINKING WATER STANDARDS WOULD HAVE BEEN ALLOWED TO MIGRATE OFFSITE. ALTERNATIVE SC-5, OFFSITE TREATMENT AND DISPOSAL, ALTHOUGH LESS EXPENSIVE BUT COMPARABLE IN COSTS TO SC-4, WAS FOUND TO BE MORE DIFFICULT TO IMPLEMENT SINCE IT INVOLVES A MUNICIPAL WASTEWATER TREATMENT FACILITY ACCEPTING THE GROUNDWATER. ADDITIONALLY, THIS ALTERNATIVE MAY HAVE AN ADVERSE IMPACT ON THE WETLANDS ADJACENT TO THE SITE DUE TO THE REMOVAL OF SIGNIFICANT AMOUNTS OF GROUNDWATER FROM THE AREA.

A SUMMARY OF THE COSTS FOR EACH OF THE ELEMENTS OF THE SELECTED REMEDY ARE PRESENTED BELOW. ALL COST ARE NET PRESENT COSTS.

TOTAL COSTS OF SELECTED REMEDY

CONTAMINATED MEDIA/REMEDY	CAPITAL	O&M	TOTAL
SEDIMENT	$ 42,000	0	42,000
CAPPING	5,205,000	953,000	6,158,000
GROUNDWATER	7,523,000	6,447,000	13,970,000
TOTAL	12,770,000	7,390,000	20,160,000

TOTAL ESTIMATED COST: $ 20,200,000

D. THE SELECTED REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

ONCE THE AGENCY IDENTIFIED THOSE ALTERNATIVES THAT ATTAIN ARARS AND THAT ARE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, EPA IDENTIFIED WHICH ALTERNATIVE UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE. THIS DETERMINATION WAS MADE BY DECIDING WHICH ONE OF THE IDENTIFIED ALTERNATIVES PROVIDES THE BEST BALANCE OF TRADE-OFFS AMONG ALTERNATIVES IN TERMS OF: 1) LONG-TERM EFFECTIVENESS AND PERMANENCE; 2) REDUCTION OF TOXICITY, MOBILITY OR VOLUME THROUGH TREATMENT; 3) SHORT-TERM EFFECTIVENESS; 4)IMPLEMENTABILITY; AND 5) COST. THE BALANCING TEST EMPHASIZED LONG-TERM EFFECTIVENESS AND PERMANENCE AND THE REDUCTION OF TOXICITY, MOBILITY AND VOLUME THROUGH TREATMENT; AND CONSIDERED THE PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT, THE BIAS AGAINST OFFSITE LAND DISPOSAL OF UNTREATED WASTE, AND COMMUNITY AND STATE ACCEPTANCE. THE SELECTED REMEDY PROVIDES THE BEST BALANCE OF TRADE-OFFS AMONG THE ALTERNATIVES.

ALTERNATIVE SC-4 WAS SELECTED AS THE REMEDY BECAUSE ITS LONG-TERM EFFECTIVENESS AND PERMANENCE AND ITS ABILITY TO REDUCE TOXICITY, MOBILITY AND VOLUME OF CONTAMINANTS THROUGH GROUNDWATER TREATMENT WAS THE MOST EFFICIENT OF ALL ALTERNATIVES IN LIGHT OF IMPLEMENTABILITY AND COST CONCERNS. THE PRINCIPAL ELEMENTS OF THE REMEDY CONSIST OF REMOVING CONTAMINATION FROM THE GROUNDWATER UNDER AND AROUND THE LANDFILL BY COLLECTING AND TREATING THE GROUNDWATER THROUGH AIR STRIPPING PRIOR TO DISCHARGING IT BACK TO THE GROUND OR SURFACE WATER. THE AIR STRIPPING PROCESS, ALONG WITH CAPPING, IS A PROVEN TECHNIQUE WHICH PROVIDES A PERMANENT SOLUTION FOR CONTAMINATED GROUNDWATER AND HAS BEEN USED SUCCESSFULLY AT OTHER HAZARDOUS WASTE CLEANUP SITES.

THIS REMEDY WAS ALSO SELECTED OVER OTHER ALTERNATIVES BECAUSE OF ITS ABILITY TO ACHIEVE CLEANUP LEVELS AT A LOWER COST WITHOUT THE NECESSITY OF DIRECTLY TREATING SOLID WASTE. AS EXPLAINED PREVIOUSLY, THERE ARE NO IDENTIFIABLE AREAS OF HIGH CONCENTRATIONS OF CONTAMINANTS ONSITE; THUS THERE IS NO NEED TO EXCAVATE AND TREAT PARTICULAR AREAS OF THE LANDFILL. GROUNDWATER TREATMENT WILL EFFECTIVELY CONTROL MIGRATION OF CONTAMINANTS OFFSITE.

ALTERATIVE SC-5 IS SIMILAR TO SC-4 IN THAT IT IS EFFECTIVE IN THE LONG-TERM AND WILL REDUCE TOXICITY, MOBILITY AND VOLUME OF CONTAMINANTS. ALTERNATIVE SC-6 IS THE MOST EFFECTIVE IN BOTH OF THESE CATEGORIES. HOWEVER, WHEN IMPLEMENTABILITY AND COST ARE FACTORED IN, SC-4 BECOMES THE SELECTED REMEDY. "WHEN THE ALTERNATIVES PROVIDE SIMILAR LONG-TERM EFFECTIVENESS AND PERMANENCE AND REDUCTION OF TOXICITY, MOBILITY OR VOLUME, THE OTHER BALANCING CRITERIA ARISE TO DISTINGUISH THE ALTERNATIVES AND PLAY A MORE SIGNIFICANT ROLE IN SELECTING THE REMEDY. NCP PREAMBLE, 55 FED. REG. 8725 (1990). ALTERNATIVE SC-5 WAS NOT SELECTED BECAUSE IT INVOLVES OFFSITE TREATMENT AND DISPOSAL OF GROUNDWATER AT A PUBLICLY OWNED TREATMENT PLANT. THIS COMPONENT COULD BE VERY DIFFICULT TO IMPLEMENT SINCE IT INVOLVES MUNICIPAL ACCEPTANCE OF GROUNDWATER. SC-6 WAS NOT SELECTED BECAUSE THE LARGE VOLUME OF LOW CONCENTRATION LEVELS OF CONTAMINANTS DID NOT JUSTIFY THE COST OF SOLIDIFICATION/INCINERATION.

E. THE SELECTED REMEDY SATISFIES THE PREFERENCE FOR TREATMENT WHICH PERMANENTLY AND SIGNIFICANTLY REDUCES THE TOXICITY, MOBILITY OR VOLUME OF THE HAZARDOUS SUBSTANCES AS A PRINCIPAL ELEMENT

THE PRINCIPAL ELEMENT OF THE SELECTED SOURCE CONTROL REMEDY IS GROUNDWATER TREATMENT. THIS ELEMENT ADDRESSES THE PRIMARY THREAT AT THE SITE, CONTAMINATION OF THE GROUNDWATER WITH VOCS AND METALS. THE SELECTED REMEDY SATISFIES THE STATUTORY PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT BY TREATING THE EXTRACTED GROUNDWATER IN TREATMENT PROCESSES WHICH RESULT IN THE REMOVAL OF VOCS AND METALS.

#SR

XIII. STATE ROLE

THE STATE OF NEW HAMPSHIRE, DEPARTMENT OF ENVIRONMENTAL SERVICES (DES) HAS REVIEWED THE VARIOUS ALTERNATIVES AND INDICATED ITS SUPPORT FOR THE SELECTED REMEDY. THE STATE HAS ALSO REVIEWED THE REMEDIAL INVESTIGATION, RISK ASSESSMENT AND THE FEASIBILITY STUDY TO DETERMINE IF THE SELECTED REMEDY IS IN COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE STATE ENVIRONMENTAL LAWS AND REGULATIONS. THE NEW HAMPSHIRE DES CONCURS WITH THE SELECTED REMEDY FOR THE COAKLEY LANDFILL SUPERFUND SITE. A COPY OF THE DECLARATION OF CONCURRENCE IS ATTACHED AS APPENDIX D.

#RS

RESPONSIVENESS SUMMARY

COAKLEY LANDFILL RESPONSIVENESS SUMMARY

THE US ENVIRONMENTAL PROTECTION AGENCY (EPA) HELD A 60 DAY PUBLIC COMMENT PERIOD FROM MARCH 16, 1990 TO MAY 14, 1990 TO PROVIDE AN OPPORTUNITY FOR INTERESTED PARTIES TO COMMENT ON THE REMEDIAL INVESTIGATION (RI), HEALTH ASSESSMENT, FEASIBILITY STUDY (FS) AND THE PROPOSED PLAN PREPARED FOR THE COAKLEY LANDFILL SUPERFUND SITE (THE SITE) IN NORTH HAMPTON, NEW HAMPSHIRE. EPA MADE A PRELIMINARY RECOMMENDATION OF ITS PREFERRED ALTERNATIVE FOR SITE REMEDIATION IN THE PROPOSED PLAN ISSUED ON MARCH 2, 1990, BEFORE THE START OF THE PUBLIC COMMENT PERIOD.

THE PURPOSE OF THIS RESPONSIVENESS SUMMARY IS TO DOCUMENT EPA'S RESPONSES TO COMMENTS AND QUESTIONS RAISED DURING THE PUBLIC COMMENT PERIOD. EPA CONSIDERED ALL OF THE COMMENTS SUMMARIZED IN THIS DOCUMENT BEFORE SELECTING A FINAL REMEDIAL ALTERNATIVE TO ADDRESS CONTAMINATION AT THE SITE.

THIS RESPONSIVENESS SUMMARY IS ORGANIZED INTO THE FOLLOWING SECTIONS:

1. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY AND PROPOSED PLAN - THIS SECTION BRIEFLY OUTLINES THE REMEDIAL ALTERNATIVES EVALUATED IN THE FS AND PROPOSED PLAN, INCLUDING EPA'S PRELIMINARY RECOMMENDATION OF A PREFERRED ALTERNATIVE.

2. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS. THIS SECTION PROVIDES A BRIEF SITE HISTORY, AND A GENERAL OVERVIEW OF COMMUNITY INTERESTS AND CONCERNS REGARDING THE SITE.

3. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS - THIS SECTION SUMMARIZES AND PROVIDES EPA'S RESPONSES TO THE COMMENTS RECEIVED FROM RESIDENTS AND OTHER INTERESTED PARTIES DURING THE PUBLIC COMMENT PERIOD. ADDITIONALLY, COMMENTS RECEIVED FROM THE POTENTIALLY RESPONSIBLE PARTIES (PRPS) ARE SUMMARIZED AND EPA'S RESPONSES TO THE COMMENTS ARE PROVIDED.

4. REMAINING CONCERNS - THIS SECTION SUMMARIZES COMMENTS RAISED DURING THE PUBLIC COMMENT PERIOD THAT CANNOT BE FULLY ADDRESSED AT THIS STAGE OF THE SUPERFUND PROCESS BUT WHICH CONTINUE TO BE OF CONCERN DURING THE DESIGN AND IMPLEMENTATION OF EPA'S SELECTED REMEDY FOR THE SITE. EPA RESPONDS TO THESE COMMENTS AND WILL ADDRESS THESE CONCERNS DURING THE REMEDIAL DESIGN AND REMEDIAL ACTION (RD/RA) PHASE OF THE CLEANUP PROCESS.

ATTACHMENT A - LIST OF COMMUNITY RELATIONS ACTIVITIES THAT EPA HAS CONDUCTED TO DATE AT THE SITE.

ATTACHMENT B - POTENTIALLY RESPONSIBLE PARTIES' COMMENTS.

ATTACHMENT C - TRANSCRIPT OF THE APRIL 3, 1990 INFORMAL PUBLIC HEARING ON THE SITE, HELD IN NORTH HAMPTON, NEW HAMPSHIRE.

1. OVERVIEW OF REMEDIAL ALTERNATIVES CONSIDERED IN THE FEASIBILITY STUDY AND PROPOSED PLAN

USING INFORMATION GATHERED DURING THE REMEDIAL INVESTIGATION (RI) (AN INVESTIGATION OF THE NATURE AND EXTENT OF BOTH ONSITE AND OFFSITE CONTAMINATION) AND THE RISK ASSESSMENT (AN ASSESSMENT OF THE POTENTIAL RISKS TO HUMAN HEALTH AND THE ENVIRONMENT ASSOCIATED WITH SITE CONTAMINATION), EPA IDENTIFIED SEVERAL CLEANUP OBJECTIVES FOR THE SITE.

THE PRIMARY CLEANUP OBJECTIVE IS TO REDUCE THE RISKS TO PUBLIC HEALTH AND THE ENVIRONMENT POSED BY EXPOSURE TO THE SOURCE OF CONTAMINATION ONSITE OR TO CONTAMINATION THAT MAY POTENTIALLY MIGRATE, OFFSITE. CLEANUP GOALS FOR GROUNDWATER AND SOILS ARE SET AT LEVELS THAT EPA CONSIDERS TO BE PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT.

AFTER IDENTIFYING THE CLEANUP OBJECTIVES, EPA DEVELOPED AND EVALUATED POTENTIAL CLEANUP ALTERNATIVES, CALLED REMEDIAL ALTERNATIVES. THE FEASIBILITY STUDY (FS) DESCRIBES THE REMEDIAL ALTERNATIVES CONSIDERED TO ADDRESS CONTAMINATION FROM SOIL WASTE, ONSITE GROUNDWATER AND SEDIMENT CONTAMINATION AND OFFSITE MIGRATION. THE FS ALSO DESCRIBES THE CRITERIA EPA USED TO NARROW THE RANGE OF ALTERNATIVES TO FIVE POTENTIAL SOURCE CONTROL (SC) REMEDIAL ALTERNATIVES. THE THREE POTENTIAL MANAGEMENT OF MIGRATION (MM) REMEDIAL ALTERNATIVES REVIEWED IN THE FS ARE NOT ADDRESSED BY THIS RECORD OF DECISION. HOWEVER, AN ADDITIONAL STUDY AND A SECOND RECORD OF DECISION WILL FOLLOW IN ORDER TO PROPERLY DEFINE THE EXTENT OF CONTAMINATION AND, SUBSEQUENTLY, TO REMEDIATE THE MIGRATED CONTAMINATION RELATED TO THE COAKLEY LANDFILL.

EPA'S PRELIMINARY RECOMMENDATION OF A PREFERRED ALTERNATIVE TO ADDRESS THE SITE CONTAMINATION INVOLVES CONSOLIDATION OF THE SOLID WASTE AND SEDIMENTS IN THE WETLANDS FOLLOWED BY CAPPING OF THE LANDFILL, COLLECTION AND TREATMENT OF LANDFILL GASES AND THE EXTRACTION AND TREATMENT OF ONSITE GROUNDWATER.

REMEDIAL ALTERNATIVES EVALUATED IN THE FS

THE FIVE REMEDIAL ALTERNATIVES CONSIDERED FOR SOURCE CONTROL BY EPA ARE LISTED BELOW. THE FEBRUARY 1990 PROPOSED PLAN SHOULD BE CONSULTED FOR A DETAILED EXPLANATION OF THESE REMEDIAL ALTERNATIVES AS WELL AS EPA'S PREFERRED ALTERNATIVE.

ALTERNATIVES TO ADDRESS SOURCE CONTROL

ALTERNATIVE SC-1:	NO ACTION
ALTERNATIVE SC-3:	CONSOLIDATION AND CAPPING
ALTERNATIVE SC-4:	CAPPING/ONSITE GROUNDWATER TREATMENT/ONSITE DISPOSAL (EPA HAS RECOMMENDED THIS AS THE PREFERRED ALTERNATIVE.)
ALTERNATIVE SC-5:	CAPPING/ONSITE GROUNDWATER PRETREATMENT/OFFSITE GROUNDWATER TREATMENT AND DISPOSAL
ALTERNATIVE SC-6:	ONSITE SOLID WASTE/GROUNDWATER TREATMENT AND DISPOSAL/CAPPING

II. SITE HISTORY AND BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

THE COAKLEY LANDFILL SUPERFUND SITE IS SITUATED ON APPROXIMATELY 92 ACRES OF LAND WITHIN THE TOWNS OF GREENLAND AND NORTH HAMPTON, NEW HAMPSHIRE. IT IS LOCATED WEST OF LAFAYETTE ROAD (US ROUTE 1) AND BORDERED ON THE NORTH BY BREAKFAST HILL ROAD. THE LANDFILL ITSELF COVERS APPROXIMATELY 27 ACRES AND IS SITUATED WITHIN THE SOUTHERNMOST PORTION OF THE SITE.

IN 1971, THE NEW HAMPSHIRE DEPARTMENT OF PUBLIC HEALTH GRANTED THE TOWN OF NORTH HAMPTON A PERMIT TO OPERATE A LANDFILL ON THE COAKLEY SITE. THE COAKLEY LANDFILL ACCEPTED MUNICIPAL AND INDUSTRIAL WASTE FROM THE PORTSMOUTH AREA FROM EARLY 1972 THROUGH 1983 AND INCINERATOR RESIDUE GENERATED BY AN INCINERATOR LOCATED AT PEASE AIR FORCE BASE FROM 1982 THROUGH 1985. THE LANDFILL STOPPED ACCEPTING MATERIAL IN JULY 1985. A TEMPORARY CAP WAS EVENTUALLY PLACED ON THE LANDFILL.

IN EARLY 1983 THE NEW HAMPSHIRE DEPARTMENT OF ENVIRONMENTAL SERVICES (DES) (FORMERLY THE WATER SUPPLY AND POLLUTION CONTROL COMMISSION, OR WSPCC) RECEIVED A COMPLAINT FROM A RESIDENT OF LAFAYETTE TERRACE, NEAR THE SOUTHEASTERN CORNER OF THE COAKLEY LANDFILL, CONCERNING DRINKING WATER QUALITY IN A RESIDENTIAL WELL. THE ANALYSIS DETERMINED THAT THE WELL WAS CONTAMINATED WITH VOLATILE ORGANIC COMPOUNDS (VOCS).

SUBSEQUENT SAMPLING OF RESIDENTIAL WELLS BY DES DETECTED ADDITIONAL AREAS OF VOC CONTAMINATION TO THE SOUTH, NORTHEAST, AND SOUTHEAST, OF THE COAKLEY LANDFILL SITE. AS A RESULT OF THESE FINDINGS, WATER SUPPLY DISTRIBUTION LINES WERE EXTENDED INTO THE AREA IN MARCH 1983.

IN DECEMBER 1983 THE SITE WAS PLACED ON EPA'S NATIONAL PRIORITIES LIST (NPL) MAKING IT ELIGIBLE TO RECEIVE FEDERAL SUPERFUND MONEY FOR INVESTIGATION AND CLEANUP. THE RI WAS CONDUCTED AT THE SITE FROM APRIL 1986 TO MAY 1987.

IN GENERAL, RESULTS OF THE RI INDICATED THAT VOCS AND METALS WERE OBSERVED TO BE THE PREDOMINANT CONTAMINANTS WITHIN THE LANDFILL AND IN THE OVERBURDEN AND BEDROCK WELLS UNDER AND IMMEDIATELY ADJACENT TO THE LANDFILL.

USING DATA COLLECTED DURING THE RI, EPA DEVELOPED A FS THAT INCLUDED THE INITIAL SCREENING OF THE SOURCE CONTROL (SC) REMEDIAL ALTERNATIVES AND THE MANAGEMENT OF MIGRATION (MM) REMEDIAL ALTERNATIVES.

FOREMOST CONCERNS OF TOWN RESIDENTS FOCUS ON THE POTENTIAL HEALTH RISKS TO RESIDENTS LIVING NEAR THE SITE, THE DELAY IN ACTION TOWARD SITE CLEANUP, THE COST AND RESPONSIBILITY FOR CLEANING UP THE SITE, AND THE PROPOSED CLEANUP METHOD. RESIDENTS BELIEVE THAT CONTAMINATION FROM THE SITE CAUSED AND MAY CAUSE SERIOUS HEALTH PROBLEMS IN THE AREA AND FEEL THAT THE HEALTH ASSESSMENT COMPLETED IN OCTOBER 1988 BY AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR) IS INSUFFICIENT. RESIDENTS ARE ALSO CONCERNED THAT CONTINUED DELAYS IN SITE CLEANUP MAY RESULT IN FURTHER MIGRATION OF CONTAMINATION FROM THE SITE, CAUSING AN INCREASE IN POTENTIAL HEALTH RISKS. ANOTHER CONCERN OF AREA RESIDENTS IS COST AND RESPONSIBILITY FOR SITE CLEANUP. RESIDENTS FEEL THAT THE STATE AND EPA ARE SPENDING TOO MUCH TIME AND MONEY TO DETERMINE COST AND RESPONSIBILITY RATHER THAN TAKING ACTION TO CLEAN UP THE SITE. FINALLY, MANY RESIDENTS HAVE EXPRESSED CONCERN THAT EPA'S PROPOSED REMEDIAL ALTERNATIVE WILL NOT ADDRESS SITE CLEANUP EFFECTIVELY.

THE COAKLEY LANDFILL STEERING COMMITTEE (COMMITTEE) RAISED CONCERNS ABOUT MIGRATION AND COMMINGLING OF CONTAMINATION, THE COST OF THE REMEDIAL ACTION, AND OVERESTIMATION OF THE RISK ASSESSMENT. IN PARTICULAR, THE COMMITTEE FEELS THAT THE SELECTED REMEDY WILL DRAW IN CONTAMINATION FROM SOURCES OTHER THAN THE COAKLEY LANDFILL. THE COMMITTEE ALSO FEELS THAT THE SELECTED REMEDY IS TOO COSTLY IN THAT IT INCORPORATES GROUNDWATER TREATMENT WITHOUT JUSTIFICATION. THE COMMITTEE CLAIMS THAT THE RISK ASSESSMENT IS EXAGGERATED BECAUSE OF OVERESTIMATES OF EXPOSURE TO CONTAMINANT LEVELS FOUND AT THE SITE.

A COMPLETE LIST OF COMMUNITY RELATIONS ACTIVITIES CONDUCTED AT THE SITE IS INCLUDED IN ATTACHMENT A AT THE END OF THIS DOCUMENT.

III. SUMMARY OF COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD AND EPA RESPONSES TO THESE COMMENTS

THIS RESPONSIVENESS SUMMARY SUMMARIZES THE COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD HELD FROM MARCH 16, 1990 TO MAY 14, 1990. TEN SETS OF WRITTEN COMMENTS WERE RECEIVED: FIVE FROM INDIVIDUAL RESIDENTS (INCLUDING A PETITION WITH 14 SIGNATURES PRESENTED BY A LOCAL YOUTH), THREE FROM REPRESENTATIVES OF CITIZENS' GROUPS (INCLUDING A PETITION WITH APPROXIMATELY 568 SIGNATURES FROM THE CITIZENS' GROUP, C.O.A.S.T), ONE FROM A PUBLIC DRINKING WATER SUPPLIER, AND ONE FROM THE COAKLEY LANDFILL STEERING COMMITTEE (PRP COMMENTS). FIVE SETS OF THE WRITTEN COMMENTS RECEIVED BY EPA, WERE ALSO PRESENTED ORALLY AT THE INFORMAL PUBLIC HEARING HELD ON APRIL 3, 1990. IN ADDITION, FOUR OTHER PEOPLE MADE COMMENTS ORALLY AT THE INFORMAL PUBLIC HEARING. ALL OF THESE COMMENTS ARE SUMMARIZED BELOW. THE PRP COMMENTS ARE INCLUDED AS ATTACHMENT B. A COPY OF THE TRANSCRIPT FROM THE INFORMAL PUBLIC HEARING IS INCLUDED AS ATTACHMENT C OF THIS DOCUMENT AND IS AVAILABLE IN THE ADMINISTRATIVE RECORD LOCATED AT THE SITE INFORMATION REPOSITORIES AT THE NORTH HAMPTON PUBLIC LIBRARY NORTH HAMPTON, NEW HAMPSHIRE AND AT THE EPA RECORDS CENTER, 90 CANAL STREET, BOSTON, MASSACHUSETTS.

A. SUMMARY OF RESIDENT AND CITIZEN GROUP COMMENTS

COMMENTS FROM RESIDENTS AND CONCERNED CITIZENS' GROUPS ARE SUMMARIZED BELOW. THE COMMENTS ARE ORGANIZED INTO THE FOLLOWING CATEGORIES:

1. COMMENTS REGARDING EPA AND STATE RESPONSE TO SITE CLEANUP
2. COMMENTS REGARDING SITE TESTING PROCEDURES
3. COMMENTS REGARDING REMEDIAL ALTERNATIVES
4. COMMENTS REGARDING HEALTH RISKS
5. COMMENTS REGARDING PRPS

1. COMMENTS REGARDING EPA AND STATE RESPONSE TO SITE CLEANUP

COMMENT A: SEVERAL COMMENTORS STATED THAT EPA AND THE STATE OF NEW HAMPSHIRE ARE NOT ADDRESSING SITE CLEANUP IN A TIMELY MANNER AND REQUESTED THAT CLEANUP BEGIN IMMEDIATELY TO AVOID POSSIBLE SPREAD OF CONTAMINATION TO THE MUNICIPAL WATER SUPPLY OR EVENTUALLY TO THE SEACOAST.

EPA RESPONSE: EPA RECOGNIZES PUBLIC FRUSTRATION WITH THE LENGTHY SUPERFUND PROCESS; HOWEVER, EPA AND THE STATE ARE REQUIRED TO CONDUCT THE INVESTIGATION OF THE COAKLEY LANDFILL IN ACCORDANCE WITH THE SUPERFUND LAW (CERCLA) AND WITH THE REGULATIONS AND GUIDANCE DOCUMENTS PROMULGATED UNDER THAT LAW. THE INVESTIGATION AND CLEANUP PROCESS IS COMPLEX AND LENGTHY. THIS ENSURES THOROUGHNESS IN ADDRESSING SITE CONTAMINATION. EPA EVALUATES ALL SUPERFUND SITES DURING VARIOUS INVESTIGATORY STAGES TO ENSURE THAT NO RELEASES OCCUR WHICH COULD EXACERBATE ANY POTENTIAL PUBLIC HEALTH OR ENVIRONMENTAL PROBLEMS. SHOULD SUCH A RELEASE OCCUR, OR IF ONE IS LIKELY TO OCCUR, EPA CAN TAKE IMMEDIATE ACTION UNDER ITS EMERGENCY REMOVAL PROGRAM.

THE IMMEDIATE THREAT TO THE LOCAL PUBLIC HEALTH IS FROM CONSUMPTION OF GROUNDWATER FROM PRIVATE WELLS IN THE AREA OF THE COAKLEY LANDFILL. THIS THREAT WAS ELIMINATED WHEN THE TOWN OF NORTH HAMPTON EXTENDED PUBLIC DRINKING WATER LINES TO AFFECTED RESIDENTS OF LAFAYETTE TERRACE IN MARCH 1983 AND TO BIRCH AND NORTH ROADS IN 1986. THE RYE WATER DISTRICT COMPLETED A WATER MAIN IN 1983 ALONG WASHINGTON AND DOW LANES. HOUSEHOLDS CHOOSING NOT TO HOOK UP TO PUBLIC WATERS AND WHICH WERE LOCATED WITHIN A POTENTIAL IMPACT AREA WERE MONITORED DURING THE RI/FS PROCESS. THEY CONTINUE TO BE SAMPLED TO DATE.

IN 1988 CONCERNS WERE RAISED REGARDING INCINERATOR ASH EXPOSED BY WIND AND RAIN EROSION AT THE SURFACE OF THE LANDFILL. FOLLOWING TESTING BY THE EPA AND A HEALTH RISK ANALYSIS OF THE SITE BY THE AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR), THE SITE'S TEMPORARY COVER WAS REPAIRED UNDER AN ADMINISTRATIVE ORDER ISSUED BY THE NH DES.

COMMENT B: ONE COMMENTOR EXPRESSED CONCERN THAT THE STATE MIGHT BE WITHHOLDING INFORMATION ABOUT SITE CONTAMINATION, HAS NOT BEEN RESPONSIVE TO CITIZENS' REQUESTS FOR INFORMATION ABOUT THE SITE, AND HAS GENERALLY IGNORED THE NEEDS AND DEMANDS OF LOCAL RESIDENTS.

EPA RESPONSE: THIS COMMENT IS DIRECTED AT THE STATE, NOT EPA. HOWEVER, EPA IS NOT AWARE THAT NH DES IS WITHHOLDING ANY INFORMATION REGARDING THE EXTENT OF CONTAMINATION AT THE COAKLEY LANDFILL SITE.

NH DES RESPONSE: ALL INFORMATION GENERATED BY NH DES WITH RESPECT TO THE SITE, INCLUDING DOMESTIC WELL WATER QUALITY ANALYSIS, HEALTH RISK ASSESSMENTS, INSPECTION REPORTS, AND INVESTIGATION REPORTS DONE BY STATE OR FEDERAL AGENCIES ARE AVAILABLE TO THE PUBLIC, EITHER AT THE CONCORD OFFICES OF THE NH DES OR AT THE SITE INFORMATION REPOSITORY IN THE NORTH HAMPTON LIBRARY. REQUEST FOR FILE REVIEWS AT THE CONCORD OFFICE CAN BE MADE THROUGH THE WASTE MANAGEMENT DIVISION AT 271-2919. SOME DOCUMENTS ARE NOT AVAILABLE TO THE PUBLIC DUE TO THEIR ENFORCEMENT SENSITIVE NATURE OR AS SPECIFIED BY STATE LAW.

COMMENT C: ONE COMMENTOR REQUESTED THAT THE QUALIFICATIONS AND PAST EXPERIENCE OF THE PROJECT MANAGERS BE PLACED IN THE PUBLIC RECORD AS PROOF OF QUALIFICATIONS FOR THE POSITION.

EPA RESPONSE: EPA DOES NOT CONSIDER IT APPROPRIATE OR NECESSARY TO RELEASE PERSONAL INFORMATION REGARDING ITS EMPLOYEES INCLUDING QUALIFICATIONS OF SUPERFUND SITE MANAGERS. REGION I HAS ESTABLISHED A MANAGEMENT PROCESS FOR EVALUATING MAJOR DECISIONS BY REVIEW TEAMS ON ALL SUPERFUND SITES. THESE REVIEW TEAMS CONSIST OF EMPLOYEES WITH A RANGE OF EXPERTISE TO ENSURE APPROPRIATENESS AND CONFORMITY WITH THE SUPERFUND LAW AND ITS REGULATIONS.

COMMENT D: ONE COMMENTOR STATED THAT MORE THAN THE SUPERFUND LAW AND REGULATIONS SHOULD BE USED TO RESOLVE THE PROBLEMS AT THE SITE. HE WANTED EPA TO REPORT ON OTHER REGULATIONS, PROCEDURES, STATE AND LOCAL AGENCIES, AND OTHER ORGANIZATIONS THAT COULD BE USED TO ANALYZE AND IMPLEMENT REMEDIES FOR SITE CLEANUP.

EPA RESPONSE: THE SUPERFUND LAW REQUIRES EPA TO COMPLY WITH ALL FEDERAL AND STATE LAWS WHICH ARE APPLICABLE OR APPROPRIATE AND RELEVANT TO THE SITE CLEANUP. INCLUDED IN TABLES 2-1, 2-2 AND 2-3, PAGES 2-2 TO 2-9 OF THE FEASIBILITY STUDY ARE EXTENSIVE LISTS OF ALL THE VARIOUS LAWS, REGULATIONS AND GUIDANCES WHICH HAVE BEEN IDENTIFIED AND INCLUDED IN THE DECISION-MAKING PROCESS FOR THE COAKLEY LANDFILL.

IN ADDITION TO IDENTIFYING THESE STATE LAWS, NH DEPARTMENT OF ENVIRONMENTAL SERVICES HAS BEEN AN INTEGRAL PART IN DEVELOPING TECHNICAL INFORMATION AT THE SITE AND IN CHOOSING THE PREFERRED ALTERNATIVE. AN ENVIRONMENTAL ENGINEERING FIRM, ROY F. WESTON, INC., PERFORMED THE RI/FS UNDER A STATE CONTRACT. LOCAL AGENCIES, OTHER ORGANIZATIONS AND INTERESTED PARTIES WERE GIVEN THE OPPORTUNITY TO COMMENT DURING DESIGNATED COMMENT PERIODS AS PRESCRIBED BY THE SUPERFUND LAW. FINALLY, THE EPA HELD A PUBLIC COMMENT PERIOD LASTING 60-DAYS FROM MARCH 16 TO MAY 14, 1990 TO ACCEPT COMMENTS ON EPA'S PREFERRED ALTERNATIVE AS OUTLINED IN THE PROPOSED PLAN AND THE RI/FS.

COMMENT E: A COMMENTOR ASKED IF THE TRANSCRIPT FROM THIS MEETING, THE CHEMICAL ANALYSIS RESULTS FROM SAMPLES TAKEN AT THE LANDFILL, AND OTHER EPA FINDINGS WOULD BECOME PUBLIC INFORMATION.

EPA RESPONSE: INFORMATION CONCERNING THE SITE HAS BEEN AVAILABLE SINCE THE ADMINISTRATIVE RECORD WAS ISSUED IN MAY, 1988. THE TRANSCRIPT OF THE APRIL 3, 1990 INFORMAL PUBLIC HEARING IS ATTACHED TO THIS DOCUMENT IN ATTACHMENT C. VALIDATED RESULTS OF CHEMICAL ANALYSES PERFORMED AT THE SITE FOR THE RI/FS ARE IN THE ADMINISTRATIVE RECORD. RESULTS OF ADDITIONAL SAMPLING PERFORMED ON LOCAL RESIDENTIAL WELLS CAN BE OBTAINED BY CONTACTING THE NH DES IN CONCORD, NEW HAMPSHIRE. THE ADMINISTRATIVE RECORD IS LOCATED AT THE NORTH HAMPTON LIBRARY, NORTH HAMPTON, NEW HAMPSHIRE AND AT THE EPA RECORDS CENTER IN BOSTON, MASSACHUSETTS.

2. COMMENTS REGARDING SITE TESTING PROCEDURES

COMMENT A: TWO COMMENTORS QUESTIONED WHETHER THE STATE AND EPA DOCUMENTED WELL TESTING ON A REGULAR BASIS FROM 1983 TO THE PRESENT. THE COMMENTORS STATED THAT WELLS RW-25, 26, 27, AND 28 WERE TESTED IN FEBRUARY AND MARCH OF 1983, AND THAT THESE WERE THE ONLY TESTS EVER ACTUALLY DONE.

EPA RESPONSE: THE DATES FOR THE VARIOUS SAMPLING EVENTS AT THE SITE DURING THE RI, THE RESULTING DATA AND ADDITIONAL SAMPLING ARE IN THE RI. THIS INFORMATION IS INCLUDED IN THE ADMINISTRATIVE RECORD.

NH DES RESPONSE: RESIDENTIAL WELLS IDENTIFIED IN THE REMEDIAL INVESTIGATION AS RW-25, 26, 27 AND 28 WERE ALL WELLS ON LAFAYETTE TERRACE. RW-25, 26 AND 28 WERE SAMPLED TWICE IN 1983, RW-27 WAS SAMPLED THREE TIMES IN 1983. A FOURTH SAMPLING OF RW-27 REPORTED IN TABLE 37 IN THE RI AND SHOWN ON FIGURE NO. 20, LISTING ANOTHER ANALYSIS IN 1987, IS NOT SUBSTANTIATED BY RECORDS IN THE PROJECT FILES. ALTHOUGH THERE WAS A SAMPLING ROUND TAKEN JULY 28 AND 29, 1987 NEITHER THE CHAIN OF CUSTODY FORM NOR THE LAB REPORTS MENTION A WELL SAMPLED AT LAFAYETTE TERRACE.

COMMENT B: ONE COMMENTOR QUESTIONED THE ACCURACY OF CONTAMINATION LEVELS REPORTED BASED ON TESTING DONE WHILE THE GROUND WAS FROZEN. THE COMMENTOR ALSO ASKED WHAT POSSIBLE HEALTH RISKS MAY EXIST FROM HAVING

DRUNK CONTAMINATED WELL WATER OVER AN EXTENDED PERIOD OF TIME.

EPA RESPONSE: SEASONAL WEATHER CONDITIONS DO NOT ADVERSELY EFFECT THE QUALITY AND ACCURACY OF GROUNDWATER DATA COLLECTION. FLUCTUATIONS IN AIR AND NEAR SURFACE SOIL TEMPERATURES HAVE MINIMAL EFFECT ON GROUNDWATER QUALITY.

THE HEALTH RISK FROM DRINKING THE CONTAMINATED GROUNDWATER OVER AN EXTENDED PERIOD OF TIME HAS ACTUALLY BEEN CALCULATED IN THE RISK ASSESSMENT PORTION OF THE RI. RISK ESTIMATES WERE BASED ON CONSERVATIVE ASSUMPTIONS. SPECIFICALLY, THE HEALTH RISKS FOR CONSUMPTION OF GROUNDWATER WERE BASED ON AN ADULT CONSUMING TWO LITERS OF WATER PER DAY FOR SEVENTY YEARS. SINCE THE COAKLEY LANDFILL STARTED OPERATION IN 1972 AND LOCAL RESIDENTS WERE SUPPLIED MUNICIPAL DRINKING WATER BY MARCH 1983, ANY POSSIBLE EXPOSURES FROM DRINKING CONTAMINATED GROUNDWATER DURING THIS PERIOD ARE EXPECTED TO POSE RISKS LESS THAN THOSE QUANTIFIED IN THE RISK ASSESSMENT. THE ATSDR STATED THERE IS NO TEST AVAILABLE TO EVALUATE PAST EXPOSURE.

COMMENT C: A COMMENTOR WANTED TO KNOW SPECIFICALLY WHAT WAS DUMPED INTO THE NORTH HAMPTON LANDFILL BY GOVERNMENT INSTALLATIONS.

EPA RESPONSE: ASH FROM AN INCINERATOR OPERATED BY THE CITY OF PORTSMOUTH WAS DISPOSED OF AT THE SITE. TRASH AND WASTES FROM SURROUNDING COMMUNITIES AS WELL AS FROM PEASE AFB WERE SENT TO THIS INCINERATOR. EPA HAS REASON TO BELIEVE THAT PEASE AFB AND PORTSMOUTH NAVAL YARD DISPOSED OF MATERIAL AT THE SITE. SPECIFICALLY WHAT WAS DUMPED AT THE SITE IS CURRENTLY CONSIDERED ENFORCEMENT SENSITIVE AND CANNOT BE RELEASED AT THIS TIME.

COMMENT D: A COMMENTOR EXPRESSED CONCERN ABOUT CONTAMINATION FOUND IN A MONITORING WELL ABUTTING HIS PROPERTY. HE HAD PLANNED TO DIG TWO NEW WATER SUPPLY WELLS ON HIS PROPERTY BUT IS WORRIED ABOUT POSSIBLE CONTAMINATION OF THESE NEW WELLS. THE COMMENTOR ALSO EXPRESSED CONCERN THAT HE WAS UNABLE TO SELL OR RENT HIS PROPERTY DUE TO ITS PROXIMITY TO THE COAKLEY LANDFILL SITE.

EPA RESPONSE: EPA BELIEVES CONTAMINANTS IN THE WELLS LOCATED TO THE NORTH/NORTHEAST OF THE COAKLEY LANDFILL PROPERTY MAY COME FROM OTHER SOURCES. TRIHALOMETHANES, WHICH WERE FOUND IN THE COMMENTOR'S DRINKING WATER WELL, WERE NOT FOUND IN THE GROUNDWATER UNDER AND AROUND THE COAKLEY LANDFILL. ALSO, GROUNDWATER FLOW FROM THE LANDFILL TENDS TO MOVE IN A WESTERLY DIRECTION.

3. COMMENTS REGARDING REMEDIAL ALTERNATIVES

COMMENT A: SEVERAL COMMENTORS ASKED IF EPA HAS ANALYZED THE RISK OF CAP FAILURE OR DAMAGE AND THE PROCEDURES NECESSARY TO MAINTAIN PROTECTIVENESS IN SUCH A SITUATION.

EPA RESPONSE: EPA IS AWARE THAT CAP FAILURE OR DAMAGE MAY OCCUR. HOWEVER, PROPER CAP INSTALLATION AND MAINTENANCE WILL EXTEND THE CAP'S LIFE SIGNIFICANTLY. SPECIFIC DETAILS OF OPERATION AND MAINTENANCE WILL BE DIRECTLY ADDRESSED IN REMEDIAL DESIGN WHEN AN "OPERATION AND MAINTENANCE PLAN" IS DEVELOPED FOR THE CAP. THE OPERATION AND MAINTENANCE COSTS DEVELOPED FOR ALL "CAPPING" ALTERNATIVES INCLUDE COSTS FOR MAINTENANCE, EROSION CONTROL AND FENCE REPAIR. MAINTENANCE INCLUDES INSPECTION AND REPLACEMENT, AS NECESSARY, OF CAP COMPONENTS, AND REPAIR OF DAMAGE TO THE CAP AS IT OCCURS.

COMMENT B: SEVERAL COMMENTORS REQUESTED THAT ALL RESIDENTS WITHIN A HALF-MILE OF THE SITE BE EVACUATED IF SOIL EXCAVATION TAKES PLACE AT THE SITE.

EPA RESPONSE: THE REMEDY INCLUDES THE EXCAVATION AND CONSOLIDATION OF 2000 CUBIC YARDS OF SEDIMENTS FROM THE WETLANDS ON THE WEST SIDE OF THE LANDFILL AND 30,000 CUBIC YARDS OF MATERIAL FROM THE EDGES OF THE LANDFILL. WHILE THERE IS A POTENTIAL FOR RELEASES TO THE ATMOSPHERE DURING THIS WORK, THE REMEDY WILL BE DESIGNED TO BEST CONTROL SUCH RELEASES AND TO ENSURE PUBLIC HEALTH IS NOT ADVERSELY AFFECTED. ADDITIONALLY, STATE AND FEDERAL LAWS CONCERNING AIR EMISSIONS HAVE BEEN IDENTIFIED FOR THE SITE AND WILL BE ATTAINED DURING THE REMEDIAL ACTION. EVACUATION DURING THIS WORK WILL BE CONSIDERED; HOWEVER, EPA BELIEVES IT WILL NOT BE NECESSARY IN LIGHT OF THE ENGINEERING CONTROLS IDENTIFIED IN THE FS.

COMMENT C: ONE COMMENTOR DISAPPROVED OF EPA'S PLAN TO MOVE SOIL FROM AROUND THE SITE TO THE AREA WHERE IT WILL BE CAPPED WITHOUT FIRST CLEANING THE SOIL.

EPA RESPONSE: EPA DOES NOT BELIEVE TREATING THE 30,000 CUBIC YARDS OF EXCAVATED SOILS PRIOR TO CONSOLIDATION ON THE LANDFILL PROPER WOULD SIGNIFICANTLY IMPROVE THE REMEDY SINCE THE LANDFILL AREA REPRESENTS A MUCH LARGER VOLUME OF CONTAMINATED MATERIAL. ADDITIONALLY, PRIOR TESTING HAS REVEALED THAT THE SEDIMENT TO BE EXCAVATED FROM THE WETLANDS AND FROM THE EDGES OF THE LANDFILL HAS ONLY LOW LEVELS OF CONTAMINATION.

COMMENT D: TWO COMMENTORS REQUESTED THE REMOVAL AND PROPER DISPOSAL OF THE "NUCLEAR BLACK SILT" AND OIL SPILL DEBRIS AREAS. ONE COMMENTOR STATED THAT THE OIL SPILL DEBRIS, THE DISPOSAL OF WHICH HAD ORIGINALLY BEEN AUTHORIZED BY THE STATE, WAS TO HAVE BEEN REMOVED BY THE STATE WITHIN THREE WEEKS OF ITS DISPOSAL.

EPA RESPONSE: THERE IS CURRENTLY NO EVIDENCE OF A BLACK SILT WITH A NUCLEAR, RADIOACTIVE MAKEUP EXISTS IN OR ON THE SITE. SEVERAL RADIOACTIVE SURVEYS DONE ON THE SITE DURING THE REMEDIAL INVESTIGATION FOUND ONLY BACKGROUND (NORMAL) RADIOACTIVITY. THERE HAVE BEEN UNCONFIRMED REPORTS OF "BLACK BEAUTY," A SAND BLASTING MATERIAL, FROM THE PORTSMOUTH NAVAL YARD SHIP PAINTING ACTIVITIES BEING DISPOSED OF AT THE SITE. HOWEVER, NO EVIDENCE OF ITS EXISTENCE OR OF RADIOACTIVITY WAS FOUND DURING TEST PIT TESTING.

AS STATED IN THE PROPOSED PLAN, EPA, UNDER THE SUPERFUND LAW, CANNOT TAKE ANY ACTION WITH REGARD TO THE OILY "DEBRIS" SINCE THE LAW SPECIFICALLY EXCLUDES PETROLEUM PRODUCTS FROM THE DEFINITION OF HAZARDOUS SUBSTANCES. REMEDIATION OF THIS AREA HAS BEEN REFERRED TO THE NH DES AND THEIR OIL SPILLS PROGRAM.

COMMENT E: SEVERAL COMMENTORS STATED THAT "PUMP AND TREAT" TECHNOLOGY TO CLEAN CONTAMINATED GROUNDWATER DOES NOT WORK FOR THE FOLLOWING REASONS: 1) USING WATER SAMPLES DOES NOT EFFECTIVELY ESTIMATE THE AMOUNT OF CONTAMINATION; 2) USING AVERAGE FLOW RATE DOES NOT EFFECTIVELY ESTIMATE THE RATE OF CONTAMINANT FLOW THROUGH THE AQUIFER; 3) IT IS NOT POSSIBLE TO LOCATE ALL SIGNIFICANT CONTAMINATION USING THE CURRENT SITE INVESTIGATION TECHNOLOGIES; 4) MANY CONTAMINANTS DO NOT MIX WITH WATER; AND 5) CARBON FILTERING DOES NOT REMOVE ACETONE AND TETRAHYDROFURANS. OTHER COMMENTORS QUESTIONED THE FEASIBILITY OF "CAP AND TREAT" TO ACHIEVE CLEANUP GOALS.

EPA RESPONSE: IN GENERAL THERE IS NO ABSOLUTE GUARANTEE THAT A GROUNDWATER EXTRACTION AND TREATMENT SYSTEM WILL BE COMPLETELY EFFECTIVE AT THE COAKLEY LANDFILL SITE OR ANY OTHER SITE WHERE IT MAY BE RECOMMENDED. THIS SYSTEM WAS SELECTED AS PART OF THE REMEDY AFTER EPA ASSESSED ALL AVAILABLE INFORMATION WHICH WAS GATHERED BY WIDELY ACCEPTED AND PROVEN METHODS. BASED ON THIS SITE-SPECIFIC DATA, EPA BELIEVES THE SYSTEM WILL ATTAIN THE CLEANUP GOALS SET IN THE RECORD OF DECISION FOR THIS SITE. MOREOVER, ADDITIONAL STUDIES, INCLUDING TREATABILITY AND/OR PILOT STUDIES, CONTAMINANT CONCENTRATIONS AND AQUIFER RESPONSE UNDER PUMPING CONDITIONS WILL BE CONDUCTED DURING THE REMEDIAL DESIGN/REMEDIAL ACTION PHASE OF THE REMEDY TO INSURE THAT ALL IDENTIFIED STANDARDS, REQUIREMENTS, CRITERIA AND LIMITATIONS ARE MET.

THE COMMENTOR IS CORRECT THAT IT CANNOT BE STATED WITH ABSOLUTE CERTAINTY THAT ALL CONTAMINANTS PRESENT WITHIN THE LANDFILL WERE DETECTED DURING THE RI. TO ELIMINATE ALL UNCERTAINTY REGARDING SOURCES WITHIN THE LANDFILL, HOWEVER, COMPLETE EXCAVATION AND SAMPLING WOULD BE REQUIRED. ONE OF THE ALTERNATIVES EVALUATED IN THE FEASIBILITY STUDY (SC-6) INCLUDED THIS ACTIVITY, BUT THIS ALTERNATIVE WAS NOT FOUND TO BE MORE PROTECTIVE THAN THE PREFERRED ALTERNATIVE IN PROPORTION TO THE COST OF THE TWO REMEDIES. THE INFORMATION COLLECTED DURING THE RI IS BELIEVED TO BE REPRESENTATIVE OF THE OVERALL CONTAMINANT PROFILE OF THE LANDFILL.

WHILE IT IS TRUE THAT MOST OF THE ORGANIC INDICATOR COMPOUNDS DO NOT "MIX" WITH WATER, ALL OF THE INDICATOR COMPOUNDS DO DISSOLVE TO SOME EXTENT IN WATER. NONE OF THE COMPOUNDS HAVE BEEN FOUND AT LEVELS APPROACHING THEIR SOLUBILITY LIMIT, INDICATING THEY ARE PRESENT IN THE GROUNDWATER IN DISSOLVED FORM, NOT IN THEIR PURE FORM. INDICATOR COMPOUNDS THAT HAVE BEEN DETECTED IN THE LANDFILL BUT HAVE NOT BEEN DETECTED IN THE GROUNDWATER WOULD BE EXPECTED TO BE RELEASED TO THE GROUNDWATER OVER TIME IF NO ACTION IS TAKEN.

THE COMMENTOR IS ALSO CORRECT THAT ACTIVATED CARBON DOES NOT EFFECTIVELY REMOVE ACETONE AND TETRAHYDROFURAN FROM GROUNDWATER. HOWEVER, ACTIVATED CARBON HAS NOT BEEN INCLUDED IN THE PROPOSED PLAN FOR THE PURPOSE OF REMOVING THESE COMPOUNDS FROM GROUNDWATER, BUT RATHER AS A TREATMENT TECHNOLOGY FOR CONTAMINANTS IN THE OFF-GASES FROM THE AIR STRIPPER. IN ADDITION, INCINERATION WAS PRESENTED IN THE FEASIBILITY STUDY FOR TREATMENT OF OFF-GASES FROM THE AIR STRIPPER. INCINERATION WOULD EFFECTIVELY DESTROY THESE CONTAMINANTS IF THIS IS DETERMINED TO BE NECESSARY.

THE TECHNOLOGIES SELECTED FOR CLEANUP AT THE COAKLEY LANDFILL SITE HAVE BEEN USED EFFECTIVELY AT OTHER SIMILAR SITES TO ACHIEVE CLEANUP LEVELS. THE REMEDY IS EXPECTED TO BE EFFECTIVE BASED ON BEST PROFESSIONAL JUDGEMENT AT THIS TIME. FURTHER INFORMATION AS TO THE ADEQUACY OF THE TECHNOLOGIES WILL BE GATHERED DURING REMEDIAL DESIGN. IF INFORMATION IS COLLECTED WHICH SUGGESTS THAT THE PROPOSED ALTERNATIVE WILL NOT ACHIEVE CLEANUP LEVELS, THE DESIGN WILL BE MODIFIED TO INCLUDE PROCESSES THAT WILL ACHIEVE THOSE CLEANUP GOALS.

EPA ASSUMES THAT "CAP AND TREAT" REFERS TO THE SELECTED REMEDY OF CAPPING AND GROUNDWATER EXTRACTION AND TREATMENT. IN ADDITION TO THE ABOVE DISCUSSION ON THE EFFECTIVENESS OF GROUNDWATER EXTRACTION AND TREATMENT, THE RECORD OF DECISION FOR THE FIRST OPERABLE UNIT OF THE COAKLEY LANDFILL SITE DISCUSSES THE EFFECTIVENESS OF THE SELECTED REMEDY.

COMMENT F: ONE COMMENTOR ASKED IF EPA HAS ANALYZED THE RISK, DAMAGES, AND COST OF CLEANUP FOR "PUMP AND TREAT" FAILURE AND REQUESTED TO SEE A COST ANALYSIS BEFORE A ROD IS SIGNED.

EPA RESPONSE: COST ESTIMATES FOR THE VARIOUS COMPONENTS OF ALL THE ALTERNATIVES CARRIED THROUGH THE DETAILED ANALYSIS ARE INCLUDED IN THE FEASIBILITY STUDY. EPA IS NOT REQUIRED TO CONDUCT ANY ADDITIONAL COST ANALYSIS. COSTS ASSOCIATED WITH A FAILURE OF THE PUMP AND TREAT SYSTEM WOULD DEPEND UPON THE TYPE OF FAILURE. IT COULD RANGE FROM REPLACEMENT OF THE ENTIRE SYSTEM, WHICH IS HIGHLY UNLIKELY, TO REPLACEMENT OF SOME OF THE SYSTEM COMPONENTS. OPERATION AND MAINTENANCE COSTS ARE INCLUDED IN THE OVERALL COST OF THE REMEDY TO ADDRESS FAILURE. WHILE IT MAY BE NECESSARY TO REPLACE SOME OF THE COMPONENTS WITHIN THE SYSTEM DURING THE PLANNED TEN YEAR OPERATION, EPA DOES NOT ANTICIPATE THE NEED FOR A MAJOR OR TOTAL REPLACEMENT.

ADDITIONALLY, GROUNDWATER MONITORING WILL BE CONDUCTED THROUGHOUT THE REMEDIAL ACTION TO EVALUATE THE EFFECTIVENESS OF THE TREATMENT.

COMMENT G: SEVERAL COMMENTORS EXPRESSED CONCERN ABOUT CONTAMINATION AFFECTING LITTLE RIVER AND WETLANDS TO THE WEST OF THE SITE; PARTICULARLY CONTAMINANT AFFECTS ON HABITATS FOR WILDLIFE, FISH, AND BIRDS AS WELL AS ON HUNTING AND RECREATIONAL AREAS. ONE COMMENTOR WAS CONCERNED ABOUT POSSIBLE CONTAMINANT MIGRATION NORTH, NORTHEAST, AND WEST OF THE SITE. COMMENTORS REQUESTED THAT CONTAMINANT MIGRATION BE ADDRESSED IN THE CLEANUP ALTERNATIVE.

EPA RESPONSE: THERE IS SOME INFORMATION THAT A PLUME OF RELATIVELY LOW LEVEL CONTAMINATION EXISTS UNDER THESE WETLANDS WHICH PARTIALLY DISCHARGES THROUGH SOME LOW PERMEABILITY SOILS INTO THE WETLANDS. THE EXTENT AND CHARACTERISTICS OF THIS PLUME MUST BE BETTER DEFINED BEFORE A CLEANUP IS UNDERTAKEN, IF WARRANTED. FURTHER STUDIES, INCLUDING AN ENVIRONMENTAL ASSESSMENT, WILL BE CONDUCTED CONCERNING MIGRATION OF CONTAMINANTS. A SECOND RECORD OF DECISION WILL BE ISSUED IF NECESSARY. CURRENTLY, THERE IS NO EVIDENCE OF SIGNIFICANT IMPACTS TO THE AQUATIC ENVIRONMENT IN THESE AREAS.

COMMENT H: TWO COMMENTORS REQUESTED THAT ALTERNATIVE SC-6 BE CHOSEN AS THE PREFERRED CLEANUP METHOD BECAUSE IT IS THE MOST PERMANENT ALTERNATIVE TO ADDRESS THE SOURCE OF CONTAMINATION.

EPA RESPONSE: EPA'S RATIONALE FOR NOT SELECTED ALTERNATIVE SC-6 IS CONTAINED IN THE RECORD OF DECISION FOR THE FIRST OPERABLE UNIT OF THE COAKLEY LANDFILL SITE.

WHILE EPA DOES AGREE THAT SC-6 IS A SOMEWHAT MORE EFFECTIVE REMEDY IN TERMS OF PERMANENCE AND REDUCTION OF TOXICITY, MOBILITY AND VOLUME THROUGH TREATMENT, EPA DOES NOT BELIEVE THE INCREASED EFFECTIVENESS IS COMMENSURATE WITH THE INCREASED COST. WE BASE THIS BELIEF ON THE FOLLOWING OBSERVATIONS:

- THE RESIDUAL RISK TO PUBLIC HEALTH AND THE ENVIRONMENT AFTER CAPPING AND GROUNDWATER EXTRACTION AND TREATMENT IS LOW AS LONG AS CAP INTEGRITY IS MAINTAINED.

- THE CAP WILL BE CONSISTENT WITH RCRA CLOSURE REQUIREMENTS AND WILL THEREFORE BE ADEQUATE TO PREVENT CONTACT WITH ANY CONTAMINATED MATERIAL WITHIN THE LANDFILL. OFFSITE MIGRATION OF CONTAMINANTS WILL BE MITIGATED BY THE GROUNDWATER PORTION OF BOTH CLEANUP ALTERNATIVES. UNDER EITHER ALTERNATIVE THAT THE CONTAMINATED GROUNDWATER UNDER THE LANDFILL WILL MEET SAFE DRINKING WATER REQUIREMENTS AT THE COMPLIANCE BOUNDARY.

- IN ADDITION, S 300.430 (A) (1) OF THE NCP HAS ESTABLISHED PROGRAM GOALS FOR IDENTIFYING AND IMPLEMENTING APPROPRIATE REMEDIAL ACTIONS. THESE GOALS INCLUDE:

  1) TREATING PRINCIPAL THREATS, WHEREVER PRACTICABLE;

  2) COMBINING TREATMENT AND CONTAINMENT IN APPROPRIATE REMEDIES; AND

  3) CONSIDERING CONTAINMENT FOR WASTES THAT POSE A RELATIVELY LOW LONG-TERM THREAT OR WHERE TREATMENT IS IMPRACTICABLE.

WHILE COMPLIANCE WITH THESE PROGRAM EXPECTATIONS IS NOT REQUIRED AND DOES NOT IN ITSELF CONSTITUTE SUFFICIENT GROUNDS FOR THE SELECTION OF A REMEDY, THEY ARE PRESENTED AS GUIDANCE FOR DEVELOPING CLEANUP OPTIONS.

COMMENT I: A LANDOWNER LOCATED NORTH OF THE COAKLEY PROPERTY, COMMENTED THAT TESTING HAS SHOWN VOCS IN HIS WATER SUPPLY, SUGGESTING EVIDENCE OF POSSIBLE CONTAMINANT MIGRATION TO THE WEST, NORTH AND NORTHEAST. THE COMMENTOR REQUESTED THAT MUNICIPAL WATER SUPPLY LINES BE EXTENDED TO RESIDENTS OF BREAKFAST HILL ROAD.

EPA RESPONSE: EPA BELIEVES CONTAMINANTS IN THE WELLS LOCATED TO THE NORTH OF THE COAKLEY LANDFILL PROPERTY MAY COME FROM OTHER SOURCES. TRIHALOMETHANES, WHICH WERE FOUND IN THE COMMENTOR'S DRINKING WATER WELL, WERE NOT FOUND IN THE GROUNDWATER UNDER AND AROUND THE COAKLEY LANDFILL. ALSO, GROUNDWATER FLOW FROM THE LANDFILL TENDS TO MOVE IN A WESTERLY DIRECTION. THE REQUEST TO EXTEND THE WATER SUPPLIES MUST

BE ADDRESSED AT A LOCAL LEVEL.

COMMENT J: ONE COMMENTOR NOTED THAT ALTERNATIVE SC-4 INCLUDES AN EXTRACTION SYSTEM OF OVERBURDEN AND BEDROCK WELLS ON THE SOUTHERN AND EASTERN PERIMETERS OF THE LANDFILL. THE COMMENTOR REQUESTED THAT THE GROUNDWATER EXTRACTION SYSTEM ALSO BE EXTENDED TO THE NORTH AND WEST PERIMETERS.

EPA RESPONSE: THE CONCEPTUAL DESIGN OF THE GROUNDWATER EXTRACTION SYSTEM INCLUDES RECOVERY WELLS ON THE EAST AND SOUTH PERIMETERS OF THE LANDFILL BECAUSE THESE LOCATIONS WERE THE MOST PRACTICAL EXTRACTION POINTS FOR DEVELOPING A GROUNDWATER CAPTURE ZONE TO CONTROL THE SOURCE OF CONTAMINATION. THIS SYSTEM DOES NOT ATTEMPT TO COLLECT CONTAMINATED GROUNDWATER THAT HAS MIGRATED AWAY FROM THE SOURCE OR WHICH MAY BE COMING FROM OTHER SOURCES. THE EXACT LOCATION OF THE EXTRACTION SYSTEM WILL BE FINALIZED DURING THE REMEDIAL DESIGN PHASE. THIS FINAL DESIGN MAY INCLUDE EXTRACTION WELLS AT THE NORTH AND WEST PERIMETERS.

COMMENT K: SEVERAL COMMENTORS QUESTIONED THE LEVEL OF EFFECTIVENESS OF THE PREFERRED CLEANUP METHOD, AND, MORE SPECIFICALLY, HOW EPA'S PREFERRED ALTERNATIVE SC-4 PROTECTS BEDROCK WELLS IN THE AREA.

EPA RESPONSE: ALTERNATIVE SC-4 WAS SELECTED FOR THE EFFECTIVENESS OF THE TECHNOLOGIES IN ADDRESSING SITE CONDITIONS AND CONTAMINANTS BASED ON THEIR USE AT OTHER SIMILAR SITES. ACTUAL INFORMATION AS TO THEIR EFFECTIVENESS AT THE COAKLEY LANDFILL SITE WILL BE COLLECTED DURING REMEDIAL DESIGN TREATABILITY STUDIES AND OPERATION OF THE FACILITY.

THIS REMEDY WAS ALSO SELECTED TO MINIMIZE THE RISKS ASSOCIATED WITH THE SOURCE OF CONTAMINATION (THE LANDFILL) AND TO PREVENT FURTHER OFFSITE MIGRATION OF CONTAMINANTS FROM THE SOURCE. WHILE SC-4 WILL NOT CLEAN UP OFFSITE WELLS, IT WILL MINIMIZE ANY FURTHER CONTAMINATION OF THESE WELLS WHICH IS ATTRIBUTABLE TO THE COAKLEY LANDFILL, AND WILL DECREASE THE AMOUNT OF TIME REQUIRED FOR THE NATURAL REDUCTION OF CONTAMINATION LEVELS.

COMMENT L: A COMMENTOR ASKED IF A FENCE COULD BE CONSTRUCTED AROUND THE LANDFILL IN NORTH HAMPTON.

EPA RESPONSE: THE PREFERRED ALTERNATIVE INCLUDES A FENCE AROUND THE PERIMETER OF THE LANDFILL.

COMMENT M: SEVERAL COMMENTORS REQUESTED THAT THE LAND AT THE SITE BE RETURNED TO A SAFE AND USABLE ENVIRONMENT, AS DETERMINED AND AGREED UPON BY LOCAL CITIZENS AND THEIR CHOSEN ADVISORS.

EPA RESPONSE: THE SELECTED REMEDY IS, IN EPA'S OPINION, THE BEST REMEDY WHEN JUDGED AGAINST ALL APPLICABLE STATUTORY AND REGULATORY CRITERIA (SEE ROD, SECTION X). THE REMEDY REQUIRED TO MEET THE GOALS SUGGESTED BY THIS COMMENT APPEARS TO BE SIGNIFICANTLY MORE COSTLY THAN ALTERNATIVE SC-6 WHICH PROVIDES FOR EXCAVATION AND TREATMENT OF ALL THE WASTES AND REDEPOSITION ON THE SITE UNDER A CAP AT AN ESTIMATED COST OF APPROXIMATELY $52,000,000, YET THE OVERALL PROTECTIVENESS IN PROPORTION TO THE COST IS NOT BETTER THAN SC-4. RETURNING THE SITE TO A SAFE AND USABLE ENVIRONMENT WOULD INVOLVE OFFSITE DISPOSAL OF THE WASTE AND GROUNDWATER TREATMENT AND EXTRACTION AT A SUBSTANTIAL COST. IN ADDITION, SUCH MEASURE WOULD NOT ABSOLUTELY GUARANTY THE SITE WOULD BE SAFE AND USABLE FOR ALL PURPOSES. IN FACT, SS 300.430(F) OF THE NCP STATES THAT A REMEDY IS COST-EFFECTIVE IF ITS "COSTS ARE PROPORTIONAL TO ITS OVERALL EFFECTIVENESS."

THE SUPERFUND LAW GIVES EPA THE RESPONSIBILITY TO MAKE CLEANUP DECISIONS WITH APPROPRIATE INPUT FROM THE COMMUNITY AS SPECIFIED IN THE NCP.

EPA SPONSORS A PROGRAM CALLED SUPERFUND TECHNICAL ASSISTANCE GRANTS (TAG). A TAG AWARD TO A GROUP AFFECTED BY THE COAKLEY LANDFILL WOULD PROVIDE THE GROUP WITH FUNDS TO HIRE A TECHNICAL ADVISOR TO ASSIST THEM IN INTERPRETING AND COMMENTING ON SITE FINDINGS AND FURTHER PROPOSED ACTIONS. A FACT SHEET ON THE TAG PROGRAM IS ATTACHED WHICH CONTAINS GENERAL INFORMATION AND CONTACTS FOR FURTHER INFORMATION.

COMMENT N: THE HAMPTON WATER WORKS COMPANY (HWWCO) COMMENTED THAT IT IS CURRENTLY DEVELOPING A PRODUCTION WELL FIELD FOR AN ADDITIONAL WATER SUPPLY IN THE AREA OF NORTH ROAD AND BIRCH ROAD, SOUTHWEST OF THE COAKLEY LANDFILL SITE, IN NORTH HAMPTON. HWWCO STATED THAT THE COAKLEY REMEDIAL INVESTIGATION REPORT INDICATED THAT THE AREA OF THIS WELL SITE IS NOT LIKELY TO BE CONTAMINATED IN THE NEAR FUTURE. HWWCO EXPRESSED CONCERNED THAT THE REMEDIAL ACTION CHOSEN FOR CLEANUP MAY CONTAMINATE THIS NEW POTENTIAL WATER SUPPLY SOURCE IN THE FUTURE. HWWCO STATED THAT IT IS CONTINUING EXTENSIVE GROUNDWATER TESTING AND MODELING IN THE AREA AS A RESULT OF THE NEW WELL'S RELATIVE PROXIMITY TO THE LANDFILL AND EXPECTS THAT EPA, THROUGH ITS MONITORING PROGRAM, WILL ALERT HWWCO OF ANY CONTAMINANT MIGRATION TOWARD HWWCO'S PRODUCTION WELL.

EPA RESPONSE: EPA WILL CONTINUE TO MONITOR THE GROUNDWATER IN AND AROUND THE COAKLEY LANDFILL DURING IMPLEMENTATION OF THE REMEDY AND FOR A PERIOD OF TIME THEREAFTER. EPA DOES NOT ANTICIPATE NOR ENVISION THAT THE REMEDIAL ACTION WILL RESULT IN ANY CONTAMINATION TO THE WELL SITE BECAUSE THE REMEDIAL ACTION SELECTED IS DESIGNED TO CONTROL MIGRATION OF OFFSITE CONTAMINANTS FROM THE SOURCE AREA. THE FUTURE

STUDIES OF THE CONTAMINATION UNDER THE WETLANDS WEST OF THE SITE CALLED FOR IN THE PROPOSED PLAN WILL ALSO ADDRESS HWWCO'S CONCERNS. EPA WILL KEEP HWWCO ADVISED OF ANY MONITORING RESULTS THAT COULD HAVE A BEARING ON THIS MATTER. EPA ALSO SUGGESTS THAT HWWCO OBTAIN THE RESULTS OF TESTS THAT THE NH DES HAS PERIODICALLY PERFORMED ON RESIDENTIAL WELLS IN THE AREA.

4. COMMENTS REGARDING HEALTH RISKS

COMMENT A: SEVERAL COMMENTORS STATED THAT THE HEALTH ASSESSMENT CONDUCTED BY THE STATE WAS INADEQUATE AND REQUESTED A THOROUGH HEALTH STUDY.

EPA RESPONSE: A HEALTH ASSESSMENT REPORT DATED OCTOBER 13, 1988, BY ATSDR IS INCLUDED IN THE ADMINISTRATIVE RECORD. BECAUSE MOST OF THE RESIDENTS AND BUSINESSES SURROUNDING THE SITE HAVE BEEN SERVICED BY MUNICIPAL WATER LINES SINCE 1983, AND INDOOR AIR MONITORING CONDUCTED IN 1986 DID NOT DETECT CONCENTRATIONS OF VOCS THAT WOULD BE EXPECTED TO CAUSE ADVERSE HEALTH EFFECTS, THE COAKLEY LANDFILL IS NOT BEING CONSIDERED FOR FOLLOW-UP HEALTH STUDIES AT THIS TIME.

COMMENT B: SEVERAL COMMENTORS STATED THEIR CONCERNS FOR THE HEALTH AND WELL-BEING OF CHILDREN LIVING IN THE AREA OF THE SITE AND ASKED ABOUT THE POSSIBLE FUTURE HEALTH RISKS FACING THESE CHILDREN.

EPA RESPONSE: BASED UPON DATA COLLECTED DURING THE RI/FS AND EVALUATED IN THE RISK ASSESSMENT, CHILDREN WHO PLAY IN THE WATER, SEDIMENTS OR SOILS ON OR NEAR THE LANDFILL ARE NOT EXPECTED TO BE MORE SUSCEPTIBLE TO THE RISK OF DEVELOPING CANCER. THE REMEDIAL ACTION WILL MINIMIZE FUTURE RISKS FROM GROUNDWATER CONTAMINATION.

5. COMMENTS REGARDING PRPS

COMMENT A: SEVERAL COMMENTORS STATED THAT THE STATE OF NEW HAMPSHIRE SHOULD BE HELD RESPONSIBLE FOR SITE CLEANUP BECAUSE IT WAS THE STATE THAT ORIGINALLY PERMITTED THE LANDFILL. TWO COMMENTORS ALLEGED THAT THE STATE WAS AWARE OF AND ALLOWED ILLEGAL DUMPING AT THE SITE, IGNORING CLASS II LANDFILL LAWS.

EPA RESPONSE: EPA IS CONTINUING ITS INVESTIGATION REGARDING PARTIES WHICH COULD BE CONSIDERED POTENTIALLY RESPONSIBLE FOR THE COAKLEY LANDFILL SITE AS THEY ARE DEFINED UNDER THE SUPERFUND LAW (CERCLA). AT THIS TIME EPA DOES NOT CONSIDER THE STATE TO BE A POTENTIALLY RESPONSIBLE PARTY (PRP).

COMMENT B: A COMMENTOR REQUESTED THAT REPARATIONS BE MADE TO RESIDENCES AND BUSINESSES AFFECTED BY THE SITE EVEN IF THIS REQUIRES EVACUATION AND RELOCATION AND/OR PURCHASE OF PROPERTY.

EPA RESPONSE: THERE IS NO PROVISION IN CERCLA THAT ALLOWS FOR COMPENSATION TO RESIDENTS AND PROPERTY OWNERS IN THE VICINITY OF A SUPERFUND SITE TO SELL, RENT OR BUY THEIR HOMES.

COMMENT C: SEVERAL COMMENTORS STATED THAT FEDERAL LAW REQUIRED EPA TO TAKE ACTION AGAINST TOXIC SITES FIRST, AND THEN TO RECOVER CLEANUP COSTS FROM POLLUTERS. COMMENTORS FEEL THAT EPA HAS COMPROMISED AN EFFECTIVE PERMANENT REMEDY BECAUSE OF COSTS AND HAVE REQUESTED THAT EPA NOT WAIT TO NEGOTIATE SETTLEMENTS WITH PRPS BEFORE TAKING ACTION TO CLEANUP THE SITE.

EPA RESPONSE: THE IMMEDIATE THREAT TO PUBLIC HEALTH FROM THE COAKLEY SITE WAS REMOVED FROM THE SITE WHEN THE RESIDENTS WERE SUPPLIED PUBLIC WATER IN MARCH 1983. ALL PREVIOUS, CURRENT AND FUTURE RESPONSE ACTIONS AT COAKLEY LANDFILL SITE HAVE BEEN AND WILL CONTINUE TO BE UNDERTAKEN AS REQUIRED BY THE SUPERFUND LAW (CERCLA) AND ITS REGULATIONS (NCP).

COMMENT D: TWO COMMENTORS REQUESTED AN INVESTIGATION INTO GOVERNMENT AND BUSINESS PRACTICES THAT CAUSED THIS PROBLEM IN ORDER TO DETERMINE WHO SHOULD BE HELD ULTIMATELY RESPONSIBLE. THE COMMENTORS SUGGESTED PUBLIC DISCLOSURE, AND CIVIL AND CRIMINAL PROSECUTION OF THOSE FOUND RESPONSIBLE.

EPA RESPONSE: THE EPA IS CONTINUING TO INVESTIGATE POTENTIALLY RESPONSIBLE PARTY (PRPS) PRACTICES WHICH MAY HAVE SOME RELATIONSHIP TO PROBLEMS AT THE COAKLEY LANDFILL SITE. APPROPRIATE ACTION WILL BE TAKEN AGAINST PARTIES FOUND TO BE LIABLE FOR CONTAMINATION AT THE SITE.

COMMENT E: ONE COMMENTOR REQUESTED THAT EPA CONSIDER THE DEPARTMENTS OF THE AIR FORCE AND NAVY AS MAJOR PRPS.

EPA RESPONSE: THE EPA HAS SENT GENERAL NOTICE LETTERS TO THE US AIR FORCE AND THE US NAVY NAMING THEM AS POTENTIALLY RESPONSIBLE PARTIES (PRPS) AS WELL AS TO 58 OTHER PRPS.

B. SUMMARY OF POTENTIALLY RESPONSIBLE PARTIES COMMENTS

ONE SET OF WRITTEN COMMENTS WAS RECEIVED FROM A GROUP OF PRPS, KNOWN AS THE COAKLEY LANDFILL PRP GROUP. THE MAIN POINTS MADE BY THIS GROUP OF PRPS ARE SUMMARIZED BRIEFLY BELOW. THE PRP COMMENTS ARE INCLUDED IN ATTACHMENT B. PRP COMMENTS ARE DIVIDED INTO THE FOLLOWING FOUR CATEGORIES:

1. EVALUATION OF SITE CHARACTERIZATION
2. EVALUATION OF EPA'S PREFERRED ALTERNATIVE
3. EVALUATION OF OTHER REMEDIAL ALTERNATIVES
4. ALTERNATIVE PROPOSAL FOR STAGED REMEDIAL ACTIONS

1. EVALUATION OF SITE CHARACTERIZATION

COMMENT A: THE POSSIBLE IMPACT OF CONTAMINANT MIGRATION FROM RYE LANDFILL DURING GROUNDWATER EXTRACTION UNDER THE PROPOSED REMEDIAL PLAN HAS NOT BEEN CHARACTERIZED BY THE EPA.

EPA RESPONSE: COMMINGLING OF CONTAMINANTS FROM THE COAKLEY AND RYE LANDFILLS IS UNLIKELY UNDER NATURAL OR STRESSED (PUMPING) CONDITIONS. THE CONTAMINATION ATTRIBUTED TO THE COAKLEY AND RYE LANDFILLS IS SEPARATED BY THE PRESENCE OF HIGH BEDROCK AND GROUNDWATER LEVELS IN THE AREA BETWEEN THE TWO LANDFILL. THE OVERBURDEN AQUIFER WAS FOUND TO BE DRY IN THIS AREA DURING THE RI, PRECLUDING CONTAMINANT MIGRATION FROM RYE LANDFILL FROM MIXING WITH COAKLEY CONTAMINANTS VIA AN OVERBURDEN PATHWAY.

FOR CONTAMINANTS FROM THE RYE LANDFILL TO ENTER THE GROUNDWATER COLLECTION SYSTEM AT COAKLEY, THE BEDROCK PUMPING WELLS WOULD HAVE TO CAUSE A GRADIENT REVERSAL EXTENDING BEYOND THE GROUNDWATER HIGH NORTH OF THE LANDFILL. GIVEN THE ANTICIPATED PLACEMENT OF THE WELLS, THE PUMPING RATE AND THE CONDUCTIVITY OF THE BEDROCK, THIS SEEMS UNLIKELY. THIS SUPPOSITION WILL BE CONFIRMED DURING REMEDIAL DESIGN. GROUNDWATER GRADIENTS WILL BE MONITORED DURING OPERATION OF THE GROUNDWATER COLLECTION SYSTEM. PUMPING RATES FROM INDIVIDUAL WELLS WILL BE ADJUSTED ROUTINELY TO CONTROL THE BOUNDARIES OF THE CAPTURE ZONE OF THE GROUNDWATER COLLECTION SYSTEM.

COMMENT B: THE POSSIBLE IMPACT OF CONTAMINANT MIGRATION FROM OTHER SOURCE AREAS (SEVERAL BODY SHOPS AND AUTO DEALERSHIPS THAT GENERATE HAZARDOUS WASTE, AND A NUMBER OF ESTABLISHMENTS THAT HAVE UNDERGROUND STORAGE TANKS) DURING GROUNDWATER EXTRACTION UNDER THE PROPOSED REMEDIAL PLAN HAS NOT BEEN CHARACTERIZED.

EPA RESPONSE: THE EPA HAS NOT DISPUTED THE POSSIBILITY OF OTHER SOURCES OF CHEMICAL CONSTITUENTS IN GROUNDWATER IN THE GENERAL AREA OF THE COAKLEY LANDFILL. THE FOCUS DURING REMEDIATION WILL BE TO LIMIT THE COLLECTION OF GROUNDWATER TO "SOURCE CONTROL", I.E. WATER WITHIN AND IMMEDIATELY ADJACENT TO THE COMPLIANCE BOUNDARY. GROUNDWATER CONTAMINATION AT GZ-122 WOULD BE ADDRESSED UNDER THE IMPLEMENTATION OF A MANAGEMENT OF MIGRATION ALTERNATIVE. AS DISCUSSED IN THE PROPOSED PLAN, THE SELECTION OF A MANAGEMENT OF MIGRATION ALTERNATIVE HAS BEEN DELAYED PENDING THE COLLECTION OF FURTHER DATA. THE GROUNDWATER EXTRACTION SYSTEM WILL BE DESIGNED AND OPERATED SO AS TO MINIMIZE THE COLLECTION OF GROUNDWATER POTENTIALLY CONTAMINATED BY SOURCES OTHER THEN COAKLEY LANDFILL.

COMMENT C: OF THE SEVEN ORGANIC INDICATOR CHEMICALS, NONE HAVE BEEN DETECTED IN OFFSITE OVERBURDEN MONITORING WELLS DIRECTLY ATTRIBUTABLE TO COAKLEY LANDFILL.

EPA RESPONSE: THIS COMMENT IS VERY SPECIFIC TO EXISTING OFFSITE OVERBURDEN WELLS. ONSITE OVERBURDEN WELLS HAVE SHOWN CONTAMINATION ABOVE CLEANUP GOALS. THE CONTAMINATION APPEARS TO BE MIGRATING TO THE BEDROCK GROUNDWATER BOTH ON AND OFFSITE. THE MAJORITY OF THIS GROUNDWATER CONTAMINATION IS LOCALIZED UNDER THE LANDFILL IN THE OVERBURDEN AND BEDROCK HYDROGEOLOGICAL UNITS. HOWEVER, THE INDICATOR COMPOUNDS HAVE BEEN DETECTED IN NUMEROUS OFFSITE BEDROCK WELLS AND HAVE BEEN FOUND AT LEVELS EXCEEDING THE CLEANUP GOALS IN TWO OFFSITE BEDROCK MONITORING WELLS AND FIVE FORMER DOMESTIC WELLS. IT IS ALSO POSSIBLE THERE IS SOME CONTAMINATION OF OVERBURDEN GROUNDWATER CLOSE TO THE SITE BOUNDARY, HOWEVER, THE OFFSITE OVERBURDEN MONITOR WELL NETWORK WAS NOT ESTABLISHED CLOSE TO THE BOUNDARY.

THE LIST OF WELLS CHOSEN BY THE PRP GROUP AS "OFFSITE" WELLS IS VERY LIMITED. THEY HAVE ELIMINATED WELLS THAT THEY FEEL ARE POTENTIALLY AFFECTED BY SOURCES OTHER THAN COAKLEY. TO IGNORE DOWNGRADIENT WELLS INSTALLED FOR THE PURPOSE OF MONITORING OFFSITE MIGRATION IS CLEARLY SLANTING THE INFORMATION TO THE DESIRED VIEW.

COMMENT D: OF THE SEVEN ORGANIC INDICATOR CHEMICALS, ONLY BENZENE, 2-BUTANONE (MEK) AND CHLOROBENZENE WERE DETECTED IN ON-SITE OVERBURDEN WELLS AT CONCENTRATIONS THAT EXCEED THEIR RESPECTIVE CLEANUP GOAL.

EPA RESPONSE: THIS COMMENT FAILS TO MENTION THAT TRANS-1,2-DICHLOROETHENE AND THE THREE INORGANIC INDICATOR CHEMICALS (ARSENIC, CHROMIUM, AND NICKEL) WERE ALSO DETECTED ON-SITE IN CONCENTRATIONS GREATER THAN THEIR RESPECTIVE CLEANUP GOALS. DICHLOROETHENE IS LISTED IN THE DATA TABLE AS THE COMBINED TOTAL OF THE CIS AND TRANS ISOMERS, HOWEVER IT SHOULD BE CONSERVATIVELY ASSUMED THAT THIS CONCENTRATION REPRESENTS THE TRANS ISOMER (AN INDICATOR CHEMICAL). THE OTHER THREE INDICATOR COMPOUNDS (TETRACHLOROETHENE, PHENOL, AND DIETHYL PHTHALATE) WERE CHOSEN AS INDICATOR COMPOUNDS DUE TO THEIR PRESENCE IN TEST PIT SAMPLES

COLLECTED WITHIN THE LANDFILL. THEY WERE RETAINED AS GROUNDWATER INDICATOR CHEMICALS AND CLEANUP GOALS WERE DEVELOPED BASED ON THE POTENTIAL FOR LEACHING TO THE GROUNDWATER.

COMMENT E: ONLY TWO ORGANIC INDICATOR CHEMICALS HAVE BEEN DETECTED IN BEDROCK MONITORING WELLS AT CONCENTRATIONS THAT EXCEED THEIR RESPECTIVE CLEANUP GOALS.

EPA RESPONSE: INDICATOR CHEMICALS WERE NOT SELECTED BASED SOLELY ON THEIR PRESENCE IN BEDROCK GROUNDWATER MONITORING WELLS. ALL INDICATOR CHEMICALS HAVE BEEN DETECTED IN AT LEAST ONE OF THE MEDIA SAMPLED DURING THE RI. THE USE OF THE WORD "ONLY" IS INAPPROPRIATE IN THIS COMMENT SINCE IT IS SIGNIFICANT THAT THE CLEANUP GOALS FOR TWO OF THE INDICATOR CHEMICALS ARE EXCEEDED IN TWO BEDROCK MONITOR WELLS. THE INDICATOR CHEMICALS HAVE BEEN DETECTED IN FOUR OFF-SITE BEDROCK MONITORING WELLS AND IN NUMEROUS FORMER RESIDENTIAL WELLS INCLUDING WELLS AT LAFAYETTE TERRACE.

COMMENT F: EVEN IF ONE ASSUMES THAT THE LAFAYETTE TERRACE WELLS WERE AFFECTED BY THE LANDFILL DUE TO PAST PUMPING OF THE WELLS, RATHER THAN FROM NATURAL GRADIENTS, THESE RESIDENTIAL WELLS ARE NOW CLOSED AND ADDITIONAL MIGRATION FROM THE LANDFILL TO LAFAYETTE TERRACE WOULD NOT BE EXPECTED.

EPA RESPONSE: THIS COMMENT SEEMS TO IMPLY THAT IT WOULD BE NECESSARY FOR A GROUNDWATER MOUND TO EXIST TO THE EAST OF THE LANDFILL IN ORDER TO ALLOW CONTAMINATION TO MIGRATE TOWARDS LAFAYETTE TERRACE. DATA FROM THE RI SUGGEST THAT A GRADIENT EXISTED, WHILE THE RESIDENTIAL WELLS WERE PUMPING, TOWARDS LAFAYETTE TERRACE. IT IS IMPOSSIBLE TO DETERMINE, USING RI DATA, THE IMPACT OF DISCONTINUED USE OF THESE WELLS ON GROUNDWATER GRADIENTS. IT WAS ASSUMED THAT GROUNDWATER WOULD CONTINUE TO FLOW IN THE DIRECTION OF LAFAYETTE TERRACE, BUT AT A SHALLOWER GRADIENT, DUE THE FACT THAT THE LANDFILL SITS ON SEVERAL WATERSHED DIVIDES. THERE IS AN EXPECTED DIMINISHED FLOW IN THE DIRECTION OF LAFAYETTE TERRACE BUT THIS WOULD NOT REMOVE THE POTENTIAL RISK FOR USE OF THE GROUNDWATER AS A DRINKING WATER SOURCE IN THE FUTURE. THE GROUNDWATER COLLECTION SYSTEM DESIGN EFFORT WILL INCLUDE MEASUREMENT OF FLOW GRADIENTS UNDER PUMPING CONDITIONS.

EVEN IF THE ASSERTION MADE WERE CORRECT, EPA WOULD BE REQUIRED, UNDER SEVERAL REGULATIONS AND/OR POLICIES INCLUDING RCRA, THE GROUNDWATER PROTECTION STRATEGY AND THE SAFE DRINKING WATER ACT, TO UNDERTAKE A REMEDY WHICH WOULD INSURE THAT THE MIGRATION OF CONTAMINANTS ABOVE MCLS AND/OR LEVELS PROTECTIVE OF PUBLIC HEALTH WOULD NOT OCCUR UNDER ANY SCENARIO. THE GROUNDWATER IN THE COAKLEY LANDFILL AREA WOULD BE REQUIRED TO BE RETURNED TO A QUALITY CONSISTENT WITH PREVIOUS HIGHEST BENEFICIAL USE, I.E. DRINKING WATER.

COMMENT G: THE STATED GROUNDWATER CLEANUP GOAL FOR ARSENIC, 30 UG/L, SHOULD BE UPDATED TO 50 UG/L TO REFLECT CURRENT EPA POLICY.

EPA RESPONSE: AS EXPLAINED IN THE RECORD OF DECISION FOR THE FIRST OPERABLE UNIT OF THE COAKLEY LANDFILL SITE, THE CLEANUP LEVEL FOR ARSENIC IN GROUNDWATER HAS BEEN SET AT 50 UG/L IN ACCORDANCE WITH THE MCL.

COMMENT H: ONLY TWO MONITORING WELLS HAVE HAD ARSENIC VALUES ABOVE 50 UG/L AND NO WELLS OUTSIDE THE COMPLIANCE BOUNDARY HAVE LEVELS OF ARSENIC ABOVE 50 UG/L.

EPA RESPONSE: AN OBJECTIVE OF THE SOURCE CONTROL REMEDY IS TO PREVENT FUTURE OFFSITE MIGRATION OF CONTAMINANTS WHICH ARE PRESENTLY WITHIN THE CAPTURE ZONE. THE CHOSEN ALTERNATIVE IS A SOURCE CONTROL REMEDY WHICH INCLUDES THE PREVENTION OF MIGRATION OF ONSITE CONTAMINANTS. THE TWO MONITORING WELLS WITH LEVELS EXCEEDING 50 UG/L ARE LOCATED AT THE COMPLIANCE BOUNDARY OF THE SITE. BECAUSE OF THE POTENTIAL USE OF THE AQUIFER AT AND BEYOND THE COMPLIANCE BOUNDARY AS A DRINKING WATER SOURCE, EPA WILL MEET MCLS AT THE COMPLIANCE BOUNDARY.

COMMENT I: BASED ON THE DATA COLLECTED, NO MONITORING WELLS OUTSIDE THE COMPLIANCE BOUNDARY HAVE LEVELS OF CHROMIUM AND NICKEL ABOVE THEIR RESPECTIVE CLEANUP GOAL.

EPA RESPONSE: WHILE THE COMMENT IS CORRECT THAT NICKEL AND CHROMIUM HAVE NOT BEEN FOUND IN OFFSITE WELLS ABOVE THE CLEANUP GOALS, THESE METALS WERE DETECTED IN ONSITE WELLS ABOVE CLEANUP LEVELS. IT IS EPA'S CONTENTION THAT THIS REPRESENTS A SOURCE OF THESE METALS WHICH MUST BE CONTROLLED FROM MIGRATING OFF-SITE. AS DISCUSSED IN THE FS, THE PROPOSED TREATMENT SYSTEM IS DESIGNED FOR REMOVAL OF METALS.

COMMENT J: THE RISKS ARE OVERESTIMATED BECAUSE THEY ARE BASED ON INGESTING WATER FROM WELLS LOCATED WITHIN THE BOUNDARIES OF THE LANDFILL AND ARE BASED ON OVERLY CONSERVATIVE EXPOSURE ASSUMPTIONS.

EPA RESPONSE: CONSISTENT WITH EPA GUIDANCE, EPA HAS MADE A CONSERVATIVE ESTIMATE OF EXISTING AND POTENTIAL PUBLIC HEALTH RISKS UNDER A "NO ACTION" ALTERNATIVE. AS PART OF THIS ANALYSIS, IT IS EPA PRACTICE TO USE MONITORING INFORMATION FROM BOTH WITHIN AND BEYOND THE BOUNDARY OF THE LANDFILL AS NEEDED TO FULLY CHARACTERIZE THE EXTENT OF CONTAMINATION AND THUS POSSIBLE EXPOSURE. ASSUMPTIONS USED TO ESTIMATE EXPOSURE INCLUDING EXPOSURE DURATION, WERE MADE CONSISTENT WITH THE EPA GUIDANCE AVAILABLE AT

THE TIME THE RISK ASSESSMENT WAS WRITTEN (SUPERFUND PUBLIC HEALTH EVALUATION MANUAL, OCTOBER 1986) AND WITH ASSUMPTIONS MADE BY EPA'S OFFICE OF DRINKING WATER REGARDING EXPOSURE DURATION. EPA REGION I VIEWS A 70-YEAR EXPOSURE PERIOD TO BE A REASONABLY CONSERVATIVE ESTIMATE FOR THE DURATION OF POSSIBLE EXPOSURE OVER A LIFETIME UNDER THE "NO-ACTION" ALTERNATIVE. WHILE THE RECENT GUIDANCE REFERRED TO BY THE PRP GROUP (EPA EXPOSURE FACTORS HANDBOOK, 1989) SUGGESTS THAT EXPOSURE DURATIONS OF LESS THAN 70 YEARS MAY BE SUITABLE IN SOME INSTANCES, IT ALSO AFFORDS THE RISK MANAGER THE OPPORTUNITY TO SELECT AN EXPOSURE DURATION OF HIS CHOICE DEPENDING ON SITE SPECIFIC INFORMATION, CONSIDERATION OF POLICY OR PRECEDENT FACTORS. FURTHERMORE, THE PUBLICATION DATE OF THIS REPORT WAS SUCH THAT IT WAS NOT AVAILABLE AT THE TIME THE RISK ASSESSMENT WAS WRITTEN (OCT. 1988) THUS IT COULD NOT HAVE BEEN CONSIDERED FOR THE COAKLEY LANDFILL RISK ASSESSMENT.

COMMENT K: THE RISKS ARE OVERESTIMATED BECAUSE THEY ARE DRIVEN BY THE INGESTION OF ARSENIC WHICH IS SUBJECT TO CONSIDERABLE SCIENTIFIC UNCERTAINTY.

EPA RESPONSE: MUCH OF THE "SCIENTIFIC UNCERTAINTY" REGARDING THE CARCINOGENIC POTENTIAL POSED BY THE INGESTION OF ARSENIC REFERRED TO BY THE PRP GROUP HAS BEEN RESOLVED. IN A MEMO FROM THE EPA ADMINISTRATOR TO ASSISTANT ADMINISTRATORS (JUNE 21, 1988) SUMMARIZING THE WORK OF EPA'S RISK ASSESSMENT FORUM SPECIAL REPORT ON ARSENIC HE STATES THAT, "THE FORUM CONCLUDED... THAT ARSENIC IS A HUMAN CARCINOGEN BY THE ORAL ROUTE, WHICH PUTS THE CHEMICAL IN CATEGORY A OF THE AGENCY'S SCHEME FOR DESIGNATING THE WEIGHT-EVIDENCE". AS A KNOWN HUMAN CARCINOGEN EPA REGION I DOES NOT BELIEVE THAT A DISCUSSION OF THE SCIENTIFIC UNCERTAINTY ON THE CARCINOGENIC POTENTIAL OF ARSENIC IS WARRANTED. THE EXTENT TO WHICH ARSENIC CAUSES CANCER (CANCER POTENCY ESTIMATE) AND THE NATURE OF THE CANCER INDUCED (SKIN) INFLUENCED THE SELECTION OF A CLEANUP LEVEL FOR THIS COMPOUND AND WERE THE SUBJECT OF DISCUSSION IN THE RECORD OF DECISION (SECTION XI).

COMMENT L: EPA HAS NOT DEMONSTRATED THAT THE METALS SELECTED AS INDICATOR CHEMICALS ARE ABOVE BACKGROUND LEVELS OR ARE, IN FACT, SITE CONTAMINANTS.

EPA RESPONSE: THE SELECTION OF INDICATOR CHEMICALS WAS PERFORMED DURING THE RI IN ACCORDANCE WITH ACCEPTED PROCEDURE AT THE TIME IT WAS PERFORMED. CONTAMINANTS WERE SELECTED BASED ON FREQUENCY OF DETECTION, CONCENTRATION, TOXICOLOGICAL EFFECTS, AND CHEMICAL AND PHYSICAL PROPERTIES. THE SELECTION OF THE THREE METALS WAS BASED PRIMARILY ON ELEVATED LEVELS IN SOIL AND/OR GROUNDWATER. AS NOTED BY THE PRP GROUP, SEVERAL WELLS EXIST WHICH DO NOT APPEAR TO HAVE BEEN IMPACTED BY COAKLEY LANDFILL. IN SEVERAL OF THESE "BACKGROUND" WELLS NONE OF THE THREE INDICATOR METALS WERE FOUND IN CONCENTRATIONS ABOVE THE DETECTION LIMIT. HOWEVER, SIGNIFICANT CONCENTRATIONS WERE DETECTED IN WELLS IMMEDIATELY ADJACENT TO THE LANDFILL. THIS SUPPORTS THE SELECTION OF THESE METALS AS INDICATOR CHEMICALS OF SITE CONTAMINATION. THESE METALS, THEREFORE, MAY HAVE BEEN DIRECTLY DISPOSED OF IN THE LANDFILL.

IT IS EPA'S BELIEF THAT ARSENIC MAY BE EMANATING FROM WASTE MATERIALS IN THE LANDFILL OR MAY BE MOBILIZED FROM NATURALLY OCCURRING ARSENIC IN CONTACT WITH LEACHATE, THEREBY CAUSING CONTAMINATION OF THE GROUNDWATER. THE PHENOMENA OF IRON MOBILIZATION FROM SOILS WITHIN ORGANIC RICH LEACHATE PLUMES IS WELL DOCUMENTED. THE GEOCHEMISTRY OF ARSENIC IS SUCH THAT IT TENDS TO ADSORB ON IRON OXIDE DEPOSITS IN SOIL. THUS ARSENIC MAY BE RELEASED FROM SOIL WHEN IRON IS MOBILIZED. ELEVATED LEVELS OF IRON HAVE BEEN NOTICED IN GROUNDWATER AND IRON STAINING IS EVIDENT ON SURFACE SOILS AND SEDIMENTS IN THE AREA SURROUNDING COAKLEY LANDFILL. REVIEW OF THE DATA INDICATES THE OCCURRENCE OF ARSENIC ABOVE THE DETECTION LIMIT TYPICALLY COINCIDES WITH ELEVATED VOC AND IRON CONCENTRATIONS. ARSENIC LEVELS IN EXCESS OF THE CLEAN UP LEVELS HAVE BEEN FOUND IN OVERBURDEN WELLS AT THE COMPLIANCE BOUNDARY ALONG THE SOUTHERN AND EASTERN EDGE OF THE LANDFILL.

COMMENT M: ALL OF THE SEVEN COMMENTS IN PART II. D OF THE PRP GROUP'S WRITTEN COMMENTS AND ALL OF THE FIVE COMMENTS IN PART III. D OF THEIR WRITTEN COMMENTS RELATE TO THE CONCEPTUAL GROUNDWATER EXTRACTION SYSTEM DESIGN AND THE GROUNDWATER SIMULATION CONDUCTED TO EVALUATE THE ALTERNATIVES.

EPA RESPONSE: IN GENERAL OUR RESPONSE TO THESE COMMENTS IS AS FOLLOWS:

THE FINAL GROUNDWATER FLOW MODEL CONFIGURATION PROVIDES A CONCEPTUAL RECOVERY SYSTEM DESIGN BASED ON BOTH THE FIELD DATA COLLECTED AND ON THE MODEL "CALIBRATION" PROCESS. CALIBRATION OF A STEADY STATE GROUNDWATER FLOW MODEL BASED ON UNSTRESSED WATER LEVEL DATA (NON-PUMPING CONDITIONS) IS DIFFICULT, AND WILL PROVIDE ONLY QUALITATIVE ESTIMATES OF STRESSED CONDITIONS (PUMPING). HOWEVER, THE ESTIMATES OBTAINED WERE DEEMED SUFFICIENT FOR COST PURPOSES (PLUS 50 PERCENT TO MINUS 30 PERCENT OF ESTIMATED COST). THE EPA RECOGNIZES THAT ADDITIONAL FIELD WORK WILL BE REQUIRED PRIOR TO FINAL DESIGN. BEDROCK AQUIFER PUMPING TESTS ARE RECOMMENDED IN THE FS IN ORDER TO PROVIDE MORE ACCURATE VALUES OF TRANSMISSIVITY AND HYDRAULIC CONDUCTIVITY, AND PROVIDE ADDITIONAL DATA ON LEAKAGE BETWEEN LAYERS, POTENTIAL BEDROCK WELL PUMPING RATES AND EVENTUAL RECOVERY WELL SPACING.

AN ADDITIONAL EVALUATION OF SOME OF THE COMMENTS WITH RESPECT TO THE NUMBER, LOCATION, AND PUMPING RATES (AS RELATED TO TREATMENT PLANT COSTS AND DESIGN) OF THE GROUNDWATER RECOVERY SYSTEM USING A THEIS TYPE

DRAWDOWN ANALYSIS OF THE GROUNDWATER CAPTURE ZONE WAS PERFORMED. THIS ANALYSIS ASSUMED A 100 FOOT THICK AQUIFER WITH A HYDRAULIC CONDUCTIVITY OF 0.8 FT/DAY, STORAGE COEFFICIENT OF 0.05 AND A 365 DAY PUMPING PERIOD. EIGHT BEDROCK WELLS WERE INCLUDED IN THE ANALYSIS, EACH WELL PUMPING ABOUT 10 GPM. THIS ANALYSIS RESULTS IN DRAWDOWNS IN EACH OF THE EIGHT RECOVERY WELLS OF APPROXIMATELY 60 FEET WITH DRAWDOWNS OF 20 FEET OR MORE EXTENDING MORE THAN 200 FEET FROM THE RECOVERY WELLS. IF WE ASSUME, AS THE COMMENTORS SUGGEST, THAT THE BEDROCK RECOVERY SYSTEM WILL DRY UP THE SHALLOW OVERBURDEN AQUIFER AND RECOVERY TRENCH, THE 100 GALLON PER MINUTE FLOW INCLUDED IN THE FS IS A REASONABLE, IF SOMEWHAT CONSERVATIVE CONCEPTUAL DESIGN FLOW.

IT SHOULD BE NOTED THAT THE THEIS ANALYSIS PERFORMED TO REVIEW THE DESIGN USED THE GEOMETRIC MEAN OF THE FIELD DERIVED HYDRAULIC CONDUCTIVITIES OF THE BEDROCK. THESE VALUES MAY BE SOMEWHAT HIGHER THAN THE BULK AQUIFER CONDUCTIVITIES DETERMINED DURING A PUMPING TEST BECAUSE THE FIELD TESTS WERE PERFORMED ON WHAT WAS INTERPRETED TO BE THE MORE PRODUCTIVE ZONES OF THE BEDROCK. ALSO BECAUSE IT WAS NOTED IN THE RI THAT THE FRACTURE ZONES MAY BE LESS OPEN BELOW A DEPTH OF 50 FEET IN ROCK, SERIOUS CONSIDERATION SHOULD BE GIVEN TO TEST THE UPPER 50 FEET OF BEDROCK DURING THE PUMPING TESTS. THIS MAY RESULT IN REDUCED PUMPING RATES AND STILL AFFECT COMPLETE CONTAMINANT CAPTURE.

THE COMMENTORS SUGGEST THAT THE GROUNDWATER RECOVERY SYSTEM IS OVER DESIGNED. THE FINAL DESIGN OF THE RECOVERY WELL AND TRENCH SYSTEM MAY DIFFER FROM THE CONCEPTUAL DESIGN, BUT THE FINAL OPTIMAL DESIGN CANNOT BE DETERMINED UNTIL THE FIELD WORK AND ANALYSIS IS COMPLETE DURING THE DESIGN PHASE. THE TOTAL FLOW FROM THE RECOVERY SYSTEM APPEARS TO BE SOMEWHAT CONSERVATIVE BUT WITHIN THE RANGE OF A REASONABLE DESIGN FLOW GIVEN THE FIELD DATA AVAILABLE.

2. EVALUATION OF EPA'S PREFERRED ALTERNATIVE (SC-4)

COMMENT A: EPA HAS NOT JUSTIFIED THAT EVERY ELEMENT OF THE PROPOSED MULTI-MEDIA CAP OVER THE LANDFILL AREA IS NECESSARY.

EPA RESPONSE: THE CAP DESCRIBED IN THE FS AND IN THE PROPOSED PLAN, WAS DESIGNED BASED ON COMPLIANCE WITH BOTH RCRA AND STATE OF NEW HAMPSHIRE REGULATIONS. THE STATE OF NEW HAMPSHIRE HAZARDOUS WASTE REGULATIONS, AND SOLID WASTE REGULATIONS FOR LANDFILLS, WERE DEEMED TO BE ARARS FOR THE COAKLEY SITE BY EPA. AS NOTED IN THE FS, THE PROPOSED CAP IS SIMPLY A CONCEPTUAL MODEL FOR THE CAPPING TECHNOLOGY. THEREFORE, ANY CAP PROPOSED DURING THE REMEDIAL DESIGN PHASE WHICH IS AS EFFECTIVE AS THE ONE DESCRIBED AND MEETS ALL ARARS, WOULD BE ACCEPTABLE.

FURTHER, THE ONLY DIFFERENCE BETWEEN THE CAP DESCRIBED BY THE PRP GROUP AND THE ONE IN THE PROPOSED PLAN IS THE INCLUSION OF A DRAINAGE NET BETWEEN THE LINER AND THE SUB-BASE AND A DRAINAGE MESH ALONG THE TOP OF THE LANDFILL. THE DRAINAGE NET IS PROVIDED TO ASSIST THE SAND IN DRAINING INFILTRATION AWAY FROM THE LANDFILL, WHILE THE DRAINAGE MESH IS INCLUDED TO PREVENT EROSION AND SETTLING IN THE CAP LAYERS. BOTH OF THESE FEATURES HAVE BEEN INCLUDED IN SEVERAL CAP DESIGNS RECENTLY APPROVED BY NH DES.

COMMENTS B: EPA HAS NOT JUSTIFIED THE NEED FOR ACTIVE COLLECTION AND TREATMENT OF LANDFILL GASES GENERATED BELOW THE CAP. THESE COMMENTS FOCUSED ON ACTIVE LANDFILL GAS COLLECTION AND TREATMENT, WHICH WAS INCLUDED WITH ALL CAPPING ALTERNATIVES IN THE FS.

EPA RESPONSES: THE OVERRIDING FACTOR INFLUENCING THE DECISION TO PERFORM ACTIVE GAS COLLECTION WAS THE PROXIMITY OF THE LANDFILL TO RESIDENTIAL AND COMMERCIAL PROPERTIES TO THE EAST AND SOUTH. THE RISK ASSESSMENT PERFORMED RELATIVE TO AIR EMISSIONS WAS BASED ON PRESENT (UNCAPPED) CONDITIONS WHICH DETECTED UP TO 48 PPB OF VOCS. THE PRESENCE OF A CAP WILL ALTER GAS MIGRATION PATTERNS. WITHOUT ACTIVE GAS COLLECTION, GAS COULD POTENTIALLY MIGRATE HORIZONTALLY UNDER THE CAP AND ACROSS THE SITE BOUNDARY IN THE VADOSE ZONE. ALSO, GAS COLLECTED BY GRAVITY VENTS (IN A PASSIVE COLLECTION SYSTEM) WOULD BE EMITTED AT HIGHER CONCENTRATIONS AT DISCRETE POINTS ON THE SITE. THE UNKNOWN AND POTENTIAL RISKS ASSOCIATED WITH THESE SCENARIOS MAKES IT REASONABLE TO INCLUDE ACTIVE GAS COLLECTION AS A COMPONENT OF THE ALTERNATIVES EVALUATED, AND AS AN INTEGRAL PART OF THE PROPOSED PLAN.

TREATMENT OF COLLECTED GAS IS PROPOSED FOR THE FOLLOWING REASONS:

- TREATMENT PROVIDES REDUCTION IN TOXICITY IN ACCORDANCE WITH CERCLA, AND
- THE TREATMENT METHODS SELECTED, THERMAL DESTRUCTION, PROVIDE ECONOMIC BENEFIT FOR ON-SITE GROUNDWATER TREATMENT ALTERNATIVE BY MAKING AVAILABLE A HEAT SOURCE. THIS BENEFIT WOULD BE IN THE FORM OF REDUCED CAPITAL AND OPERATION AND MAINTENANCE COST FOR TREATMENT OF AIR EMISSIONS FROM THE GROUNDWATER TREATMENT SYSTEM.

ANOTHER POTENTIAL BENEFIT WHICH COULD BE DERIVED FROM ACTIVE GAS COLLECTION, BUT WHICH WAS NOT INCLUDED IN THE COST EVALUATIONS PRESENTED, IS COGENERATION OF ELECTRICITY. THIS ON-SITE GENERATED ELECTRICITY COULD DECREASE THE O&M COST OF GAS AND GROUNDWATER COLLECTION AND TREATMENT SYSTEMS.

COMMENT C: THE GROUNDWATER TREATMENT SYSTEM IS SIGNIFICANTLY OVERDESIGNED SINCE THE INFLUENT CONCENTRATIONS ARE BASED ON AVERAGE LEVELS FOUND IN THE MOST CONTAMINATED WELLS INSTEAD OF ALL WELLS.

EPA RESPONSE: THE GROUNDWATER TREATMENT SYSTEM DESIGN PRESENTED IN THE FS AND PROPOSED PLAN IS A CONCEPTUAL DESIGN FOR THE PURPOSE OF ALTERNATIVE EVALUATION. THE INFLUENT CONCENTRATIONS USED IN DESIGNING THE PROPOSED SYSTEM, WHILE CONSERVATIVE, WERE USED AS A COMMON DESIGN BASIS FOR ALL ALTERNATIVES EVALUATED. FURTHER INFORMATION AS TO EXPECTED INFLUENT CONCENTRATIONS WILL BE COLLECTED DURING PUMP TESTS AND ANY BENCH OR PILOT-SCALE TESTING PERFORMED DURING REMEDIAL DESIGN. THIS INFORMATION WILL THEN BE USED TO DESIGN AN EFFICIENT COST-EFFECTIVE GROUNDWATER TREATMENT SYSTEM FOR THE SITE.

COMMENT D: THE GROUNDWATER TREATMENT SYSTEM IS LIKELY TO BE OVERDESIGNED BECAUSE IT WAS BASED ON A FLOW RATE OF ABOUT 100,000 GALLONS PER DAY.

EPA RESPONSE: AS PREVIOUSLY DISCUSSED, A GROUNDWATER MODEL WAS USED TO DEVELOP A COMMON CONCEPTUAL DESIGN BASIS FOR EVALUATING ALTERNATIVES. THE GROUNDWATER EXTRACTION RATE ESTIMATED BY THE MODEL (75 GPM) IS A REASONABLE ESTIMATE, AS DISCUSSED IN RESPONSE 1.M. THE DESIGN FLOW RATE FOR THE GROUNDWATER TREATMENT SYSTEM COST ESTIMATE WAS 100 GPM, WHICH CONSERVATIVELY INCORPORATED A SAFETY FACTOR OF ONE-THIRD OF THE FLOW PREDICTED BY THE MODEL. THE ACTUAL DESIGN BASIS FOR THE FINAL DESIGN OF THE GROUNDWATER TREATMENT SYSTEM WILL BE SET FOLLOWING PUMPING TESTS CONDUCTED DURING THE REMEDIAL DESIGN.

COMMENT E: NO ANALYSIS HAS BEEN ADVANCED TO SUGGEST THAT ACTIVATED CARBON OR AN INCINERATOR ARE NECESSARY FOR AIR POLLUTION CONTROLS FOR PUBLIC HEALTH OR ENVIRONMENTAL PROTECTION.

EPA RESPONSE: THERE IS CURRENTLY AN OSWER DIRECTIVE 9355.0-28 THAT REQUIRES AIR EMISSIONS CONTROL FOR AIR STRIPPERS AT SUPERFUND GROUNDWATER SITES IN OZONE NON-ATTAINMENT AREAS AS ESTABLISHED BY THE NATIONAL AMBIENT AIR QUALITY STANDARDS. COAKLEY LANDFILL IN ROCKINGHAM COUNTY IS IN A OZONE NON-ATTAINMENT AREA WHICH REQUIRES AN AIR EMISSIONS CONTROL.

COMMENT F: IT IS NOT APPARENT THAT BOTH AN AIR STRIPPER AND A BIOLOGICAL TREATMENT UNITS ARE NEEDED TO ATTAIN WATER QUALITY OBJECTIVES.

EPA RESPONSE: THE UNIT OPERATIONS PRESENTED IN EPA'S SELECTED REMEDY ARE REPRESENTATIVE PROCESS OPTIONS SELECTED FROM APPLICABLE TECHNOLOGIES DURING THE SCREENING PHASE OF THE FS PROCESS. AS SUCH, DIFFERENT PROCESS OPTIONS FROM THE SAME TECHNOLOGY TYPE WHICH ARE CAPABLE OF MEETING CLEANUP GOALS COULD BE IMPLEMENTED DURING REMEDIAL DESIGN AND REMEDIAL ACTION. REPRESENTATIVE PROCESS OPTIONS ARE SELECTED TO LIMIT THE SCREENING PROCESS AND ARE NOT MEANT AS A FINAL REQUIRED DESIGN. FURTHER, IF A SURFACE WATER DISCHARGE IS REQUIRED DURING HIGH GROUNDWATER PERIODS, THE EFFLUENT FROM THE AIR STRIPPER WOULD REQUIRE FURTHER TREATMENT TO MEET THE MORE STRINGENT REQUIREMENTS FOR SURFACE WATER DISCHARGE. ADDITIONAL TREATMENT WOULD LIKELY INCLUDE NITRIFICATION OF AMMONIA AND REMOVAL OF BIOCHEMICAL OXYGEN DEMAND (BOD).

IF BIOLOGICAL TREATMENT WERE USED AS THE REPRESENTATIVE PROCESS OPTION IN THE FS ALTERNATIVE SCREENING PROCESS, EXCESSIVE TREATMENT WOULD OCCUR FOR ALTERNATIVES SC-4 WITH ONLY RECHARGE TO AQUIFER AND SC-5. NEITHER OF THE ALTERNATIVES REQUIRE THE LEVEL OF TREATMENT PROVIDED BY BIOLOGICAL TREATMENT AND THEREFORE THE COST INCREASE COULD NOT BE JUSTIFIED. THE COST SAVINGS TO SC-4 WITH SURFACE WATER DISCHARGE DUE TO THE PRP GROUP'S PROPOSED MODIFICATION WOULD BE LESS THAN $150,000, CONSISTING MOSTLY OF THE CAPITAL COST OF THE AIR STRIPPER. MINIMAL SAVINGS OF O&M COSTS WOULD BE REALIZED.

MANY OF THE COMPOUNDS DETECTED AT THE SITE ARE BIODEGRADABLE, THEREFORE, BIOLOGICAL TREATMENT IS POSSIBLY APPLICABLE AND WILL BE INVESTIGATED DURING THE REMEDIAL DESIGN PHASE FOR THE SITE. ALTHOUGH BIOLOGICAL TREATMENT WILL BE CONSIDERED, AIR-STRIPPING REMAINS THE SELECTED PROCESS FOR REMOVING VOCS BECAUSE OF THE FOLLOWING UNCERTAINTIES WITH BIOLOGICAL TREATMENT:

- AIR EMISSION CONTROLS;
- POTENTIAL TOXICITY PROBLEMS ARISING DUE TO SITE CONTAMINANTS WHICH WOULD LIMIT THE EFFECTIVENESS OF BIOLOGICAL TREATMENT; AND
- CHLORINATED VOLATILE ORGANICS (E.G. TRANS-1,2-DICHLOROETHENE) OFTEN CONVERT TO VINYL CHLORIDE BY BIOLOGICAL PROCESSES. VINYL CHLORIDE IS A KNOWN CARCINOGEN WHICH COULD NOT BE DISCHARGED TO SURFACE WATER AT A CONCENTRATION ABOVE THE DETECTION LIMIT OR THE GROUNDWATER ABOVE ITS MCL OF 2 PPB.

COMMENT G: THE LEVELS OF METALS PRESENT IN THE GROUNDWATER AT THE SITE ARE INSUFFICIENT TO JUSTIFY THEIR PRETREATMENT.

EPA RESPONSE: THE METALS PRETREATMENT PROCESS DESCRIBED IN THE PROPOSED PLAN WAS DESIGNED TO MEET TWO OBJECTIVES: (1) TO REMOVE INDICATOR METALS TO CLEANUP GOALS AND (2) TO REMOVE METALS WHICH WOULD LIMIT THE EFFECTIVENESS OF THE ORGANICS TREATMENT PROCESS(ES). THE LEVEL OF TREATMENT REQUIRED TO MEET THESE TWO OBJECTIVES WOULD BE FINALIZED DURING REMEDIAL DESIGN. THE MAJOR METAL OF CONCERN FOR AN AIR STRIPPER/BIOLOGICAL SYSTEM WOULD BE IRON. THE LEVELS OF IRON FOUND IN WELLS ON-SITE INDICATES DIFFICULTY OPERATING EITHER OF THESE TREATMENT SCENARIOS WITHOUT METALS REMOVAL. WHILE AIR STRIPPERS HAVE BEEN INSTALLED FOR GROUNDWATER TREATMENT WITHOUT IRON REMOVAL, DEPENDING ON THE IRON CONCENTRATION THEY EITHER REQUIRE FREQUENT ACID WASHING TO REMOVE IRON FROM THE PACKING OR FREQUENT REPLACEMENT OF THE PACKING. O&M COST MAY BE GREATLY INCREASED IF METAL PRETREATMENT IS NOT PERFORMED.

COMMENT H: THE PRP GROUP REFERS TO A MEMORANDUM REGARDING A STUDY THAT SUGGESTS THAT IT MAY BE DIFFICULT TO ACHIEVE CLEANUP CONCENTRATION GOALS IN GROUNDWATER EXTRACTION SYSTEMS. ADDITIONALLY, THE PRP GROUP CLAIMS THAT INADEQUATE DATA HAS BEEN COLLECTED BY EPA AT THE COAKLEY LANDFILL SITE TO ALLOW FOR AN ADEQUATE DESIGN OF AN EFFICIENT CLEANUP APPROACH.

EPA RESPONSE: THE FINDINGS OF THE STUDY REFERRED TO IN THE MEMORANDUM STATES THAT "EXTRACTIONS SYSTEMS ARE GENERALLY EFFECTIVE IN CONTAINING CONTAMINANT PLUMES, THUS PREVENTING FURTHER MIGRATION OF CONTAMINANTS." AS A SOURCE CONTROL REMEDY AND AS STATED IN THE FS, AN OBJECTIVE OF THE REMEDIAL ACTION IS TO "PREVENT THE OFF-SITE MIGRATION OF CONTAMINANTS ABOVE LEVELS PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT". THE STUDY SUGGESTS THAT THE CHOSEN ALTERNATIVE WOULD MEET THIS OBJECTIVE. DATA COLLECTED TO DATE IS ADEQUATE FOR CONCEPTUAL DESIGN OF THE GROUNDWATER EXTRACTION SYSTEM PART OF THE REMEDY. ADDITIONAL DATA NEEDED FOR FINAL DESIGN WILL BE COLLECTED DURING THE REMEDIAL DESIGN PHASE.

3. EVALUATION OF OTHER REMEDIAL ALTERNATIVES

COMMENT A: EPA DOES NOT ADEQUATELY DEMONSTRATE THAT ALTERNATIVE SC-3 WOULD NOT MEET FEDERAL AND STATE ARARS AND WOULD NOT MINIMIZE THE MIGRATION OF CONTAMINANTS FROM SOILS INTO GROUNDWATER.

EPA RESPONSE: EPA ACKNOWLEDGES IN THE FS THAT MIGRATION OF CONTAMINANTS IS LOWERED TO SOME EXTENT BY CONSTRUCTION AND MAINTENANCE OF THE CAP. HOWEVER, AS STATED, THIS ALTERNATIVE WOULD NOT ALLOW ARARS TO BE ACHIEVED IN AN ACCEPTABLE TIME PERIOD. BASED ON THE PREAMBLE IN THE NEW NATIONAL CONTINGENCY PLAN PUBLISHED MARCH 8, 1990, IT IS EPA'S POLICY TO, "RETURN USABLE GROUNDWATERS TO THEIR BENEFICIAL USES WITHIN A TIME FRAME THAT IS REASONABLE".

THE ASSUMPTION THAT MCLS WOULD NOT BE MET FOR SEVERAL DECADES WITHOUT GROUNDWATER COLLECTION AND TREATMENT WAS BASED ON THE FOLLOWING:

1. ELEVATED LEVELS OF INDICATOR COMPOUNDS WERE OBSERVED OFFSITE (PARTICULARLY WEST OF THE LANDFILL) AS WELL AS ONSITE; AND

2. AFTER THE CAP IS PLACED, CONTAMINANTS WILL MIGRATE AND/OR DEGRADE AT A SLOWER RATE DUE TO THE DECREASE OF INFILTRATION. SLOWER PERCOLATION OF CONTAMINANTS TO GROUNDWATER CAUSES LONGER SUSTAINED CONTAMINANT LEVEL ABOVE MCLS.

GIVEN THAT THE SIGNIFICANT MIGRATION PATHWAY FOR THE SITE IS THROUGH THE BEDROCK, THAT INDICATOR COMPOUNDS ABOVE CLEANUP GOALS HAVE BEEN FOUND IN BEDROCK WELLS BOTH ON AND OFF-SITE, AND THAT THE CONDUCTIVITY OF THE BEDROCK IS VERY LOW, THE CONCLUSION IS DRAWN THAT CONTAMINANTS WOULD TAKE A LONG TIME TO REACH CLEANUP GOALS AT THE COMPLIANCE BOUNDARY.

NO ACCEPTABLE MODELING TOOL WAS FOUND FOR CONTAMINANT TRANSPORT WHICH COULD BE APPLIED TO THE SITE. GIVEN THE HETEROGENEITY OF THE MATERIAL IN THE LANDFILL, IT WOULD BE DIFFICULT TO ACCURATELY PREDICT SOURCE CHARACTERISTICS. THE HELP MODEL REFERENCED IN THIS COMMENT IS A TOOL FOR ESTIMATING THE FLOW VERTICALLY THROUGH A LANDFILL, AND DOES NOT PROVIDE INFORMATION REGARDING CONTAMINANT TRANSPORT.

COMMENT B: EPA DOES NOT DEMONSTRATE THAT ALTERNATIVE SC-4 IS SUPERIOR TO ALTERNATIVE SC-5.

EPA RESPONSE: ALTERNATIVE SC-5 WAS EVALUATED TO THE MAXIMUM EXTENT POSSIBLE DURING THE FS PROCESS AND WAS EVALUATED APPROPRIATELY RELATIVE TO OTHER ALTERNATIVES. AS DISCUSSED IN THE PROPOSED PLAN, IT WAS NOT SELECTED DUE TO CONCERNS WITH THE ADMINISTRATIVE IMPLEMENTABILITY OF THE ALTERNATIVE, (I.E. WHETHER APPROVAL COULD BE OBTAINED FROM THE TOWN OF HAMPTON TO DISCHARGE TO THEIR SEWERAGE SYSTEM), AND IN PART DUE TO UNCERTAINTY REGARDING IMPACT ON THE WETLAND. EACH OF THE INDIVIDUAL TOPICS BULLETED BY THE PRP GROUP ARE DISCUSSED BELOW:

DURING THE FS PROCESS, INQUIRIES WERE MADE TO THE TOWN OF HAMPTON CONCERNING THEIR WILLINGNESS TO TAKE PRETREATED GROUNDWATER FROM THE COAKLEY SITE, THE ESTIMATED USER CHARGE FOR SUCH A HOOKUP, AND THE MOST APPROPRIATE LOCATION TO CONNECT TO THE SEWERAGE SYSTEM. THE ESTIMATED COST AND CONNECTION LOCATION WERE USED TO PERFORM THE CONCEPTUAL DESIGN AND COSTING OF ALTERNATIVE SC-5. THE TOWN PERSONNEL CONTACT

INDICATED THAT THE ACCEPTANCE AND ACTUAL COST WOULD HAVE BE NEGOTIATED BEFORE PERMISSION WOULD BE GIVEN. THE NEGOTIATION PROCESS IS A POST-ROD ACTIVITY AND NOT PART OF THE FS PROCESS.

THE PORTSMOUTH POTW WAS NOT CONSIDERED TO BE AN ACCEPTABLE TREATMENT FACILITY FOR THE GROUNDWATER FROM COAKLEY. THE PORTSMOUTH POTW HAS ONLY PRIMARY TREATMENT AND CURRENTLY EXPERIENCES PERMIT COMPLIANCE PROBLEMS. THIS POTW WOULD NOT PROVIDE THE NECESSARY RESIDUAL ORGANIC AND AMMONIA REMOVAL.

BASED ON CALCULATIONS PERFORMED ON ALL DATA FROM TABLE 13 OF THE RI, IT IS ESTIMATED THAT DURING SEMI-ANNUAL LOW FLOW CYCLES THE GROUNDWATER EXTRACTION SYSTEM MAY EXTRACT 100 PERCENT OF THE SURFACE WATER LEAVING THE WETLAND VIA BERRY'S BROOK AND UP TO 20 PERCENT OF THE SURFACE WATER LEAVING THE WETLAND VIA LITTLE RIVER, BASED ON AN EXTRACTION RATE OF 100 GPM. IF SC-5 WERE TO BE SELECTED, FURTHER STUDY WOULD BE NEEDED DURING REMEDIAL DESIGN TO PREDICT WHAT EFFECT WILL OCCUR.

WHILE THE PROPOSED PLAN DOES NOT SPECIFICALLY CITE REDUCTION OF RESIDUAL ORGANIC CARBON AND AMMONIA AT AN OFF-SITE POTW, IT DOES DISCUSS THAT A REDUCTION OF TOXICITY, MOBILITY AND VOLUME OF CONTAMINANTS WOULD OCCUR IF SC-5 WERE IMPLEMENTED. HOWEVER, REMOVAL OF ORGANIC CARBON AND AMMONIA IS NOT UNIQUE TO SC-5, AS THIS COMMENT IMPLIES. THIS FEATURE IS INCLUDED ALSO IN SC-4 AND IN THE PROPOSED PLAN.

FINALLY, THE TOTAL COSTS FOR SC-5 AND SC-4 ARE RELATIVELY CLOSE ($18,900,000 VERSUS $20,200,000) MAKING THE BASIS FOR SELECTION SOMETHING OTHER THAN COSTS. EPA HAS DETERMINED THAT THE POTENTIAL IMPLEMENTATION PROBLEMS AND POSSIBLE NEGATIVE IMPACTS TO THE ADJACENT WETLANDS (SHORT-TERM EFFECTIVENESS) ASSOCIATED WITH SC-5 MAKE IT A LESS DESIRABLE ALTERNATIVE.

COMMENT C: COST ANALYSES PRESENTED IN THE FS APPENDIX B ARE NOT CONSISTENT BETWEEN ALTERNATIVES FOR CERTAIN LINE ITEMS.

EPA RESPONSE: THE OILY DEBRIS IS NOT INCLUDED AS PART OF EPA'S PROPOSED PLAN AND HAS BEEN REFERRED TO NH DES. THE OVERALL COST DIFFERENTIAL TO ALTERNATIVE SC-5 WOULD BE A REDUCTION OF APPROXIMATELY $800,000, REDUCING THE OVERALL COST OF THE ALTERNATIVE TO APPROXIMATELY $18,900,000. THIS COST IS LESS THAN THAT OF SC-4 AS SHOWN IN THE PROPOSED PLAN BY JUST OVER $1 MILLION DOLLARS. IN THE OVERALL ASSESSMENT, ALTERNATIVES SC-4 AND SC-5 WOULD BE CONSIDERED TO HAVE SIMILAR COSTS LEAVING OTHER CRITERIA (I.E., IMPLEMENTABILITY AND SHORT-TERM EFFECTIVENESS) AS THE BASIS FOR SELECTION.

4. ALTERNATIVE PROPOSAL FOR STAGED REMEDIAL ACTIONS

COMMENT A: THE PRP GROUP STATES THAT THE MOST EFFECTIVE REMEDIAL ACTION WOULD BE INSTALLATION OF A CAP THAT MEETS NEW HAMPSHIRE MUNICIPAL LANDFILL CLOSURE STANDARDS AND ASSESSING THE FEASIBILITY OF A "PUMP AND TREAT" SYSTEM.

EPA RESPONSE: THIS PROPOSAL ESSENTIALLY PROVIDES FOR THE CAPPING OF THE LANDFILL AND DEFERRAL OF THE GROUNDWATER REMEDY UNTIL A EVALUATION OF THE IMPACT OF THE CAP ON MIGRATION OF CONTAMINANTS IS CONDUCTED. DISCUSSION RELEVANT TO THIS PROPOSAL IS INCLUDED IN PART IN RESPONSE NUMBERS 2.A AND 3.A AND AS FOLLOWS:

- THE CAP INCLUDED IN THE SELECTED REMEDY (SC-4) IS CONSISTENT WITH THE STATE OF NEW HAMPSHIRE, DEPARTMENT OF ENVIRONMENTAL SERVICES CURRENT REQUIREMENTS FOR CLOSURE OF A SOLID WASTE LANDFILL. EPA HAS DETERMINED THAT THE NEW HAMPSHIRE HAZARDOUS AND SOLID WASTE REGULATIONS ARE ARARS FOR THE COAKLEY LANDFILL. THEREFORE, THE CAP MUST BE CONSISTENT WITH THESE REQUIREMENTS.

- AS DISCUSSED IN COMMENT 1.C AND IN THE ROD, EPA BELIEVES THAT THE MAJORITY OF GROUNDWATER CONTAMINATION IS UNDER AND BEYOND THE LANDFILL IN THE OVERBURDEN AND BEDROCK HYDROGEOLOGICAL UNITS AND IS MIGRATING RADIALLY OUT BEYOND THE COMPLIANCE BOUNDARY ESTABLISHED IN THE PROPOSED PLAN. CAPPING OF THE LANDFILL MAY, AND PROBABLY WILL, SLOW THIS MIGRATION. HOWEVER, WE HAVE NO EVIDENCE TO SUGGEST IT WILL BE RETARDED SUCH THAT CLEANUP LEVELS (ARARS) WILL BE MET AT THE COMPLIANCE BOUNDARY WITHIN A REASONABLE TIMEFRAME. FURTHER, EPA BELIEVES THAT IF WATER SUPPLY WELLS ARE REINTRODUCED TO THE AREA IN THE VICINITY OF THE COAKLEY LANDFILL, THE GROUNDWATER GRADIENTS WILL BE SIGNIFICANTLY ALTERED. SUCH ALTERATION WILL ACCELERATE MIGRATION OF CONTAMINATED GROUNDWATER FROM THE LANDFILL BEYOND THE COMPLIANCE BOUNDARY IN CONCENTRATIONS EXCEEDING CLEANUP LEVELS.

- THE ALTERNATIVE PROPOSED BY THE PRP GROUP DOES NOT SATISFY THE PREFERENCE FOR TREATMENT THAT REDUCES TOXICITY, MOBILITY OR VOLUME AS A PRINCIPAL ELEMENT OF THE REMEDY AS SET FORTH IN SECTION 121 OF CERCLA.

- THE CONSTRUCTION OF AN EFFECTIVE GROUNDWATER EXTRACTION SYSTEM WOULD BE SIGNIFICANTLY MORE COMPLICATED IF DONE AFTER THE CAP WERE IN PLACE AND THE INTEGRITY OF THE CAP COULD BE SERIOUSLY COMPROMISED DURING THAT CONSTRUCTION.

COMMUNITY RELATIONS ACTIVITIES
CONDUCTED AT THE LANDFILL SUPERFUND SITE
IN NORTH HAMPTON, NEW HAMPSHIRE

EPA/DES HAVE CONDUCTED THE FOLLOWING COMMUNITY RELATIONS ACTIVITIES AT THE COAKLEY LANDFILL SUPERFUND SITE:

- AUGUST 18, 1983 - SITE TOUR (PRESENTATIONS BY NH WSPCC, NORTH HAMPTON SELECTMEN, US EPA, AND SENATOR GORDON HUMPHREY).
- NOVEMBER 4, 1985 - NORTH HAMPTON BOARD OF SELECTMEN HOLD A PUBLIC INFORMATIONAL MEETING TO RECEIVE STATE INPUT ABOUT THE GYDROGEOLOGICAL STUDY TO ASSIST THE TOWN IN PLANNING WATER LINE EXTENSIONS.
- JANUARY 1986 - DES/WSPCC PREPARED A COMMUNITY RELATIONS PLAN.
- APRIL 1986 - DES ISSUES A PRESS RELEASE ANNOUNCING THE PUBLIC MEETING TO KICKOFF THE RI/FS.
- MAY 14, 1886 - DES HOLDS THE RI/FS KICKOFF PUBLIC INFORMATIONAL MEETING
- JULY 8, 1988 - NH DIVISION OF PUBLIC HEALTH SERVICES ISSUES REPORT #88-007, "EVALUATION OF CANCER INCIDENCE AND MORTALITY."
- OCTOBER 13, 1988 - ATSDR ISSUES A HEALTH ASSESSMENT REPORT/
- OCTOBER 25, 1988 - EPA ISSUES A PRESS RELEASE ANNOUNCING THE PUBLIC MEETING TO DISCUSS DES/EPA REMEDIAL INVESTIGATION RESULTS.
- OCTOBER 1988 - EPA ISSUES A FACT SHEET ON THE RI RESULTS.
- OCTOBER 1988 - DES ISSUES A FACT SHEET ON THE RI RESULTS.
- NOVEMBER 3, 1988 - DES/EPA HOLD A PUBLIC INFORMATIONAL MEETING ON THE RESULTS OF THE RI.
- NOVEMBER 30, 1988 - EPA ISSUES A PUBLIC NOTICE IN THE PORTSMOUTH HERALD ANNOUNCING THE AVAILABILITY OF THE ADMINISTRATIVE RECORD.
- FEBRUARY 1990 - EPA ISSUES THE PROPOSED PLAN FOR SITE CLEANUP.
- MARCH 7, 1990 - EPA ISSUES A PRESS RELEASE ANNOUNCING THE AVAILABILITY OF THE PROPOSED PLAN, THE DATES OF THE PUBLIC INFORMATIONAL MEETING AND INFORMAL PUBLIC HEARING AND THE BEGINNING OF THE PUBLIC COMMENT PERIOD.
- MARCH 9, 1990 - EPA ISSUES PUBLIC NOTICES IN THE PORTSMOUTH HERALD AND FORTER'S DAILY DEMOCRAT ANNOUNCING THE PROPOSED PLAN, THE DATES OF THE PUBLIC INFORMATIONAL MEETING AND INFORMAL PUBLIC HEARING, AND THE BEGINNING OF THE PUBLIC COMMENT PERIOD.
- MARCH 15, 1990 - EPA/DES HOLD A PUBLIC INFORMATIONAL MEETING ON THE PROPOSED PLAN FOR SITE CLEANUP.
- MARCH 16, 1990 - MAY 14, 1990 - PUBLIC COMMENT PERIOD ON THE PROPOSED PLAN.
- MARCH 30, 1990 - EPA ISSUES A PRESS RELEASE ANNOUNCING THE EXTENSION OF THE PUBLIC COMMENT PERIOD.
- APRIL 3, 1990 - EPA/DES HOLD AN INFORMAL PUBLIC HEARING ON THE PROPOSED PLAN.

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TABLE 1
SELECTED INDICATOR SUBSTANCES

FOR SOILS	FOR GROUNDWATER
ARSENIC	ARSENIC
BARIUM	BARIUM
BENZO (A)PYRENE	BENZENE
BIS(2-ETHYLHEXYL)PHTHALATE	CHLOROBENZENE
CADMUIM	CHROMIUM
DDT	1,2-DICHLOROETHYLENE
LEAD	DIETHYL PHTHALATE
NICKEL	NICKEL
TETRACHLOROETHYLENE	PHENOL
FOR SURFACE WATER	**FOR SEDIMENTS**
ARSENIC	ARSENIC
BARIUM	BARIUM
METHYL ETHYL KETONE	CADMIUM
TOLUENE	LEAD
	NICKEL

TABLE 2
SUMMARY OF CONTAMINANTS OF CONCERN IN SOIL

CONTAMINANTS OF CONCERN	GEOMETRIC MEAN (MG/KG)	MAXIMUM (MG/KG)	FREQUENCY OF DETECTION
ARSENIC	25	32	7/8
BARIUM	59	133	8/8
BENZO (A)PYRENE	485	490	2/8
CADMIUM	5	11	8/8
DDT	44	61	2/8
LEAD	69	435	8/8
NICKEL	57	96	8/8

TABLE 3
SUMMARY OF CONTAMINANTS OF CONCERN IN GROUNDWATER

CONTAMINANTS OF CONCERN	GEOMETRIC MEAN (UG/1)	MAXIMUM (UG/1)	FREQUENCY OF DETECTION
ARSENIC	15.1	89	11/18
2-BUTANONE (MEK)	97.3	2700	13/88
BARIUM	68.9	368	14/15
BENZENE	8.6	60	34/91
CHLOROBENZENE	9.7	182	12/88
CHROMIUM	19.7	330	5/16
1,2-DICHLOROETHYLENE	15.7	72	4/88
DIETHYL PHTHALATE	16.7	230	5/15
NICKEL	22.6	200	14/15
PHENOL	39.0	120	3/15

TABLE 4
SUMMARY OF CONTAMINANTS OF CONCERN IN SURFACE WATER

CONTAMINANTS OF CONCERN	GEOMETRIC MEAN (UG/1)	MAXIMUM (UG/1)	FREQUENCY OF DETECTION
ARSENIC	1	2.2	4/7
BARIUM	85.2	227	2/7
2-BUTANONE (MEK)		8.4	1/9
TOLUENE		6.6	1/9

TABLE 5
SUMMARY OF CONTAMINANTS OF CONCERN IN SEDIMENTS

CONTAMINANTS OF CONCERN	GEOMETRIC MEAN (MG/KG)	MAXIMUM (MG/KG)	FREQUENCY OF DETECTION
ARSENIC	6.9	46	9/9
BARIUM	29	59	7/9
CADMIUM	2.4	2.8	4/9
LEAD	34.7	114	9/9
NICKEL	22.2	33	6/9

TABLE 17
CONTAMINANT AND LOCATION-SPECIFIC

	APPLICABLE - 2	RELEVANT & APPROPRIATE
A. GROUNDWATER		
1. RSA 149:8,III; N.H. ADMIN. WS CH. 410-PROTECTION OF GROUNDWATER	X	
A. WS 410,05 (A) DISCHARES TO GROUNDWATER	X	
B. WS 410.09 GROUNDWATER DISCHARGE CRITERIA, IN-CORPORATING BY REFERENCE WS PART 302 (MAXIMUM CON-TAMINANT LEVELS(MCLS) AND SUGGESTED NO ADVERSE RESPONSE LEVELS (SNARLS))	X	

1. SEE APPENDIX A FOR SYNOPSIS OF EACH REQUIREMENT AND DISCUSSION OF ACTION NECESSARY TO ATTAIN ARAR'S.

2. THE ABSENCE OF ANY SYMBOL IN THE COLUMNS DESIGNATED "APPLICABLE" OR "RELEVANT AND APPROPRIATE" INDICATES THAT, IN THE CIRCUMSTANCES PRESENT AT THIS SITE, THE REQUIREMENT IS NOT APPLICABLE OR RELEVANT AND APPROPRIATE.

TABLE 17 (CONT)
CONTAMINANT AND LOCATION-SPECIFIC

	APPLICABLE - 2	RELEVANT & APPROPRIATE
C. WS 410.10, ADDITIONAL GROUNDWATER CRITERIA.	X	
D. WS 410.05 (E) GROUNDWATER QUALITY CRITERIA; HEALTH BASED GROUNDWATER PROTECTION STANDARDS.	X	
E. WS 410.05 (G) GROUNDWATER QUALITY CRITERIA; NONDEGRADATION OF SURFACE WATER.	X	
B. SURFACE WATER		
1. RSA 149:8 I-ENFORCEMENT OF SURFACE WATER CLASSIFICATIONS.	X	
2. WS CH. 400, PART 437-WATER QUALITY STANDARDS FISH LIFE	X	
3. WS CH. 400, PART 439-ANTIDEGRADATION POLICY.		
C. WETLANDS IMPACT		
1. RSA 149:8-A, DREDGING AND CONTROL OF RUN-OFF; WS CH. 400 PART 415, DREDGING RULES.	X	
2. FILL AND DREDGE IN WETLANDS, RSA CH. 483-A AND WT. CH. 300, CRITERIA AND CONDITIONS.		
D. AIR EMISSIONS		
1. RSA CH. 125-C, AIR POLLUTION CONTROL; N.H. ADMIN. CODE AIR CH. 100 PARTS 604 THROUGH 606; PART 1002.	X	

E.	HISTORIC PRESERVATION	
1.	NEW HAMPSHIRE HISTORIC PRESERVATION ACT, RSA 227-C.	
2.	LOCAL HISTORIC DISTRICTS, RSA 31:89-A-31:89-K	
E.	HAZARDOUS WASTE REQUIREMENTS	
	N.H. HAZARDOUS WASTE MANAGEMENT ACT, RSA CH. 147-A; HAZARDOUS WASTE MANAGEMENT RULES, N.H. ADMIN. RULES HE-P CH. 1905.	X
G.	SOLID WASTE REQUIREMENTS	
	N.H. SOLID WASTE MANAGEMENT ACT, RSA CH. 149-M SOLID WASTE MANAGEMENT RULES, N.H. ADMIN. RULES HE-P CH. 1901.	X