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Environmental Protection
Agency

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Remedial Response

EPA/ROD/R07-89/022
November 1988

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Superfund Record of Decision:

Todtz, Lawrence Farm, IA

50272-101

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First Remedial Action - Final

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16. Abstract (Limit: 200 words)

The 2.7-acre Dupont Impoundment of the Todtz Farm site is part at the 12-acre parcel of land known as the Todtz Farm Landfill, which is located on a 120-acre farm 1.25 miles west of Camanche, Iowa. Originally a sand and gravel mine, the landfill received municipal waste from 1969 to 1975. In 1971, Dupont constructed the impoundment in the northwest corner of the landfill and disposed of an estimated 4,300 tons of wet end cellophane process wastes from 1971 until its closure in 1975. Impoundment wastes are periodically in direct contact with the ground water beneath the site, which flows southeasterly toward the Mississippi River. Domestic wells and the municipal water supply wells for Camanche located downgradient of the site may be affected by contamination from the site. In addition, several ponds and lakes in the vicinity are potential receptors for contaminated runoff and recharge. The primary contaminants of concern affecting the ground water are VOCs including toluene and benzene, and metals including arsenic, lead, and chromium.

The selected remedial action for this site includes installation of a soil cover over the Dupont Impoundment; implementation of institutional controls including deed and land use restrictions; provision of an alternate water supply for an
(See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision - Todtz, Lawrence Farm, IA
First Remedial Action - Final
Contaminated Media: gw
Key Contaminants: VOCs (benzene, toluene), metals (arsenic, lead, chromium)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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16. Abstract (continued)

affected residence by relocating an existing well; and groundwater monitoring. EPA has determined that further remedial actions will be immediately implemented if ground water trigger levels provided in the ROD are met or exceeded. If ground water monitoring indicates that contaminant levels exceed the less stringent chemical-specific action levels provided in the ROD, ground water pumping and treatment will be implemented; if the more stringent action levels are exceeded, a treatability study of the impoundment waste will be conducted and either a permanent treatment remedy of the impoundment material or a cap and slurry wall containment system will be implemented. The estimated present worth cost for this remedial action is $1,030,000. O&M cost was not provided.

RECORD OF DECISION DECLARATION

SITE NAME AND LOCATION

DuPont Impoundment of the Todtz Farm Site
Camanche, Iowa

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the DuPont Impoundment of the Todtz Farm Site in Camanche, Iowa. This final plan has been developed in accordance with CERCLA as amended by SARA, and, to the extent practicable, the National Contingency Plan. The decision is based on the administrative record for this site. The attached index identifies the items which comprise the administrative record upon which the selection of the remedial action is based.

DESCRIPTION OF THE SELECTED REMEDY

This remedial action represents the final action for the DuPont Impoundment of the Todtz Farm Site. The selected remedy includes the following major components:

- A 2-foot soil cover over the DuPont Impoundment;
- Access restrictions which include deed limitations and site fencing;
- Site maintenance which includes mowing the grass and repairing the fence;
- A ground water monitoring system which includes implementation of further remedial actions if certain chemical specific action levels are exceeded;
- Replacement of the Bark residence drinking water well in the deeper bedrock aquifer.

DECLARATION

The selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate to this remedial action, and is cost-effective. This remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable for this site. However, because implementation of treatment at this time was determined not to be cost-effective

based on the relative overall risk to public health and the environment, this remedy does not satisfy the statutory preference for treatment as a principal element of the remedy. However, if the exceedance of certain chemical specific action levels (as detected in the ground water monitoring system) are exceeded in the future, there will be provisions to implement treatment if it is feasible at that time.

This remedy will result in hazardous substances remaining onsite above health based levels, that will be covered by a 2-foot soil cover. Since these hazardous substances will remain onsite, 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.

11-4-88
Date

Morris Kay
Regional Administrator
Region VII

RECORD OF DECISION

FOR

THE DUPONT IMPOUNDMENT

OF

THE TODTZ FARM SITE

CAMANCHE, IOWA

Prepared by:

U.S. ENVIRONMENTAL PROTECTION AGENCY

October, 1988

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 BACKGROUND

The 2.7 acre DuPont Impoundment is located within the 12-acre parcel of land known as the Todtz Farm Landfill located on the 120 acre Todtz family farm, 1-1/4 miles west of Camanche, Iowa. Camanche is located on the Mississippi river about 2 miles south of Clinton, Iowa.

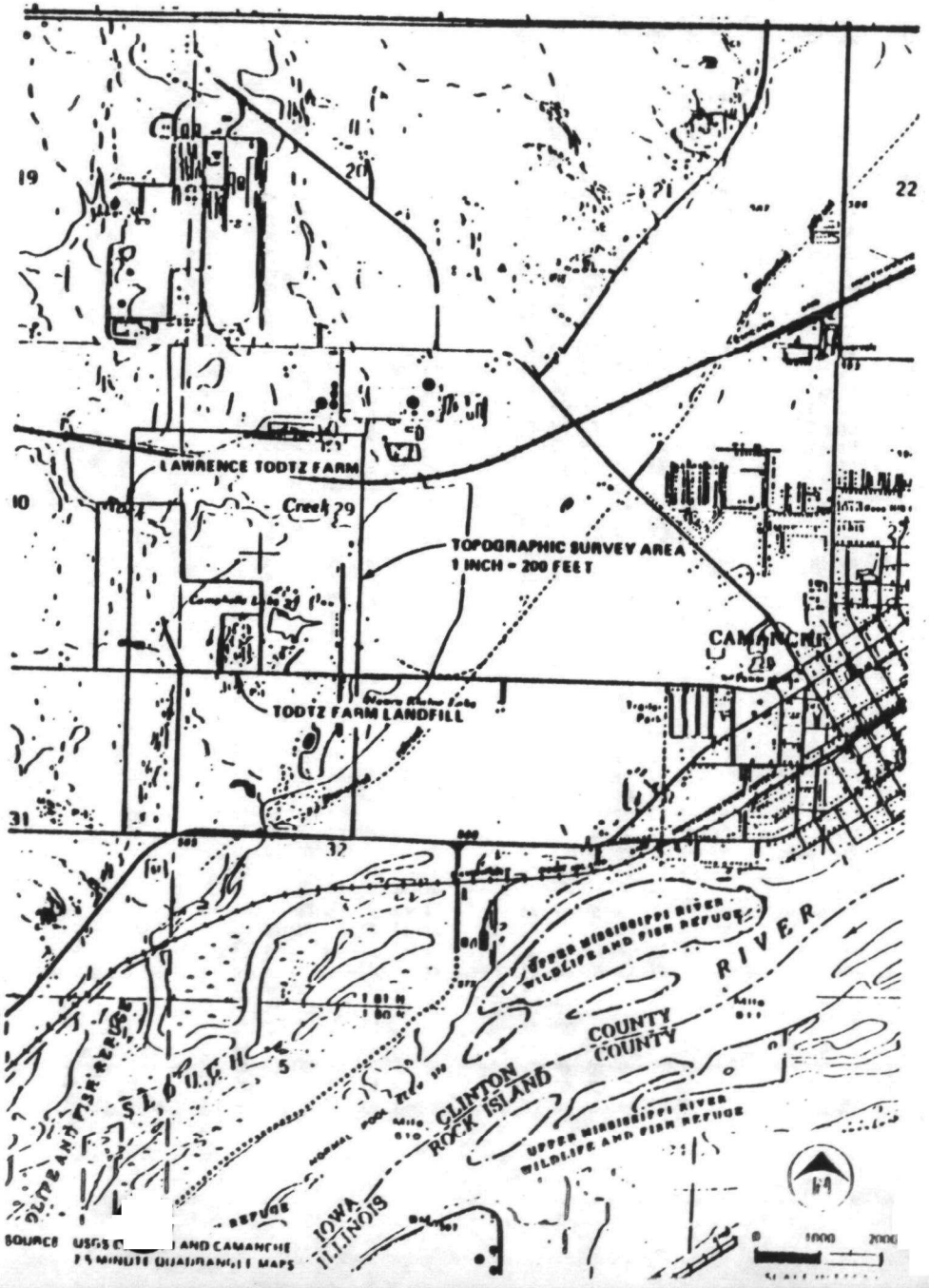
Between 1959 and 1969, sand and gravel were mined from the 12-acre parcel of land. The mined area was used as a landfill for disposal of municipal refuse from 1969 to 1975. The DuPont Impoundment was constructed in the northwest corner of the Todtz Farm Landfill sometime in 1971. An estimated 4300 tons of wet end cellophane process wastes from DuPont's Clinton, Iowa plant were disposed of in the impoundment between 1971 and its closure in 1975.

1.2 HYDROGEOLOGIC SETTING

A sand and gravel terrace associated with glacial outwash activity forms the natural uppermost aquifer around the site. Ground water in the uppermost water bearing unit flows generally in a southeasterly direction toward the Mississippi River. Domestic wells are located downgradient of the site and are potential receptors for contaminated ground water. It is possible that the municipal water supply wells of Camanche may also may be impacted.

In the vicinity of the landfill, the sand and gravel unit is underlain by a thick sequence of low permeability clays and silts with occasional lenses of silty to clayey fine sands. These low permeability soils directly overlie dolomite bedrock that also serves as a source of drinking water to local residents. The low permeability soils appear to behave as an aquitard preventing hydraulic connection between the two water bearing units.

Surface water bodies in the vicinity of the site which are potential receptors for contaminated run-off and/or recharge are the north and south ponds, Murphy's Lake and Bandixen Lake. Secondary potential receptors include other downgradient lakes and the federally owned and managed Upper Mississippi River Fish and Wildlife refuge located less than one mile from the site. (Refer to Figure 1.3)



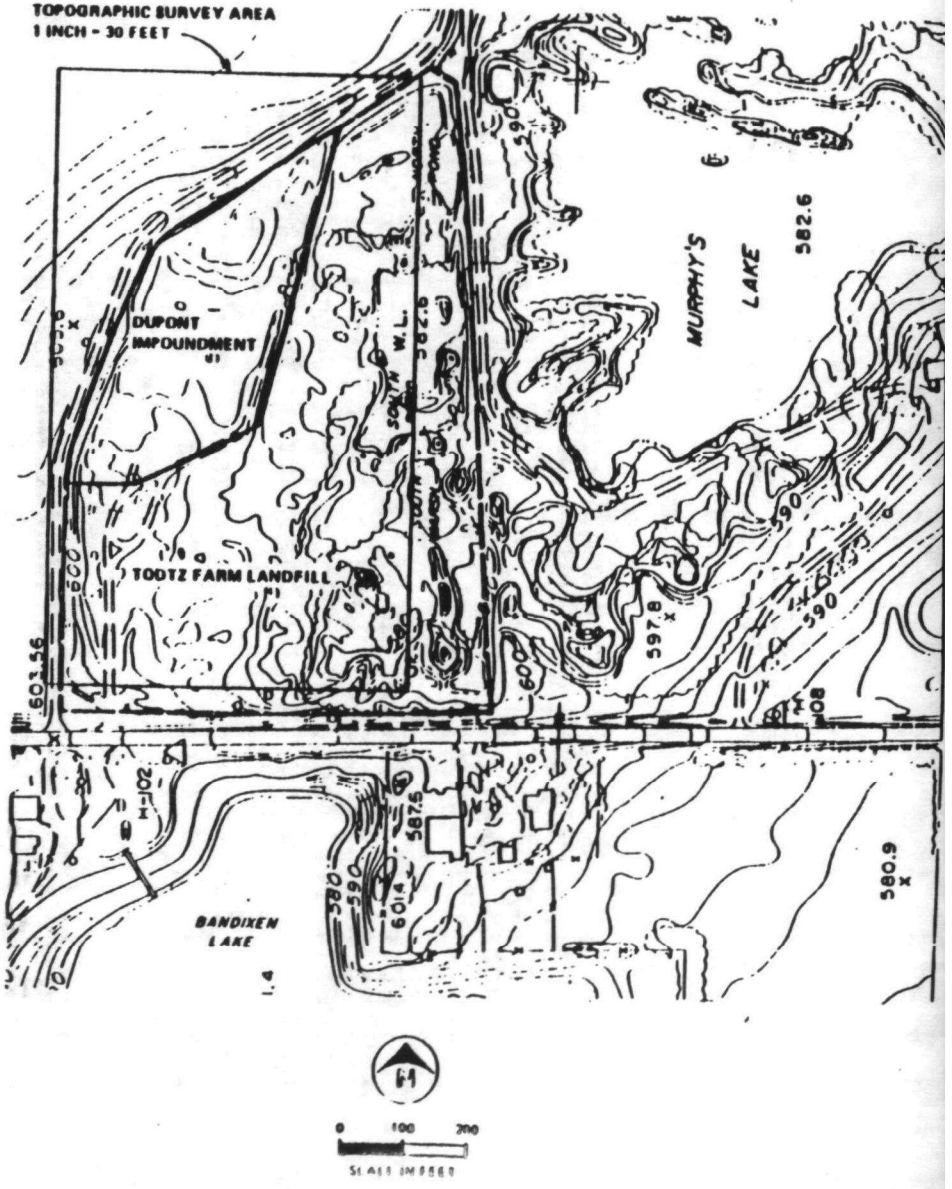


FIGURE
TOPOGRAPHIC SURVEY AREAS
DUPONT IMPOUNDMENT AREA

1.3 PREVIOUS STUDIES

The Todtz Farm Landfill was identified as a potential uncontrolled hazardous waste site in 1979. A preliminary site inspection was conducted by EPA's Field Investigation Team (FIT) Contractor in 1980. The site was given a Hazard Ranking System (HRS) score of 52.11 in March 1985, and added to the National Priorities List (NPL) in June 1986.

FIT returned to the site in August 1985 to take additional surface water, sediment, and residential drinking water samples.

In September 1986, EPA's REM II contractor installed six ground water monitoring wells around the landfill and near the DuPont Impoundment and collected additional surface water, sediment, soil and residential well samples. The monitoring wells were sampled five times through August 1987 by REM II. Ground water samples taken from the monitoring wells installed in the downgradient impoundment berm (monitoring wells MW-3, MW-4, and MW-5 as shown on Figure 1.4) have shown the presence of levels as high as 3600 ug/l for carbon disulfide, 400 ug/l for lead, 8,800 ug/l for toluene, 97,000 ug/l for tetrahydrofuran, 1,000 ug/l for 4-methyl phenol, 1.10 ug/l for mercury, 160 ug/l for arsenic, and 209 ug/l for benzene. Except for arsenic and benzene, these compounds are among those reported by DuPont as being used at the Clinton cellophane plant and were disposed in the DuPont Impoundment.

1.4 COMMUNITY RELATIONS HISTORY

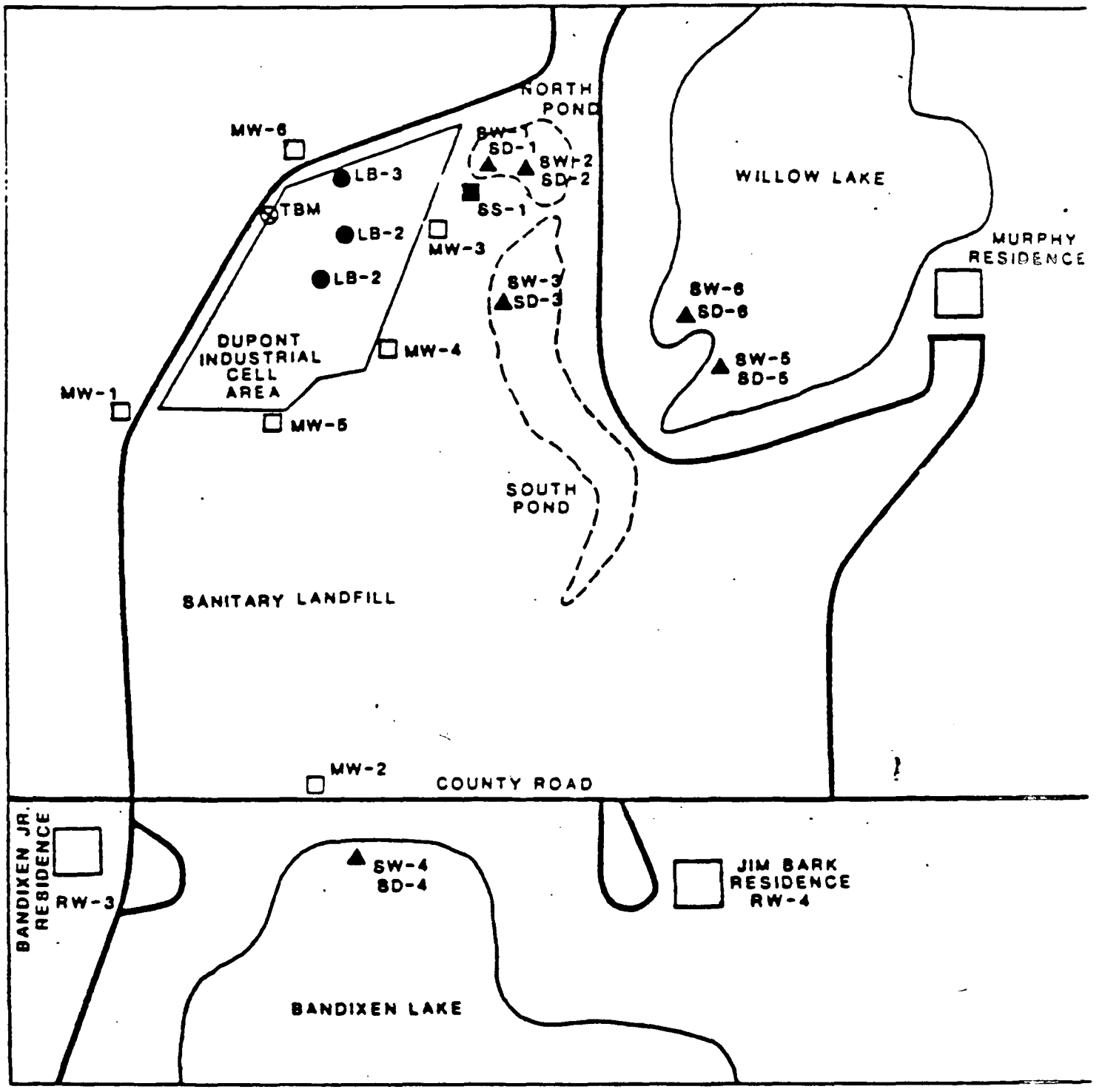
The local community has not recently expressed concern regarding remediations of the Lawrence Todtz Farm site.

A 21-day public comment period was held from August 20 through September 10, 1988. In that time period, no public comments from the local community were received and there were no requests for a public meeting. A comment letter was received from DuPont's consultant. A phone call was also received from the Bark residence. These comments are addressed in the Responsiveness Summary.

All community relations activities have been in conformance with the requirements of Sections 113 and 117, CERCLA, and the National Contingency Plan (NCP) in 40 CFR 300.

1.5 ROLE AND SCOPE OF REMEDIAL ACTION

Based on investigations conducted onsite prior to 1988, it was evident that there was a release or a threat of release of hazardous substances from the DuPont Impoundment. EPA had also



SOURCE: FIT REPORT, AUGUST, 1985, REVISIONS BASED ON SITE VISIT MAY, 1986.

NOTE: LOCATION OF ROADS AND SURFACE WATER FEATURE APPROXIMATED BY FIELD PERSONNEL

⊠ GEOTECHNICAL BORING

□ MONITORING WELLS

RW RESIDENTIAL WELL

● LANDFILL BORING LOCATION

■ NEAR SURFACE SOIL SAMPLE

▲ SURFACE WATER AND SEDIMENT SAMPLE LOCATION

⊗ TEMPORARY BENCH MARK SET BY FIELD PERSONNEL ON UTILITY POLE PIER. ASSUMED ELEVATION 100.0 FT

N

NOTE: LOCATION OF ROADS AND SURFACE WATER FEATURES APPROXIMATED BY FIELD PERSONNEL.

0 100 200

SCALE FEET

DUPONT LANDFILL
GROUNDWATER CONTAMINATION SITE
CAMANCHE, IOWA

Woodward-Clyde Consl
ENGINEERS, GEOLOGISTS AND ENVIRONMENTAL SC

SITE SAMPLING LOCATION MAP

DRN BY MC	DATE 4/15/87	PROJECT NO 320ES1	1-
CHK'D BY [illegible]	DATE 4/25/87		

sent CERCLA 104/RCRA 3007 information request letters to companies who reportedly had sent wastes to the municipal landfill. Responses to these letters did not indicate that hazardous substances had been disposed in the municipal landfill. It seemed likely that the source of contamination for the Lawrence Todtz Farm Site was the DuPont Impoundment and that the remedial alternative selected for the impoundment would be a sufficient final remedy for the entire site.

1.6 ENFORCEMENT ACTIVITIES

During the REM II site investigation, EPA began negotiations with E.I. DuPont de Nemours and Co. for DuPont to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the site. DuPont agreed to conduct a RI/FS focused on their impoundment. On April 5, 1988, a CERCLA 104/122 Consent Order was signed by both EPA and DuPont, finalizing the agreement for DuPont to conduct the RI/FS.

Dupont conducted the RI/FS pursuant to the "DuPont Impoundment Operable Unit RI/FS Work Plan" dated February 12, 1988. This workplan, prepared by DuPont's consultant CH2M Hill, was approved by EPA and included as an attachment to the CERCLA 104/122 Consent Order. The purpose of the RI/FS was to fully characterize the DuPont Impoundment, determine the extent of contamination, evaluate the risk to downgradient receptors, and evaluate appropriate remedial alternatives for the DuPont Impoundment.

1.71 SITE CHARACTERISTICS

The RI was conducted during the spring of 1988 and consisted of the following tasks: a source area characterization study to evaluate physical and chemical characteristics of the impoundment; a hydrogeologic investigation to define site stratigraphy, ground water flow paths and contaminant migration pathways; and an environmental sampling task to define the nature and extent of contaminants of concern in ground water and surface water.

The upper ground water aquifer at the site generally flows in a southeast direction with the majority of the ground water recharge occurring upgradient of the site. The impoundment wastes are periodically in direct contact with the ground water. The bedrock aquifer is separated from the upper aquifer by a thick sequence of low permeable clays and silts that appear to behave as an aquitard. Although the Todtz and Bandixen residence wells are completed in bedrock, ground water quality in the bedrock aquifer has not been fully investigated at this time.

As part of the source area characterization, soil and water samples were taken from test pits excavated within the impoundment. Figures 7-1a and 7-1b indicate levels of organic and inorganic substances detected in the test pit soils. Comparing the test pit samples (TP-01, TP-02, and TP-03) with the background location (FB-04), the levels of organics and inorganics in the impoundment soils exceed background concentrations. Figures 7-1c and 7-1d indicate levels of organic and inorganic substances detected in the test pit water. Comparing test pit water samples (TW-01, TW-02, and TW-03) to the background ground water sample (DP-01), it was concluded that ground water in the impoundment exceeds background concentrations of organic and inorganic constituents.

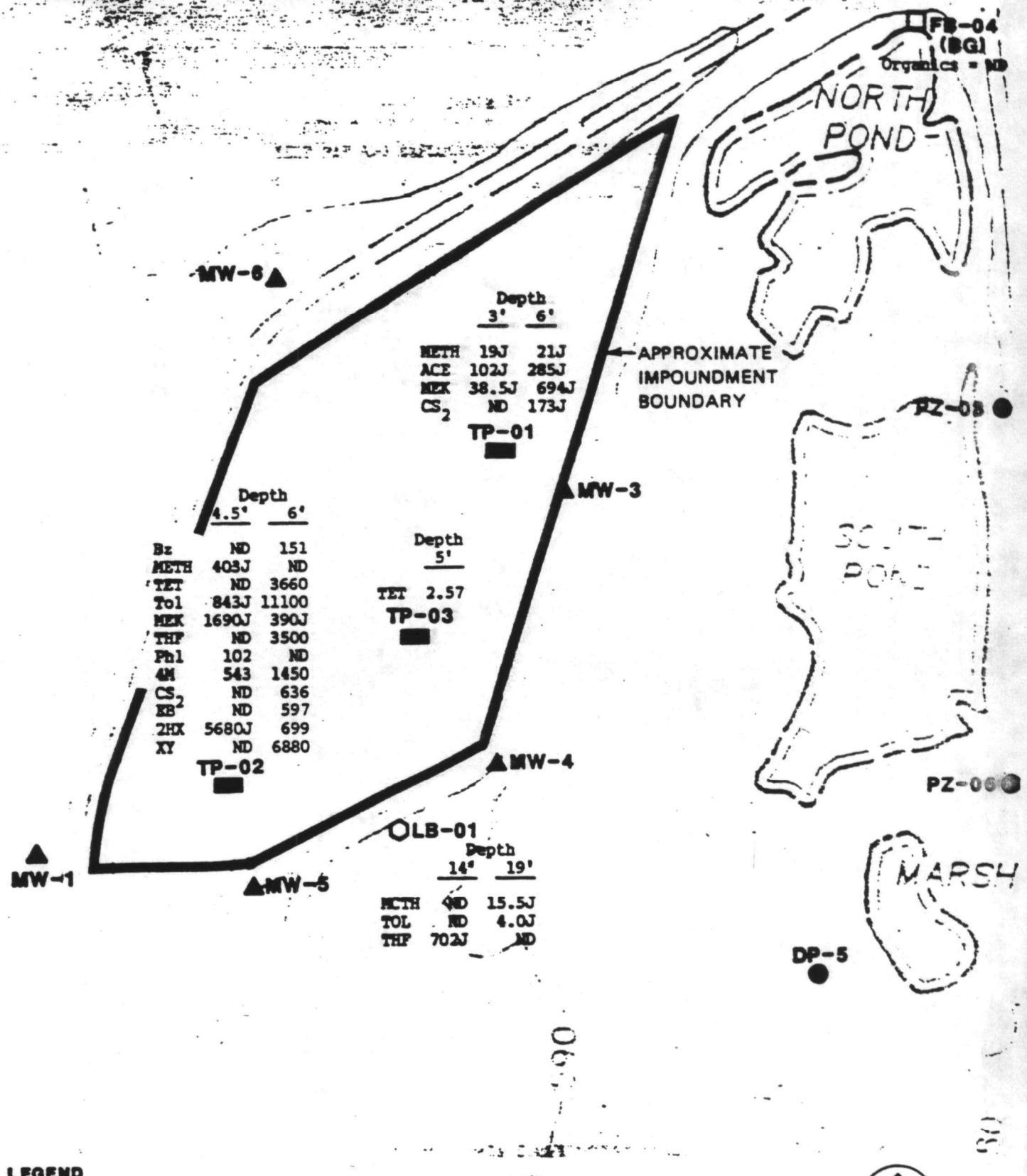
As indicated on Figures 7-1e and 7-1f, analysis of ground water samples confirms the presence of elevated levels of organic and inorganic constituents significantly above background in the monitoring wells (MW-03, MW-04, and MW-05) located downgradient of the DuPont Impoundment in the impoundment berm, as was concluded by the REM II Investigation. Above background concentrations of several inorganic constituents were detected in other downgradient wells (DP-05, DP-02, PZ-02 and the Bark residence well). Arsenic was also detected in the ground water sample from PZ-03 in concentrations above background. Also, EPA split samples for DP-05, DP-02 and PZ-02 detected results of tetrahydrofuran of 7 ug/l, 2 ug/l M and 1 ug/l M respectively. (The "M" code designates that the compound was detected, but the levels are below the EPA contract detection limits. Therefore, the quantification is an estimate). The tetrahydrofuran found in the split sample analysis was not confirmed during a subsequent sampling event.

1.72 SUMMARY OF SITE RISKS

The Endangerment Assessment (EA) is included in the RI report and presents an evaluation of the existing and potential future impacts of contamination at the DuPont Impoundment on human health and the environment. One of the major objectives of the assessment was to assist in identification of the principal routes of human and environmental exposure to site contaminants in order to focus the FS on remedial alternatives that would most effectively prevent or preclude adverse impacts.

Several potential human and environmental exposure settings that could be impacted by the contaminants of concern were evaluated on a qualitative basis by the EA (Refer to Tables 7-2a and 7-2b). Those exposure settings that had a low probability of occurrence were not evaluated on a quantitative basis.

One of the more likely scenarios would be a setting in which children trespassing on the site to play might be exposed by direct contact with or inadvertent ingestion of contaminated



LEGEND

- ▲ MONITORING WELL INSTALLED BY EPA
- ● WELLS/PIEZOMETERS INSTALLED BY CH2M HILL
- ○ EXPLORATORY BORING
- ▬ TEST PIT LOCATION

Bz	= Benzene	EB	= Ethylbenzene
METH	= Methylene chloride	2Hx	= 2-Hexanone
TOL	= Toluene	Xy	= Total Xylenes
ACE	= Acetone	J	= Value estimated
TET	= Tetrachloroethylene	ND	= Not detected at detection limit used
MEK	= Methylethyl Ketone (2-butanone)		
THF	= Tetrahydrofuran		
Phl	= Phenol		
4M	= 4-Methylphenol		
CS_2	= Carbondisulfide		

N

0 100

SCALE IN FEET

FIGURE 7-1a
DISTRIBUTION OF ORGANIC CONSTITUENTS IN TEST PIT SOILS (ug/kg)
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LANDFILL SITE

LEGEND

- ▲ MONITORING WELL INSTALLED BY EPA
- ● WELLS/PIEZOMETERS INSTALLED BY CH2M HILL
- ○ EXPLORATORY BORING
- ▬ TEST PIT LOCATION

BBG = AT OR BELOW BACKGROUND LEVELS

Al = Aluminum	Fe = Iron
As = Arsenic	Pb = Lead
Ba = Barium	Mn = Manganese
Be = Beryllium	Ni = Nickel
Cr = Chromium	Na = Sodium
Co = Cobalt	V = Vanadium
Cu = Copper	Zn = Zinc

FIGURE 7-16
DISTRIBUTION OF INORGANIC CONSTITUENTS (mg/kg) IN TEST PIT SOILS
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LANDFILL SITE

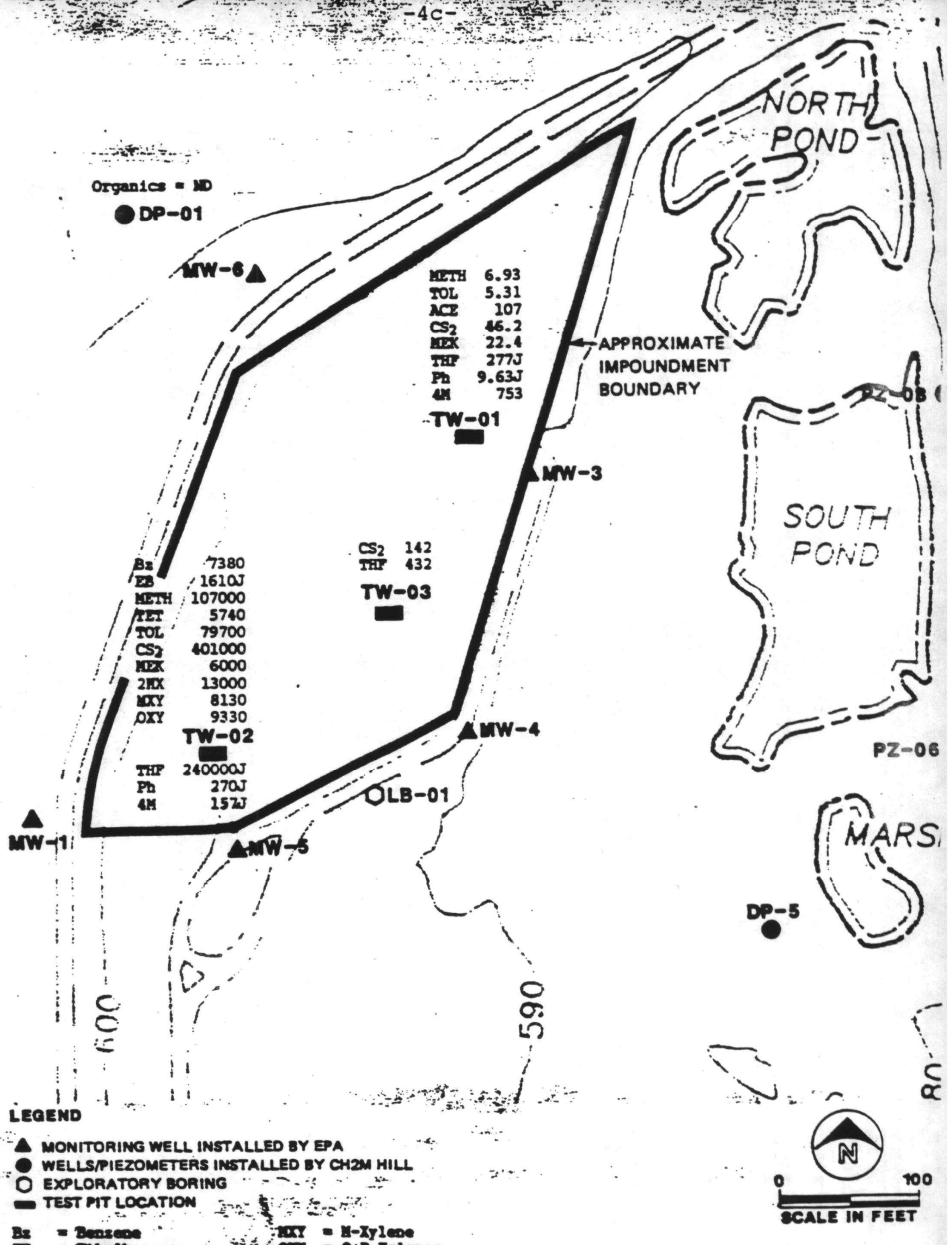


FIGURE 7-1c
DISTRIBUTION OF ORGAN
CONSTITUENTS (ug/l) IN
TEST PIT WATER
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LANDFILL SITE

LEGEND

- ▲ MONITORING WELL INSTALLED BY EPA
- ● WELLS/PIEZOMETERS INSTALLED BY CH2M HILL
- ○ EXPLORATORY BORING
- ▬ TEST PIT LOCATION

J = Estimated Value
ND = Not Detected at Detection Limit Used

Al = Aluminum	Fe = Iron
Sb = Antimony	Pb = Lead
As = Arsenic	Mn = Manganese
Ba = Barium	Hg = Mercury
Be = Beryllium	Ni = Nickel
Cd = Cadmium	Na = Sodium
Cr = Chromium	Th = Thallium
Co = Cobalt	V = Vanadium
Cu = Copper	Zn = Zinc

N

0 100

SCALE IN FEET

FIGURE 7-1d
DISTRIBUTION OF INORGANIC (mg/l) CONSTITUENTS IN TEST PIT WATER
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LANDFILL SITE

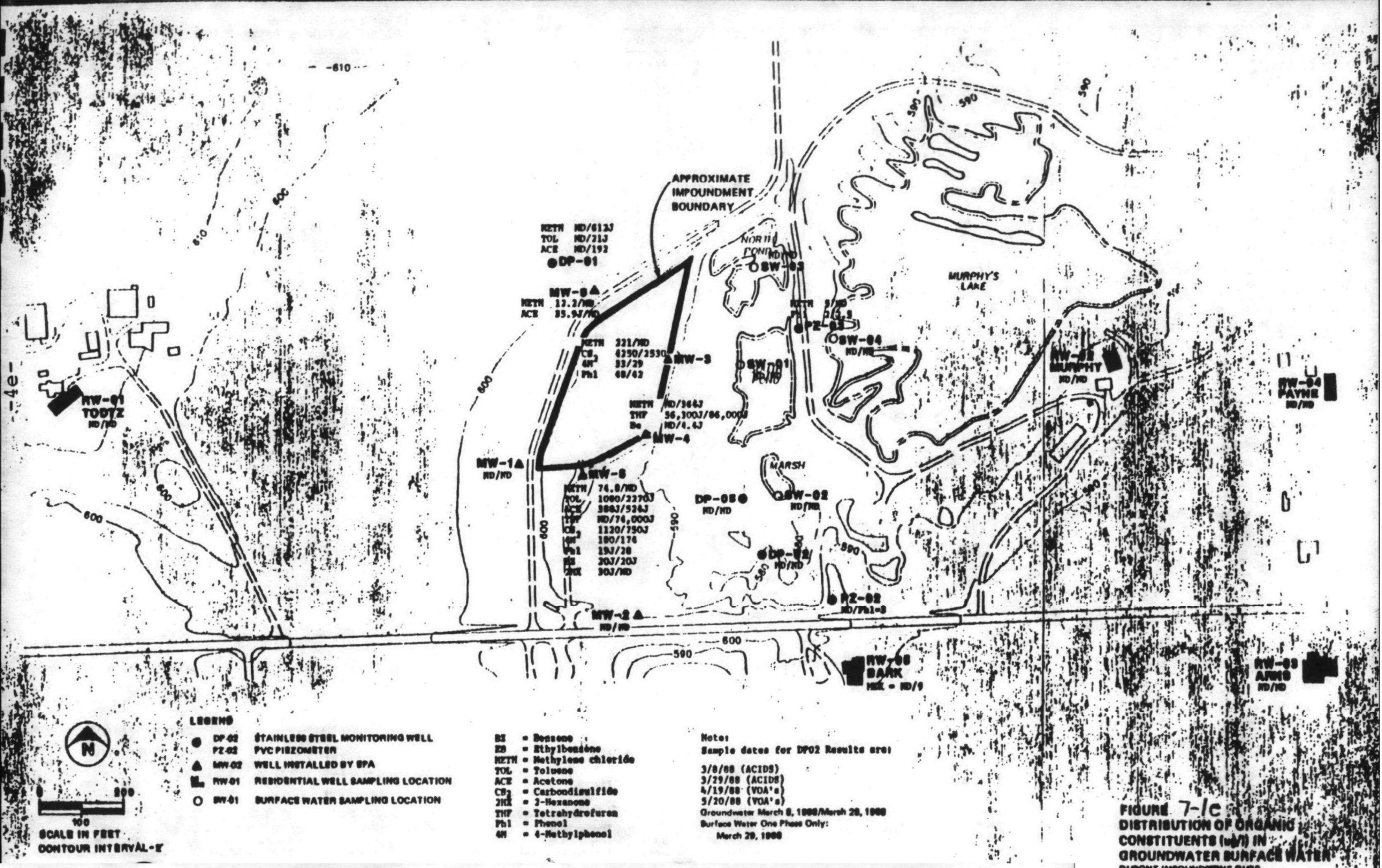


FIGURE 7-1c
DISTRIBUTION OF ORGANIC CONSTITUENTS (ug/l) IN GROUNDWATER SURFACE WATER
DUPONT IMPOUNDMENT RI/FS
TOOTZ FARM LA[illegible] SITE

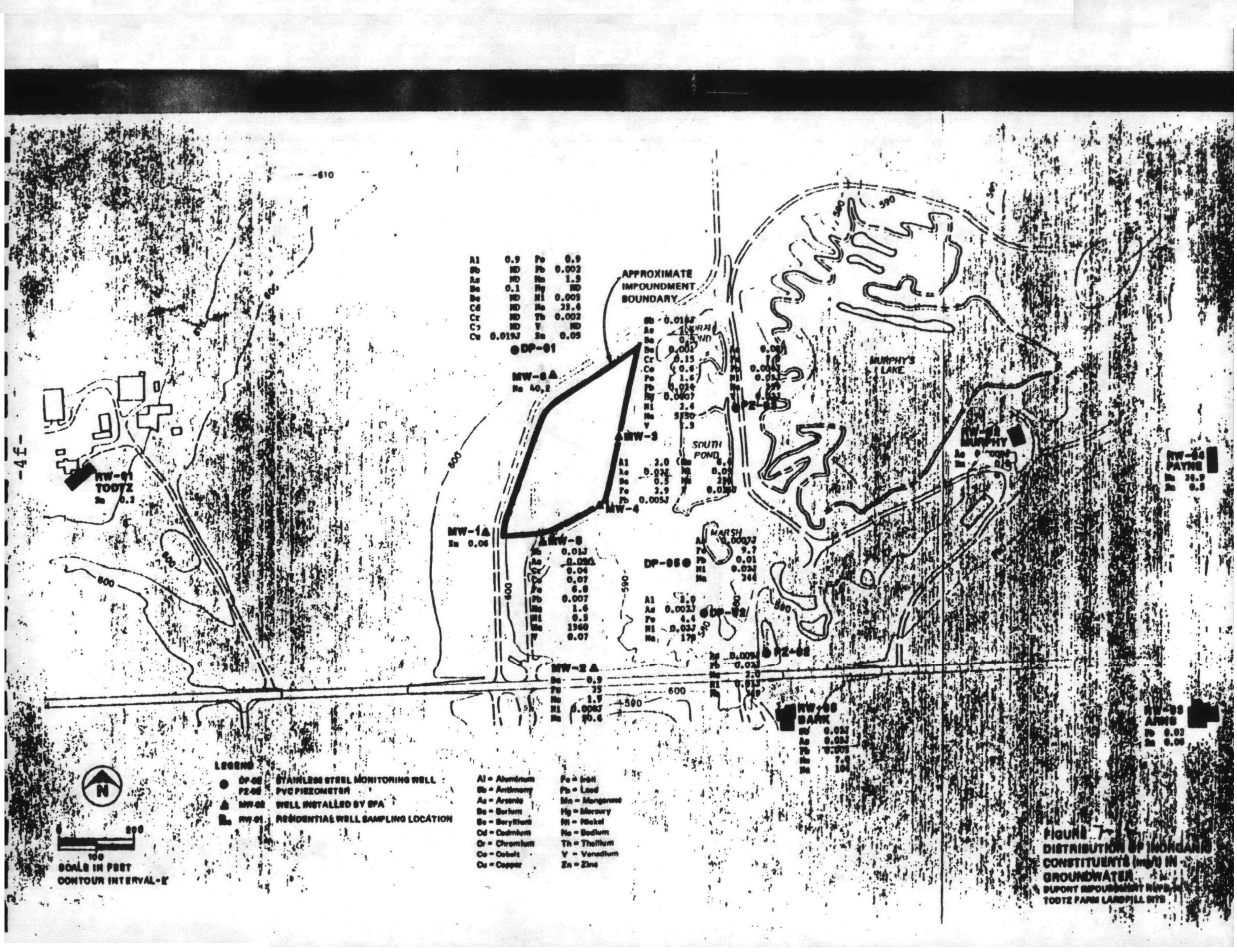


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FIGURE 7
DISTRIBUTION OF INORGANIC CONSTITUENTS (mg/l) IN GROUNDWATER
DUPONT IMPOUNDMENT AREA
TOOTZ FARM LANDFILL SITE

Table 7-3a
POSSIBLE HUMAN EXPOSURE SETTINGS

Medium	Setting	Population-at-Risk
Air	Inhalation of vapors or contaminated dusts released from contaminated areas of the site	Nearby residents
Surface soils and impoundment wastes	Ingestion of contaminated soils or wastes during recreational, residential or occupational activities onsite	Children playing/ riding bikes; adults working/ gardening; construction workers
Surface water	Ingestion of contaminated fish from the Murphy and Bandixen Lakes	Recreational fishermen and their families
	Dermal absorption of contaminants while swimming in the Murphy and Bandixen Lakes	Local families
Groundwater from surficial or bedrock aquifers	Ingestion of contaminated groundwater from surficial aquifers	Families with private wells downgradient of site, or onsite assuming future development
	Inhalation of volatile organic contaminants released during showers or other household uses of groundwater	Same as above
	Dermal contact with contaminants during showers, baths, or other household use of groundwater	Same as above
Agricultural products	Ingestion of dairy products or beef from cattle grazing onsite or drinking from north and south ponds	Consumers of meat and dairy products

Table 7-2b
POSSIBLE ENVIRONMENTAL EXPOSURE SETTINGS

Medium	Setting	Population-at-Risk
Surface soils	Direct contact with/ ingestion of contaminated soils or wastes during foraging, burrowing	Burrowing mammals, insects
	Ingestion of contaminated organisms	Burrowing mammals, birds
Crops or vegetation	Ingestion of contaminated crops grown onsite	Grazing wildlife or domestic animals
Surface water	Ingestion of contaminated drinking water from onsite ponds or nearby lakes	Wildlife or domestic animals
	Ingestion of contaminated fish or aquatic organisms in onsite ponds and nearby lakes	Raccoons, ducks, other aquatic feeders

GLT786,60

surface and impoundment soils. This scenario was, therefore, evaluated on a quantitative basis. Possible future exposures were also evaluated on a quantitative basis for a scenario in which the site was assumed to be developed for residential use. In this scenario, both soil ingestion and ground water use were evaluated for adults and young infants. All of the exposure settings assumed long-term exposures to existing levels of contaminants, which provides conservative assessments, since some degradation of contaminants may occur over time.

To evaluate the potential adverse effects of exposure to surface and impoundment soils at the concentrations of contaminants present, the hazard index (HI) was calculated. The HI, which is calculated by the summation of the DI/RfD (daily intake/reference dose) ratio for each chemical present, is intended to provide a measure of possible effects of exposure to several toxic chemicals. The daily intake (DI) or estimated dose is calculated based on soil ingestion. The reference dose (RfD) is defined as an estimate of a daily exposure to the human population that is unlikely to result in appreciable risk of deleterious effects during a lifetime. An HI of one or greater indicates the possibility of adverse health effects. For all of the contaminants detected in the surface and impoundment soils, the HIs were calculated to be below one.

To evaluate the health risks associated with consumption of contaminated drinking water, it was assumed that ground water from monitoring wells MW-3, MW-4, and MW-5 would be ingested. These wells were chosen because they contain elevated concentrations of contaminants associated with the DuPont Impoundment. The concentrations of contaminants in the wells were evaluated on the basis of hazard index, increased lifetime cancer risk, and comparison with EPA National Primary Drinking Water Standards established for the protection of human health. The ground water assessment concluded that the Hazard Index exceeded one for both mean and maximum concentrations of contaminants detected in the three monitoring wells. The contaminant concentrations also exceeded a number of MCLs and MCLGs (refer to Table 7-2c). Lifetime cancer risk, based on exposure to concentrations of benzene and arsenic in the three wells, was also greatly increased.

The following conclusions have been reached based on the exposure scenarios evaluated in the EA.

1. Risks to human health or the environment associated with direct contact and ingestion of surface soils or surface downgradient to the impoundment appear to be below those used by EPA in determining whether human health or the environment are protected.

2. There would be an unacceptable risk to human health or the environment through ingestion of ground water within impoundment and at the impoundment berm.

Table 7-2c

SUMMARY OF CONTAMINANT CONCENTRATIONS IN MW-03, MW-04, MW-05, COMPARISON TO DRINKING WATER STANDARDS OR GUIDELINES

	MINIMUM VALUE	MAXIMUM VALUE	MEAN VALUE	MEDIAN VALUE	NATIONAL PRIMARY DRINKING WATER STANDARDS MCL	MCLG
ORGANIC COMPOUNDS			Concentration (ug/l)			
ACETONE	2	2000	253.6	2 a		
BENZENE	0.8	209	15.8	2 a	5	
CARBON DISULFIDE	2	4250	1056.6	360		
ETHYL BENZENE	2	3.3	2.1	2 a		680
METHYLENE CHLORIDE	2	2500	226.4	2 a		
METHYL ETHYL KETONE	2	75	5 5	2 a		
4-METHYLPHENOL	14 7	1000	109 3	29		
PHENOL	14.7	185	40.2	14.7 a		
TETRACHLOROETHYLENE	2	2	2 0	2 a		0
TETRAHYDROFURAN	2	95500	24830.8	2600		
TOLUENE	2	8400	820.0	2 a		
XYLENES (TOTAL)	2	5.3	2 2	2 a		440
INORGANIC COMPOUNDS						
ARSENIC	5	1600	349 0	89	50	50
BARIUM	285	1900	620 0	585	1000	
BERYLLIUM	0.251	14	2 6	0.251		
CADMIUM	2 155	60	7.9	2.155	10	5
CHROMIUM (Total)	0 405	360	121 5	150	50	120
LEAD	2.5	400	63 8	7 1	50	20

a Not detected value presented is one half the detection limit and is used for the purposes of calculation and because absense of a quantifiable value does not necessarily mean 0 ug/l

3. Risks to human health or the environment through ingestion or direct contact with ground water from the shallow aquifer at or near the southern or southeastern boundaries of the Todtz Landfill Site perimeter, which is several hundred feet downgradient from the DuPont Impoundment, appear to be below those used by EPA in determining whether human health or the environment are protected. Concentrations of 60 ug/l and 80 ug/l of arsenic have been detected at PZ-03 on the eastern boundary of the landfill. These concentrations exceed the Maximum Contaminant Level of 50 ug/l. However, risks to human health or the environment in this portion of the landfill would appear to be acceptable because the aquifer would not be considered a viable drinking water supply at this location.

The findings of the RI and the EA indicate that the DuPont Impoundment is the source of contamination for the Lawrence Todtz Farm Site. The focus of the FS was on the development of cost-effective remedial actions for controlling potential release of waste constituents from the impoundment.

1.8 DOCUMENTATION OF SIGNIFICANT CHANGES

There are no significant changes between the Record of Decision and the Proposed Plan. A few non-significant changes have been made throughout the Record of Decision to clarify various aspects of site conditions and the selected remedy.

2.0 ALTERNATIVES EVALUATED

Remedial alternatives were screened based on effectiveness, implementability, and relative capital, operations, and maintenance costs. Excavation of the impoundment wastes and disposal at a RCRA landfill or treatment onsite using incineration, stabilization or in-situ treatment technologies were eliminated since they were not cost-effective based on the relatively low risk to the public health and the environment and the large capital cost.

The EPA has evaluated four basic alternatives and two variations for remediation of the DuPont Impoundment of the Todtz Farm Landfill Site. These alternatives are 1) no action, 2) soil cover, 3) geomembrane multilayer cap, and 4) geomembrane-clay multilayer cap with bentonite slurry wall. Alternatives 2TS and 3TS have also been developed as variations of Alternatives 2 and 3 which would allow for permanent treatment remedies to be considered as further remedial actions. Alternatives 2, 3, and 4 would also include ground water monitoring (with contingency triggers for further remedial actions if certain action levels are exceeded), institutional controls, fencing, and deed restrictions. Installation of a new well in the deeper aquifer for the Bark residence would be included as part of Alternatives 2, 3, 4, 2TS and 3TS. A description of the alternatives is provided below.

2.1 ALTERNATIVE 1 - NO ACTION

The no action alternative would allow site conditions to remain as they currently exist. Evaluation of the no action alternative is required by the National Contingency Plan (NCP) and also provides a baseline of comparison for the other alternatives.

2.2 ALTERNATIVE 2 - SOIL COVER

The major component of Alternative 2 is a 2-foot soil cover which consists of an 18-inch thick soil layer overlain by a 6-inch layer of topsoil and vegetation over the DuPont Impoundment. Site fencing, ground water monitoring, cover maintenance, and deed restrictions would also be incorporated. Installation of a drinking water well for the Bark residence in the deeper aquifer is also included in this alternative.

The cover would prevent erosion and subsequent direct contact with the contaminated materials or contaminant transport by wind or surface water run-off and would also reduce the volume of surface water currently infiltrating into the impoundment by as much as 10% per year.

The installation of a new well in the deeper aquifer for the Bark residence is necessary because the residence well is located in the shallow aquifer and would be the immediate receptor of any ground water contamination from the DuPont Impoundment that would migrate beyond the landfill. The Bark well has already detected concentrations above background for sodium and arsenic which may indicate that ground water quality is being impacted by the site.

The ground water monitoring system is depicted in Figure 2-1. If the ground water monitoring system at any time detects the exceedance of any specified chemical specific action levels, the exceedance would first be verified through statistical analysis and additional sampling. If the exceedance is verified, a cap and slurry wall containment system would then be installed.

If these action levels are exceeded and the slurry wall containment system is constructed, another set of action levels would immediately be in effect in the event of failure of the containment system. In this case, if any of these action levels would be exceeded (which will be verified by statistical analysis and additional sampling), ground water remediation would immediately be incorporated.

2.2A ALTERNATIVE 2TS - ALTERNATIVE 2 WITH TREATABILITY STUDY

In order to incorporate the preference for permanent treatment remedies, EPA has developed a version of Alternative 2 that will allow for treatment as a further remedial action if any of the chemical specific action levels are exceeded and if treatment would be determined to be feasible at that time.

Chemical specific action levels as specified in Table 2-1a and b have been established to trigger further remedial actions prior to any adverse effects on human health and the environment. The first set of specified chemical action levels are as listed on Table 2-1a. If any of these action levels are exceeded (which will be verified by statistical analysis and additional sampling), a treatability study of the impoundment waste will immediately be conducted. If the cost of the treatment remedy is comparable to the cost of the slurry wall, either Alternative 4 (cap and slurry wall) or a permanent treatment remedy of the impoundment material will be selected by EPA.

If a second set of action levels, as listed in Table 2-1b, are exceeded (which will be verified by statistical analysis and additional sampling), ground water remediation would immediately be incorporated.

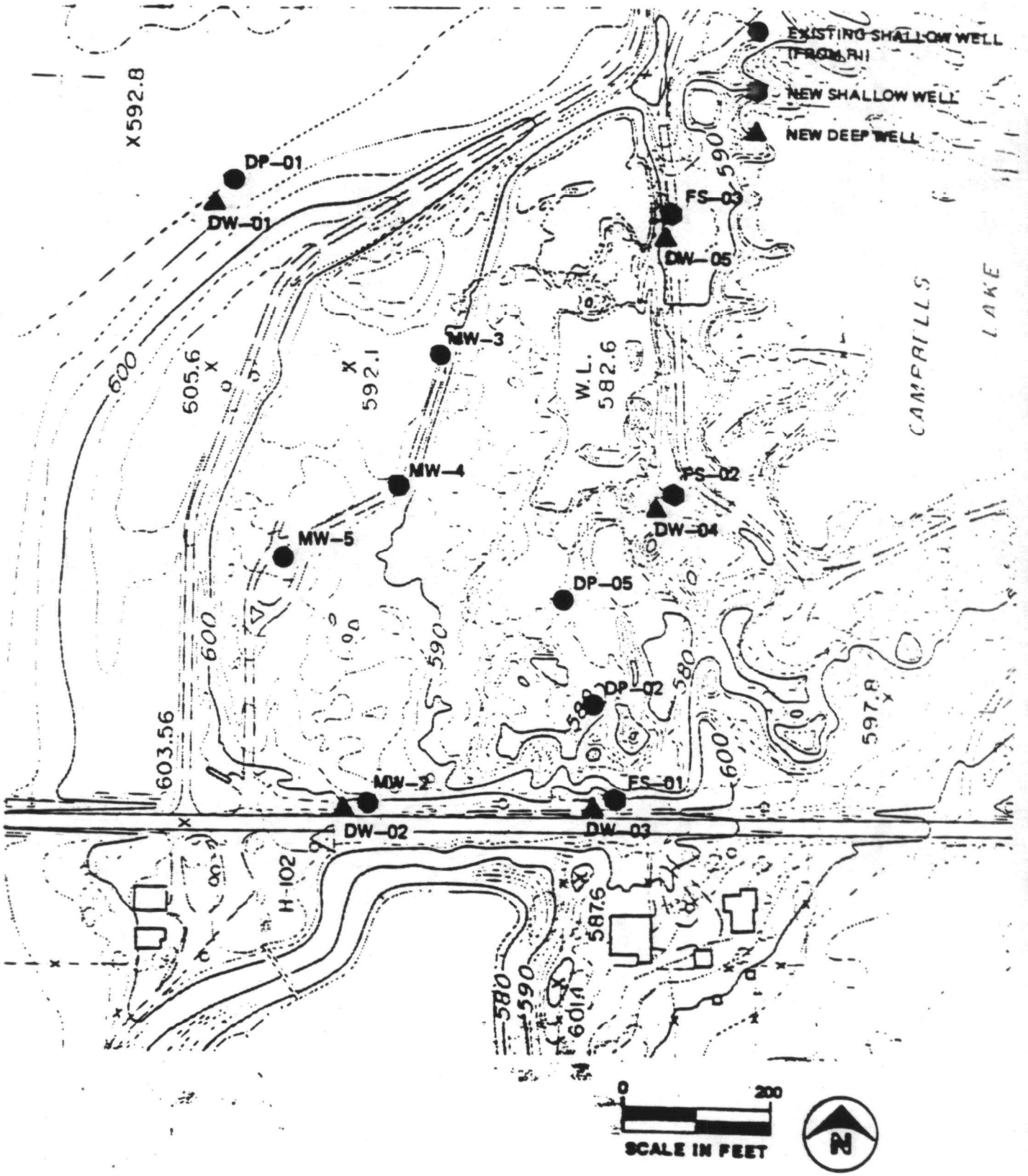

FIGURE 2-1
MONITORING WELL LOCCATIONS FOR ALTERNATIVE 2TS
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LANDFILL SITE

2.3 ALTERNATIVE 3 - GEOMEMBRANE MULTILAYER CAP

This multilayer cap would consist of a geomembrane, gravel drainage layer, geotextile and a soil cover. The other components, including fence, deed restrictions, cap maintenance and the contingent slurry wall would be the same for Alternative 3 as Alternative 2. Like Alternative 2, this alternative would prevent erosion and direct contact with contaminated soils, and wind or surface run-off. This alternative would also virtually eliminate surface water infiltration into the impoundment.

2.3A ALTERNATIVE 3TS - ALTERNATIVE 3 WITH TREATABILITY STUDY

Alternative 3TS has the same components as Alternative 3. However, Alternative 3TS, like Alternative 2TS, has been developed to allow the consideration of treatment as a further remedial action if the chemical specific action levels, as listed in Table 2-1a, are exceeded.

2.4 ALTERNATIVE 4 - GEOMEMBRANE-CLAY MULTILAYER CAP WITH BENTONITE SLURRY WALL

Alternative 4 would include construction of a soil-bentonite slurry wall in the native soil surrounding the impoundment in addition to the other components as described in Alternative 3. A collection system (trench) would also be installed within the perimeter of the slurry wall to collect enough ground water to maintain gradient control. This ground water would be hauled to a publicly owned treatment works (POTW) for treatment. This alternative would prevent surface water infiltration through the impoundment and prevent migration of contaminated ground water from the impoundment.

TABLE 2-1a

IMPLEMENT ALTERNATIVE 4 OR TREATMENT REMEDY

COMPOUND	HEALTH BASED STANDARD (UG/L)	ACTION LEVEL[1] (UG/L)
ORGANICS:		
Carbon disulfide	3500	500/250[2]
Tetrahydrofuran	700	100/50[2]
INORGANICS:		
Arsenic	50	125/50[3]
Chromium (VI)	50	100/50[2]

Notes:

1. Action level = Concentration to go to treatability study prior to implementing Alternative 4 or a treatment based alternative at comparable cost.

2. The binary values apply to monitoring wells DP05/and perimeter monitoring wells respectively.

3. The binary values apply to monitoring wells FS-03, FS-02/and MW-2, FS-01.

TABLE 2-1b

IMPLEMENT GROUND WATER REMEDIATION

COMPOUND	HEALTH BASED STANDARD (UG/L)	ACTION LEVEL[1] (UG/L)
ORGANICS:		
Carbon disulfide	3500	3500/1750[2]
Tetrahydrofuran	700	700/350[2]
INORGANICS:		
Arsenic	50	250/75[3]
Chromium (VI)	50	50[4]

Notes:

1. Action level requiring ground water extraction and treatment to Maximum Contaminant Level.

2. The binary values apply to monitoring wells DP05/and perimeter monitoring wells respectively.

3. The binary values apply to monitoring wells FS-03, FS-02/and MW-2, FS-01.

4. Landfill perimeter wells only.

3.0 SUMMARY OF THE COMPARATIVE ANALYSIS OF THE ALTERNATIVES

The alternatives described in Section 2.0 were evaluated using evaluation criteria presented in EPA Directive 9355.3-02, "Draft Guidance on Preparing Superfund Decision Documents: The Proposed Plan and Record of Decision." These criteria relate directly to factors mandated by Section 121 of CERCLA and as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986 and considerations which measure the overall feasibility and acceptability of the remedy. These evaluations are summarized below.

3.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Protection of human health and the environment is the central mandate of CERCLA, as amended by SARA. Protection is achieved by minimizing risks and taking action to ensure that there will be no future unacceptable risks to human health and the environment through any pathway. Each remedial alternative will have different long-term and short-term effects on the protection of human health and the environment.

Alternative 1, which would allow site conditions to remain unchanged, would not be protective of human health and the environment. Under this alternative, there would be continued contaminant migration from onsite wastes to ground water and an unacceptable threat to human health through potential ingestion of ground water contained within the impoundment or at the impoundment perimeter.

Alternatives 2, 2TS, 3, 3TS, and 4 would all be protective of human health and the environment. Alternative 4 would be more protective than Alternatives 2, 2TS, 3, and 3TS since it would essentially eliminate contaminant migration to ground water. However, at this time, there is no confirmed evidence of ground water contamination by hazardous substances downgradient of the site, with the possible exception of arsenic at PZ-03. Since Alternative 4 would be less dependent on ground water monitoring, it is considered more reliable in the protection of human health and the environment. A substantial difference in protection of human health and the environment between Alternatives 2 and 3 and Alternatives 2TS and 3TS is not anticipated because the onsite surface water recharge component to the ground water underneath the impoundment is thought to be minimal.

3.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Section 121 (d) of CERCLA, as amended by SARA, requires that remedial actions comply with applicable or relevant and appropriate requirements (ARARs) under Federal and State

environmental laws. All of the alternatives considered, with the exception of the no action alternative, meet or exceed ARARs identified for the site at the landfill boundary. Refer to Table 3.2 which provides a list of the appropriate ARARs for the site.

The trigger levels for monitoring wells installed in the causeway between the Todtz Landfill Site and Murphy's Lake have been established at values above Maximum Contaminant Levels (MCL). The ground water between this zone is not considered a viable water supply, since it is in a mined-out gravel pit area between two hydraulically connected surface water bodies on the boundary of the municipal landfill. Therefore, the MCLs would not be considered applicable, relevant or appropriate.

3.3 REDUCTION OF TOXICITY, MOBILITY OR VOLUME

This evaluation criteria relates to the performance of a technology or remedial alternative in terms of eliminating or controlling risks posed by the toxicity, mobility, or volume of hazardous substances.

None of the six alternatives include treatment of the contaminated source material of the impoundment as a component to reduce toxicity, mobility, or volume of hazardous substances. Treatment of the source material was considered during the initial phase of the feasibility study, was determined not to be cost-effective based on the relative low overall risk to public health and environment, and, therefore, was eliminated during the screening process. Treatment of a certain amount of ground water, collected to maintain gradient control would take place in Alternative 4. This is, therefore, the only alternative which would use treatment to reduce toxicity and volume of contaminants at this time. However, Alternatives 2TS and 3TS would allow treatment of the source material if any of the specified chemical action levels are exceeded, if the treatment alternative was cost-effective.

Since the contaminated source material would not initially be treated or removed for Alternatives 2, 2TS, 3, 3TS, and 4, the toxicity and volume of the source would not be reduced. However, Alternatives 2, 2TS, 3, 3TS, and 4 would all be effective in reducing mobility of contaminated soils because capping would prevent erosion and reduce mobility by wind and surface water transport. Alternatives 3, 3TS, and 4 would, in addition, eliminate surface water migration into the ground water. However, since the waste will remain in contact with the ground water for Alternatives 2, 2TS, 3, and 3TS and onsite surface water recharge is relatively small, Alternatives 2 and 2TS would be virtually as effective as Alternatives 3 and 3TS in reducing the mobility of the contaminants via surface water recharge to ground water.

ARARs IDENTIFIED FOR THE [redacted] IMPOUNDMENT SITE

[redacted] REQUIREMENT	POTENTIAL ARAR DETERMINATION	ANALYSIS
FEDERAL REGULATIONS		
U S EPA REGULATIONS FOR IDENTIFYING HAZARDOUS WASTE		
40 CFR 261 — Identifies those wastes subject to regulation as hazardous wastes	Applicable to all alternatives	The criteria and limitations used to identify wastes as being hazardous or non-hazardous in 40 CFR 261 are applicable to all proposed cleanup actions at the DuPont impoundment site. Determining whether wastes qualify as hazardous may establish whether additional regulations are applicable to the site. This EE report assumes that the DuPont impoundment does not contain hazardous wastes as defined under this regulation
U S EPA PRETREATMENT STANDARDS		
40 CFR 403 § — If wastes are discharged or delivered for treatment at a publicly owned treatment works facility (POTW) the treatment process must not allow waste to pass through untreated or result in contaminated sewage sludge	Applicable to Alternative 4	Effluent from the drainage trench inside the slurry wall may be discharged or delivered to a POTW. The cited performance standard and other rules under 40 CFR 403 would be applicable to such an action. Thus, this rule also makes local POTW requirements applicable
STATE OF IOWA REGULATIONS		
IOWA ENVIRONMENTAL QUALITY ACT		
455B 304 — Requires continuous monitoring of groundwater for a period of 30 years after closure of a sanitary waste disposal facility. The monitoring period may be reduced or extended based on site-specific circumstances.	Relevant & appropriate for all alternatives	Rules promulgated in the Iowa Environmental Quality Act (chapter 455B of the Iowa Administrative Codes) specify administrative requirements for the management of solid waste in Iowa. The requirements cited herein are considered relevant and appropriate for the DuPont impoundment site because they specify requirements for post-closure site maintenance
455B 426 — Sanitary waste disposal sites in the state of Iowa shall be included on a registry. This registry shall, for each regulated site, specify limitations on future land uses and on other transactions	As above	
IOWA GROUNDWATER PROTECTION		
Chapter 455E — This chapter, legislated in 1987, is a broad antidegradation rule for protection of groundwater resources in Iowa. The Iowa Department of Natural Resources shall administrate the regulations of 455E on a site-specific basis to prevent unjustified groundwater quality degradation.	Applicable to all alternatives.	Rules of this chapter are considered applicable to actions that could cause groundwater quality degradation. Site-specific guidance on 455E regulations would be required from the Department under any of the proposed remedial alternatives
IOWA SOLID WASTE DISPOSAL RULES		
103.2(2)l — The finished surface of the site shall be repaired as required, covered with soil, and seeded with native grasses or other suitable vegetation.	Relevant & appropriate for all alternatives.	Substantive (design-related) state regulations regarding closure of a sanitary landfill (including those cited herein) have been deemed relevant and appropriate for the DuPont impoundment site based on a preliminary determination that impoundment wastes are non-hazardous. All proposed remedial alternatives are considered compliant with these ARARs.
103.2(2)j — Monitoring wells shall be positioned, sampled, and analyzed according to technical criteria and a schedule specified by the Iowa Department of Natural Resources	As above	
103.2(2)k — The Iowa Department of Natural Resources shall be notified if a leachate release is detected. The site operator shall then submit a plan for controlling and treating the leachate. This plan shall be implemented immediately upon approval	As above	Note that Alternative 4 includes a leachate collection system designed to control a leachate release as described under this regulation
103.2(2)m — Repairs shall be made to the final cover as necessary for a period of five years following closure to ensure the integrity of the final cover.	As above	
103.2(2)d — Requires at least a two feet of compacted soil cover over a solid waste facility that will not be used for more than two months. The cover shall be graded to allow surface water runoff.	As above	All proposed alternatives would meet or exceed this design requirement
103.2(2)e — The final cover (at least two feet thick) shall be designed to be consistent with the proposed site land use	As above	No active use of the site is anticipated in the foreseeable future

Alternative 4 is the only alternative which would not only reduce the toxicity and volume of the contaminated ground water, but would also eliminate the mobility of contaminated ground water outside of the site. However, Alternatives 2, 2TS, 3, and 3TS would contain the necessary contingency triggers to implement further remedial actions if any of the predetermined chemical action levels are exceeded in the future.

3.4 SHORT-TERM EFFECTIVENESS

Short-term effectiveness addresses how well an alternative is expected to perform, the time to achieve performance and the potential adverse impacts of its implementation.

Adverse impacts to nearby residents and construction workers involved in impoundment remedial actions will not be significant for any of the alternatives if the mitigative actions and health and safety precautions outlined in the feasibility study are taken. The relatively minor impacts from noise, dust, and vehicular traffic that do occur during construction are greatest due to the truck traffic to and from the site. The truck traffic would be about:

- 1,000 truckloads for Alternatives 2 and 2TS
- 1,400 truckloads for Alternatives 3 and 3TS
- 1,800 truckloads for Alternative 4

The time required between signature of the Record of Decision (ROD) and completion of remedial actions is not significantly different between alternatives. The estimated times range from 10 to 12 months for Alternatives 2 and 2TS, 12 to 14 months for Alternatives 3 and 3TS, and 13 to 15 months for Alternative 4.

3.5 LONG-TERM EFFECTIVENESS AND PERMANENCE

Long-term effectiveness and permanence address the long-term protection and reliability an alternative affords.

All of the alternatives, except Alternative 1, are nearly equal in their effectiveness in preventing erosion of the contaminated source material given proper construction and maintenance. They also rely equally on deed restriction and the IDNR state registry to prevent future development of the site.

Alternatives 2, 2TS, 3, 3TS, and 4 would all provide protection to human health and the environment by minimizing contact with contaminated ground water within the impoundment

and, through monitoring, possible future contact with contaminants potentially released from the impoundment. The differences in effectiveness of the alternatives result from the varying levels of reliance on ground water monitoring and implementation of contingency plans to achieve protection.

Alternatives 2 and 2TS would reduce contaminant loadings to ground water by a maximum of 10 percent and would not substantially alter contaminant migration when compared to the no action alternative. The RI results detected elevated levels of some inorganic constituents, indicating that the ground water may have already been impacted by the site. Therefore, ground water monitoring of Alternatives 2 and 2TS is necessary to detect the predetermined chemical specific action levels in order to provide the time necessary to implement further remedial actions.

Alternatives 3 and 3TS further reduces contaminant loading to the ground water by essentially eliminating infiltration of water through the impoundment waste. Because 25 to 50 percent of the waste would remain in periodic contact with the water table, it is anticipated that the contaminant loading to ground water could remain substantial. However, since the onsite surface water component of ground water recharge is believed to be a minimal amount of the ground water volume, the reduction of contaminant loading by Alternatives 3 and 3TS would probably not be much different than Alternatives 2 and 2TS. Therefore, Alternatives 3 and 3TS are similar to Alternatives 2 and 2TS in the reliance on monitoring and the contingency for implementation of further remedial actions.

Alternative 4 relies least on ground water monitoring since the potential for future contaminant levels to exceed health risk levels in offsite residential wells would be less. The slurry wall and cap containment would be effective in minimizing future contaminant contributions to the ground water given proper maintenance. The contaminants that would remain outside the containment structure would diminish over time as a result of dispersion, adsorption, biodegradation, or volatilization. Ground water monitoring would still be implemented to monitor the migration of residual contamination.

3.6 IMPLEMENTABILITY

Implementability addresses how easy or difficult, feasible or infeasible, an alternative would be to carry out from design through construction, operation and maintenance.

The various components of Alternatives 2, 2TS, 3, 3TS, and 4 are proven technologies and materials necessary to implement them should be readily available. Implementation of these alternatives will require detailed design and competent supervision.

Implementation time ranges from 10 to 12 months for Alternatives 2 and 2TS, 12 to 14 months for Alternatives 3 and 3TS, and 13 to 15 months for Alternative 4.

3.7 COST

CERCLA requires that EPA select the most cost-effective (not merely the lowest cost) alternative that protects human health and the environment and meets other requirements of the law. Treatment alternatives were eliminated during the screening process since they were not cost-effective. The no action alternative, which would involve no cost, was considered in order to meet requirements of the law.

Total capital costs are estimated at $520,000, 880,000 and 2,300,000 respectively for Alternatives 2, 3, and 4. Present worth operation and maintenance costs (at 5%) are estimated at $510,000, 560,000, and 520,000 for Alternatives 2, 3, and 4 respectively. The total present worth costs are, therefore, estimated at $1,030,000 for Alternative 2, $1,440,000 for Alternative 3, and $2,820,000 for Alternative 4. These costs were taken directly from the FS Report and are presented for comparative purpose. Costs for Alternatives 2TS and 3TS are assumed to be the same as Alternatives 2 and 3, respectively. Final costs will be developed during design.

Alternative 2TS is the most cost-effective alternative since it is the least costly alternative that is protective of human health and the environment and meets other requirements of the law.

3.8 COMMUNITY ACCEPTANCE

This evaluation criteria addresses the degree to which members of the local community support the remedial alternatives being evaluated.

The local community has not recently expressed concern over remediation of the Todtz Farm Site. There were no written comments received from the community during the 21-day public comment period which began on August 20 and ended on September 10, 1988.

3.9 STATE ACCEPTANCE

The state acceptance criteria addresses the concern and degree of support that the state government has expressed regarding the remedial alternatives being evaluated.

This is an EPA enforcement-lead site. The State has participated in the review of all of the RI/FS documents and in negotiations with DuPont.

In a letter to EPA dated September 10, 1988, the State indicated a preference for Alternative 4 rather than Alternative 2TS. Subsequently, the EPA and the State discussed the data, information, technical considerations and legal constraints involved. The State issued their concurrence on the selected remedy in a letter dated October 20, 1988.

4.0 THE SELECTED ALTERNATIVE

Based on the information available to evaluate the remedial options against the required nine criteria, EPA has concluded that Alternative 2TS is the preferred remedy (Figure 4-1).

The major components of Alternative 2TS are a 2-foot soil cover, ground water monitoring, site fencing and deed restrictions. The soil cover will provide protection of human health and the environment against direct contact with the waste. If the monitoring system detects exceedance of the predetermined chemical action levels, either a cap and slurry wall containment system or treatment remedy will be implemented. The monitoring system and contingency plans would protect human health and the environment by providing adequate protection against contact with contaminants in the ground water. Installation of a new well in the deeper aquifer for the Bark residence will provide additional protection of human health because the present Bark well would probably be the immediate receptor of releases of contaminants from the site.

The preferred remedy satisfies the remedy selection requirements under CERCLA, as amended, and the National Contingency Plan (NCP). The preferred remedy at the site is protective of human health and the environment, satisfies all identified applicable or relevant and appropriate environmental requirements, and is the most cost-effective. The advantages of this alternative outweigh those offered by the other alternatives.

In order to initiate construction of the preferred alternative, detailed design plans and specifications will need to be prepared. Implementation of the plans and specifications will need to be conducted by qualified field personnel. Following is a summary of the components that will be implemented.

4.1 SOIL COVER

Clearing, grubbing and preliminary grading would be the first phases of construction. A geotextile layer would then be placed to provide a distinct boundary between the potentially contaminated soil and the cover materials and to lessen the possibility of their mixing in the future.

An 18-inch thick soil layer would then be placed over the geotextile layer, followed by a 6-inch layer of topsoil (Figure 4-1). The cover will prevent erosion and subsequent direct contact with the contaminated materials or contaminant transport by wind or surface run-off. The vegetation and slope of the cover will reduce the volume of surface water currently infiltrating into the impoundment by as much as 10 percent.

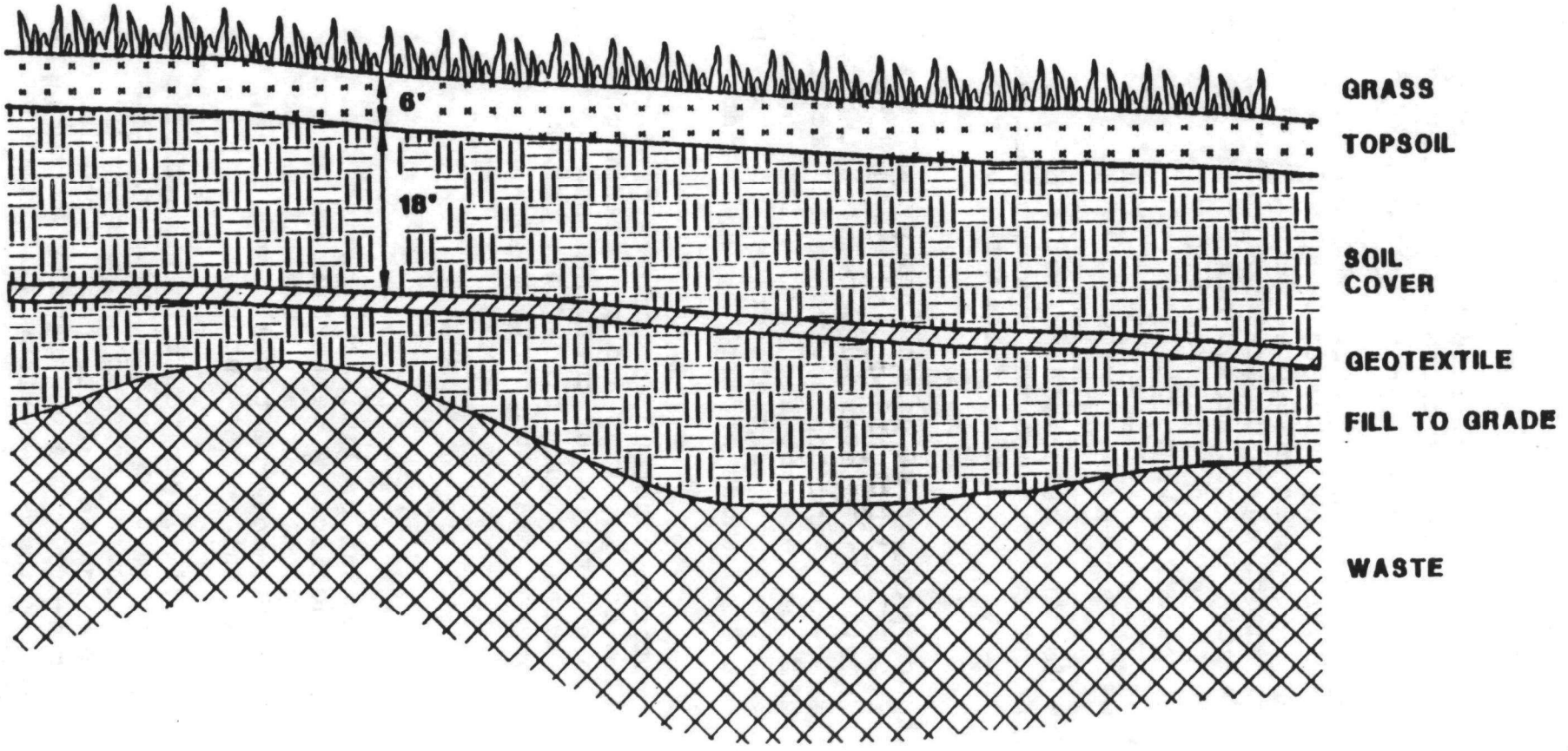

FIGURE 4-1
ALTERNATIVE 2
SOIL COVER
DUPONT IMPOUNDMENT RI/FS
TODTZ FARM LAN[redacted]L SITE

4.2 ACCESS RESTRICTIONS

A restrictive covenant will be placed on the deed for the property on which the DuPont Impoundment is located. Deed limitations would prevent future development of the area without further remedial action or consideration of impacts to public health and the environment. The site is being placed on the Iowa State registry of hazardous waste sites. This action will include a notice on the deed preventing sale of the property or change in land use without approval by the State.

A site fence will also be installed a minimum of 10-feet outside of the perimeter of the impoundment to limit access by human or animal traffic to the contaminated source. The fence will include a locking gate to allow entry for regular maintenance, such as mowing or cover repair.

4.3 MAINTENANCE

Site maintenance will consist of mowing the grass and repairing the fence. The soil cover will require routine inspection semiannually for the first 5 years and annually thereafter. Maintenance would consist of repairing damage caused by erosion, freeze-thaw, and settlement. It is estimated that 500 cu yards of soil (10 percent of cover, 1-foot thick) will need to be replaced every 5 years to fill depressions and replace soil lost by erosion. The actual amount of settlement and erosion occurring will depend on the properties of the materials disposed in the impoundment and the finished surface slopes.

4.4 GROUND WATER MONITORING

Ground water monitoring will consist of monitoring wells upgradient and downgradient of the site to be sampled and tested routinely. The ground water monitoring wells included in the plan are as indicated on Figure 2-1. Bedrock monitoring wells have been included to document the water quality in the bedrock aquifer. Monitoring is considered an integral part of this alternative because detection of contaminants at concentrations above target levels at or within the landfill will call for immediate implementation of further remedial actions as discussed further in Section 4.5. The target levels are as stated in Tables 2-1a and 2-1b.

All of the shallow wells would be sampled semiannually for the first 5 years, and on an annual basis thereafter. The deep wells would be sampled semiannually until four consecutive samples show no traces of contamination, and once every 5 years thereafter.

Ground water well samples will be tested for volatile organic compounds (including tetrahydrofuran), sulfates, sulfides, chloride, iron, manganese, phenols, pH, conductivity, total organic carbon, total organic halogen, sodium, arsenic, lead, chromium. EPA plans to periodically conduct an independent analysis of all semi-volatile organic and inorganic compounds.

The ground water monitoring program will include the following components to detect changes in ground water quality over time and to verify the exceedance of target contaminant action levels through statistical analysis.

a. If contamination is found within 50% of action levels at any of the perimeter wells or DP-05, quarterly sampling at the well will be done for 1 year with 4 replicates of each sample.

b. A treatability study will be conducted and either a treatment remedy (if feasible) or Alternative 4 will be implemented if in 2 successive sampling episodes, the mean of any of the concentrations of compounds listed in Table 2-1a (using the 4 replicates) is significantly greater than the indicated action level at the 0.05 significance level using the Student's t-test.

c. Construction of a ground water collection system and treatment of ground water to MCLs if, in 2 successive sampling episodes, the mean of any of the concentration of compounds listed in Table 2-1b (using the 4 replicates) is significantly greater than the indicated action level of 0.05 significance level using the Student's t-test.

4.5 FURTHER REMEDIAL ACTIONS

EPA has determined that further remedial actions will be immediately implemented in the event that certain trigger levels as shown in Tables 2-1a and 2-1b are met or exceeded (which will be verified by statistical analysis).

If any of the first set of trigger levels as shown in Table 2-1a are met or exceeded (which will be verified by statistical analysis), a treatability study will immediately be conducted. The treatability study will include an evaluation of the most appropriate technologies that will be available at that time and their comparative costs. Suitable pilot tests and/or bench scale studies will be conducted as needed. At the conclusion of the treatability study, EPA will decide whether the remedial action will consist of treatment of the impoundment waste or encapsulation by a slurry wall. If the second set of trigger levels shown in Table 2-1b are met or exceeded (which will be statistically verified), remedial action including pumping and treatment of ground water will immediately be implemented.

The trigger levels, as indicated on Tables 2-1a and 2-1b have been established to protect human health and the environment. It should be noted that for carbon disulfide and tetrahydrofuran, the two contaminants that are the main fingerprint constituents of DuPont's cellophane waste, action levels that will trigger treatment or encapsulation of the DuPont Impoundment have been established at less than 10 percent of the drinking water equivalent level (DWEL) at the landfill boundary (i.e., 50 ug/l for tetrahydrofuran which has a DWEL of 700 ug/l). For the implementation of ground water extraction and treatment, the action levels of these two compounds have been set at half of the DWEL at the landfill boundary (i.e., 350 ug/l for tetrahydrofuran which has a DWEL of 700 ug/l).

For Chromium VI the action levels have been set at the MCL at the landfill boundary for both sets of trigger levels.

Arsenic, unlike tetrahydrofuran and carbon disulfide, is found at elevated concentrations in both the DuPont Impoundment and the municipal landfill as well as some lesser concentrations upgradient and offsite. Arsenic is not a known constituent of the DuPont cellophane process. However, a high concentration of arsenic was found in the DuPont Impoundment.

In the area of PZ-03, where monitoring wells FS-02 and FS-03 will be installed, trigger levels of arsenic higher than the MCL of 50 ug/l can be allowed because the ground water at this location cannot potentially be used as a drinking water source.

The major component of ground water flow in the area of PZ-03 would be towards Murphy's Lake. The surface water concentration of arsenic detected in Murphy's Lake is 1 ug/l. That is substantially less than the U. S. EPA Ambient Water Quality Criteria of 48 ug/l for the more toxic form of arsenic which has been developed for the protection of aquatic life.

If the concentration of arsenic of 125 ug/l in monitoring wells FS-02 and FS-03 is met or exceeded (which will be statistically verified), a treatability study will immediately be conducted. The treatability study will include an evaluation of the most appropriate technologies that will be available at that time and their comparative costs. Suitable pilot tests and/or bench scale studies as needed will be conducted. At the conclusion of the treatability study, EPA will decide whether the remedial action will consist of treatment of the impoundment waste or encapsulation of the impoundment by a slurry wall.

If the second trigger level of 250 ug/l of arsenic at FS-02 and FS-03 is met or exceeded (which will be statistically verified), a ground water extraction and treatment system will be implemented. The resulting cleanup level will be the MCL of 50 ug/l.

In regard to the trigger levels set for arsenic in FS-01 and MW-02, it should be noted that ground water flow from the DuPont Impoundment would be expected to flow primarily in the southeasterly direction toward FS-01. However, the onsite monitoring wells located downgradient of the impoundment and between the impoundment and FS-01 have detected relatively low levels of arsenic as compared to the levels found in the impoundment, PZ-03 and Bark's well, the immediate downgradient receptor. EPA has established that monitoring will be conducted and treatment or encapsulation of the impoundment will be implemented if the MCL of 50 ug/l of arsenic is met or exceeded in FS-01 and MW-2. An additional trigger of 75 ug/l of arsenic at FS-01 and MW-02 has been established for implementation of ground water extraction and treatment. If triggered, ground water extraction and treatment will continue until the MCL of 50 ug/l for arsenic is achieved and maintained at the site boundary.

The only known receptor located directly downgradient of the site is the Bark's drinking well, which is presently screened in the upper sand and gravel aquifer. For an extra measure of safety, this well will be decommissioned and a new drinking water well will be installed in the deeper bedrock aquifer, below the clay aquitard. EPA anticipates that an onsite trigger level of 75 ug/l would not result in contamination of usable ground water at levels exceeding the MCL of arsenic of 50 ug/l due to the natural ground water attenuation and the influence of the remedial pumping and treatment which would be triggered by a level of 75 ug/l.

4.6 HEALTH AND SAFETY

A health and safety plan, similar to the one successfully utilized during the RI/FS activities will be prepared and followed during the remedial action.

It is anticipated that Level D protection will be necessary for clearing, grubbing, preliminary site grading, and placement of the geotextile and that minimal protection will be necessary for placement of the soil cover.

4.7 TIME SCHEDULE

It is estimated that the entire action will take approximately 10 to 12 months from the beginning of the onsite mobilization.

5.0 STATUTORY DETERMINATION

Based upon available information, the selected remedy satisfies the remedy selection requirements under CERCLA, as amended, and the National Contingency Plan. The selected remedy at the site is protective of public health and the environment, satisfied all applicable or relevant and appropriate environmental requirements and is cost-effective.

The 2-foot soil cover would provide adequate protection of human health and the environment against direct contact with the waste. If the ground water monitoring system indicates exceedance of predetermined chemical specific action levels, either a cap and slurry wall or treatment remedy will be installed. The monitoring system and contingency plans would also provide adequate protection of human health and the environment against contact with contaminants in ground water.

It should be noted that the concentrations of arsenic from the ground water samples taken at PZ-03 were 80 ug/l and 60 ug/l during the two remedial investigation sampling events, which exceed the Maximum Contaminant Level (MCL) of 50 ug/l. The MCL was established for the protection of human health. However, the MCL is applicable only if the ground water is a public drinking water supply and would be considered relevant and appropriate only if the ground water could be used for human consumption. In this case, the ground water at PZ-03 would not be considered a viable water supply and, therefore, the MCL is not applicable or relevant and appropriate. The trigger levels for the monitoring wells to be installed adjacent to PZ-03 have been established above the MCL because of the same rationale. However, MCL is the cleanup level established in the event ground water remediation is triggered.

The estimated total present worth cost of the selected remedy is $1,030,000 which includes the cost of soil cover construction and maintenance and ground water monitoring. The remedy is the most cost-effective of those that were evaluated.

In evaluation of treatment alternatives, it was determined that these alternatives are not cost-effective based on the relatively low overall risk of the site to public health and the environment. The selected alternative also provides for treatment in the future if the predetermined chemical action levels are exceeded and treatment would be comparable in cost to the cap and slurry wall.

Based on the cost-effectiveness, the consideration of treatment to the maximum extent practicable, and satisfaction of the remaining nine criteria, the selected remedy provides the best combination of attributes of all of the remedies available for the site.

The Agency has determined that a five-year review will need to be conducted onsite since contamination will remain above health based criteria.

RESPONSIVENESS SUMMARY

Record of Decision for The DuPont Impoundment of The Todtz Farm Site in Camanche, Iowa

This Responsiveness Summary presents the responses of the Environmental Protection Agency (EPA) to public comments received regarding the Proposed Plan and the Remedial Investigation/ Feasibility Study (RI/FS) report for the DuPont Impoundment of the Todtz Farm Site in Camanche, Iowa. This document addresses the comments received by EPA during the public comment period conducted as part of the remedy selection process. The public comment period ended on September 10, 1988.

The only comment received from the local community was in regard to replacement of a local resident's drinking water well. A comment letter was also received from the Iowa Department of Natural Resources (IDNR). All of the remaining comments, which were in regard to the Proposed Plan, were submitted on behalf of DuPont by their consultant, CH2M Hill.

Comment: The commentor wanted clarification as to whether the local resident's drinking water well would automically be replaced as part of the remedial alternative or whether replacement of the well would be contingent on exceedance of chemical specific action levels. The preference is to have the well replaced as soon as possible.

Response: Although analyses of samples from the resident's well has not detected the presence of any compounds which exceed EPA Primary National Drinking Water Standards (established for protection of human health), analyses has detected exceedance of some of the Secondary Drinking Water Standards (sodium and manganese) which indicate taste and odor characteristics. Also, the well would be the immediate receptor of any contamination migrating from the site.

In response to the comment, the resident's drinking water well is to be replaced as part of the remedial action and is not a contingency. Since the remedial action will probably not take place until next year, EPA will discuss the possibilty of replacing the local resident's well as soon as possible with DuPont.

Comment from the Iowa Department of Natural Resources (IDNR):

In a letter to EPA dated September 10, 1988, IDNR indicated that Alternative 4 was preferable (among the alternatives considered in the FS) because it would not allow further contaminant migration from the DuPont Impoundment. IDNR further said that it did not support Alternative 2TS, because it would allow contaminant concentrations to increase to a level in excess of the MCL at or beyond the site boundary.

At a meeting between EPA and IDNR on October 18, 1988, EPA explained how the offsite ground water would be protected by the monitoring program, trigger levels and further contingent remedial actions. Since tetrahydrofuran and carbon disulfide triggers would be set at a fraction of the DWEL, the discussion focused primarily on the arsenic contamination at PZ-03 which exceeds the MCL of 50 ug/l. The ground water at PZ-03 would not be a potential drinking water source and the MCL would not be considered applicable, relevant or appropriate. EPA further explained that the trigger levels would provide adequate protection of human health and the environment and that an appropriate remedial response would be implemented if and when the staged trigger levels were met or exceeded. Further, it was pointed out that any agreement with a private party to perform the remedy as contemplated in the ROD would be incorporated in a judicial Consent Decree as required by SARA.

In a letter to EPA dated October 20, 1988, IDNR concurred that the selected alternative would be an appropriate remedial response for the site.

The remaining comments are in regard to the Proposed Plan. The section, page, and paragraphs referred to below are in reference to those in the Proposed Plan.

Comment: p. 2, Section 1.3, 1st paragraph, last sentence

The City of Camanche water supply wells are not located downgradient of the Todtz Farm Landfill Site and are not likely to be affected by any contaminants leaving the site. Further, it is our understanding that the two water supply wells completed in the alluvial aquifer are no longer in use due to nitrate contamination from other sources.

Response: According to the Iowa Department of Natural Resources (IDNR), the City of Camanche has three municipal water wells completed in the alluvial aquifer and one deep well completed in the Jordon aquifer. At this time, the City is using the deep well exclusively because of nitrate problems in the alluvial wells. However, the alluvial wells are maintained for use should

the need arise. Since these wells lie in the general downgradient direction of ground water flow, they may possibly be impacted sometime in the future.

Comment: p. 2, Section 1.3, 3rd paragraph

The North and South Ponds are located onsite, are in direct contact with municipal refuse, and do not support a thriving aquatic community.

The Mississippi Wildlife Refuge is so far removed from the site and so unlikely to be affected by the Todtz Farm Landfill Site that its mention as a potential receptor of site contaminants is, in our opinion, inappropriate and should be deleted.

Response: The Proposed Plan does not state that the onsite ponds support a thriving aquatic community.

The Upper Mississippi Fish and Wildlife Refuge is a potential secondary receptor. Since the HRS scoring system assigns values to critical habitat within one mile of a Superfund site, this area meets that criterion. Also, the CERCLA Consent 104/122 Order, signed by both EPA and DuPont acknowledges the Refuge as a potential secondary receptor. However, EPA agrees that the Refuge is far removed from the site and not likely to be affected.

Comment: p.3, Section 1.4, 1st full sentence

It should be mentioned that the site was listed based on trace levels of phthalate detected in nearby residential wells, and that the results of the analyses were questionable because they were also found in blanks.

Phthalate compounds are ubiquitous in the environment and are a common constituent of municipal landfill leachate.

It should also be mentioned that the FIT investigation concluded that there was no evidence of any release having occurred from the DuPont Impoundment. However, EPA continued with additional phases of remedial investigation.

Response: The HRS site scoring for the NPL did include a release of phthalates at a nearby resident's drinking water well and in one of the onsite ponds. These samples were collected and analyzed in August of 1980 according to quality control and quality assurance procedures that were in effect at that time. Apparently, no blanks were analyzed.

During the October 1985 FIT Site Investigation, phthalates were detected in several surface water locations. However, the residential well used in the HRS scoring was not resampled due to access problems. In June of 1986, a qualification check conducted of the October 1985 samples indicated that since phthalates were also detected at certain concentrations in the blanks, the data were suspect.

EPA acknowledges that phthalate compounds are considered ubiquitous in the environment and may be a constituent of municipal landfill leachate. However, they were also reported by DuPont as being part of the feed stock and waste products associated with the manufacturing of cellophane and, therefore, are likely to have originated from the DuPont Impoundment.

Since the phthalate data from the FIT Site Investigation was inconclusive and it had not been resolved whether there was a release or threat of release, EPA concluded that further investigation was required. During the REM II investigation, tetrahydrofuran and carbon disulfide were detected in elevated concentrations in MW-3, MW-4, and MW-5. These compounds were known to be used in DuPont's cellophane manufacturing process. They became the main contaminants of concern.

Comment: p. 3, 2nd full paragraph, last sentence

DuPont did not use lead, arsenic, benzene, or mercury in its manufacturing process nor did it report the use of these compounds to EPA.

Response: In a response to a CERCLA 104 letter dated August 25, 1986, DuPont acknowledged the use of lead acetate and mercury in their laboratory and maintenance but not necessarily in the cellophane manufacturing process. These constituents were found in the DuPont Impoundment which was reportedly used only by DuPont.

It is true that in the same letter, DuPont did not report the use of arsenic or benzene in the cellophane process to EPA, however, these constituents also were found in the DuPont Impoundment during the RI.

Comment: p.3, Section 1.5

The first two sentences of this paragraph are false. First, the REM II data do not show a release of hazardous substances from the DuPont Impoundment. Samples collected from wells placed in the impoundment berm showed the presence of hazardous substances. The berm is part of the impoundment and hence part of the containment structure. The REM II data do not show a

release of hazardous substances beyond the berm of the DuPont Impoundment. The REM II data do not indicate the presence of any hazardous substances in the municipal landfill either. Secondly, the scope of the REM II investigation was insufficient to make the blanket statement that "a significant release of hazardous substances from the municipal landfill was not observed." The REM II contractor placed only one monitoring well at the periphery of the municipal landfill. Examination of the REM II ground water data clearly show that this well (MW-2) is downgradient of only a small portion of the municipal landfill. Therefore, EPA has no basis in fact for making this statement.

Response: EPA acknowledges that it would be more correct to say, "Based on investigations conducted prior to 1988, it was evident that there was a release or threat of release of hazardous substances from the DuPont Impoundment." The presence of hazardous constituents in the berm wells indicates that the constituents have migrated at least as far as the outside periphery of the berm.

EPA considers the second sentence of page 5, Section 1.5 of the Proposed Plan to be a correct statement, but acknowledges additional work was needed that was conducted in the RI/FS.

Comment: p.3, Section 1.5, last sentence

What contamination is EPA referring to? The REM II data, collected prior to 1988, do not show hazardous substances having been released from the DuPont Impoundment, therefore, it is not clear what contamination EPA is referring to. The REM II data showed some elevated concentrations of sodium in a residential well downgradient of the Todtz Farm Landfill. Is this the contamination EPA is referring to? If so, there is no conclusive evidence that the DuPont Impoundment is the source of this elevated sodium. In fact, the municipal landfill is as likely a source of the elevated sodium as the DuPont Impoundment.

Why is EPA discussing "the remedial alternative selected for the impoundment" at this point in reference to the REM II work when the REM II contractor did not perform a feasibility study. Any discussion of remedial action should be in reference to the feasibility study performed by DuPont's contractor.

Response: EPA believes that the DuPont Impoundment is a potential source of contamination for the Todtz Farm Landfill. This fact is evidenced based on the levels of contaminants observed in MW-3, MW-4 and MW-5. These wells are located on the outside periphery of the berm and indicate that hazardous constituents are migrating into and at least as far as the back edge of the berm.

The contamination referred to is tetrahydrofuran and carbon disulfide which are fingerprint constituents of the cellophane manufacturing process.

EPA acknowledges that discussion of remedial alternatives for the impoundment is more appropriate in reference to the RI/FS as opposed to the REM II investigation alone. On the basis of the RI/FS, EPA believes that the selected remedy will suffice for the entire Todtz Landfill Site.

Comment: p.4, Section 1.6 1st paragraph

The objective of the RI/FS was to determine the physical and chemical characteristics of the DuPont Impoundment, determine whether a release of DuPont related constituents had occurred beyond the confines of the DuPont Impoundment and, if a release had occurred, evaluate the extent of the released constituents and determine if released constituents presented a risk to human health or the environment.

Response: EPA believes that the objective of the RI/FS stated above is consistent with that stated in the Proposed Plan.

Comment: p. 4, Section 1.7.1, 1st paragraph

The first sentence should be changed to read . . . . ; and environmental sampling task to determine whether DuPont related constituents had migrated from the impoundment to surrounding surface water bodies and ground water.

The impoundment wastes are periodically in contact with ground water.

Samples from the Todtz and Bandixen residential wells, completed in bedrock, provide some indication of local bedrock aquifer ground water quality.

Response: EPA acknowledges that the statement as provided above is that presented in the DuPont RI/FS report. However, the DuPont-related constituents contain the contaminants of concern so there is no need for revision of the sentence.

EPA stands by the statement as given. Figure 3-12, 3-13, 3-14, and 3-15 in the DuPont RI report do not illustrate an instance when at least a portion of the waste material is not in direct contact with the ground water.

EPA acknowledges that samples from the Todtz and Bandixen residential wells do provide some indication of local bedrock aquifer ground water quality. However, ground water quality in the bedrock has not been specifically investigated at this time.

Comment: p.4, Section 1.71, 2nd paragraph

EPA should mention that only one background soil sample was collected and that this one sample may not reflect true background conditions.

Response: EPA acknowledges that only one background soil sample was collected. However, the information obtained from this single sample is more useful than a strict comparison to literature values in estimating background concentrations.

Comment: p. 4, Section 1.71, 3rd paragraph

The use of the word "significantly" is inappropriate.

PZ-01 should be changed to PZ-02.

The above background concentrations of inorganic constituents in DP-02, DP-05, and PZ-02 and the Bark well could very well be from the municipal landfill.

Response: EPA believes that order of magnitude differences are significant.

EPA acknowledges that PZ-01 is incorrectly identified and that the well referred to should be PZ-02.

The statement does not assert that the inorganic constituents originated from the DuPont Impoundment. It simply states that they were also observed in these wells.

Comment: p. 4-5, Section 1.71, last paragraph

DuPont feels that this paragraph is biased against DuPont by not presenting the complete facts relative to this matter.

EPA fails to mention that tetrahydrofuran was not detected in the three rounds of sampling the same wells by DuPont's contractor including the first round, for which EPA split samples. EPA also fails to mention that independent review of EPA's data package showed that the EPA contract laboratory did not meet the criteria for identification of tetrahydrofuran. Therefore, the EPA data are suspect.

In our opinion there is no conclusive evidence of DuPont related constituents being present in monitoring wells DP-02, DP-05, PZ-02 and the Bark residential well.

Again, based on the findings of the DuPont RI, it is not clear exactly what contamination EPA is referring to.

Response: EPA acknowledges that the tetrahydrofuran (THF) found in the split sample analysis was not confirmed during a subsequent sampling event and that two of the values were below the contract detection limit (M-coded) and are, therefore, estimates. EPA also acknowledges that DuPont's laboratory reviewed the data and questions whether the contract laboratory met identification criteria. However, EPA Region VII laboratory re-reviewed the data and believes that the THF was present in the samples. The commenter also did not mention that the detection limit utilized by DuPont's laboratory was higher than that used by EPA (10 ug/l versus 5 ug/l) during the sampling event in which EPA identified the presence of THF in DP-02, DP-05, and PZ-02.

EPA does not refer to contamination of any kind in this paragraph.

Comment: p. 6, last paragraph, 1st sentence

Dupont cannot agree with this statement. First, it is not clear to what contamination EPA is referring. Secondly, the findings of the RI conclude the following:

While there is evidence that ground water degradation has occurred downgradient of the DuPont Impoundment, degradation cannot be conclusively tied to the DuPont Impoundment because of the intervening presence of municipal refuse between the DuPont Impoundment and downgradient sampling points. There is also no conclusive evidence that the upper sand and gravel aquifer has been contaminated by DuPont-related constituents beyond the perimeter of the DuPont Impoundment with the exception of arsenic which is present in low concentrations in piezometer PZ-03.

Potential human environmental exposures resulting from direct contact or ingestion of surface water downgradient of the impoundment do not exceed criteria used by EPA in evaluating whether human health or the environment are protected with the exception of arsenic. Concentrations of arsenic in onsite surface water bodies exceed the Ambient Water Quality Criteria for the Protection of Human Health at a 1×10^{-6} protection level but do not exceed the MCL.

Exposures to human health or the environment through ingestion or direct contact with ground water from the shallow aquifer at or near the Todtz Farm Landfill perimeter are also below the criteria used by EPA in evaluating whether human health or the environment are protected with the exception of arsenic which exceed the MCL at PZ-03.

None of these statements imply or conclude that the DuPont Impoundment is the source of any "contamination" at the Todtz Farm Site with the possible exception of arsenic in PZ-03.

Response: EPA believes that the DuPont Impoundment is the source of the tetrahydrofuran (THF) observed in the EPA split samples and at least one of the sources of the elevated arsenic level in PZ-03. EPA also believes that the DuPont Impoundment is contributing to the elevated sodium levels observed in wells downgradient of the landfill. The RI/FS does not appear to identify any contaminants of concern migrating from the Todtz Landfill Site that are not present in significant concentrations in the DuPont Impoundment. Tetrahydrofuran and carbon disulfide found at high concentrations in the DuPont Impoundment appear to be in the process of migrating and remain sources of contamination at the Todtz Farm Landfill Site as a whole.

Comment: p.7, Section 2.0, 1st paragraph

The second sentence should be changed to read: "Excavation of the impoundment wastes and disposal at a RCRA landfill or treatment onsite using incineration."

Response: EPA acknowledges that this statement, as presented above, is consistent with statements made in the DuPont RI/FS report. However, the statement does not acknowledge that other technologies were also screened out. The sentence in the Proposed Plan should be restated as follows: "Excavation of the impoundment wastes and disposal at a RCRA landfill or treatment onsite using inceration, stabilization, or in-situ treatment technologies were eliminated since they were not cost-effective based on the relatively low risk to public health and the environment and the large capital cost."

Comment: p. 8, 1st paragraph

All references to the DuPont Impoundment in this paragraph should be changed to the Todtz Farm Landfill.

Response: EPA believes that this comment is correct and would consent to changing references to the Todtz Farm Landfill. However, EPA notes that sodium and arsenic detected in the Bark's well are in much higher concentrations in the DuPont Impoundment.

Comment: p.8, 2nd paragraph

This statement is not quite true. If an exceedance of a trigger compound is detected, steps will be taken to verify this exceedance through statistical analysis and additional sampling. If the exceedance is verified, then DuPont will undertake treatability studies to determine whether a treatment based remedial action is appropriate. If the treatment based option is determined to be appropriate and is comparable in cost to Alternative 4, the treatment based remedial action will be implemented.

Response: EPA acknowledges that a statistically based analysis will be performed to verify if the action levels have been exceeded. It should also be noted that there is a difference between Alternative 2, which is described in the RI/FS report and Section 2.2 of the Proposed Plan, and Alternative 2TS, which is described in Sectiion 2.2A. Alternative 2TS is similar to Alternative 2 except that Alternative 2TS calls for a treatment study and implementation of a treatment remedy if action levels are exceeded and if treatment is determined to be cost-effective at that time.

Comment: p. 10, Table 2-1b

Chromium (Total) should be changed to Chromium (VI).

Response: EPA acknowledges the change.

Comment: p. 13, Section 3.2, 2nd paragraph

Change the word berm to causeway. Confusion may result because the word berm is used consistently in reference to the berm encapsulating the DuPont Impoundment.

Response: EPA acknowledges that the use of the word berm may be confusing and agrees that causeway is an appropriate description. However, EPA further wants to point out that the berm does not encapsulate the impoundment but surrounds.

Comment: p.14, Section 3.4, 1st paragraph

Short-term effectiveness addresses the effect of an alternative during construction and implementation.

Response: EPA agrees that short-term effectiveness does address the effect of an alternative during construction and implementation. However, it also defines the period of time needed to achieve protection of human health and the environment

during implementation of a remedy and until cleanup goals are reached. This definition is consistent with that provided in the Proposed Plan.

Comment: p. 15, 2nd paragraph, 2nd sentence

The sentence should be modified to reflect that the municipal landfill may also be affecting ground water quality.

Response: EPA acknowledges that the municipal landfill may also be affecting ground water quality.

Comment: p. 18, Section 4.0, 2nd paragraph

The paragraph should be clarified that deed restrictions will be placed on the Todtz property and that the DuPont Impoundment will be fenced as part of the remedial action, not the entire Todtz Farm Landfill.

Response: EPA agrees with the comment. This clarificatiion is made in Section 4.2.

Comment: p.20, 3rd paragraph

Ground water samples will be analyzed for all of the compounds listed EXCEPT lead, barium, beryllium, and mercury. To the best of our knowledge, DuPont agreed to add arsenic, sodium and chromium to the list of analytes, but at no time agreed to add lead, barium, beryllium, or mercury. EPA should delete these compounds from the list.

Response: EPA acknowledges that DuPont did not agree to analyze for lead, barium, beryllium or mercury. However, EPA intends to include these metals in the list of analytes.