

**EPA Superfund
Record of Decision:**

**NEW CASTLE STEEL
EPA ID: DED980705255
OU 01
NEW CASTLE, DE
03/31/1988**

SECTION 265.253 (A)--COVER MUST BE PROVIDED TO CONTROL WIND DISPERSAL
SECTION 265.253 (B)--AN IMPERMEABLE BASE MUST BE PROVIDED
SECTION 265.1--PILES MUST BE PROTECTED FROM RUN-ON

IN ADDITION, DEEMER STEEL HAD BEEN NOTIFIED OF THE FOLLOWING VIOLATIONS:

- OPERATING A HAZARDOUS WASTE FACILITY WITHOUT RECEIPT OF INTERIM STATUS FOR 1 MONTH AFTER THE REGULATIONS GOVERNING HAZARDOUS WASTE WERE PROMULGATED.
- OPERATING WITHOUT A PERMIT FROM 1974 TO 1980--SECTION 7.03 (G) OF THE DELAWARE SOLID WASTE DISPOSAL REGULATIONS.
- OPERATING A DISPOSAL SITE FOR NON-HAZARDOUS WASTE WITHOUT A PERMIT.

IN DECEMBER 1983, AN AGREEMENT BETWEEN DEEMER AND DNREC ESTABLISHED A THREE PHASE PROGRAM OF ACTIONS IN ORDER TO ADDRESS PAST VIOLATIONS. PHASE I WAS THE IMPLEMENTATION OF A GROUND WATER MONITORING PLAN. PHASE II INCLUDED DNREC REVIEW OF THE REPORT AND RECOMMENDATIONS TO EITHER PURSUE MONITORING AND INVESTIGATION OF THE DEEPER POTOMAC AQUIFER, AND/OR IMPLEMENT A LANDFILL MANAGEMENT PROGRAM UNDER PHASE III.

#CR

COMMUNITY RELATIONS

THE PREFERRED ALTERNATIVE FOR THE NEW CASTLE STEEL SITE WAS PUBLISHED IN THE WILMINGTON NEWS--JOURNAL PAPERS ON MARCH 8, 1988. A PUBLIC MEETING WAS HELD ON MARCH 17, 1988. THE ONLY RESPONSES AT THE MEETING ABOUT THE SITE CONCERNED THE USE OF THE SITE AFTER IT WAS DELISTED. THE RESPONSES ARE SHOWN IN THE TRANSCRIPT OF THE MEETING ATTACHED TO THIS ROD. THE STATE REPLIED THAT THE SITE WOULD BE CLOSED UP UNDER THE SOLID WASTE REGULATIONS REQUIRING THE OWNER TO CAP THE SITE. THE STATEMENT WAS IN RESPONSE TO JEFF MACK, DELAWARE STATE REPRESENTATIVE FROM NEW CASTLE COUNTY.

NO TELEPHONE CALLS OR WRITTEN COMMUNICATION IN RESPONSE TO THE PUBLIC MEETING OR ADVERTISEMENT HAVE BEEN RECEIVED. REPRESENTATIVE MACK SENT A FOLLOW-UP LETTER OF HIS MEETING COMMENT TO THE STATE OF DELAWARE. HIS MEETING COMMENT WAS ADEQUATELY RESPONDED TO IN THE TRANSCRIPT.

GEOLOGY

THE SITE IS LOCATED ON THE ATLANTIC COASTAL PLAIN, A THICK WEDGE OF UNCONSOLIDATED SEDIMENTS OF CRETACEOUS TO QUATERNARY AGE. THE SEDIMENTARY WEDGE IS THINNEST NEAR THE FALL LINE, ABOUT 45 MILES NORTH OF NEW CASTLE, WHERE IT IS IN CONTACT WITH THE OUTCROP AREA OF CRYSTALLINE BEDROCK COMPRISING THE APPALACHIAN PIEDMONT PROVINCE. THE COASTAL PLAIN SEDIMENTS BECOME THICKER TOWARD THE SOUTHEAST AND ARE 2400 FEET THICK IN SOUTHEAST NEW CASTLE COUNTY.

BEDROCK LIES AT A DEPTH OF BETWEEN 500 AND 600 FEET BELOW THE SITE. IN NORTHEASTERN NEW CASTLE COUNTY, SEDIMENTS OF THE POTOMAC FORMATION OVERLIE BED-ROCK AND ARE MANTLED BY A THIN LAYER OF PLEISTOCENE AND QUATERNARY SEDIMENTS. THE POTOMAC FORMATION WAS DEPOSITED BY STREAMS DURING EARLY TO LATE CRETACEOUS TIME, AND CONSISTS OF VARIEGATED CLAY AND SILT WITH INTERBEDDED SANDS. THE PLEISTOCENE AND QUATERNARY SEDIMENTS (COLUMBIA FORMATION) OVERLIE THE POTOMAC FORMATION. THE COLUMBIA SEDIMENTS WERE DEPOSITED BY RIVERS FED BY MELTING GLACIERS TO THE NORTH AND ARE MOSTLY POORLY SORTED SANDS, GRAVELS, SILTS AND CLAYS.

HYDROGEOLOGY

PERMEABLE SAND LAYERS IN THE POTOMAC FORMATION ARE AN IMPORTANT SOURCE OF WATER FOR MUNICIPALITIES AND INDUSTRIES IN THE NEW CASTLE AREA. THE POTOMAC AQUIFER CONSISTS OF MANY SEPARATE SAND AQUIFERS WITH VARIABLE DEGREES OF HYDRAULIC INTERCONNECTION. THESE AQUIFERS ARE HIGHLY VARIABLE IN HYDRAULIC CHARACTERISTICS. THE VERTICAL HYDRAULIC CONDUCTIVITIES OF THE CONFINING LAYERS SEPARATING THE SANDS HAVE BEEN MEASURED IN FEW CASES, AND ARE BETWEEN THE LOW PERMEABILITY VALUES OF 2.9×10^{-6} CM/S AND 1×10^{-5} CM/S.

RECHARGE TO THE POTOMAC AQUIFER IS PRIMARILY THROUGH THE OVERLYING COLUMBIA FORMATION. DEPENDING ON LOCAL STRATIGRAPHY, THE COLUMBIA AND POTOMAC AQUIFERS MAY BE ISOLATED OR FUNCTION AS A SINGLE HYDROLOGIC UNIT.

IN ORDER TO DETERMINE THE RELATIONSHIP BETWEEN THE POTOMAC AND COLUMBIA AQUIFERS THE DRILLING LOGS FROM THE FOUR MONITORING WELLS AND TEST HOLES WERE RECORDED AND INTERPRETED. THE WELL LOGS SHOW THAT SANDY AND SILTY SEDIMENTS ARE 10 FEET OR LESS THICK WEST OF THE SITE, AND ARE UNDERLAIN BY POTOMAC CLAYS TO A DEPTH OF 55 OR 60 FEET. BELOW THIS DEPTH, SAND AQUIFERS ALTERNATE WITH LAYERS OF CLAY OR SANDY CLAY.

EAST AND NORTHEAST OF THE SITE COLUMBIA SEDIMENTS MAY BE 35 TO 60 FEET THICK IN PLACES AND UNDERLAIN BY POTOMAC CLAYS TO A DEPTH OF APPROXIMATELY 90 FEET. THUS IT APPEARS THAT ABOUT 30 TO 50 FEET OF CLAY OVERLIES THE UPPERMOST POTOMAC AQUIFER IN THE AREA WITHIN ONE MILE RADIUS OF THE DEEMER STEEL SITE. NEAR THE DEEMER DISPOSAL AREA, THE UPPERMOST POTOMAC AQUIFER WOULD BE EXPECTED AT A DEPTH OF ABOUT 70 FEET AND SHOULD BE OVERLAIN BY ABOUT 50 FEET OF LOW PERMEABILITY CLAYS.

#RSI

REMEDIAL SAMPLING INVESTIGATION

THE REMEDIAL SAMPLING INVESTIGATION CONSISTED OF TWO PHASES. A HYDROGEOLOGICAL STUDY WAS CONDUCTED BY EARTH DATA IN 1984 WHO WAS HIRED BY THE RESPONSIBLE PARTY DEEMER STEEL. THIS STUDY WAS FOLLOWED BY AN ANALYTICAL SAMPLING IN 1987 TO DETERMINE THE IMPACT OF THE WASTE MATERIAL CAUSED BY THE OTHER TRANSMISSION ROUTES INCLUDING SOILS, AIR AND SURFACE WATERS. AN ENDANGERMENT ASSESSMENT (EA) BASED ON THE COMPLETE SAMPLING RESULTS OF THE TWO STUDIES WAS MADE BY VERSAR INC. WHO WAS HIRED BY THE ENVIRONMENTAL PROTECTION AGENCY. THE EA CONCLUDED THAT NO SIGNIFICANT RISK TO HUMAN HEALTH OR THE ENVIRONMENT COULD BE ATTRIBUTED TO THE SITE. THE RESULTS OF THE STUDIES ARE SUMMARIZED IN THE FOLLOWING PARAGRAPHS:

A. WASTE CHARACTERIZATION

IN MAY 1984 EARTH DATA INC. COLLECTED WASTE SAMPLES FROM SIX EXCAVATED PITS AT THREE DIFFERENT DEPTHS. THE NEAR-SURFACE SAMPLES WERE TAKEN BETWEEN 0.5 AND 3.0 FEET FROM THE GROUND SURFACE, THE INTERMEDIATE DEPTH SAMPLES RANGED FROM 5.0 TO 6.8 FEET, AND THE DEEP SAMPLES RANGED FROM 8.5 TO 13.0 FEET. NEAR SURFACE SAMPLES WERE TAKEN AT TWO ADDITIONAL LOCATIONS, (SEE FIGURE 3).

THE ANALYTICAL METHOD EMPLOYED WAS THE EP (EXTRACTION PROCEDURE) TOXICITY TEST AS DESCRIBED IN 40 CFR 261, APPENDIX II AND THE COMPARABLE DELAWARE REGULATIONS. THE ANALYSIS WAS EXPANDED TO INCLUDE THE ENTIRE LIST OF 18 METALS. TWO COMPOSITE SAMPLES WERE PREPARED, FROM BOTH ACTIVE AND INACTIVE AREAS. THE ANALYTICAL RESULTS FOR THE TWO COMPOSITE SAMPLES ARE SUMMARIZED IN TABLE 1. CONCENTRATIONS OF THE EIGHT METALS USED TO DEFINE THE CHARACTERISTIC OF EP TOXICITY ARE ALL BETWEEN TWO AND THREE ORDERS OF MAGNITUDE LOWER THAN THE ESTABLISHED LIMITS FOR EPA TOXICITY (SEE TABLE 1). ON THE BASIS OF THE ANALYSES, IT WAS CONCLUDED THAT THE FILL MATERIAL IN BOTH AREAS IS NOT CONSIDERED EP TOXIC.

IN JANUARY 1987, THE NUS CORPORATION CONDUCTED WASTE SAMPLING AT THE SITE TO CHARACTERIZE THE AIR MIGRATION POTENTIAL OF LEAD IN THE SOIL. A TOTAL OF EIGHT SAMPLES WERE TAKEN FOR USE IN THE COWHERD MODEL. THIS MODEL IS USED TO ASSESS THE HEALTH EFFECTS OF AIRBORNE CONSTITUENTS FROM SOIL ON A SITE. THE AIRBORNE CONCENTRATION DETERMINED FROM THE MODEL WAS COMPARED TO A REFERENCE LEVEL. THE REFERENCE LEVEL IS THAT LEVEL FOR NON-CARCINOGENIC CONSTITUENTS BELOW WHICH THERE IS NO TOXIC EFFECTS. THE EXPOSURE LEVELS WAS 1.96×10^{-5} MG/KG/DAY COMPARED TO A REFERENCE LEVEL OF 4.3×10^{-4} MG/KG/DAY. THE OBSERVED LEVEL WAS WELL UNDER THE REFERENCE INDICATING NO TOXIC LEVELS FROM THE AIRBORNE LEAD.

A TOTAL OF 21 SAMPLES WERE OBTAINED FROM SEVEN TEST PITS (SEE FIGURE 4, TABLE 2 AND 3) TO DETERMINE THE POTENTIAL FOR TOXIC EFFECTS FROM INGESTION. THE LEVELS FOR CADMIUM, CHROMIUM AND NICKEL WERE COMPARED TO A REFERENCE LEVEL SINCE THE INGESTION EFFECTS ARE NOT CARCINOGENIC. THE WORST-CASE ASSESSMENT FOR THESE METALS IS SUMMARIZED BELOW:

METAL	EXPOSURE LEVEL MG/KG/DAY	REFERENCE LEVEL MG/KG/DAY
CADMIUM	3.3×10^{-6}	2.9×10^{-4}
CHROMIUM	3.4×10^{-5}	5.1×10^{-3}
LEAD	1.5×10^{-3}	1.4×10^{-3}
NICKEL	6.53×10^{-5}	1.0×10^{-2}

THESE LEVELS DO NOT INDICATE ANY PROBLEM FOR PUBLIC HEALTH; THESE WERE DETERMINED AS WORST-CASE VALUES, IF THE MOST PROBABLE CASE WAS USED, THE EXPOSURE LEVELS WOULD BE MUCH LOWER.

ARSENIC WAS NOT INCLUDED IN THE ABOVE LIST BECAUSE IT IS CONSIDERED A CARCINOGEN. THE RISK DUE TO INGESTION EXPOSURE FOR USING THE HIGHEST OBSERVED CONCENTRATION BASED ON A SINGLE SEDIMENT SAMPLE WAS CALCULATED TO BE 2.94×10^{-5} . AVERAGE CONCENTRATIONS OF ARSENIC FOUND ON SITE ARE WITHIN RANGES OF ARSENIC FOUND IN NATURAL SOIL.

THESE ESTIMATES WERE BASED ON A NO-ACTION REMEDIAL RESPONSE AND ASSUMED THAT THE FILL AREA WILL REMAIN UNCOVERED FOR SEVENTY YEARS. THE ASSESSMENT OF EXPOSURE AND RISK WERE COMPUTED CONSERVATIVELY SO ANY POTENTIAL RISK TO HUMAN HEALTH WOULD BE IDENTIFIED.

THE TOTAL NUMBER OF SAMPLES OBTAINED DURING THE INVESTIGATION WAS FORTY-EIGHT WASTE AND SEDIMENT SAMPLES, WHICH WERE ANALYZED FOR INORGANIC CONSTITUENTS, FIVE OF THESE SAMPLES WERE COMPOSITED AND ANALYZED FOR ORGANIC CONSTITUTES.

B. HYDROGEOLOGICAL INVESTIGATION

DURING THE SPRING, 1984 HYDROGEOLOGICAL INVESTIGATION CONDUCTED BY EARTH DATA, INC., FOUR MONITORING WELLS WERE INSTALLED IN THE COLUMBIA FORMATION (SEE FIGURE 1). AFTER THE INSTALLATION, THE MONITORING WELLS WERE DEVELOPED TO ASSURE AN ADEQUATE FLOW FOR SAMPLING PURPOSES. ONE-HALF INCH PIEZOMETERS WERE INSTALLED AT 5 LOCATIONS SHOWN IN FIGURE 2. THE PIEZOMETERS WERE USED TO GATHER ADDITIONAL WATER-LEVEL INFORMATION, BUT NOT USED FOR COLLECTING GROUND WATER SAMPLES.

DURING THE INVESTIGATION, WATER LEVEL MEASUREMENTS WERE TAKEN FROM THE MONITORING WELL LOCATIONS AND THE PIEZOMETERS. THE WATER LEVEL CONTOUR MAP WAS CONSTRUCTED BASED ON THE WATER LEVEL MEASUREMENTS. IT APPEARS THAT THE FLOW IN THE SHALLOW SATURATED ZONE IS STRONGLY INFLUENCED BY THE DRAINAGE CHANNEL SEPARATING THE INACTIVE AND ACTIVE DISPOSAL AREAS. FLOW DIRECTIONS ARE TOWARD THE CHANNEL WITH A SOUTHERLY COMPONENT OF FLOW NEAR THE SOUTHERN MARGIN OF THE FILL ADJACENT TO THE MARSH. MUCH OF THE GROUND WATER IN THE SHALLOW FLOW SYSTEM BENEATH THE SITE IS LIKELY TO DISCHARGE INTO THE CHANNEL AND FLOW SOUTHEAST TOWARD THE MARSH AND EVENTUALLY INTO THE MARSHY AREA BORDERING THE FILL ON THE SOUTH. DISCHARGE OF GROUND WATER FLOWING BENEATH THE SITE INTO THE DRAINAGE DITCH TO THE WEST OR INTO THE MARSHY AREA TO THE EAST IS LIKELY TO BE MINIMAL.

DURING THE HYDROGEOLOGICAL INVESTIGATION, A NUMBER OF SHALLOW WELL AND TEST BORINGS WERE DRILLED. EARTH DATA, INC., OBTAINED WELL AND TEST HOLE DRILLING LOGS NEAR NEW CASTLE FROM THE FILES OF THE DELAWARE GEOLOGICAL SURVEY. BASED ON THE EXISTING WELL AND TEST HOLE DRILLING LOGS, IT WAS DETERMINED THAT LOW PERMEABILITY CLAYS UNDERLIE THE SHALLOW AQUIFER AT A DEPTH OF 15 TO 20 FEET BELOW THE SURFACE. THESE CLAYS HAVE LOW VERTICAL HYDRAULIC CONDUCTIVITIES BASED ON PUBLISHED REPORTS. APPROXIMATELY, 50 FEET OF CLAYS ARE ESTIMATED TO SEPARATE THE SHALLOW AQUIFER FROM THE UPPER MOST CONFINED POTOMAC AQUIFER BENEATH THE SITE (SEE FIGURE 5 AND 6).

GROUND WATER SAMPLES WERE OBTAINED FROM EACH OF THE FOUR MONITORING WELLS AND AT TWO OF THE SURFACE WATER GAUGING STATIONS IN MAY, 1984. ANALYSIS OF GROUND WATER SAMPLES WAS DONE FOR ALL OF THE GROUP 1,2 AND 3 PARAMETERS AS SPECIFIED UNDER DELAWARE REGULATIONS GOVERNING HAZARDOUS WASTE, SECTION 265.92 (6), WITH THE EXCEPTION OF THE PESTICIDE PARAMETERS LISTED UNDER GROUP #1. THESE PARAMETERS, ALONG WITH THE ANALYTICAL RESULTS FOR THE SIX SAMPLES ARE SHOWN IN TABLE 4.

GROUND WATER IN THE SHALLOW SATURATED ZONE IS GENERALLY GOOD IN QUALITY. BASED ON THE ANALYSIS OF SAMPLES FROM MONITORING WELLS, THE GROUND WATER BENEATH THE DEEMER DISPOSAL AREAS WOULD MEET MOST CRITERIA FOR DRINKING WATER EXCEPT FOR MODERATELY HIGH LEVELS OF IRON AND MANGANESE. THE TWO METALS, IN THE CONCENTRATIONS REPORTED, ARE NOT OF CONCERN WITH REGARD TO TOXICITY. THE CONCENTRATIONS OF OTHER CONSTITUENTS, INCLUDING LEAD, CADMIUM AND CHROMIUM, ARE WELL BELOW THE LEVELS ESTABLISHED AS MAXIMUM CONTAMINANT LEVELS (MCL) UNDER THE SAFE DRINKING WATER ACT.

C. SURFACE WATER AND SEDIMENTS INVESTIGATION

DURING THE SPRING, 1984, INVESTIGATION PERFORMED BY EARTH DATA, INC. TWO SURFACE WATER SAMPLES WERE TAKEN AT TWO LOCATIONS IN THE CITY DRAINAGE DITCH. THE ANALYTICAL RESULTS ARE SHOWN IN TABLE 4.

THE ONLY PARAMETER ABOVE THE AMBIENT WATER QUALITY CRITERIA FOUND IN THE MARSH AREA WAS LEAD. THE OTHER METALS USED AS INDICATORS FOR CONTAMINANTS OF CONCERN INCLUDED ARSENIC, CHROMIUM, NICKEL AND CADMIUM. THE ARSENIC, CHROMIUM AND NICKEL WERE BELOW ALL ACUTE AND CHRONIC AMBIENT WATER QUALITY CRITERIA WHILE CADMIUM WAS BELOW THE ACUTE AND NOT SIGNIFICANTLY DIFFERENT THAN THE CHRONIC CRITERIA.

IN JANUARY, 1987, NUS CORPORATION TOOK 11 SURFACE WATER SAMPLES AT THE NEW CASTLE STEEL SITE (SEE FIGURE 7). TWO OF THE ELEVEN SAMPLES TAKEN WERE THE BACKGROUND SAMPLES. THE ANALYTICAL RESULTS ARE SHOWN IN TABLE 5. THREE OF THE NINE DOWNSTREAM SAMPLES EXCEEDED U.S. EPA AMBIENT WATER QUALITY CRITERIA (AWQC) FOR LEAD AND EIGHT OF THE NINE SAMPLES EXCEEDED THE LOWEST CHRONIC LEVELS FOR WATER OF MEDIUM HARDNESS. THE BACKGROUND SAMPLES FOR LEAD ALSO EXCEEDED U.S. EPA AWQC. THE HIGHEST LEAD SAMPLES WERE CONTAMINATED WITH SEDIMENT ACCORDING TO THE FIELD INVESTIGATION REPORT OF NUS. ALTHOUGH NICKEL AND HEXAVALENT CHROMIUM COMPOUNDS EXHIBIT APPRECIABLE SOLUBILITY IN WATER, ALL NICKEL CONCENTRATIONS IN SAMPLES FROM LOCATIONS NEAR OR DOWNGRAIENT OF THE SITE ARE WITHIN U.S. EPA AWQC. A COMPARISON OF SELECTED METAL CONTAMINANTS WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) FOR GROUNDWATER AND SURFACE WATER IS SHOWN IN TABLE 7.

IN JANUARY, 1987, A TOTAL OF 21 SOIL AND SEDIMENT SAMPLES FROM OFF SITE LOCATIONS WERE ANALYZED FOR TOTAL METALS. THE OFF-SITE LOCATIONS INCLUDED BACKGROUND LOCATIONS NOT MATERIALLY AFFECTED BY THE SITE, AND

LOCATIONS NEAR TO THE SITE OR TOPOGRAPHICALLY DOWNGRAIENT FROM NEW CASTLE STEEL SITE.

FOR SAMPLES FROM THE DOWNGRAIENT AREAS AND BACKGROUND LOCATIONS, ANALYTICAL DATA (TOTAL METALS) WERE COMPILED FOR ARSENIC (AS), CADMIUM (CD), CHROMIUM (CR), LEAD (PB), AND NICKEL (NI).

ARSENIC CONCENTRATIONS IN SAMPLES FROM DOWNGRAIENT AREAS (AREAS WHERE DIRECT CONTACT EXPOSURES ARE MOST LIKELY TO OCCUR OWING TO THE PROXIMITY OF THE MARSH AND THE DELAWARE RIVER), RANGE FROM JUST ABOVE THE DETECTION LIMIT TO 42 MG/KG, BUT RANGES FROM 1 TO 50 PPM (SEE FIGURE 8).

THE CADMIUM CONCENTRATIONS RANGE FROM BELOW THE DETECTION LIMIT TO 7 MG/KG, AND THE MEAN CONCENTRATION IS 2.59 MG/KG, LOWER THAN THE AVERAGE VALUE FOR CADMIUM AT BACKGROUND LOCATIONS, 4.34 MG/KG. CONCENTRATIONS OF CADMIUM IN SOIL RANGE FROM 0.01 TO 7 PPM AND GENERALLY AVERAGE ABOUT 0.15 PPM (SEE FIGURE 9).

CHROMIUM CONCENTRATIONS IN DOWNGRAIENT AREAS WERE GENERALLY HIGHER IN CONCENTRATION COMPARED TO ARSENIC AND CADMIUM, FROM 11 TO 74 MG/KG, AND AVERAGE 32.45 MG/KG OF SOIL. TYPICAL SOIL CHROMIUM CONCENTRATIONS MAY RANGE FROM 20 TO 100 PPM (SEE FIGURE 10).

LEAD CONCENTRATIONS IN THE SOIL AND SEDIMENTS HAVE THE BROADEST RANGE AND ARE HIGHEST. LEAD CONCENTRATIONS RANGE FROM 21 TO 3,260 MG/KG AND AVERAGE 419.64 MG/KG. THE COMPUTED STANDARD DEVIATION OF 955.29 MG/KG IS NOTABLY HIGH, SUGGESTING THAT THE MAXIMUM VALUE OF 3,260 MG/KG OBTAINED AT THE ROUTE 9 CULVERT IS AN OUTLIER. URBAN SOILS COMMONLY HAVE LEAD CONCENTRATIONS RANGING FROM 150 TO 300 MG/KG, AND LEAD MAY EXCEED 2,000 MG/KG OF SOIL NEAR ROADSIDES. THESE HIGH LEVELS ARE LARGELY A RESULT OF THE EXTENSIVE USE OF LEADED GASOLINES AND THE RELATIVE IMMOBILITY OF LEAD IN SEDIMENTS (SEE FIGURE 11).

NICKEL CONCENTRATIONS RANGE FROM 10 TO 140 MG/KG, AND THE AVERAGE NICKEL CONCENTRATION ON SOIL AND SEDIMENT IS 44.73 MG/KG. NICKEL CONCENTRATIONS IN SOIL GENERALLY AVERAGE 40-80 PPM (SEE FIGURE 12).

IT SHOULD BE NOTED THAT IN SEVERAL INSTANCES, "BACKGROUND" CONCENTRATION VALUES FOR ARSENIC, CADMIUM, CHROMIUM, LEAD AND NICKEL EXCEED "DOWNGRAIENT" VALUES, INDICATING OTHER SOURCE AREAS SIGNIFICANTLY CONTRIBUTED TO THESE ENVIRONMENTAL CONCENTRATIONS (SEE TABLE 6).

#EA

ENDANGERMENT ASSESSMENT

AFTER THE COMPLETION OF THE JANUARY, 1987 SAMPLING PERFORMED BY NUS CORPORATION, U.S. EPA TASKED VERSAR, INC. TO WRITE AN ENDANGERMENT ASSESSMENT (EA) REPORT TO EVALUATE THE MAGNITUDE AND PROBABILITY OF ACTUAL OR POTENTIAL HARM TO PUBLIC HEALTH OR WELFARE, OR THE ENVIRONMENT POSED BY THE HAZARDOUS SUBSTANCES PRESENT AT THE SITE.

THE EA PROCESS ANALYZES THE EXPECTED ENVIRONMENTAL FATE AND TRANSPORT OF INDICATOR CHEMICALS IDENTIFIED THROUGH CONTAMINANT SCREENING, TO ESTIMATE POTENTIAL ROUTES AND EXTENT OF EXPOSURES. EACH INDICATOR CHEMICAL IS FURTHER EVALUATED FOR ITS TOXICOLOGICAL PROPERTIES, AND BASED ON ESTIMATED DOSES INCURRED, RELATIVE RISK IS COMPUTED. THE FOLLOWING REPRESENTS A SUMMARY OF THE MAJOR FINDINGS OF THIS REPORT:

- NUMEROUS ORGANIC AND INORGANIC COMPOUNDS WERE IDENTIFIED AT THE NEW CASTLE STEEL SITE. CONTAMINANT SCREENING IDENTIFIED FIVE INDICATOR CHEMICALS WHICH REPRESENT CONTAMINANTS OF PRIMARY CONCERN FROM A PUBLIC AND ENVIRONMENTAL HEALTH STANDPOINT. THESE CONTAMINANTS WERE ARSENIC, CADMIUM, CHROMIUM, LEAD, AND NICKEL.
- BASED ON THE AVAILABLE DATA, FATE AND TRANSPORT STUDIES INDICATE THAT EACH OF THE CONTAMINANTS OF CONCERN ARE ADSORBED TO AN APPRECIABLE EXTENT BY SOIL PARTICLES AND THEREFORE DOMINATES ITS MOVEMENT IN THE ENVIRONMENT.
- TWO EXPOSURE ROUTES WERE IDENTIFIED: INHALATION OF LEAD-CONTAMINATED PARTICULATES EMITTED FROM THE ACTIVE DISPOSAL AREA OF THE SITE; AND DIRECT CONTACT OF CONTAMINATED SURFACE WATER, SOIL, AND SEDIMENT IN DRAINAGE WAYS FROM THE SITE AND IN THE TOPOGRAPHICALLY LOWER MARSH AREAS.
- POTENTIAL HEALTH RISKS WERE IDENTIFIED FOR INGESTION EXPOSURE TO LEAD (NONCARCINOGEN) AND ARSENIC (CARCINOGEN) USING THE HIGHEST OBSERVED CONCENTRATIONS.
- SOME HIGH LEAD CONCENTRATIONS WERE DETECTED IN SURFACE WATER SAMPLES COLLECTED ON THE SITE. THE HIGHEST VALUES WERE FOUND IN SAMPLES THAT WERE UNFILTERED AND OBSERVED TO HAVE SEDIMENT. THE CLEAR SAMPLES WERE SLIGHTLY ABOVE THE LOWEST WATER QUALITY CRITERIA (CHRONIC) FOR WATER WITH A HARDNESS OF 100 MG/L. THE VALUES IN THE MARSH ARE NOT SIGNIFICANTLY HIGHER AND CAN BE PARTIALLY ATTRIBUTED TO THE URBAN ENVIRONMENT AND TIDAL INFLUX FROM THE RIVER. THE VALUES OF CLEAR SAMPLES FROM THE MARSH DID NOT EXCEED ACUTE WATER QUALITY VALUES.

- THE ONLY PARAMETER OF CONCERN IN THE WETLAND SAMPLES WAS LEAD. SOME LEAD IN SURFACE WATER SAMPLES NEAR THE SITE EXCEEDED EPA'S AMBIENT WATER QUALITY CRITERIA (ACUTE) FOR FRESH WATER ON SITE AND MAY BE ADVERSELY IMPACTING A LOCALIZED WETLANDS AREA. THERE IS NO EVIDENCE TO LINK THE LEVELS OF LEAD IN THE WETLANDS TO THE SITE. BACKGROUND VALUES TAKEN UPGRADIENT OF THE SITE SHOW HIGHER LEVELS THAN THE LEAD VALUES IN THE MARSHLAND. THE LEVELS OF LEAD IN THE WETLANDS WERE INCREASED BY MANY OTHER FACTORS IN ADDITION TO THE SITE. THESE INCLUDE DRAINAGE FROM THE URBAN AREA, TOTAL INFLUENCES IN THE MARSH, AND RUNOFF FROM OTHER SITES INCLUDING ROADS AND ANOTHER FOUNDRY IN THE AREA. EPA WILL PERIODICALLY MONITOR THE SITE CONDITIONS UNTIL THE SITE IS DELETED FROM THE NATIONAL PRIORITIES LIST OR UNTIL THE SITE IS CLOSED UNDER THE STATE OF DELAWARE'S SOLID WASTE DISPOSAL REGULATIONS.
- SOME LEAD IN SURFACE WATER SAMPLES COLLECTED NEAR THE SITE EXCEEDED EPA'S AMBIENT WATER QUALITY CRITERIA (ACUTE) FOR FRESH WATER, AND MAY BE ADVERSELY IMPACTING A LOCALIZED WETLANDS AREA.
- WHEN BACKGROUND CONCENTRATIONS AND WASTE ANALYSES WERE COMPARED WITH REMAINING ENVIRONMENTAL SAMPLES, IT IS EVIDENT THAT OTHER CONTAMINANT SOURCES WERE CONTRIBUTING TO THE ENVIRONMENTAL CONCENTRATIONS FOUND.
- VIRTUALLY ALL CONCENTRATIONS OF ARSENIC, CADMIUM, CHROMIUM, LEAD, AND NICKEL WERE WITHIN TYPICAL CONCENTRATION RANGES FOUND IN URBAN, INDUSTRIALIZED SETTINGS.

BASES ON AN EVALUATION OF ALL AVAILABLE INFORMATION AND DATA ON THE NEW CASTLE STEEL SITE, THERE EXISTS NO SIGNIFICANT THREAT TO HUMAN HEALTH. THIS SUPPORTED ON A COMPREHENSIBLE REVIEW OF THE SITE'S HISTORY AND OPERATIONS, AN EVALUATION OF THE SITE'S ENVIRONMENTAL SETTING, RECENT WASTE ANALYSES PERFORMED ON MATERIAL KNOWN TO HAVE BEEN DISPOSED AT THE SITE, AND FINALLY, ON ANALYTICAL DATA COLLECTED IN JANUARY 1987, WHICH WAS USED TO ASSESS ANY EXPOSURE HAZARDS PRESENT.

#CON

CONCLUSION

A. RECOMMENDED ALTERNATIVE

BASED ON THE CONCLUSIONS OF THE ENDANGERMENT ASSESSMENT PREPARED BY VERSAR, INC., FOR U.S. EPA, IT IS RECOMMENDED THAT NO FURTHER REMEDIAL ACTIONS UNDER CERCLA SHOULD BE IMPLEMENTED AT THE SITE. U.S. EPA WILL MONITOR THE SURFACE WATERS FOR LEAD UNTIL THE SITE IS DELETED FROM THE NATIONAL PRIORITY LIST AND CLOSED UNDER THE STATE CLOSURE LAW. A NO ACTION ALTERNATIVE IS THE MOST REASONABLE AND COST EFFECTIVE ALTERNATIVE FOR PROTECTION OF PUBLIC HEALTH, WELFARE AND ENVIRONMENT. IT IS RECOMMENDED THAT NEW CASTLE STEEL SITE IS PROPOSED FOR DELETION FROM THE NATIONAL PRIORITIES LIST.

B. DELETION OF NEW CASTLE STEEL SITE FROM NPL

"NO ACTION" SITES ARE CONSIDERED AS COMPLETIONS ONCE THE DETERMINATION IS MADE THAT NO FURTHER REMEDIAL ACTIONS ARE NECESSARY TO BE PROTECTIVE OF PUBLIC HEALTH AND THE ENVIRONMENT AND THE NO-ACTION ROD IS APPROVED. ONCE A SITE IS CONSIDERED AS A COMPLETION IT BECOMES A CANDIDATE FOR DELETION FROM THE NPL. THE DELETION PROCESS IS SEPARATE FROM THE ROD ACTION AND INVOLVES SEVERAL STEPS INCLUDING PUBLIC NOTICES AND DELETION DOCKET PREPARATION.

DELETION OF A SITE FROM THE NPL DOES NOT PRECLUDE ELIGIBILITY FOR SUBSEQUENT FUND-FINANCED OR PRP ACTIVITIES. SECTION 300.66(C)(8) OF THE NCP STATES THAT FUND-FINANCED ACTIONS MAY BE TAKEN AT SITES THAT HAVE BEEN DELETED FROM THE NPL IF FUTURE CONDITIONS WARRANT SUCH ACTIONS.

C. RECOMMENDATIONS OUTSIDE THE SCOPE OF THE NEW CASTLE STEEL ROD

ONCE THE NEW CASTLE STEEL SITE IS DELETED FROM THE NPL, THE STATE OF DELAWARE WILL PROCEED WITH A CLOSURE OF THE DISPOSAL AREA IN ACCORDANCE WITH THE DELAWARE SOLID WASTE DISPOSAL REGULATIONS. THE STATE WILL REQUIRE THE OWNER OF THE SITE TO IMPLEMENT SUCH MEASURES AS SURFACE DRAINAGE CONTROLS, SURFACE CAPPING, AND GROUND WATER AND SURFACE WATER MONITORING. SUCH MEASURES WILL CONTROL WIND DISPERSAL, PROTECT PILES FROM RUN-OFF AND MONITOR THE SURFACE WATER AND GROUND WATER FOR POTENTIAL CONTAMINATION.

#TA

TABLES, ATTACHMENTS

TABLE 1
RP TOXICITY TEST AND PM RESULTS FOR INACTIVE
AND ACTIVE DISPOSAL AREAS
NEW CASTLE STEEL SITE
MAY 21, 1984

PARAMETER	MAXIMUM CONCENTRATION LIMIT	INACTIVE DISPOSAL AREAS	ACTIVE DISPOSAL AREA
TOXIC METALS			
ARSENIC	5.0	0.005	0.005
BARIUM	100.0	0.1	0.1
CADMIUM	1.0	0.005	0.005
CHROMIUM	5.0	0.01	0.01
LEAD	5.0	0.02	0.02
MERCURY	0.2	0.0011	0.005
SELENIUM	1.0	0.005	0.005
SILVER	5.0	0.005	0.005
OTHER METALS			
ALUMINUM	NA	0.5	0.5
BERYLLIUM	NA	0.001	0.001
COBALT	NA	0.03	0.03
COPPER	NA	0.005	0.005
IRON	NA	2.43	1.55
MANGANESE	NA	10.0	1.95
NICKEL	NA	1.75	0.07
VANADIUM	NA	0.005	0.005
ZINC	NA	0.189	0.295
PH	NA	9.2	8.6

1 ALL CONCENTRATIONS (EXCEPT PH) REPORTED IN MG/L.

2 LIMITS ESTABLISHED UNDER 40 CFR 261.24.

3 MAXIMUM CONCENTRATION LIMITS HAVE NOT BEEN ESTABLISHED FOR THESE ELEMENTS.

TABLE 4
ANALYTICAL RESULTS FROM GROUND-WATER AND SURFACE-WATER
SAMPLE DEEMER STEEL, MAY 1984

	MW-1	MW-2	MW-3	MW-4	SW-1	SW-2	DRINKING WATER LIMIT
ARSENIC	0.001	0.001	0.001	0.001			0.05
BARIUM	0.038	0.034	0.059	0.011			1.0
CADMIUM	0.001	0.001	0.001	0.001	0.002	0.001	0.01
CHROMIUM	0.001	0.005	0.003	0.002	0.002	0.001	0.05
FLUORIDE	0.11	0.73	0.12	0.02			1.4-
LEAD	0.003	0.001	0.028	0.004	0.054	0.022	0.05
MERCURY	0.001	0.001	0.001	0.001			0.00
NITRATE-N	0.3	1.2	5.0	2.0			10-
SELENIUM	0.001	0.001	0.001	0.001			0.01
SILVER	0.001	0.001	0.001	0.003			
CHLORIDE	12.0	72.0	28.0	115.0			
IRON	0.63	8.30	2.45	17.40			
MANGANESE	3.20	2.70	0.76	3.20			
PHENOLS	0.01	0.01	0.01	0.01			
SODIUM	50.	90.	40.	100.			
SULFATE	75.	122.	45.	273.			
PH	6.15	5.95	5.80	4.70			
SP							
COND.	368.	798.	275.	795.			
TOTAL ORGANIC CARBONS	26.8	90.0	16.4	55.8			
TOTAL ORGANIC HALOGEN	0.028	0.051	0.012	0.073			

NOTE: ALL UNITS ARE MG/1 EXCEPT PH (UNITS) AND SP. CONDUCTANCE (UMBOS/CM)

TABLE 7
SELECTED CONTAMINANT ARAR REQUIREMENTS
(CONCENTRATIONS IN PPB)

CONTAMINANT	GROUNDWATER	SDWA	MCL	SURFACE WATER CONCENTRATION	
	CONCENTRATION			MEAN	MAXIMUM
ARSENIC	1		50	9.6	38
CADMIUM	1		10	2.5	2.5
CHROMIUM	5		50	23.1	102
LEAD	28		50	149.5	660

FOOTNOTES :

1. SURFACE WATER AVERAGE REPRESENTS ELEVEN DATA POINTS
2. SURFACE WATER QUALITY CRITERIA (ACUTE) FOR LEAD EXCEEDED FOR THREE SAMPLES.

TABLE 7 (CONTD)
SELECTED CONTAMINANT ARAR REQUIREMENTS
(CONCENTRATIONS IN PPB)

CONTAMINANT	CWA WATER QUALITY CRITERIA AQUATIC LIFE (FRESHWATER)	
	ACUTE	CHRONIC
ARSENIC	360	190
CADMIUM	3.9	1.1
CHROMIUM	1700	210
LEAD	82	3.2

FOOTNOTES :

1. SURFACE WATER AVERAGE REPRESENTS ELEVEN DATA POINTS
2. SURFACE WATER QUALITY CRITERIA (ACUTE) FOR LEAD EXCEEDED FOR THREE SAMPLES.

#RS

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION III

NEW CASTLE STEEL SITE

RESPONSIVENESS SUMMARY

THE PREFERRED ALTERNATIVE FOR THE NEW CASTLE STEEL WAS PUBLISHED IN THE WILMINGTON NEWS-JOURNAL PAPERS ON MARCH 8, 1988. A PUBLIC MEETING WAS HELD ONE MARCH 17, 1988. THE ONLY RESPONSES AT THE MEETING ABOUT THE SITE CONCERNED THE USE OF THE SITE AFTER IT WAS DELISTED. THE RESPONSES ARE SHOWN IN THE TRANSCRIPT OF THE MEETING ATTACHED TO THIS ROD. THE STATE REPLIED THAT THE SITE WOULD BE CLOSED UP UNDER THE SOLID WASTE REGULATIONS REQUIRING THE OWNER TO CAP THE SITE. THE STATE WAS IN RESPONSE TO JEFF MACK, DELAWARE STATE REPRESENTATIVE FROM NEW CASTLE COUNTY.

NO TELEPHONE CALLS OR WRITTEN COMMUNICATION IN RESPONSE TO THE PUBLIC MEETING OR ADVERTISEMENT HAVE BEEN RECEIVED. REPRESENTATIVE MACK SENT A FOLLOW-UP LETTER OF HIS MEETING COMMENT TO THE STATE OF DELAWARE. HIS MEETING COMMENT WAS ADEQUATELY RESPONDED TO IN THE TRANSCRIPT.