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(2)

PROPOSED DECISION DOCUMENT
OTHER CONTAMINATION SOURCES
INTERIM RESPONSE ACTION
SOUTH TANK FARM PLUME

Prepared by
MK-Environmental Services
Denver, Colorado

Shell Oil Company

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2

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OTHER CONTAMINATION SOURCES
INTERIM RESPONSE ACTION
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Prepared by
MK-Environmental Services
Denver, Colorado

Prepared for
Shell Oil Company/Holme Roberts & Owen
Denver, Colorado

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13. ABSTRACT (Maximum 200 words)

THE SOUTH TANK FARM PLUME (STFP) IS LOCATED IN THE SOUTHERN HALF OF SECTIONS 1 AND 2. IT IS A COMPOSITE PLUME OF C6H6, MEC6H5, XYLEN, DCPD, AND BCHPD WHICH IS MIGRATING FROM THE AREA OF TANK 464A. RECENT INVESTIGATIONS HAVE SHOWN THAT THE STFP IS BEING BIODEGRADED NATURALLY AND WILL NOT MIGRATE INTO EITHER LAKE LADORA OR LOWER DERBY LAKE PRIOR TO IMPLEMENTATION OF THE FINAL REMEDY.

MONITORING WITH THE SPECIFIC OBJECTIVES OF 1) VERIFYING THE RATE OF MIGRATION AND 2) LOCATING THE LEADING EDGE OF THE PLUME OVER THE TIME FRAME OF THE IRA IS PROPOSED AS THE PREFERRED ALTERNATIVE ACTION.

SECTIONS OF THIS PROPOSED DECISION DOCUMENT PROVIDE SUMMARIES OF:

1. SITE DESCRIPTION - HISTORY, HYDROGEOLOGY, EXTENT OF CONTAMINATION
2. IRA OBJECTIVE
3. THE IRA PROJECT
4. CHRONOLOGY OF EVENTS LEADING TO THE INITIATION OF THE IRA
5. THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS, STANDARDS,

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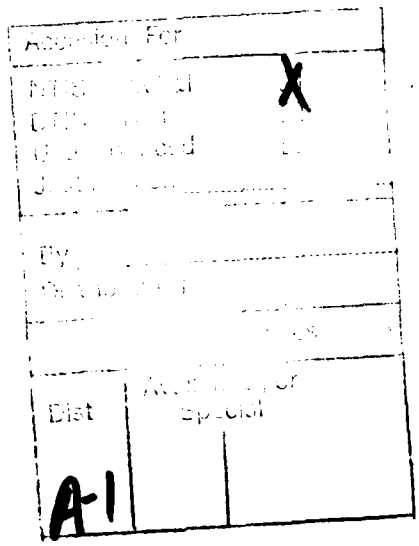


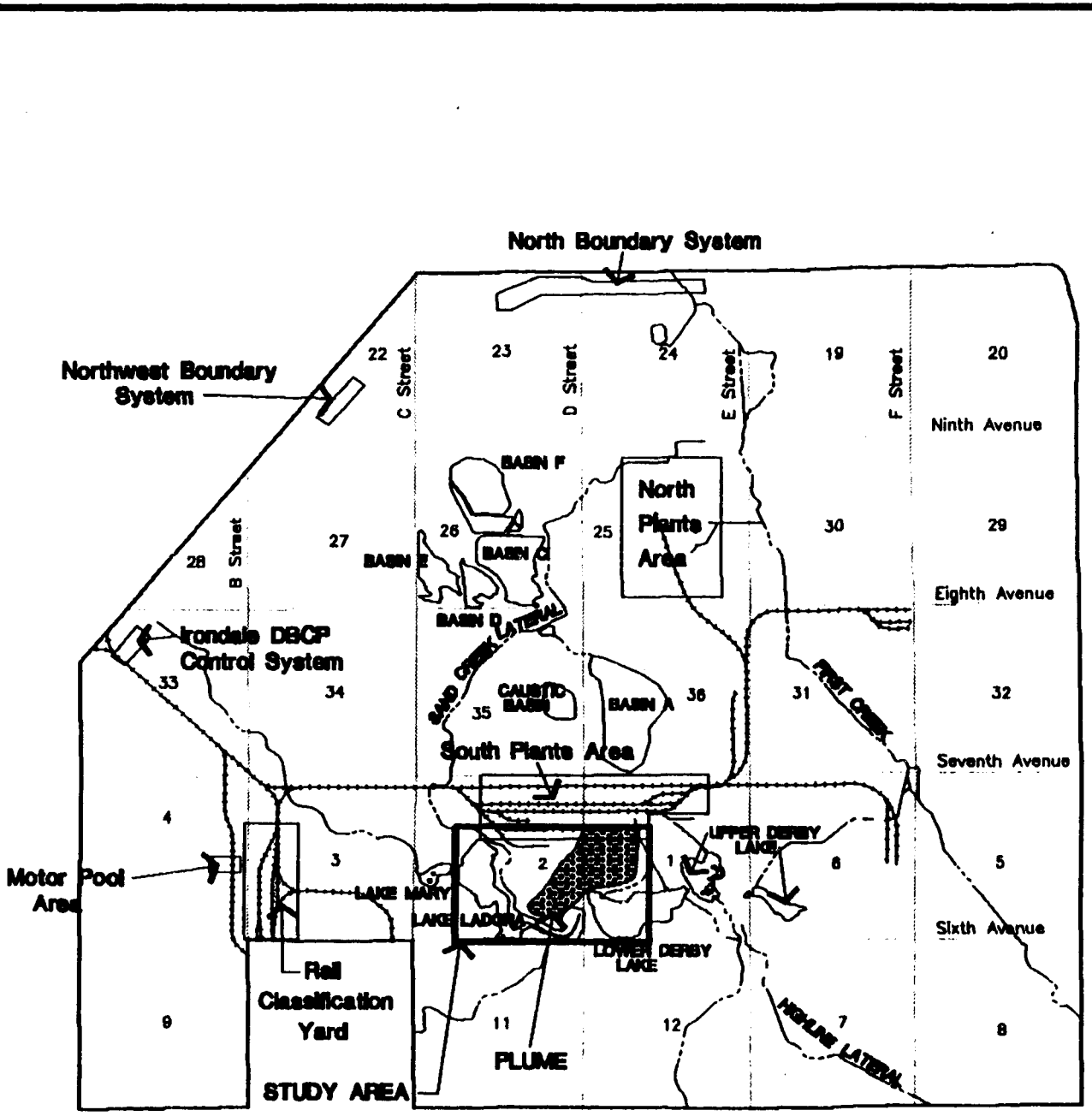
1.0 INTRODUCTION/EXECUTIVE SUMMARY

The South Tank Farm Plume (STFP) is listed under the "Remediation of Other Contamination Sources" Interim Response Action (IRA) sites under the Final Technical Program Plan FY88-FY92 and the Federal Facility Agreement. The process and guidelines used to assess alternatives, produce this Proposed Decision Document, and implement this IRA are specified in and conducted in accordance with the Federal Facility Agreement.

As listed in Section 22.8 of the Federal Facility Agreement, the purposes of the Proposed Decision Document for Other Contamination Sources IRAs are to: (a) state the objective of the IRA; (b) discuss Interim Response Action alternatives, if any, that were considered; (c) provide the rationale for the alternative selected; (d) present the final ARAR decision; (e) summarize the significant comments received regarding the IRA and responses to those comments; and (f) establish an IRA Deadline for completion of the IRA, if appropriate. Each of the above mentioned issues is addressed in this document.

The South Tank Farm Plume (STFP) is located in the southern half of Sections 1 and 2 on the Rocky Mountain Arsenal (RMA) (Figure 1-1). The constituents of the STFP are those present in the Light Nonaqueous Phase Liquid (LNAPL) plume, which is one of the sources of the dissolved plume.

In 1989, Shell proposed, and the Army and EPA agreed, that the STFP be added to the list of RMA IRAs. The basis for the nomination and acceptance of this plume for an IRA was an apparent increase in concentration and areal distribution of the STFP compounds, notably benzene which defines the leading edge of the plume (Shell 1989). The data suggested that benzene was



Legend

- Railroad
- Stream/Drainage
- Study Area
- Plume
- Lakes

0 1/2 1 2

MILES

ROCKY MOUNTAIN ARSENAL
South Tank Farm Study Area

Figure 1-1

Study Area Location Map

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migrating toward Lake Ladora rapidly enough to reach the lake prior to the implementation of the final remedy.

Based on this interpretation of the rate of contaminant migration, the original objective of the IRA was to prevent the STFP from reaching Lake Ladora prior to the implementation of the final remedy. However, recent investigations have shown that the STFP is being biodegraded naturally and will not migrate into either Lake Ladora or Lower Derby Lake prior to the implementation of the final remedy (Shell May 1990).

Since there is no imminent threat of contamination to Lake Ladora or Upper Derby Lake by the STFP, interim response alternatives cannot be meaningfully developed or evaluated within the context of the original objective of this IRA. In accordance with Section 22.1(1) of the Federal Facility Agreement which addresses the "assessment and, as necessary, the selection and implementation of an IRA . . .", an evaluation of monitoring as the appropriate course for the interim response action has been conducted. This evaluation shows that: (1) the STFP poses no risk to human or non-human biotic receptors because it will not enter the lakes prior to the final remedy, and (2) there is no significant benefit in terms of cost or accelerated cleanup by conducting an IRA on the plume because of the low rate of contaminant migration and active biodegradation that are presently occurring in the plume. Therefore, monitoring with the specific objectives of verifying the rate of contaminant migration and ensuring current knowledge of the location of the leading edge of the plume over the time frame of the IRA, is the appropriate course for this IRA. Determination concerning the implementation of this IRA has been reached through a consideration of the objectives of Sections 2.3(a), 22.5, and 22.6 of the Federal Facility Agreement, and by application of the Decision Flow Chart for Other Contamination Sources IRAs adopted

by the Organizations and the State of Colorado at the June 7, 1989 Subcommittee meeting (Figure 1-2). The evaluation process is discussed further in Section 3.0.

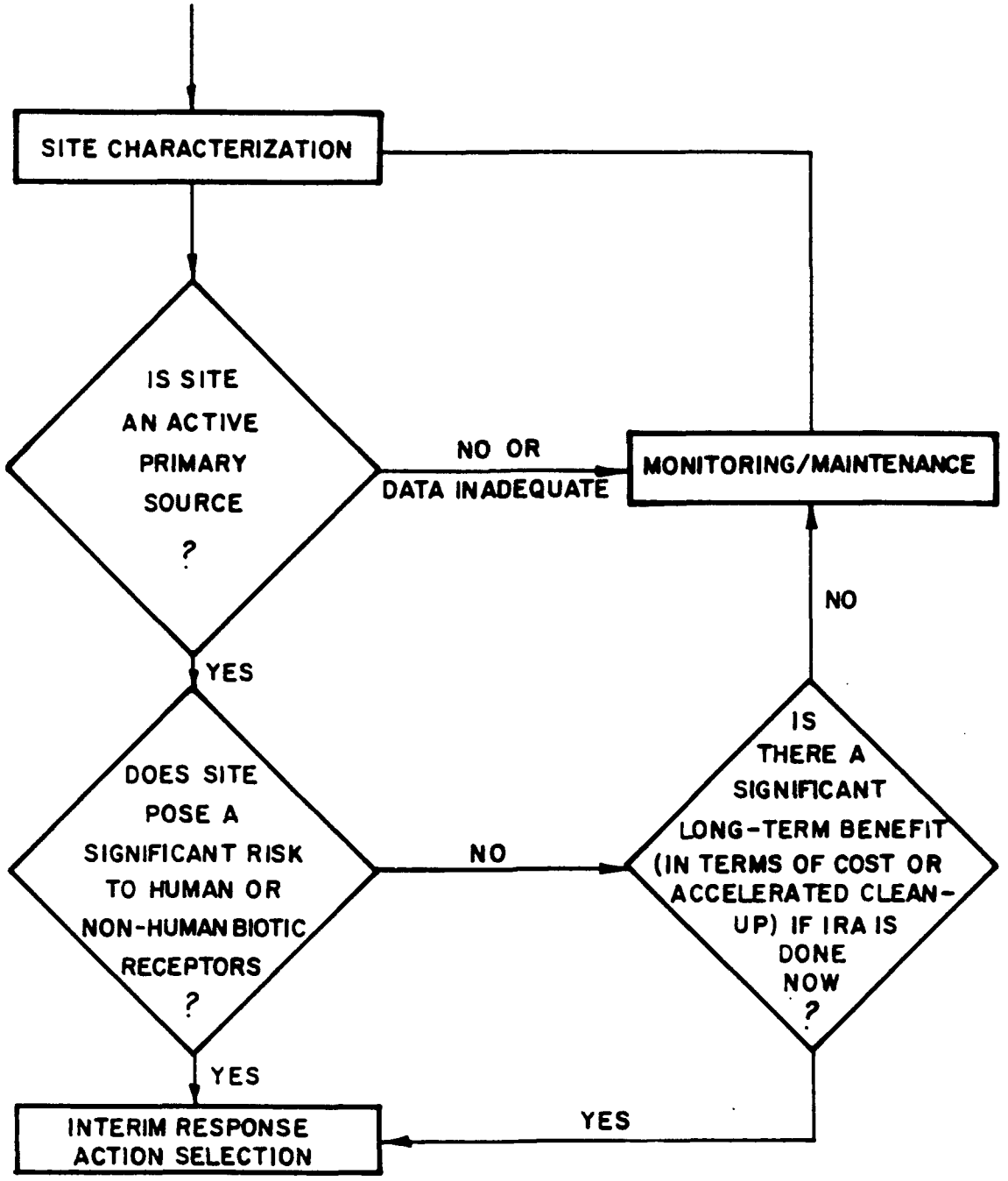

Figure: 1-2

DECISION FLOW CHART FOR INTERIM REMEDIAL ACTION VERSUS MONITORING/MAINTENANCE

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From: WOODWARD-CLYDE, 1989

2.0 SITE DESCRIPTION

2.1 LOCATION AND SITE HISTORY

The STFP is defined as the composite plume of benzene, toluene, and xylene (collectively referred to as BTX), bicycloheptadiene (BCHPD), and dicyclopentadiene (DCPD) dissolved in the uppermost water-bearing zone (WBZ1) groundwater. The dissolved plume originates from the area of a LNAPL plume located near Tank 464A. The STFP is migrating in the direction of Lower Derby Lake and Lake Ladora.

The STFP and LNAPL plume constituents include compounds previously stored in the South Tank Farm (STF) and used in the manufacture of pesticides and compounds potentially associated with other production, disposal, and storage activities in the South Plants. Between 1947 and 1978, Tanks 464A, 464B, and others were used intermittently to store DCPD and BCHPD bottoms generated from pesticide manufacturing.

Tanks 464A and 464B were cleaned in 1956, 1966, and 1967. In 1956, BCHPD bottoms were "pumped" onto the ground, and the affected area was later cleaned up. In 1966, residue from a mixture of fuel oil and BCHPD bottoms containing DCPD was buried in the STF. In 1967, a mixture of DCPD bottoms and fuel oil was collected in a low spot in the STF, and later drummed and shipped offsite. From 1960-1963, leakage of BCHPD/DCPD bottoms occurred from a pipe connected to Tank 464A, although the quantity spilled is unknown. Additional disposal and spill events involving BCHPD and DCPD occurred at unidentified locations in the STF in 1964 and 1978, respectively.

Although records do not show that either benzene, toluene, or xylene were stored in the STF, a large spill of benzene

containing toluene and xylene impurities reportedly occurred at an unidentified location in the STF in 1948. Toluene may also have been present in trace amounts in BCHPD.

2.2 HYDROGEOLOGY

Two geologic units occur in the STFP study area: an upper alluvial unit, underlain by the Denver Formation. The alluvium consists of brown, unconsolidated, silty sand with increasing silt and clay content at depth. The alluvium ranges from approximately 5 feet thick near the STF to 25 feet thick near Lake Ladora.

The Denver Formation underlying the alluvium is composed of brown to green, weathered and unweathered claystones, mudstones, and siltstones. These strata, referred to as the VC (volcaniclastic unit) and VCE (volcaniclastic equivalent unit) in the South Plants Study Area Report (Ebasco 1989), are fractured. The uppermost portion of the Denver Formation is weathered and averages 4 to 6 feet thick, but may extend to approximately 20 feet at some locations. Lithologic variability near the leading edge of the STFP is shown by the geologic cross-section in Figure 2-1.

The STFP affects the WBZ1, as defined in the South Plants Study Area Report (Ebasco 1989). WBZ1 encompasses saturated alluvium and the uppermost weathered Denver Formation. The top of WBZ1 is defined by the water table and the base is defined by a green to brown Denver Formation claystone exhibiting a lesser degree of fracturing and weathering (Ebasco 1989, Shell 1989). In the STFP area, WBZ1 ranges in saturated thickness from approximately 10 to 25 feet.

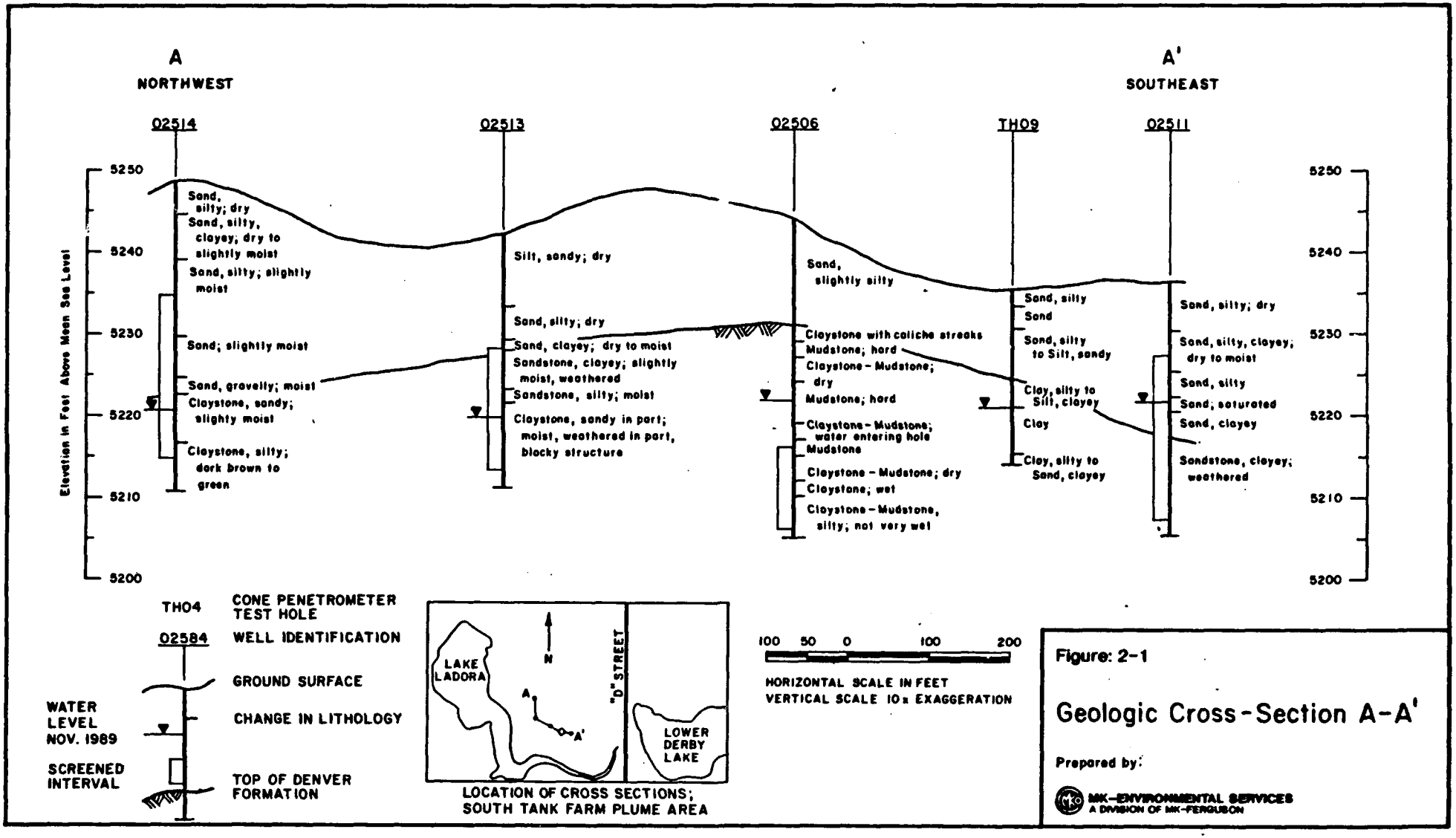

Figure: 2-1

Geologic Cross-Section A-A'

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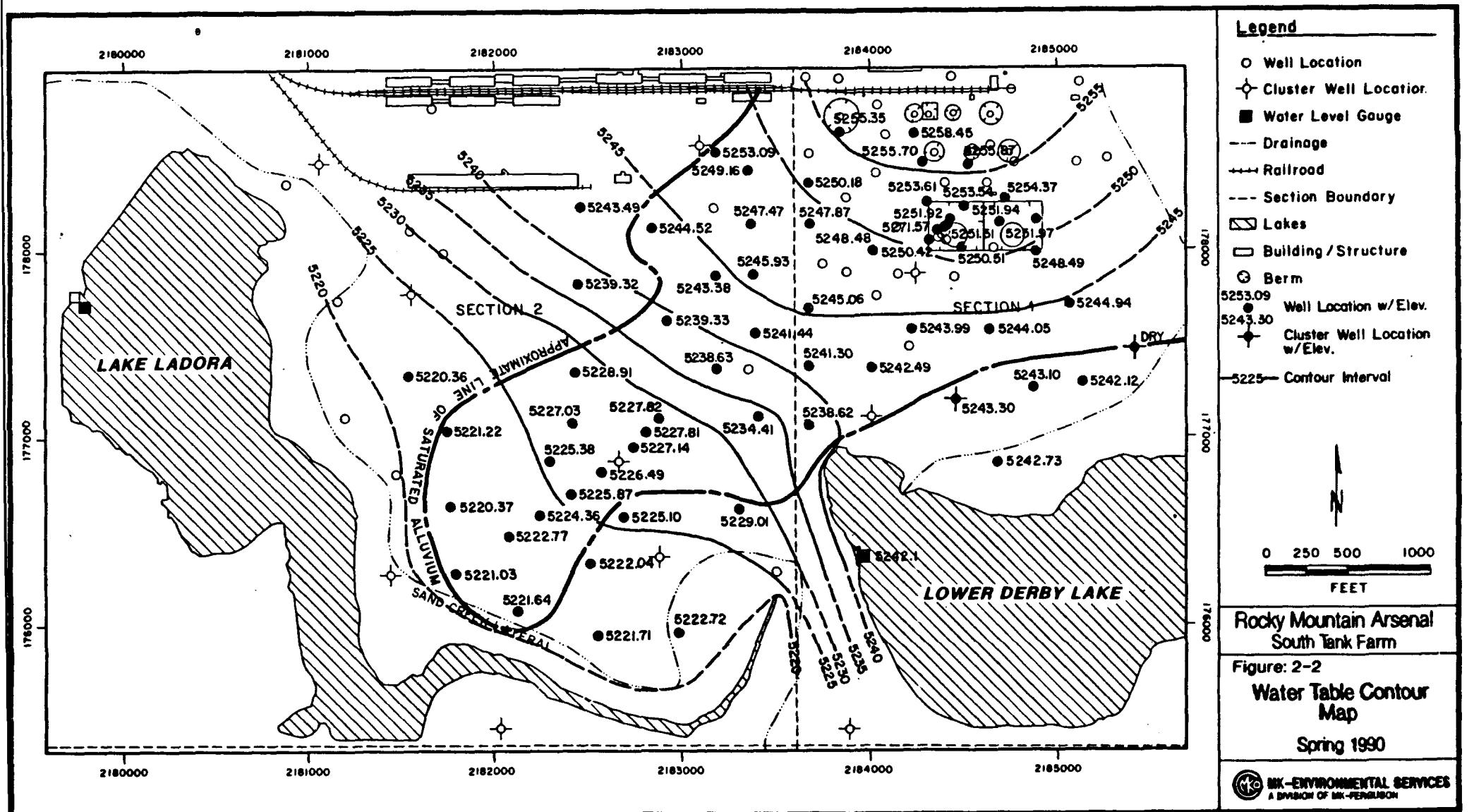
The water table occurs in the alluvium in the northwestern and southeastern portions of the study area, and in the weathered Denver Formation immediately southwest of the STF (Figure 2-2). Groundwater in WBZ1 flows away from the STF to the southeast, south, and southwest. The water table gradient is reduced near the lakes, although near the northwest corner of Lower Derby Lake groundwater flowpaths are deflected sharply towards the southwest and in the direction of Lake Ladora.

Water levels in the STF area have been declining (RMA-PMO database). Since the spring of 1988, water levels near the tank farm have declined as much as 5 feet, while water levels in wells near Lake Ladora have declined approximately 1 to 2 feet (Shell May 1990).

The hydraulic gradient in the STF area varies from approximately 0.015 ft/ft in the vicinity of the tanks to approximately 0.006 ft/ft near Lake Ladora (Figure 2-2). The water-level data in the RMA database indicate that the average hydraulic gradient for the STF area is about 0.009 ft/ft, and that the gradient appears to be slightly decreasing with time.

In the Fall of 1989, single-well injection (slug) tests were conducted within the weathered Denver Formation near Lake Ladora and Lower Derby Lake. The calculated hydraulic conductivities from seven slug tests conducted near Lake Ladora ranged from 1.6 x 10^{-3} to 4.3 x 10^{-5} cm/sec, and from 4.0 x 10^{-4} to 3.4 x 10^{-4} cm/sec for the tests performed in the vicinity of Lower Derby Lake. These estimates appear to be in agreement with the observed field data.

The plume is not [illegible] following the [illegible] Denver readings are higher in the Denver [illegible] dilution in the coarse grained alluvium



Rocky Mountain Arsenal
South Tank Farm

Figure: 2-2
Water Table Contour Map
Spring 1990

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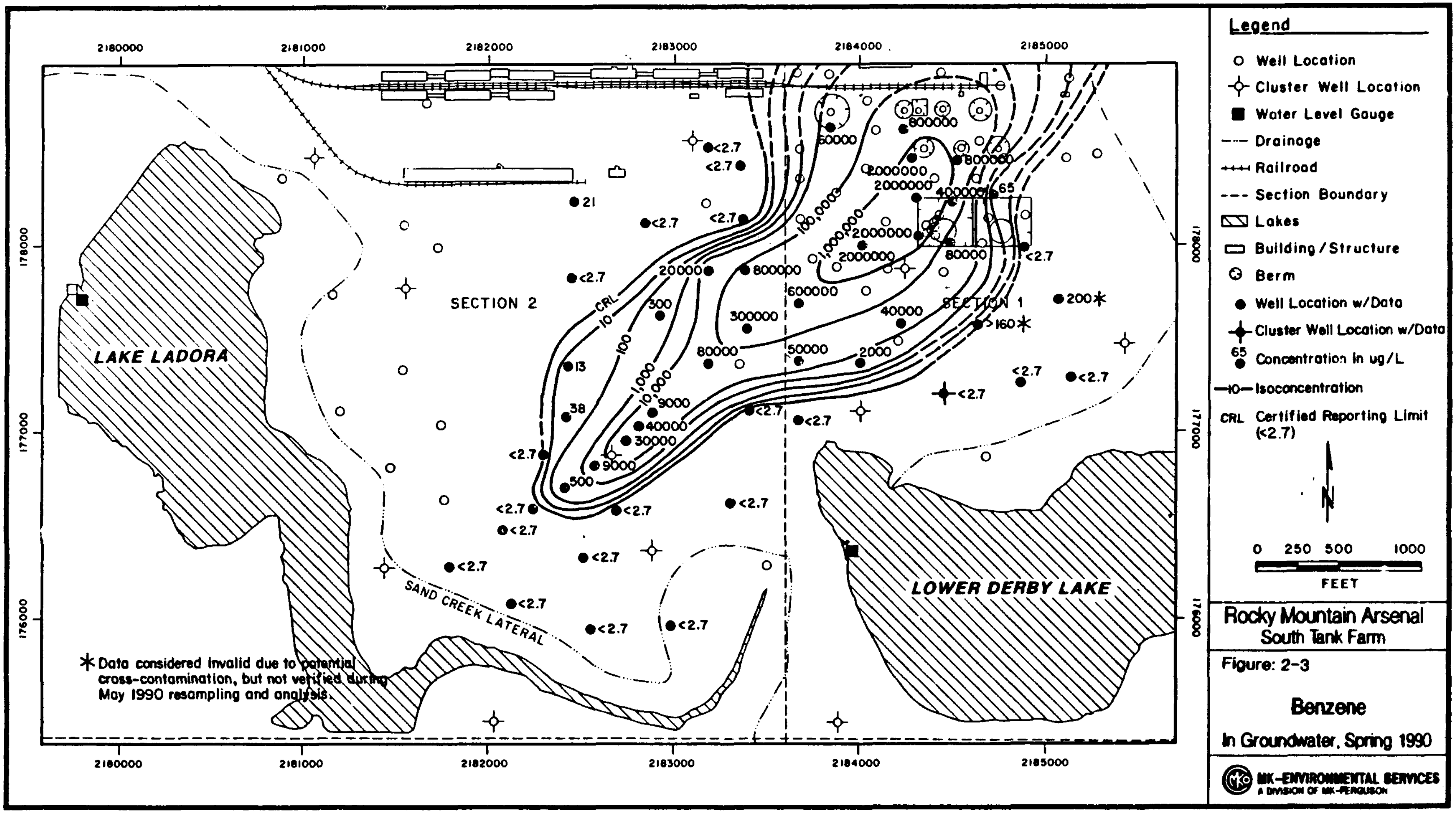
2.3 NATURE AND EXTENT OF CONTAMINATION

LNAPL near Tank 464A is the source for the STF dissolved phase plume and the highest concentrations in groundwater occur primarily near Tanks 464A and 464B (Figures 2-3 through 2-7). High concentrations also occur near Tanks 463A, 463E, and 463G, and Tanks 462A, 463B, and 463F may be potential sources of contaminants common to the defined STFP constituents. Benzene exhibits the greatest concentration and areal distribution of the STFP compounds, and defines the leading edge of the STFP directed southwest toward Lake Ladora. DCPD is the most widely distributed contaminant within the south-southeastern component of the STFP and defines the leading edge of the plume towards Lower Derby Lake. None of the STFP compounds were detected in wells located within 500 feet of either Lake Ladora or Lower Derby Lake.

Groundwater quality information obtained during 1990 show an inverse correlation between dissolved oxygen (DO) concentrations and the total concentrations of benzene, toluene and xylene. This becomes evident along the axis of the STFP; near the suspected source where BTX concentrations are high, the DO levels are low; and at the edge of the plume, where BTX concentrations are lower, DO levels are higher. This inverse correlation is consistent with data presented by Chiang et al. (1989), and indicates that these aromatic compounds are biodegraded in the presence of appropriate DO concentrations. The biodegradation which is occurring in the STFP contributes to the variability and recently observed decrease in benzene concentrations in wells near the plume margin (Shell May 1990). Additionally, laboratory studies conducted using saturated sediment samples from the STF area verify the existence of


Legend
Well Location
Cluster Well Location
Water Level Gauge
Drainage
Railroad
Section Boundary
Lakes
Building / Structure
Berm
Well Location w/Data
Cluster Well Location w/Data
65 Concentration in ug/L
10 Isoconcentration
CRL Certified Reporting Limit (<2.7)
N
0 250 500 1000
FEET
Rocky Mountain Arsenal
South Tank Farm
Figure: 2-3
Benzene
In Groundwater, Spring 1990
MK-ENVIRONMENTAL SERVICES
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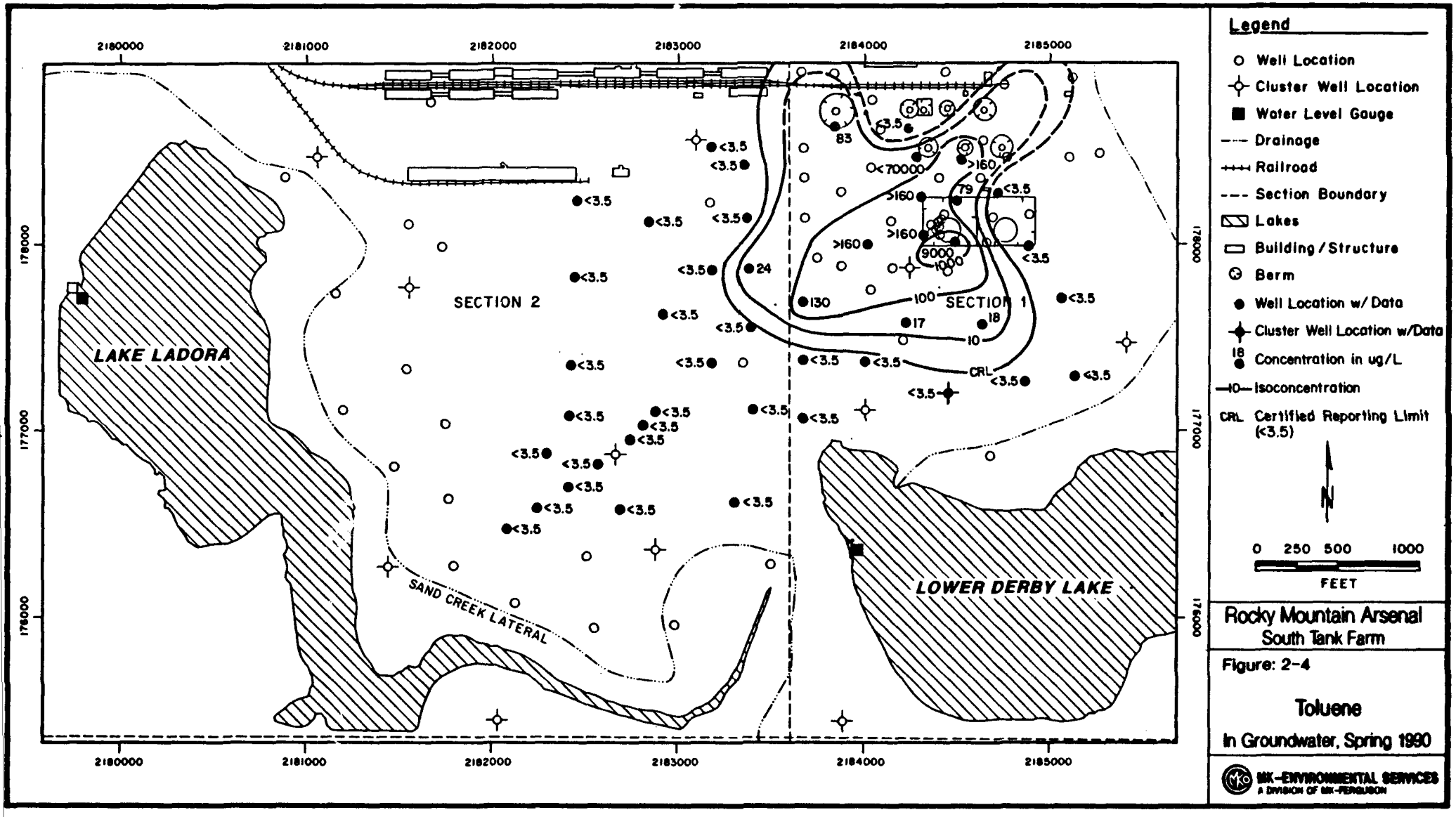
2180000
2181000
2182000
2183000
2184000
2185000
178000
177000
176000
LAKE LADORA
LOWER DERBY LAKE
SECTION 2
SECTION 1
SAND CREEK LATERAL
CRL
10
100
1,000
10,000
100,000
1,000,000
2000000
800000
600000
400000
300000
80000
60000
50000
40000
30000
20000
9000
2000
500
300
200*
>160*
65
38
21
13
<2.7
* Data considered invalid due to potential cross-contamination, but not verified during May 1990 resampling and analysis.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2181000
2182000
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2184000
2185000
178000
177000
176000
LAKE LADORA
SECTION 2
SECTION 1
SAND CREEK LATERAL
LOWER DERBY LAKE
<3.5
24
83
<70000
>160
79
9000
1000
130
100
17
18
10
CRL
Legend
Well Location
Cluster Well Location
Water Level Gauge
Drainage
Railroad
Section Boundary
Lakes
Building / Structure
Berm
Well Location w/ Data
Cluster Well Location w/Data
18 Concentration in ug/L
—10— Isoconcentration
CRL Certified Reporting Limit (<3.5)
N
0 250 500 1000
FEET
Rocky Mountain Arsenal
South Tank Farm
Figure: 2-4
Toluene
In Groundwater, Spring 1990
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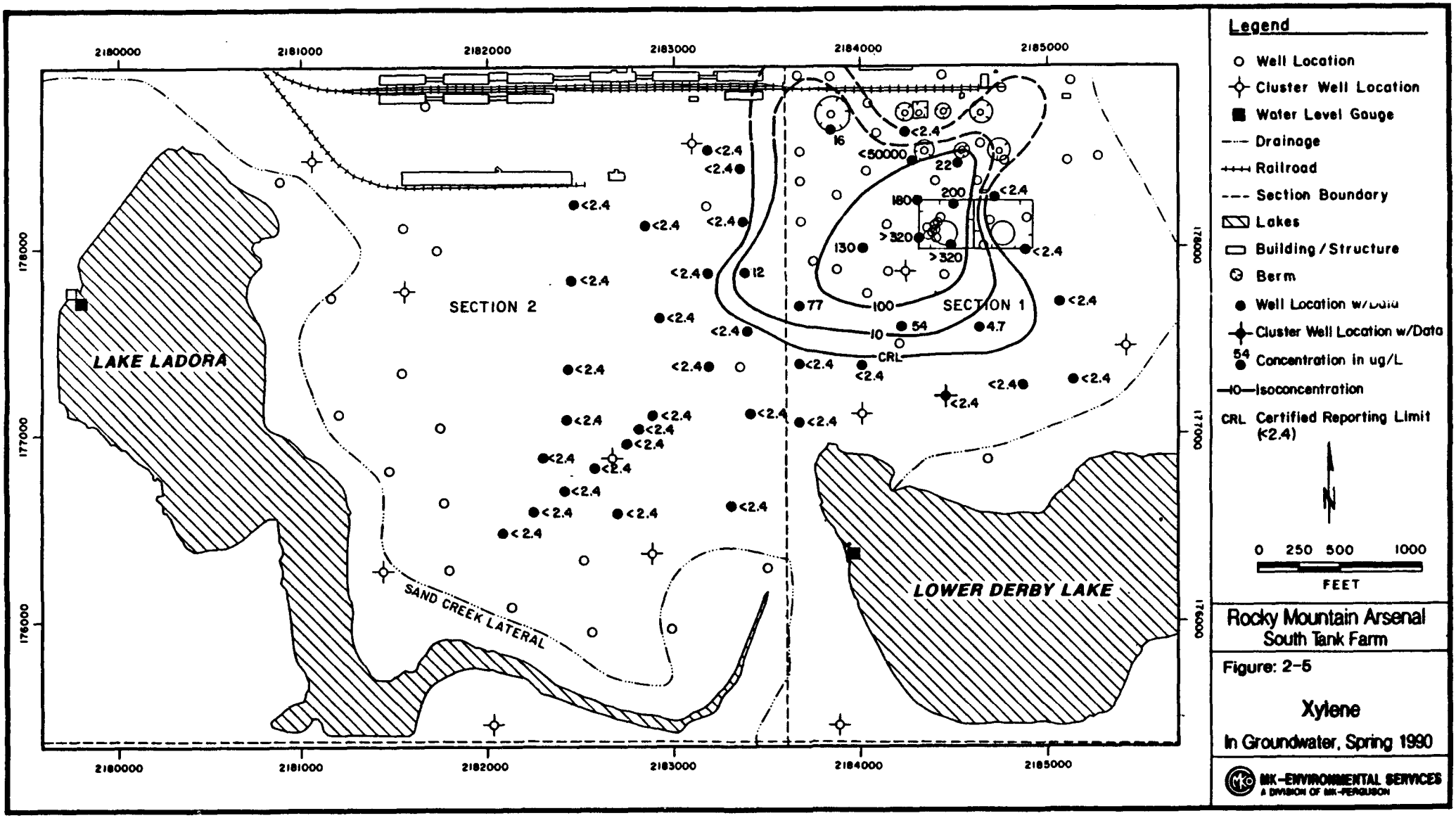

Rocky Mountain Arsenal
South Tank Farm

Figure: 2-5

Xylene

In Groundwater, Spring 1990

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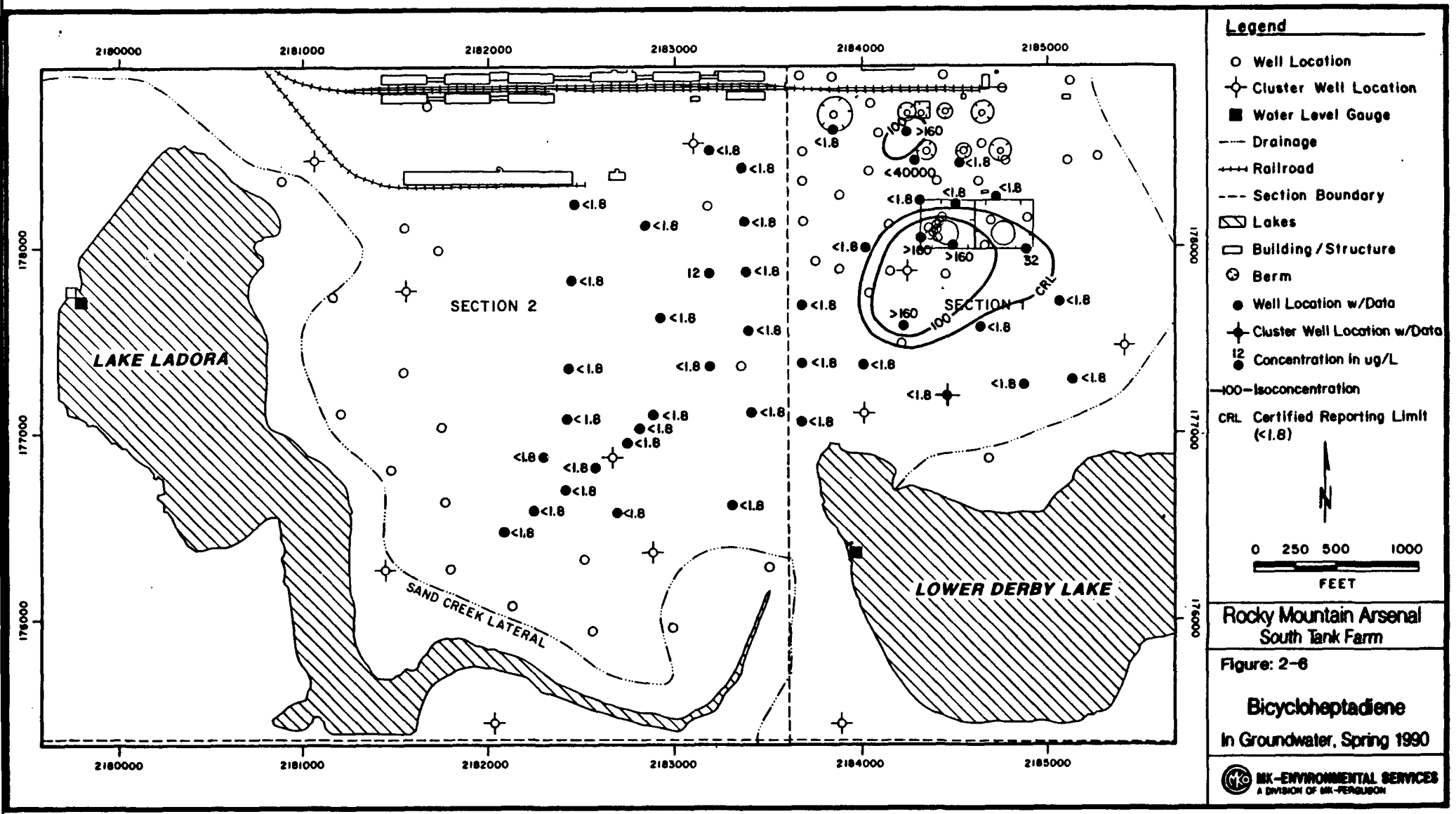
2180000
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LAKE LADORA
SECTION 2
SECTION 1
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LOWER DERBY LAKE
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12
<40000
>160
100
32
Legend
Well Location
Cluster Well Location
Water Level Gauge
Drainage
Railroad
Section Boundary
Lakes
Building / Structure
Berm
Well Location w/Data
Cluster Well Location w/Data
12 Concentration in ug/L
-100- Isoconcentration
CRL Certified Reporting Limit (<1.8)
N
0 250 500 1000
FEET
Rocky Mountain Arsenal
South Tank Farm
Figure: 2-6
Bicycloheptadiene
In Groundwater, Spring 1990
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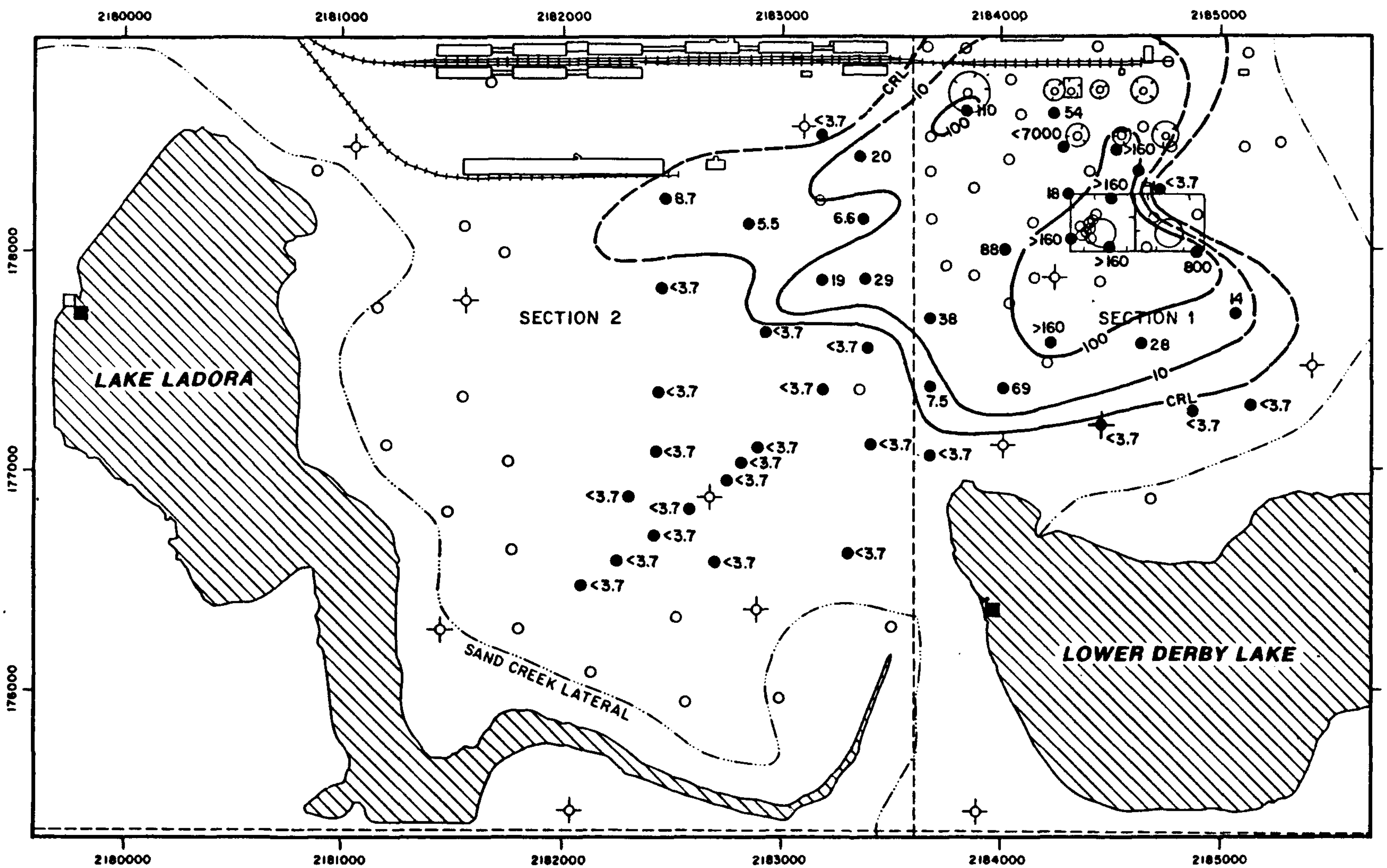

Legend

- ○ Well Location
- Cluster Well Location
- ■ Water Level Gauge
- Drainage
- Railroad
- Section Boundary
- Lakes
- Building / Structure
- Berm
- ● Well Location w/Data
- Cluster Well Location w/Data
- 88 ● Concentration in ug/L
- —10— Isoconcentration
- CRL Certified Reporting Limit (<3.7)

N

0 250 500 1000

FEET

Rocky Mountain Arsenal
South Tank Farm

Figure: 2-7

Dicyclopentadiene

In Groundwater, Spring 1990

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bacteria capable of degrading BTX and demonstrate the increased rate of biodegradation at higher concentrations of dissolved oxygen (Shell May 1990).

Based on a comparison between the 1983/84 and 1990 water quality data, the observed rate of contaminant migration at the leading edge of the plume is approximately 33 ft/yr. Based on the observed migration rate and the current location of the leading edge of the plume (approximately 900 feet from Lake Ladora), the STFP is not expected to impact Lake Ladora prior to implementation of the final remedy.

In summary, the results of the 1990 investigation indicated that: (1) natural biodegradation causes significant temporal and spatial variability in the concentrations of benzene, particularly in wells located near the plume margin; (2) cross-contamination probably occurred during the Spring 1988 sampling event resulting in the overestimation of the extent and rate of dissolved benzene migration; (3) no STFP compounds were detected in monitoring wells located within 500 feet of either lake; and (4) contrary to earlier interpretations, STFP compounds are not expected to migrate into either lake before the final remedy can be implemented. Therefore, there is no imminent threat of contamination to Lake Ladora or Lower Derby Lake due to STFP compounds.

3.0 INTERIM RESPONSE ACTION OBJECTIVE AND EVALUATION

The original objective of the STFP IRA was to prevent the STFP from migrating into Lake Ladora. This objective was based on the interpretation that the STFP may migrate into Lake Ladora prior to the implementation of the final remedy (Shell 1989). However, recent investigations have shown that the STFP is actively being biodegraded and will not migrate into either Lake Ladora or Lower Derby Lake prior to the implementation of the final remedy (Shell May 1990).

Therefore, interim response alternatives cannot be meaningfully developed or evaluated within the context of the original objective of this IRA. In accordance with Section 22.1(1) of the Federal Facility Agreement which addresses the "assessment and, as necessary, the selection and implementation of an IRA . . .," an evaluation of monitoring as the appropriate course for the STFP IRA has been conducted as specified in the Final Task Plan for Remediation of Other Sources Interim Response Action (Woodward-Clyde 1989). The results of this evaluation follow.

Figure 1-2 shows the questions that must be answered to determine whether monitoring is the appropriate course for "hotspot" IRAs (Woodward-Clyde 1989). The answers to these questions for the STFP are as follows:

1. The LNAPL portion of the STFP is an active, primary source of contaminants; however,

2. Neither the LNAPL nor the leading edge of the dissolved plume pose significant risk to human or non-human biotic receptors since neither plume is migrating into the

lakes, nor expected to do so, prior to the final remedy; moreover,

3. There is no significant long-term benefit (either cost or accelerated cleanup) of conducting an interim response action on the dissolved or LNAPL plumes since migration is very slow, and natural biodegradation of the dissolved plume is occurring.

Therefore, according to the decision logic agreed upon by the Organizations and State, monitoring is the appropriate action for this IRA. Accordingly, the objective of this IRA is to monitor the STFP to: (1) verify the data upon which conclusions on the rate of contaminant migration have been made (Shell May 1990), and (2) verify the location of the leading edge of the dissolved plume over time. The monitoring network proposed to achieve these objectives is described Section 4.

Monitoring of lake water in suff. detail to determine if chronic levels are present

4.0 DESCRIPTION OF THE INTERIM RESPONSE ACTION

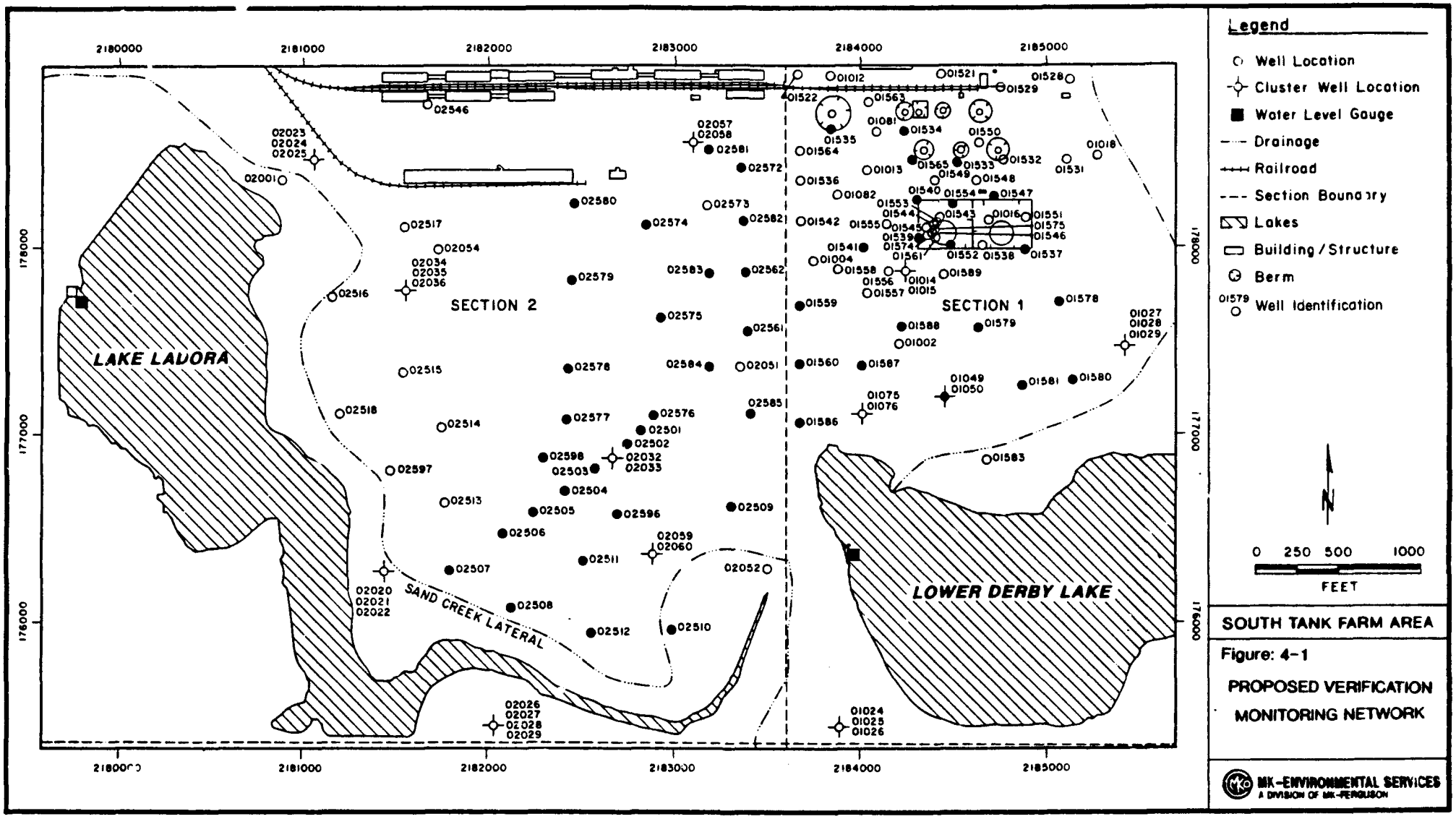
The monitoring network proposed to meet the objectives of the STFP IRA consists of three components:

- One-time comprehensive monitoring of groundwater quality throughout the STFP to verify conclusions regarding the rate of contaminant migration and occurrence of biodegradation presented in Shell (verification monitoring program) (May 1990).

- Routine annual monitoring of selected wells to verify the location of the leading edge of the STFP with respect to the South Lakes; and

- Semi-annual monitoring of the water table throughout the STFP area to identify changes to groundwater flow directions and gradients that may alter established contaminant migration patterns and/or rates.

The verification program monitoring network consists of 50 wells located throughout the STFP area (Figure 4-1). Recent construction activities associated with the Lower Derby Lake Spillway and Embankment Rehabilitation may require installation of new wells or other modifications to the proposed network. Target analytes include benzene, toluene, xylene, BCHPD, and DCPD. Target analyte concentrations will be determined using USATHAMA Method UU-8 (volatile compounds). To prevent the loss of volatile compounds during sample collection, a submersible bladder pump will be used whenever possible. Wells will be sampled sequentially from areas of low concentration to areas of higher concentration based on analytical data from the 1990 sampling event. Field measurements of DO will be made at the time of sample collection. Information from this monitoring


2180000
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176000
SECTION 2
SECTION 1
LAKE LAVORA
LOWER DERBY LAKE
SAND CREEK LATERAL
Legend
Well Location
Cluster Well Location
Water Level Gauge
Drainage
Railroad
Section Boundary
Lakes
Building / Structure
Berm
Well Identification
0 250 500 1000
FEET
SOUTH TANK FARM AREA
Figure: 4-1
PROPOSED VERIFICATION MONITORING NETWORK
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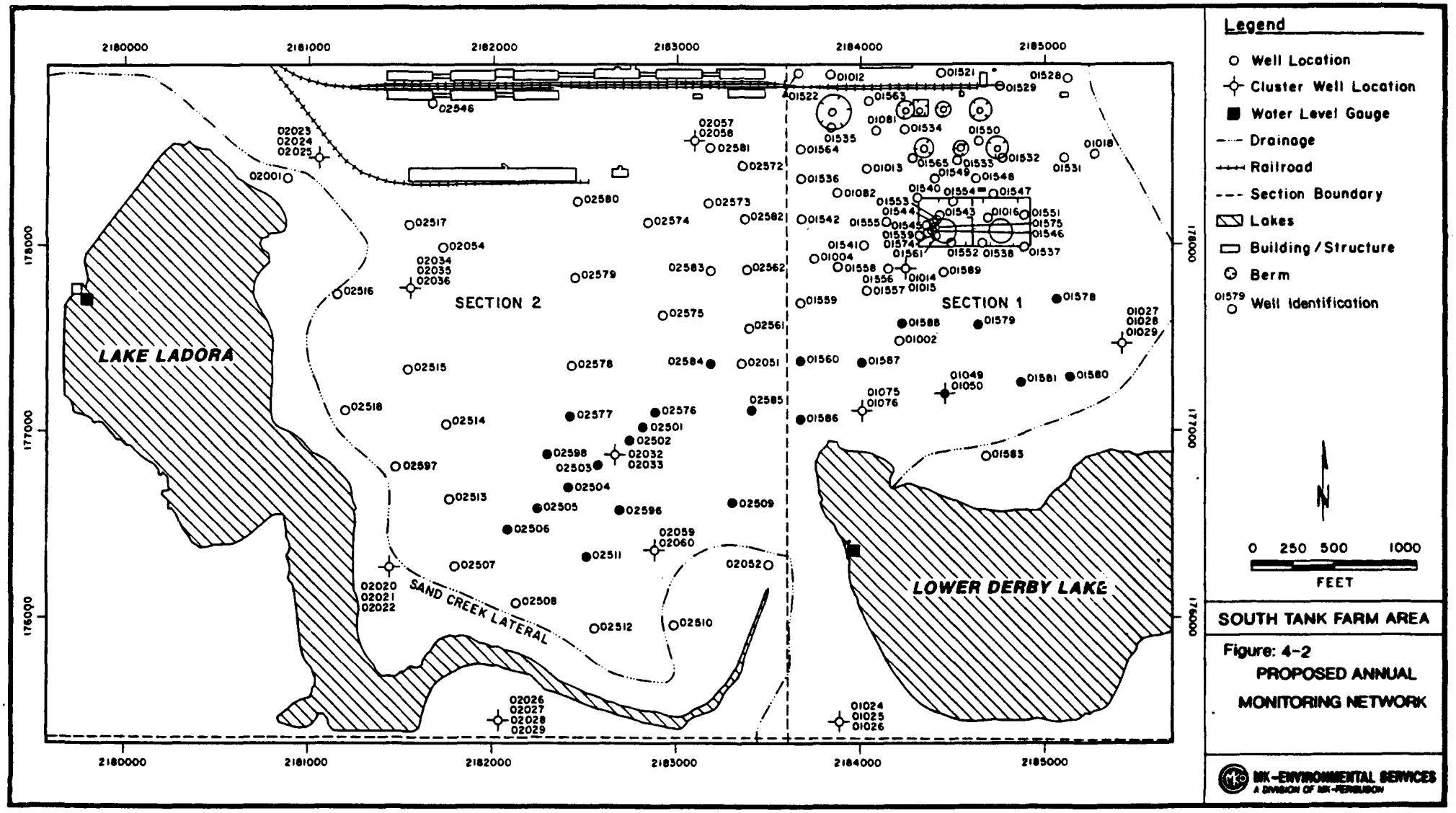
program will be used to verify the extent and migration rate of STFP constituents and to verify biodegradation within the STFP.

Subsequent to verification of the conclusions regarding contaminant migration, routine monitoring will be performed to verify the location of the leading edge of the STFP (Figure 4-2). Groundwater quality will be monitored annually in 23 wells to meet this objective. The design of this monitoring program will be identical to that of the verification monitoring program with respect to target analytes, field measurements of dissolved oxygen, sampling and decontamination procedures, and analytical methods. Routine monitoring of the leading edge of the STFP will be performed annually until the ROD is issued.

In addition to groundwater quality monitoring, the water table in Sections 1 and 2 will be monitored semi-annually, as a minimum, to identify changes in groundwater flow directions and gradients within the WBZ1 that may alter established contaminant migration patterns and/or rates (Figure 4-3).



SOUTH TANK FARM AREA

Figure: 4-2
PROPOSED ANNUAL
MONITORING NETWORK

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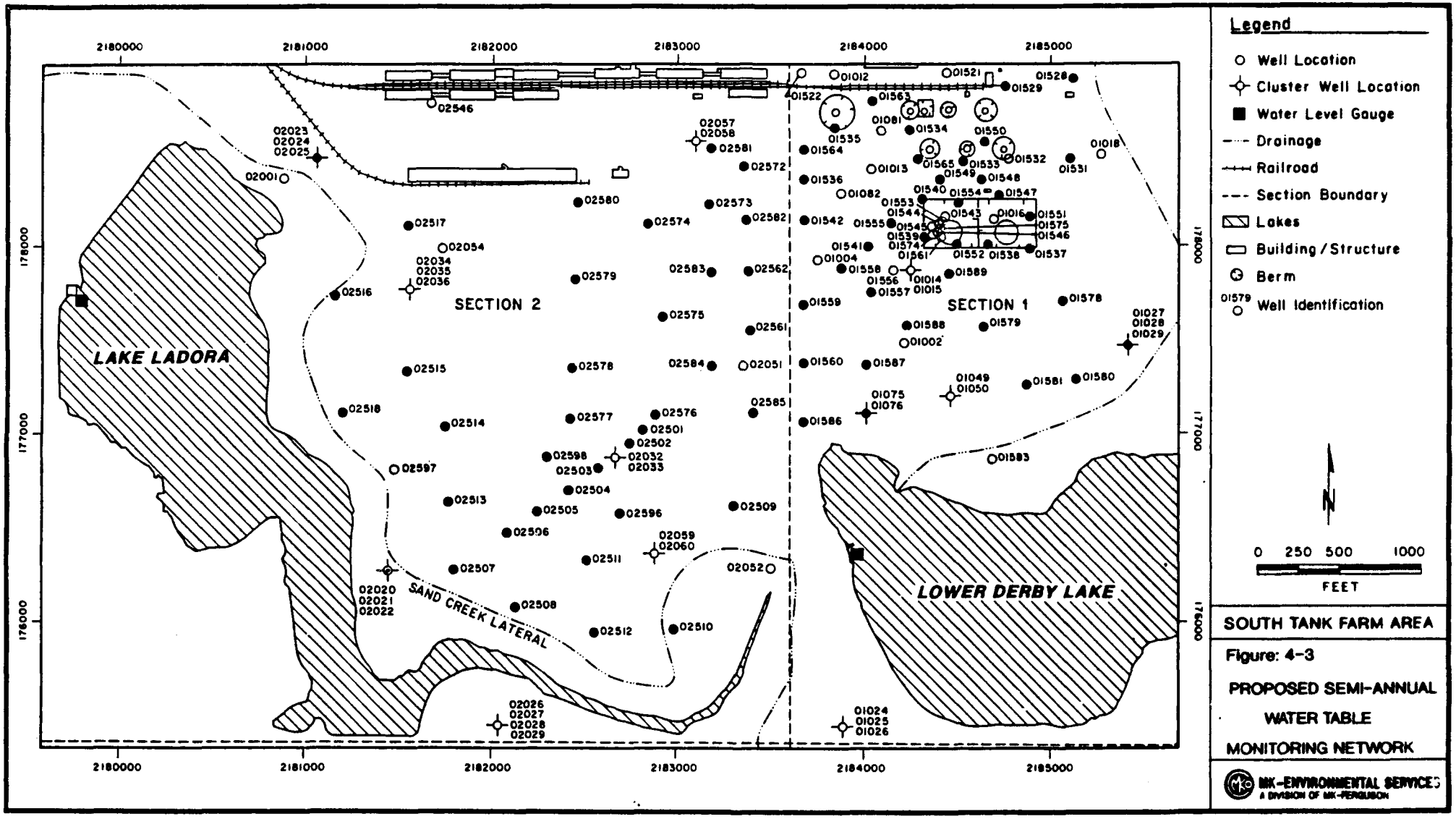

SOUTH TANK FARM AREA

Figure: 4-3

PROPOSED SEMI-ANNUAL WATER TABLE MONITORING NETWORK

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5.0 CHRONOLOGY OF EVENTS

The significant events that led to the decision to implement a monitoring program for the STFP IRA are as follows:

Date	Event
June 1987	The State of Colorado, Shell Oil Company, U.S. EPA, and U.S. Army agreed to 13 Interim Response Actions, including Remediation of Other Contamination Sources (also known as the "Hotspot Sources").
February 1988	Proposed Consent Decree lodged in the case of U.S. v. Shell Oil Company with the U.S. District Court in Denver, Colorado. The Consent Decree specified 13 Interim Response Actions, including the Hotspot Sources.
February 1989	The Federal Facility Agreement specified the Hotspot Sources as areas where Interim Response Actions are proposed.
July 1989	Shell Oil Company completes the Results of Hydrogeologic and Water Quality Investigations in the South Tank Farm Plume, Section 2, RMA report (Shell 1989). In the cover letter to the report, Shell proposes the STFP benzene plume be included as a "Hotspot" IRA.
August 1989	Shell Oil Company submitted Report of the Investigation of the LNAPL Plume Near Tank 464A, Section 1, RMA to the U.S. Army. The U.S Army and U.S. EPA agree to include the South Tank Farm Plume as a "Hotspot" IRA.
May 1990	Shell Oil Company submitted Hydrogeologic and Water Quality Conditions, South Tank Farm Plume, RMA (Shell May 1990) to the U.S.

	Army. The Army issued this report to the Organizations and State for review and comment.
June 1990	Shell Oil Company submitted Draft Final Alternatives Assessment for Other Contamination Sources, Interim Response Action, South Tank Farm Plume (Shell June 1990) to the U.S. Army. The Army issued this report to the Organizations and State for review and comment.
July 1990	Shell Oil Company received comments from the U.S. EPA, U.S. Department of Interior (DOI), and the State on the Draft Final Alternatives Assessment for Other Contamination Sources, Interim Response Action, South Tank Farm Plume and Hydrogeologic and Water Quality Conditions, South Tank Farm Plume, RMA on July 24, 1990.

6.0 IRA PROCESS

The IRA process for the STFP IRA is as follows:

1. As Lead Party, Shell prepared a "Draft Final Alternatives Assessment for Other Contamination Sources, Interim Response Action, South Tank Farm Plume, RMA." The report was submitted to the U.S. Army for issuance to the DOI and the other Organizations and the State for review and comment. Comments were submitted by the DOI, U.S. EPA, and the State.

2. Shell, DOI, and the other Organizations and State will be afforded the opportunity to participate, at the RMA Committee level, in the identification and selection of ARARs pertinent to this IRA.

3. As Lead Party, Shell submits this Proposed Decision Document for the South Tank Farm Plume IRA to the U.S. Army for issuance to the DOI and other Organizations and State. It includes the Army's final ARARs decision. Upon issuance, the Proposed Decision Document is subject to a 30-day public comment period during which the other Organizations and State, the DOI, or any other person may comment on it. Time permitting, the Army shall hold at least one public meeting during the comment period to inform the community in the vicinity of the RMA about this IRA.

4. Promptly after the close of the comment period, Shell will submit the Draft Final Decision Document for the South Tank Farm Plume IRA to the U.S. Army for transmittal to the DOI and other Organizations and State.

5. Within 20 days after issuance of the Draft Final Decision Document for the South Tank Farm Plume IRA, an Organization (including the State if it has agreed to be bound by the Dispute Resolution process, as required by the Federal Facility Agreement, or DOI under circumstances set forth in the Federal Facility Agreement) may invoke Dispute Resolution. Dispute Resolution may concern either the proposed IRA or the Army's ARAR decision.

6. After the close of the period invoking Dispute Resolution (if Dispute Resolution is not invoked) or after the completion of Dispute Resolution (if invoked), Shell shall submit a Final Decision Document for the South Tank Farm Plume IRA to the Army. The Final Decision Document will include comments received on the Proposed Decision Document and responses to those comments. The Army shall then issue a Final Decision Document to the other Organizations, the State, and DOI. If Dispute Resolution has been invoked, the decision may be subject to judicial review in accordance with Section 39.2 of the Federal Facility Agreement.

7. Following issuance of the Final IRA Decision Document, Shell shall be the Lead Party responsible for designing and implementing the IRA in conformance with the Decision Document. Shell shall issue a Draft Implementation Document to the DOI and the other Organizations for review and comment. This Draft Implementation Document shall include final drawings and specifications, final design analyses, a cost estimate, and a schedule for implementation of the IRA.

8. As Lead Party for design and implementation of this IRA, Shell will issue the Final Implementation Document, as described above, and will be responsible for implementing the IRA in accordance with the IRA Implementation Document.

7.0 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE REMEDIATION OF OTHER CONTAMINATION SOURCES (SOUTH TANK FARM PLUME) INTERIM RESPONSE ACTION

7.1 INTRODUCTION

These Applicable or Relevant and Appropriate Requirements (ARARs) address a specific area identified for evaluation for remediation prior to the issuance of a Record of Decision (ROD) for the Onpost Operable Unit of the Rocky Mountain Arsenal. The actions selected involve monitoring the plume which emanates from the area of the South Tank Farm. Some standards are discussed in general terms, to be further defined as more specific remedial actions are identified.

7.2 AMBIENT AND CHEMICAL-SPECIFIC ARARs

Ambient or chemical-specific requirements set concentration limits or ranges in various environmental media for specific hazardous substances, pollutants, or contaminants. Such ARARs either set protective cleanup levels for the chemicals of concern in the designated media or indicate an appropriate level of discharge based on health and risk-based analyses and technological considerations.

The objectives of this IRA are discussed in the Assessment Documents. This IRA will be implemented prior to the final remediation to be undertaken in the context of the Onpost Operable Unit ROD. The lists of specific contaminants included in the Assessment Documents have been completed based upon the field data concerning these specific sources. Since the selected approaches for this IRA do not involve the treatment of groundwater from the area of the South Tank Farm Plume, no

chemical-specific ARARs concerning water were selected for this IRA.

Air Emissions

The approaches selected by this IRA do not involve the operation of any treatment system which will result in air emissions. The monitoring to take place in the area of the South Tank Farm Plume will not affect any emissions that may originate in that area, but air monitoring will identify any potential concerns regarding emissions from this area.

The standards contained at 40 CFR Part 50 were reviewed and determined to be neither applicable nor relevant and appropriate to this IRA. These standards apply to Air Quality Control Regions (AQCR), which are markedly dissimilar from the area within which activity is being conducted pursuant to this IRA. An AQCR is generally a very large area, covering many square miles. The South Tank Farm Plume covers an extremely small area, far smaller than an AQCR. These standards are not generally applied to specific emissions sources, such as automobile tailpipes and smokestacks. These considerations lead to the determination that these ambient air standards are neither relevant nor appropriate to apply within the context of this IRA.

Other air standards, such as those contained at 40 CFR Parts 60 and 61 and similar state standards such as those contained at 5 CCR 1001-10, Regulation 8 were not considered as potential ARARs since the IRA will not include a treatment system which causes air emissions.

7.3 LOCATION-SPECIFIC ARARs

Location-specific requirements set restrictions on activities, depending on the characteristics of the site or the immediate environment, and function like action-specific requirements. Alternative remedial actions may be restricted or precluded, depending on the location or characteristic of the site and the requirements that apply to it.

Paragraph 44.2 of the Federal Facility Agreement provides that "wildlife habitat(s) shall be preserved and managed as necessary to protect endangered species of wildlife to the extent required by the Endangered Species Act (16 U.S.C. 1531 et seq.), migratory birds to the extent required by the Migratory Bird Treaty Act (16 U.S.C. 703 et seq.), and bald eagles to the extent required by the Bald Eagle Protection Act, 16 U.S.C. 688 et seq."

While this provision is not an ARAR, the statutory requirements are ARARs and will be complied with for purposes of this IRA. Based on where facilities related to this IRA are likely to be located the Army believes that this IRA will have no adverse impact on any endangered species or migratory birds or on the protection of wildlife habitats. Coordination will be maintained with the U.S. Fish and Wildlife Service to ensure that no such adverse impact arises from implementation of this IRA.

The provisions of 40 CFR 6.302(a) and (b) regarding construction that would have an adverse impact on wetlands or be within a floodplain are considered relevant and appropriate to apply in the context of this IRA. The Army will comply with these regulations to the maximum extent practicable to avoid construction conducted pursuant to this IRA in a manner the would have an adverse impact on wetlands or be within a flood plain.

The regulations at 40 CFR 230 were reviewed and determined not to be applicable within the context of this IRA because no discharge

of dredged or fill material into waters of the United States is contemplated. Because these regulations address only the disposal of such materials into the waters of the United States, which is not contemplated, they are not considered to be relevant and appropriate to apply in the context of this IRA.

The regulations at 33 CFR 320-330 were reviewed and determined to be neither applicable nor relevant and appropriate because they address actions affecting the waters of the United States. No such actions are contemplated within the context of this IRA.

7.4 ACTION-SPECIFIC ARARs

Description

Performance, design, or other action-specific requirements set controls or restrictions on activities related to the management of hazardous substances, pollutants, or contaminants. These action-specific requirements may specify particular performance levels, actions, or technologies as well as specific levels (or a methodology for setting specific levels) for discharged or residual chemicals.

Construction Occurring Incident to the IRA

Air Emissions

On the remote possibility that there may be air emissions during the course of the construction associated with this IRA, the Army has reviewed all potential ambient or chemical-specific air emission requirements. As a result of this review, the Army found that there are, at present, no National or State ambient air quality standards currently applicable or relevant and appropriate to any of the volatile or semivolatiles chemicals in

the ground water found in the area in which construction is contemplated.

In the context of this IRA, there is only a very remote chance of any release of volatiles or semivolatiles and, even if such a release did occur, it would only be intermittent and of very brief duration (because the activity that produced the release would be stopped and modified appropriately if a significant air emission, based upon specific standards contained in the Health and Safety Plan, was detected by the contractor's air monitoring specialist). Both the Army and Shell have significant experience with the construction of monitoring, extraction and reinjection wells and have not experienced any problems from air emissions during construction of such facilities. Since minimal excavation of saturated material is anticipated, it is not believed that air emissions are likely to occur, as they might if large amounts of saturated material were excavated and necessitated drying. The site-specific Health and Safety Plan will adequately address these concerns. This plan to be developed for use in the IRA will detail operational modifications to be implemented in the event monitoring detects specific levels of such emissions.

The National Emissions Standards for Hazardous Air Pollutants (NESHAPS) were evaluated to determined whether they were applicable or relevant and appropriate to apply in the context of construction of this IRA. These standards were not considered applicable because they apply to stationary sources of these pollutants, not to construction activity. These standards were not considered relevant and appropriate because they were developed for manufacturing processes, which are significantly dissimilar to the short-term construction activity contemplated by this IRA.

The provisions of 40 CFR 50.6, and any more stringent standards found at 5 CCR 1001-14, will be considered relevant and appropriate. These standards are not applicable because they address Air Quality Control Regions, which are areas significantly larger than and different from the area of concern in this IRA. Pursuant to these regulations, there will be no particulate matter transported by air from the site that is in excess of 50 micrograms per cubic meter (annual geometric mean) and the standard of 150 micrograms per cubic meter as a maximum 24-hour concentration will not be exceeded more than once per year.

Worker Protection

The provisions of 29 CFR 1901.120 are applicable to workers at the site because these provisions specifically address hazardous substance response operations under CERCLA. The final rule found at 54 FR 9294 (March 6, 1989) will be operative. (The final rule became effective on March 6, 1990.)

General Construction Activities

The following performance, design, or other action-specific State ARARs have been identified by the Army as relevant and appropriate to this portion of the IRA and more stringent than any applicable or relevant and appropriate federal standard, requirement, criterion, or limitation. These standards are not applicable because they specifically do not address a remedial action or circumstance under CERCLA:

Colorado Air Pollution Control Commission Regulation No. 1, 5 CCR 1001-3, Part III(D)(2)(b), Construction Activities:

a. Applicability - Attainment and Nonattainment Areas

b. General Requirement

Any owner or operator engaged in clearing or leveling of land or owner or operator of land that has been cleared of greater than one (1) acre in nonattainment areas for which fugitive particulate emissions will be emitted shall be required to use all available and practical methods which are technologically feasible and economically reasonable in order to minimize such emissions, in accordance with the requirements of Section III.D. of this regulation.

c. Applicable Emission Limitation Guideline

Both the 20% opacity and the no off-property transport emission limitation guidelines shall apply to construction activities; except that with respect to sources or activities associated with construction for which there are separate requirements set forth in this regulation, the emission limitation guidelines there specified as applicable to such sources and activities shall be evaluated for compliance with the requirements of Section III.D. of this regulation. (Cross Reference: Subsections e. and f. of Section III.D.2 of this regulation).

d. Control Measures and Operating Procedures

Control Measures or operational procedures to be employed may include but are not necessarily limited to planting vegetation cover, providing synthetic cover, watering, chemical stabilization, furrows, compacting,

minimizing disturbed area in the winter, wind breaks, and other methods or techniques.

Colorado Ambient Air Quality Standards, 5 CCR 1001-14, Air Quality Regulation A, Diesel-Powered Vehicle Emission Standards for Visible Pollutants:

a. No person shall emit or cause to be emitted into the atmosphere from any diesel-powered vehicle any air contaminant, for a period greater than 10 consecutive seconds, which is of such a shade or density as to obscure an observer's vision to a degree in excess of 40% opacity, with the exception of Subpart B below.

b. No person shall emit or cause to be emitted into the atmosphere from any naturally aspirated diesel-powered vehicle of over 8,500 lbs gross vehicle weight rating operated above 7,000 feet (mean sea level), any air contaminant for a period of 10 consecutive seconds, which is of a shade or density as to obscure an observer's vision to a degree in excess of 50% opacity.

c. Diesel-powered vehicles exceeding these requirements shall be exempt for a period of 10 minutes, if the emissions are a direct result of a cold engine start-up and provided the vehicle is in a stationary position.

d. This standard shall apply to motor vehicles intended, designed, and manufactured primarily for use in carrying passengers or cargo on roads, streets, and highways.

The following performance, design, or action-specific State ARAR is applicable to this portion of the IRA and is more stringent than any applicable or relevant and appropriate Federal standard, requirement, criterion or limitation:

Colorado Noise Abatement Statute, C.R.S. Section 25-12-103:

a. Each activity to which this article is applicable shall be conducted in a manner so that any noise produced is not objectionable due to intermittence, beat frequency, or shrillness. Sound levels of noise radiating from a property line at a distance of twenty-five feet or more there from in excess of the db(A) established for the following time periods and zones shall constitute prima facie evidence that such noise is a public nuisance:

Zone	7:00 a.m. to next 7:00 p.m.	7:00 p.m. to next 7:00 a.m.
Residential	55 db(A)	50 db(A)
Commercial	60 db(A)	55 db(A)
Light Industrial	70 db(A)	65 db(A)
Industrial	80 db(A)	75 db(A)

b. In the hours between 7:00 a.m. and the next 7:00 p.m., the noise levels permitted in subsection (1) of this section may be increased by ten db(A) for a period of not to exceed fifteen minutes in any one-hour period.

c. Periodic, impulsive, or shrill noises shall be considered a public nuisance when such noises are at a sound level of five db(A) less than those listed in Subpart (a) of this section.

d. Construction projects shall be subject to the maximum permissible noise levels specified for industrial zones for the period within which construction is to be completed pursuant to any applicable construction permit issued by proper authority or, if no time limitation is imposed, for a reasonable period of time for completion of the project.

e. For the purpose of this article, measurements with sound level meters shall be made when the wind velocity at the time and place of such measurement is not more than five mile per hour.

f. In all sound level measurements, consideration shall be given to the effect of the ambient noise level created by the encompassing noise of the environment from all sources at the time and place of such sound level measurements.

In substantive fulfillment of Colorado Air Pollution Control Commission Regulation No. 1, this IRA will employ the specified methods for minimizing emission from fuel burning equipment and construction activities. In substantive fulfillment of Colorado's Diesel-Powered Vehicle Emission Standards, no diesel motor vehicles associated with the construction shall be operated in manner that will produce emissions in excess of those specified in these standards.

The noise levels pertinent for construction activity provided in C.R.S. Section 25-12-103 will be attained in accordance with this applicable Colorado statute.

Wetlands Implications

Through estimation of the general area where any construction would occur or facilities be located and the nature of the facilities to be constructed, the Army does not believe that any wetlands could be adversely affected. However, until a final design is selected, it cannot be definitively determined that no adverse impact on wetlands will occur. If the final site selection and/or design results in an adverse impact on wetlands, the Army will review the regulatory provisions concerning wetlands impact, generally identified as relevant and appropriate in the discussion of location-specific ARARs above, and other appropriate guidance, and will proceed in a manner consistent with those provisions. Actions taken will be consistent with any requirements of Section 404 of the Clean Water Act. Coordination will be maintained with the U.S. Fish and Wildlife Service concerning any potential impacts on wetlands.

Groundwater Monitoring

The Army has determined that the substantive provisions of the regulations contained in 40 CFR § 264.97, and any provisions of 6 CCR 1007-3, § 264.97 which are more stringent than the federal regulations, are relevant and appropriate to apply to the groundwater monitoring which is to occur pursuant to this IRA. Pursuant to CERCLA Section 121(e), 42 U.S.C. § 9621(e), no federal, state or local permit is required for the groundwater monitoring to be conducted. The specific monitoring program will be developed later in the IRA process and may utilize some number of the existing monitoring wells on the Arsenal, sampling conducted under the Comprehensive Monitoring Program, the addition of new wells and/or sampling requirements or any combination of these approaches in order to fulfill the substantive requirements of these regulations.

Land Disposal Restrictions and Removal of Soil

There are no action-specific ARARs that pertain to the excavation of soil during the construction associated with this IRA.

EPA is currently developing guidance concerning the Land Disposal Restrictions (LDR) and their application during CERCLA response actions. While guidance is limited, the Army has not, at this time, made a determination that any listed waste subject to LDR will be present in the soil removed by this IRA. Further EPA guidance concerning the applicability of LDRs to CERCLA actions is likely to be issued prior to the implementation of this IRA and the Army will review such guidance as it is released. If it is determined that a listed waste is present, the Army will act in a manner consistent with EPA guidance for the management of such within the context of CERCLA actions.

Although removal of soil from the area where any treatment system will be located is a TBC, not an ARAR, it will be performed in accordance with the procedures set forth in the Task No. 32 Technical Plan, Sampling Waste Handling (November 1987), and EPA's July 12, 1985, memorandum regarding "EPA Region VIII Procedure for Handling of Materials from Drilling, Trench Excavation and Decontamination during CERCLA RI/FS Operations at the Rocky Mountain Arsenal." Soils, not included for further treatment, generated by excavation during the course of this IRA, either at surface or subsurface, may be returned to the location from which they originated (i.e., last out, first in). Any materials remaining after completion of backfilling that are suspected of being contaminated (based on field screening techniques) will be properly stored, sampled, analyzed, and ultimately disposed as CERCLA hazardous substances, as appropriate.

For material determined to be hazardous waste resulting from construction activities, substantive RCRA provisions are applicable to their management. These substantive provisions include but are not limited to: 40 CFR Part 262 (Subpart C, Pre-Transport Requirements), 40 CFR part 263 (Transporter Standards), and 40 CFR Part 264 (Subpart I, Container Storage and Subpart L, Waste Piles). The specific substantive standards applied will be determined by the factual circumstances of the accumulation, storage or disposal techniques actually applied to any such material.

Soil Treatment and Disposal

These proposed remedial actions do not include any significant possibility of on-site or off-site disposal of soils or contaminated material excavated pursuant to this IRA. The selected alternative of monitoring for the South Tank Farm Plume only involves minimal excavation and should result in only small amounts of excavated soil remaining to be handled as discussed above. In the event that some material is later considered for disposal, ARARs for such activities have been generally identified, with more specific analysis to follow after any specific disposal determination is made. On-site disposal of material is not contemplated. For off-site disposal of hazardous material the administrative and substantive provisions of 40 CFR Part 262, Subparts A, B, C, and D, and any provisions of 6 CCR 1007-3, Part 262, Subparts A, B, C, and D which are more stringent than the corresponding federal regulations, are considered relevant and appropriate.

7.5 COMPLIANCE WITH THE OTHER ENVIRONMENTAL LAWS

As is evident from the various portions of this document, this IRA was prepared in substantive compliance with 40 CFR 1502.16

(the regulations implementing the National Environmental Policy Act of 1969).

8.0 SCHEDULE

Consistent with the Federal Facility Agreement and the Final Technical Program Plan FY38-FY92, the milestone for completing the Draft Implementation Document for the South Tank Farm Plume IRA is May 12, 1991. The Deadline for completing the IRA will be established in the Implementation Document, but is presently expected to be January 24, 1993.

9.0 CONSISTENCY WITH FINAL RESPONSE ACTION

Although the Final Response Action has not yet been selected, it is believed that this IRA will be consistent with and contribute to the efficient performance of the Final Response Action by: (1) monitoring the migration of dissolved contaminants in groundwater emanating from the South Tank Farm site; and (2) verifying that the STFP does not impact either Lake Ladora or Lower Derby Lake prior to the Final Response Action.

10.0 REFERENCES

Chiang, C. Y., J. P. Salanitro, E. Y. Chai, J. D. Colthart, and C. L. Klein. 1989. Aerobic Biodegradation of Benzene, Toluene, and Xylene in a Sandy Aquifer - Data Analysis and Computer Modeling. Groundwater vol. 27, no. 6, pp. 823-834.

Ebasco, Services Inc. (Ebasco) 1989a. Final Remedial Investigation, South Plants Study Area Report.

Shell Oil Company, 1989. Report of Hydrogeologic and Water Quality Investigations in the South Tank Farm Plume, Section 2, RMA.

Shell Oil Company, May 1990. Hydrogeologic and Water Quality Conditions, South Tank Farm Plume, RMA.

Shell Oil Company, June 1990. Draft Final Alternatives Assessment, Other Contamination Sources, Interim Response Action, South Tank Farm Plume.

Shell Oil Company, August 1990. Final Alternatives Assessment, Other Contamination Sources, Interim Response Action, South Tank Farm Plume.

Woodward-Clyde, 1989. Final Task Plan for Remediation of Other Sources Interim Response Action.

APPENDIX A

RESPONSES TO COMMENTS ON THE DRAFT APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS FOR THE SOUTH TANK FARM PLUME

RESPONSES TO EPA'S COMMENTS

ARARs EVALUATION

The draft ARARs presented for the South Tank Farm Plume (STFP) generally dismiss regulations or criteria pertinent to protection of aquatic life in surface water. The chemical-specific ARARs include only five compounds, excluding other chemicals identified in plumes advancing toward Lake Ladora. The action-specific ARARs must include consideration of the applicability of the Underground Injection Control program. Additionally, clarifications are required with respect to contaminated soils.

Response:

Since the Proposed Decision Document selects monitoring as the preferred alternative, treatment ARARs are not included in this document. Since reinjection wells are not included in the monitoring program, the UIC program is not evaluated. Further information is provided concerning the management of excess soils from well construction.

1. Surface Water ARARs

   Hydrogeology and contaminant plumes in the vicinity of the STF have been documented in several reports (see References). It is clear that Lake Ladora and potentially Lower Derby Lake are likely to be impacted by contaminants in the STFP. Therefore, this IRA must consider ARARs or TBCs that have been developed for protection of aquatic life.

Response:

Since the Proposed Decision Document selects monitoring for the STFP rather than the implementation of a treatment system, contaminant specific ARARs are not evaluated.

2. Chemical specific ARARs

Only five compounds were included in the listing for chemical-specific ARARs. Our review of the available data indicates several other contaminants, including chloroform, carbon tetrachloride and cyanide within plumes advancing toward Lake Ladora. Other compounds may be present: as noted elsewhere in the technical comments, a critical group of wells is not included in the Army's database, nor did Shell present the supporting data, and thus EPA did not have access to complete current data in the vicinity of Lake Ladora.

The chemical-specific ARARs evaluation must include all compounds identified in plumes migrating toward the lakes.

Response:

See response to comment 1.

3. Action-specific ARARs

No discussion was included of the potential application of the Safe Drinking Water Act, Underground Injection Control program regulations to ground water interception and treatment alternatives.

Response:

See response to comment 1.

4. The document states that soil material suspected of being contaminated based on field screening techniques will be properly stored, sampled, etc. Clarifications are required relative to when the field screening will be conducted, assurances of worker protection during construction activities and longer term protection of potential receptors.

Response:

The Proposed Decision Document provides some detail and references concerning this issue. Further information will be provided in the Implementation Document, which will contain more detail concerning the implementation of this IRA.

SPECIFIC COMMENTS

1. Page 2, last paragraph: The alluvial aquifer discharges to Lake Ladora. Therefore, reinjection of treated effluents must take into consideration standards for protection of aquatic life in the lake, regardless of whether there are any human consumptive uses.

   Response:

   See response to general comment 1, above,

2. Page 3, first paragraph: The reinjected water will likely discharge to surface water bodies, which would require consideration of FWQC. In addition, more recent data for particular compounds will need to be included (TBCs).

   Response:

   See response to general comment 1, above.

3. Page 5, sixth paragraph: It is likely that 40 CFR 6.302(a) and (b) would also be applicable, in addition to being relevant and appropriate as indicated in the text.

   Response:

   The Army believes that this section is relevant and appropriate when considered in the context of the implementation of the preferred alternative, which will only involve the construction of monitoring wells.

4. Page 10, wetlands implications: It should be clarified that this action will follow provisions in Section 404 of the Clean Water Act.

Response:

The document was revised in response to this comment.

5. Page 11, fourth paragraph: See general comment pertaining to contaminated soils.

Response:

See response to general comment 4, above.

RESPONSE TO THE STATE'S COMMENTS

SPECIFIC COMMENTS:

1. Page 2, paragraphs 4 and 5: The State concurs with the selection of CBSG and CBSM as ARARs. However, the document states that "[t]he policy stated in section[s] 3.11.5.C.4 and [CBSM 3.1.14(9)] was followed concerning stated detection limits." The State standards are not the detection limits. The detection limits are based upon technical and economic viability, and are established for the purpose of facilitating enforcement activities. They are therefore not strictly health-based. Since the Army and Shell's certified reporting limits (CRLs) for many of those compounds are orders of magnitude lower than the State's practical quantification limits (PQLs), there is no legitimate reason to set cleanup levels at the State's PQLs. Shell must meet the standards listed in those regulations to the maximum extent practicable. The State made this exceedingly clear in its comments on the CERCLA wastewater Proposed Decision Document, Specific comment 8. The document must be revised accordingly.

   Response:

   Since the preferred alternative does not involve treatment of groundwater or installation of any treatment system, no response is necessary to this comment.

2. Page 3, paragraph 1: The document states that consistent with the NCP, FWQC were not considered relevant and appropriate because recent data in the form of TBCs were used. The State has found no evidence of this statement in

the NCP. Although the NCP does contain commentary pertaining to when other ARARs may be more relevant and appropriate, it does not seem to contain any language regarding TBCs. Please cite the page in the NCP in which this information can be found. Otherwise, please delete the statement from the ARARs analysis.

Response:

See response to comment 1.

3. Page 3, paragraph 2: The document states, "The Army believes that these limitations, in conjunction with the identified standards from the CBSM and CBSG, will result in an effluent which does not represent a potential risk to human health and the environment." This statement is unsubstantiated. First, the document fails to list ARARs for the majority of the contaminants found in the plume (see Specific Comment 4). Second, for compounds, such as bicycloheptadiene, there are no existing ARARs nor TBCs.

Response:

See response to comment 1.

4. Page 3, paragraph 4: The Army only lists a few of those contaminants "likely to be contained in any system influent" (page 1, paragraph 3 of the draft ARARs). Presented below are those contaminants acknowledged by Shell to be contained in the groundwater in the South Tank Farm Plume, (table 1 of the Report of Hydrogeologic and Water Quality Investigations in the South Tank Farm Plume (STFP Field Report, Table 1)) with a partial list of corresponding ARAR and TBC levels.

Standards for all these contaminants, at a minimum, should be met to the maximum extent practicable. All levels are in ug/l.

Response:

See response to comment 1.

COMPOUND	ARAR LEVEL	SOURCE
trans-1,2-dichloroethylene	0.033 ug/l	AWQC (water and fish ingestion)
benzene	0	MCLG
	0.66	AWQC (Water and fish ingestion)
carbon tetrachloride	0	MCLG
	0.4 ug/l	AWQC (water and fish ingestion)
	6.94	AWQC (fish consumption only)
chloroform	0.19	AWQC (water and fish ingestion)
	6 ug/l	EPA RfD
chlorobenzene	300 ug/l	CBSG
	480 ug/l	AWQC (water and fish ingestion)
ethylbenzene	680	CBSM CBSG
	1400	AWQC (water and fish ingestion)
toluene	2420	CBSM CBSG
trans-1,2-Dicholoroethylene	0.033	AWQC (water and fish ingestion)
	1.85	AWQC (fish consumption only)

COMPOUND	ARAR LEVEL	SOURCE
tetrachloroethylene	10 ug/l	CBSG CBSM
	0.8	AWQC (water and fish consumption)
	88.5	AWQC (fish consumption only)
trichloroethylene	0	MCLG
	2.7	AWQC (water and fish ingestion)

COMPOUND	TBC LEVEL	SOURCE
Ethylbenzene	7.0 ug/l	proposed MCL
	7.0 ug/l	proposed MCLG
Toluene	20.0 ug/l	proposed MCL
	20.0 ug/l	proposed MCLG
trans-1,2-dichloroethylene	1.0 ug/l	proposed MCL
	1.0 ug/l	proposed MCLG
1,1 dichloroethane	0.05 ug/l	proposed MCL
Carbon tetrachloride	0.05 ug/l	proposed MCL
tetrachloroethylene	0.05 ug/l	proposed MCL
	0	proposed MCLG
trichloroethylene	0.05 ug/l	proposed MCL
xylene	100.0 ug/l	proposed MCL
	100.0 ug/l	proposed MCLG

*source: 54 FR 22062-01

In addition, the Army failed to address State narrative standards. These narrative standards include:

CBSM Section 3.1.11(c) (color, odor, other nuisance);
CBSM Section 3.1.11(d) (free from toxics); and
CBSM Section 3.1.8 (antidegradation).

These standards should be applied to any chemicals for which the State has not promulgated numerical standards. In particular, application of Section 3.1.11(c) will probably result in a significantly lower standard for DCPD which is known to be a highly odoriferous compound.

Response:

See response to comment 1.

5. Page 4, paragraph 2: The Army again fails to acknowledge the standards contained in 40 C.F.R. § 50, the National Ambient Air Quality Standards, as ARARs even though the document inconsistently cites 40 C.F.R. § 50.6 as an ARAR later on in the document. The Army's position is directly contrary to the National Contingency Plan (NCP) which includes "National Primary and Secondary Ambient Air Quality Standards" as "[f]ederal requirements which may be potential applicable or relevant and appropriate requirements." 55 Fed. Reg. 8666, 8764 (March 8, 1990). The standards in 40 C.F.R. § 50 should be included in the ARARs analysis since a source could cause nonattainment for a region. It is important that the Army acknowledge the National Ambient Air Quality Standards as ARARs. Emissions from a source may not contribute to exceedences of the regional ambient air quality standards.

The Army must also acknowledge those individual State standards which are stricter than the federal standards. The State of Colorado has a stricter ambient air quality standards for particulates, found at 5 CCR 1001-14.

For particulates, the State ambient air standard for total suspended particulate (TSP) is 150 ug/m-3 (24-maximum concentration) and 60 ug/m-3 (annual geometric mean). This standard is applicable at the property boundary and includes background concentrations as well as source impacts. The State has not yet adopted the federal PM10 standard, but rather invokes the TSP standards. Therefore, both the federal and State standards apply as ARARs.

Response:

The Army believes its determination concerning National Ambient Air Quality Standards is consistent with EPA guidance on this issue. The document was revised in response to the State's comments concerning particulates.

6. Page 5, paragraph 2: The document correctly includes the "Control of Air Emissions from Superfund Air Strippers at Superfund Ground Water Sites" as a TBC. However, the ARARs document fails to include Colorado Regulation 7, pertaining to the regulation control of emissions of Volatile Organic Compounds (VOCs). Regulation 7 requires that all new sources utilize controls representing Reasonably Available Control Technology (RACT). The regulation also requires that no person may dispose of VOCs by evaporation or spillage unless PACT is used. It is unclear why the Army has consistently disregarded this important State standard

promulgated for the protection of the health and environment within the State.

Response:

See response to comment 1.

7. Page 6, paragraph 4: The document states that, "there are, at present, no National or State ambient air quality standards currently applicable or relevant and appropriate to any of the volatile or semivolatile chemicals in the groundwater found in the area in which construction is contemplated." Although it is true there are no ambient standards for the volatile or semivolatile compounds found in groundwater, in a sense they are regulated under the ambient air standard for ozone, since VOCs are a precursor to ozone for which Denver is in nonattainment. See 5 CCR 1001-14.

Response:

The Army could not determine ambient air quality standards for these compounds. However, since the only potential for release during the implementation of the preferred alternative is from monitoring well construction and because of the monitoring of that short-term activity, the Army believes that there is no realistic potential for a release of any significant quantity of volatile compounds from this activity.

7. Page 6, paragraph 5: The document states there is only a very remote chance of any release of volatiles or semivolatiles during the construction activity. The State

reserves the right to comment when further information is provided.

Response:

As the State is aware, an Implementation Document will be provided for review and comment. This document will provide further details concerning the construction activity to take place during this IRA.

8. Page 7, paragraph 3: Although the document lists the federal ambient air quality standard found at 40 C.F.R. § 50.6 as an ARAR, it fails to acknowledge the stricter State ambient air standard for total suspended particulates found at 5 CCR 1001-14. See Specific Comment 5.

Response:

See response to comment 5.

9. Page 7, paragraph 4: Although the Army correctly cites Colorado Regulation No. 3 as relevant and appropriate, it inaccurately describes the standard as Best Practicable Control Technology (BPCT). Regulation No. 3 requires the use of Best Available Control Technology (BACT) for those contaminants in attainment areas, and the Lowest Achievable Emission Rate (LAER) for areas with contaminants in non-attainment areas. The Arsenal is in an area of nonattainment for particulates, carbon monoxide and ozone.

Response:

See response to comment 1.

10. Page 7, paragraph 5: The State appreciates acknowledgement of its ambient air standards although it is unclear whether the Army is considering the standards as ARARs. However, the State again reiterates that Regulation No. 7, which applies to VOCs, should be met to the maximum extent practicable for any air stripper. See Specific Comment 7.

Response:

See response to comment 1.

11. Page 9, paragraph 6: Colorado's Noise Abatement Statute, at C.R.S. § 25-12-103, should apply to all IRA activities, not just construction activities.

Response:

The Army considers that the only realistic potential for the generation of appreciable noise during the implementation of the alternative selected, monitoring, is during the construction phase.

12. Page 11, paragraph 4: The documents cited in the ARARs document do not contain procedures for dealing with contaminated soils. The paragraph should be deleted. See State's specific comment 24 to the Draft Final Decision Document for CERCLA Wastewater Treatment System IRA.

Response:

The Proposed Decision Document addresses the management of excess materials from well construction. The cited document provide guidance on the management of such materials.

13. Page 12, paragraph 2: The document acknowledges the applicability of substantive RCRA provisions to the management of hazardous wastes, but fails to acknowledge the applicability of stricter State requirements promulgated under the Colorado Hazardous Waste Management Act (CHWMA), found at 6 CCR 1007-3, pts. 262, 263, 264. The State will identify those State standards with more particularity when more is known of the selected alternative.

In addition, the document states that only the substantive standards of 40 C.F.R. pts. 262, 263, 264 apply. However, for any off-site transportation of hazardous wastes, Shell must comply with both the substantive and procedural requirements of CHWMA as well as relevant federal requirements.

Response:

The document was revised in response to this comment.

RESPONSES TO SHELL OIL'S COMMENTS

1. On behalf of Shell Oil Company, this letter comments on the above-captioned document, dated March 23, 1990. Shell disagrees that MCLGs should be considered relevant and appropriate to apply to any treatment system. The NCP states that a final determination of whether MCLGs are relevant and appropriate should be made on a site-specific basis, under the factors set forth in section 300.400(g)(s), depending on the circumstances of the release. 55 Fed. Reg. 8,751 (March 8, 1990). These factors indicate that MCLGs are not relevant and appropriate to this IRA. One factor is "the purpose of the requirement and the purpose of the CERCLA action." 40 C.F.R. § 300.400(g)(2)(i). The purpose of MCLGs is to protect drinking water at the tap, without even considering the cost of treatment. In contrast, the purpose of this IRA is to prevent the South Tank Farm plume from migrating into Lake Ladora before a final remedy is implemented. These contrary purposes indicate that MCLGs are neither relevant nor appropriate for this IRA. Another factor is "the actions or activities regulated by the requirement and the remedial action contemplated at the CERCLA site." Id. 300.400(g)(2)(iv). There is no activity regulated by MCLGs since they are only goals. MCLs should also not be relevant and appropriate since the purpose of this IRA is not to treat the groundwater so that it can be consumed as drinking water. In addition, the benzene standard was derived through CAG methodology. Shell has previously set forth its criticisms of CAG methodology. Shell further does not believe that proposed MCLs for toluene and xylenes should be selected as TBCs since they may be changed after the public comment period.

Response:

Since the preferred alternative does not involve treatment or installation of a treatment system, no response is necessary to this comment.

2. Shell also questions whether any storage vessel will store liquids that contain volatile organics at concentrations that Subpart Kb standards are intended to regulate.

Response:

See response to comment 1.

3. Shell does not believe that Colorado Air Pollution Control Regulation No. 3, Section IV(D)(3)(a) provides any "standards, requirements, criteria, or limitations" that set clean up levels to protect public health and the environment during implementation of this IRA. This provision simply is a BACT requirement. The complex guidance regarding BACT for major sources is neither applicable nor relevant and appropriate to this IRA.

Response:

See response to comment 1.