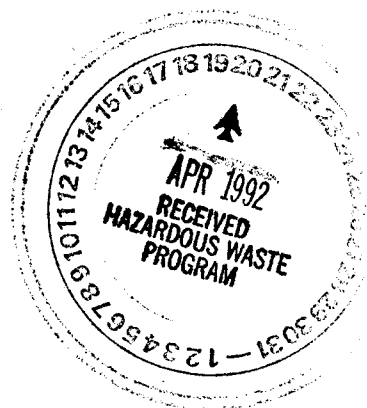




*Herb*

**Department of Energy**  
Field Office, Albuquerque  
Los Alamos Area Office  
Los Alamos, New Mexico 87544

APR 15 1992



LANL  
92  
RED

CERTIFIED MAIL - RETURN RECEIPT REQUESTED P347 153 070

Edward Horst, Program Manager  
Radioactive and Hazardous Waste Bureau  
State of New Mexico Environmental Department  
Harold Runnels Building  
1190 St. Francis Drive, P.O. Box 26110  
Santa Fe, NM 87502

Dear Mr. Horst:

Enclosed is our response to the Notice of Deficiency regarding the Technical Area 35, Building 125, Surface Impoundment Closure Plan and Report (NM0890010515) recently received by my office. All information not supplied with this transmittal, with the exception of sampling data yet to be collected, will be provided to NMED by May 15, 1992.

If you have any questions, please contact Jon Mack of my staff at 665-5026 or Larry Maassen of Los Alamos National Laboratory at 667-1691.

Sincerely,

*Steve Slater*  
Karl J. Twombly, Chief

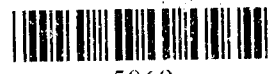
Environment, Safety and Health Branch

LESH:2JM-004

Enclosure

- cc w/enclosure:
- T. Gunderson, EM-DO, LANL, MS K491
- B. Vocke, EM-13, LANL, MS M992
- L. Maassen, EM-13, LANL, MS M992
- J. Mack, ES&H, LAAO

2



5069

**RESPONSE TO NOTICE OF DEFICIENCY  
TA-35, BUILDING 125, SURFACE IMPOUNDMENT CLOSURE PLAN  
AND REPORT**

NMED comments in bold type.

Los Alamos response in standard type.

**1. Section 4.0 Waste Inventory: Insufficient information has been provided regarding LANL's determination of possible wastes present in the surface impoundment:**

The Closure Report describes investigations and interviews conducted regarding process knowledge. However, we will conduct additional interviews and provide additional detail regarding process knowledge to ensure completeness of this information.

**provide a readable MSDS form for the Shell DIALA(R) Oil;**

Provided herein as Enclosure 1.

**describe more fully the historical/records review conducted to characterize the unit beginning from the date of initial operation and including all possible sources from TA-35. Include any criteria LANL used to determine what constituted sufficient information for validating all decisions made by these reviews. For example, provide your rationale for excluding any Appendix VIII contaminants from sampling and analysis.**

Benchmark Environmental is currently performing an extensive historical records review of all chemicals that could have been used at this location. Rationale for excluding any Appendix VIII contaminants will be provided upon completion of the review.

**provide a summary of the location, media, and analytical parameters (by class, e.g., volatiles, semivolatiles etc.) for each sample taken to characterize the unit;**

A summary table will be provided.

**provide an explanation with data to demonstrate that the analytical results for EP Toxicity would not exceed TCLP concentrations.**

The EP Toxicity was the appropriate analytical procedure for the time period in which these samples were collected and analyzed. No metals were detected using EP Toxicity; no metals would likely be detected above action levels using TCLP.

**2. Section 5.0 Closure Design:** Your records indicate that no sampling of the soils or surface water in Ten Site Canyon was done subsequent to the last overtopping of the impoundment (7/1/88). As part of a clean closure demonstration, LANL must prove that releases from the unit impacting surrounding soils or surface water are below health based levels. Propose a sampling and analysis plan to meet this requirement.

Agree. This plan is being developed in consultation with NMED and will be implemented as soon as possible.

**Section 5.1.4.2. Ground-water Investigation Plan:** The original Interim Status Closure and Post-Closure Care Plan states that three test holes will be drilled on top of the mesa to an approximate depth of 120 feet to determine the likelihood of recovery of a representative volume of perched ground water. Provide reasoning why these three test holes were not drilled.

LANL did not believe that these test holes would reveal the presence of perched ground water based on studies performed at other Technical Areas (TAs) at the Laboratory (TA-16 and TA-54). Subsequently the test holes were removed from more recent versions of the closure plan. If the Department feels that these types of test holes would strengthen LANL's Clean Closure Equivalency Demonstration, then the holes will be drilled and the hydrogeologic information gathered would be supplied.

**Section 5.3 Soil Removal, Sampling, Analysis, and Evaluation Plan:**

Phase III test results indicate that the beryllium LOQ exceeded health based limits and background concentrations. The LOQ is not adequate to verify that LANL's clean closure standard for beryllium was met.

Beryllium was not used in the operations of this facility. The Closure Report describes investigations and interviews conducted regarding process knowledge. However, we will conduct additional interviews and provide additional detail regarding process knowledge to ensure completeness of this information.

## **Corehole Sampling:**

**provide your rationale for placing the exterior corehole (125-1) up topographic slope instead of down slope from the surface impoundment;**

Slope stability was a factor taken into account for the positioning of Corehole 125-1. Corehole 125-1 was drilled just outside the impoundment's northeastern corner to a depth of approximately 55 feet below ground surface. Samples were collected at five-foot depth intervals to determine the level and extent of contaminant migration. Based upon existing understanding of the hydrogeological environment, if contamination were present at depth, this position of the corehole would be adequate for this determination.

**provide a readable printout sheet of the surrogate recoveries for volatiles;**

Provided herein as Enclosure 2.

**several volatile surrogate samples did not fall within EPA recovery limits. Data for these samples cannot be used to support a clean closure determination;**

Enclosure 3 is a justification from the Los Alamos Environmental Chemistry Group (EM-9) explaining why these data are valid.

**furnish your rationale for excluding any constituents from analysis by EPA Method 8270 and for excluding metals from corehole sampling;**

Metals were not analyzed in this sampling phase because no metals were detected in previous sampling events. Also, further demonstration of process knowledge will help rationalize why many constituents were not analyzed.

**the Limits of Quantitation (LOQ) for three SVOCs (benzidine, n-nitrosodimethylamine, and n-nitrosodi-n-propylamine) exceeded health based action levels during all sampling phases with the exception of phase II in which the holding times were exceeded. It has not been demonstrated that the above named constituents are not present at or above health based action levels.**

Interference from petroleum hydrocarbons in the soil samples resulted in high limits of quantitation (330 ppb) for the semivolatile organic analyses. Process knowledge indicates these three SVOCs were not used in

the operations at this facility. Further documentation of process knowledge will be supplied.

**Section 5.4 Groundwater Investigation Plan: the closure plan references a 265 Interim Status Groundwater Monitoring Waiver. This is not adequate to support a clean closure demonstration. LANL should submit a groundwater monitoring waiver according to 264 standards based on "no migration". HRMB is currently reevaluating the nature of existing groundwater monitoring waiver documentation previously submitted.**

It is the Laboratory's intent to supply NMED with sufficient information to demonstrate that a RCRA clean closure equivalency has been met. As per EPA guidance, the criteria set forth in the Office of Solid Waste and Emergency Response Directive # 9476.00-18 will be met to assure compliance with the general closure performance standard (40 CFR 264.111).

**3. 6.3 Final Report: provide the QA/QC summary as described on page 42 of the closure plan.**

A more descriptive summary will be provided.

**MATERIAL SAFETY DATA SHEET**

MSDS NUMBER ▶ 60,030-7

PAGE 1

<b>24 HOUR EMERGENCY ASSISTANCE</b>		<b>GENERAL MSDS ASSISTANCE</b>	
SHELL: 713-473-9461 CHEMTREC: 800-424-9300		SHELL: 713-241-4819	
ACUTE HEALTH 1	FIRE 1	REACTIVITY 0	HAZARD RATING ▶ LEAST - 0    SLIGHT - 1    MODERATE - 2 HIGH - 3    EXTREME - 4
*For acute and chronic health effects refer to the discussion in Section III			



<b>SECTION I</b>	<b>NAME</b>
PRODUCT ▶	SHELL DIALA(R) OIL AX
CHEMICAL NAME ▶	MIXTURE (SEE SEC II-A)
CHEMICAL FAMILY ▶	PETROLEUM HYDROCARBON: INDUSTRIAL OIL
SHELL CODE ▶	68702    69702    63702    63722

SECTION II-A		PRODUCT/INGREDIENT	
NO.	COMPOSITION	CAS NUMBER	PERCENT
P	SHELL DIALA OIL AX	MIXTURE	100
1	SOLVENT REFINED HYDROTREATED MIDDLE DISTILLATE	64742-46-7	70-100
2	SEVERELY HYDROTREATED LIGHT NAPHTHENIC DISTILLATE	64742-53-6	0-30
3	BUTYLATED HYDROXY TOLUENE	128-37-0	<0.2

SECTION II-B				ACUTE TOXICITY DATA		
NO.	ACUTE ORAL LD50	ACUTE DERMAL LD50	ACUTE INHALATION LC50			
P	>10 ML/KG, RAT	>2 ML/KG, RAT	NOT AVAILABLE			

BASED UPON DATA AVAILABLE TO SHELL. COMPONENT 3 IN THIS PRODUCT IS NOT HAZARDOUS UNDER OSHA HAZARD COMMUNICATION (29 CFR 1910.1200).

### SECTION III HEALTH INFORMATION

THE HEALTH EFFECTS NOTED BELOW ARE CONSISTENT WITH REQUIREMENTS UNDER THE OSHA HAZARD COMMUNICATION STANDARD (29 CFR 1910.1200).

**EYE CONTACT**

BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING PRODUCT IS PRESUMED TO BE NONIRRITATING TO THE EYES.

**SKIN CONTACT**

BASED ON ESSENTIALLY SIMILAR PRODUCT TESTING PRODUCT IS PRESUMED TO BE SLIGHTLY IRRITATING TO THE SKIN. PROLONGED AND REPEATED CONTACT MAY RESULT IN VARIOUS SKIN DISORDERS SUCH AS DERMATITIS, FOLLICULITIS OR OIL ACNE.

**INHALATION**

INHALATION OF VAPORS (GENERATED AT HIGH TEMPERATURES ONLY) OR OIL MIST MAY CAUSE A MILD IRRITATION OF THE MUCOUS MEMBRANES OF THE UPPER RESPIRATORY TRACT.

**INGESTION**

INGESTION OF PRODUCT MAY RESULT IN VOMITING; ASPIRATION (BREATHING OF VOMITUS INTO THE LUNGS) MUST BE AVOIDED AS EVEN SMALL QUANTITIES MAY RESULT IN ASPIRATION PNEUMONITIS.

**SIGNS AND SYMPTOMS**

IF IRRITATION AS NOTED ABOVE. ASPIRATION PNEUMONITIS MAY BE EVIDENCED BY COUGHING, LABORED BREATHING  
CYANOSIS (BLUISH SKIN); IN SEVERE CASES DEATH MAY OCCUR.

**AGGRAVATED MEDICAL CONDITIONS**

PREEXISTING SKIN AND RESPIRATORY DISORDERS MAY BE AGGRAVATED BY EXPOSURE TO THIS PRODUCT.

-----  
**SECTION IV OCCUPATIONAL EXPOSURE LIMITS**  
-----

NO.	OSHA PEL/TWA	OSHA PEL/CEILING	ACGIH TLV/TWA	ACGIH TLV/STEL	OTHER
P	5 MG/M3*	NONE	5 MG/M3*	10 MG/M3*	

\*OIL MIST, MINERAL

-----  
**SECTION V EMERGENCY AND FIRST AID PROCEDURES**  
-----

**EYE CONTACT**

FLUSH EYES WITH WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

**SKIN CONTACT**

REMOVE CONTAMINATED CLOTHING/SHOES AND WIPE EXCESS FROM SKIN. FLUSH SKIN WITH WATER. FOLLOW BY WASHING WITH SOAP AND WATER. IF IRRITATION OCCURS, GET MEDICAL ATTENTION.

**INHALATION**

REMOVE VICTIM TO FRESH AIR AND PROVIDE OXYGEN IF BREATHING IS DIFFICULT. GET MEDICAL ATTENTION.

**INGESTION**

DO NOT INDUCE VOMITING. IF VOMITING OCCURS SPONTANEOUSLY, KEEP HEAD BELOW HIPS TO PREVENT ASPIRATION OF LIQUID INTO THE LUNGS. GET MEDICAL ATTENTION.

**NOTE TO PHYSICIAN**

IF MORE THAN 2.0 ML PER KG HAS BEEN INGESTED AND VOMITING HAS NOT OCCURRED, EMESIS SHOULD BE INDUCED WITH SUPERVISION. KEEP VICTIM'S HEAD BELOW HIPS TO PREVENT ASPIRATION. IF SYMPTOMS SUCH AS LOSS OF GAG REFLEX, CONVULSIONS OR UNCONSCIOUSNESS OCCUR BEFORE EMESIS, GASTRIC LAVAGE USING A CUFFED ENDOTRACHEAL TUBE SHOULD BE CONSIDERED.

-----  
**SECTION VI SUPPLEMENTAL HEALTH INFORMATION**  
-----

NONE IDENTIFIED.

-----  
**SECTION VII PHYSICAL DATA**  
-----

BOILING POINT: >300 (° F)	SPECIFIC GRAVITY: 0.883 (H2O=1)	VAPOR PRESSURE: NOT AVAILABLE (MM HG)
MELTING POINT: -60 (POUR POINT) (° F)	SOLUBILITY: NEGLIGIBLE (IN WATER)	VAPOR DENSITY: NOT AVAILABLE (AIR=1)

EVAPORATION RATE (N-BUTYL ACETATE = 1): NOT AVAILABLE

VIS CS (40 DEG C)  
9.07-9.3

APPEARANCE AND ODOR:  
WHITE LIQUID. SLIGHT HYDROCARBON ODOR.

-----  
**SECTION VIII FIRE AND EXPLOSION HAZARDS**  
-----

FLASH POINT AND METHOD:  
295-310 DEG F (CDC)

FLAMMABLE LIMITS /% VOLUME IN AIR  
LOWER: N/AVA UPPER: N/AVA

**EXTINGUISHING MEDIA**

USE WATER FOG, FOAM, DRY CHEMICAL OR CO2. DO NOT USE A DIRECT STREAM OF WATER. PRODUCT WILL FLOAT AND CAN BE REIGNITED ON SURFACE OF WATER.

**SPECIAL FIRE FIGHTING PROCEDURES AND PRECAUTIONS**

MATERIAL WILL NOT BURN UNLESS PREHEATED. DO NOT ENTER CONFINED FIRE-SPACE WITHOUT FULL BUNKER GEAR (HELMET WITH FACE SHIELD, BUNKER COATS, GLOVES AND RUBBER BOOTS), INCLUDING A POSITIVE-PRESSURE NIOSH-APPROVED SELF-CONTAINED BREATHING APPARATUS. COOL FIRE EXPOSED CONTAINERS WITH WATER.

-----  
**SECTION IX REACTIVITY**  
-----

STABILITY: STABLE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS AND MATERIALS TO AVOID:  
AVOID HEAT, OPEN FLAMES, AND OXIDIZING MATERIALS.

**HAZARDOUS DECOMPOSITION PRODUCTS**

THERMAL DECOMPOSITION PRODUCTS ARE HIGHLY DEPENDENT ON THE COMBUSTION CONDITIONS. A COMPLEX MIXTURE OF AIRBORNE SOLID, LIQUID, PARTICULATES AND GASES WILL EVOLVE WHEN THIS MATERIAL UNDERGOES PYROLYSIS OR COMBUSTION. CARBON MONOXIDE AND OTHER UNIDENTIFIED ORGANIC COMPOUNDS MAY BE FORMED UPON COMBUSTION.

-----  
**SECTION X EMPLOYEE PROTECTION**  
-----

**RESPIRATORY PROTECTION**

IF EXPOSURE MAY OR DOES EXCEED OCCUPATIONAL EXPOSURE LIMITS (SECTION IV) USE A NIOSH-APPROVED RESPIRATOR TO PREVENT OVEREXPOSURE. IN ACCORD WITH 29 CFR 1910.134 USE EITHER AN ATMOSPHERE-SUPPLYING RESPIRATOR OR AN AIR-PURIFYING RESPIRATOR FOR ORGANIC VAPORS AND PARTICULATES.

**PROTECTIVE CLOTHING**

WEAR CHEMICAL-RESISTANT GLOVES AND OTHER PROTECTIVE CLOTHING AS REQUIRED TO MINIMIZE SKIN CONTACT. NO SPECIAL EYE PROTECTION IS ROUTINELY NECESSARY. TEST DATA FROM PUBLISHED LITERATURE AND/OR GLOVE AND CLOTHING MANUFACTURERS INDICATE THE BEST PROTECTION IS PROVIDED BY NITRILE GLOVES.

-----  
**SECTION XI ENVIRONMENTAL PROTECTION**  
-----

**SPILL OR LEAK PROCEDURES**

MAY BURN ALTHOUGH NOT READILY IGNITABLE. USE CAUTIOUS JUDGMENT WHEN CLEANING UP LARGE SPILLS. \*\*\* LARGE SPILLS \*\*\* WEAR RESPIRATOR AND PROTECTIVE CLOTHING AS APPROPRIATE. SHUT OFF SOURCE OF LEAK IF SAFE TO DO SO. DIKE AND CONTAIN. REMOVE WITH VACUUM TRUCKS OR PUMP TO STORAGE SALVAGE VESSELS. SOAK UP RESIDUE WITH AN ADSORBENT SUCH AS CLAY, SAND, OR OTHER SUITABLE MATERIALS; DISPOSE OF PROPERLY. FLUSH AREA WITH WATER TO REMOVE TRACE RESIDUE. \*\*\* SMALL SPILLS \*\*\* TAKE UP WITH AN ABSORBENT MATERIAL AND DISPOSE OF PROPERLY.



-----  
SECTION XII

SPECIAL PRECAUTIONS  
-----

MINIMIZE SKIN CONTACT. WASH WITH SOAP AND WATER BEFORE EATING, DRINKING, SMOKING OR USING TOILET FACILITIES. LAUNDRY CONTAMINATED CLOTHING BEFORE REUSE. PROPERLY DISPOSE OF CONTAMINATED LEATHER ARTICLES, INCLUDING SHOES, THAT CANNOT BE DECONTAMINATED.

-----  
SECTION XIII

TRANSPORTATION REQUIREMENTS  
-----

DEPARTMENT OF TRANSPORTATION CLASSIFICATION:  
NOT HAZARDOUS BY D.O.T. REGULATIONS

-----  
SECTION XIV

OTHER REGULATORY CONTROLS  
-----

THE COMPONENTS OF THIS PRODUCT ARE LISTED ON THE EPA/TSCA INVENTORY OF CHEMICAL SUBSTANCES. IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE EDS SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

-----  
SECTION XV

SPECIAL NOTES  
-----

SECTION XI - ENVIRONMENTAL PROTECTION HAS BEEN REVISED. THE INFORMATION IN THE "WASTE DISPOSAL" AND "ENVIRONMENT PROTECTION" HAS BEEN REMOVED AND INCLUDED IN THE ATTACHED ENVIRONMENTAL DATA SHEET. IN ACCORDANCE WITH SARA TITLE III, SECTION 313, THE EDS SHOULD ALWAYS BE COPIED AND SENT WITH THE MSDS.

-----  
THE INFORMATION CONTAINED HEREIN IS BASED ON THE DATA AVAILABLE TO US AND IS BELIEVED TO BE CORRECT. HOWEVER, SHELL MAKES NO WARRANTY, EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF. SHELL ASSUMES NO RESPONSIBILITY FOR INJURY FROM THE USE OF THE PRODUCT DESCRIBED HEREIN.  
-----

DATE PREPARED: SEPTEMBER 04, 1989  
-----

J. C. WILLET  
-----

BE SAFE

READ OUR PRODUCT  
SAFETY INFORMATION ... AND PASS IT ON  
(PRODUCT LIABILITY LAW  
REQUIRES IT)

SHELL OIL COMPANY  
PRODUCT SAFETY AND COMPLIANCE  
P. O. BOX 4320  
HOUSTON, TX 77210

LOS ALAMOS NATIONAL LABORATORY  
 HEALTH, SAFETY AND ENVIRONMENT DIVISION  
 HSE-9  
 SURROGATE RECOVERIES FOR VOLATILES  
 SOIL

REQUEST #: 11044  
 NUMBER OF SAMPLES: 32  
 MATRY: 9  
 ANALYST: JAT  
 DATE: 12/19/91

*JAT*  
*1/4/91*

SURROGATE RECOVERIES

SURROGATE  
 RECOVERIES IN PERCENT (%)

*Suzanne Bell*  
*1-10-91*

SAMPLE NUMBER	TYPE	94-1,2-	toluene-	4-methyl-
		dichloro- ethane	(95)	fluorobenzene
1	890.19770 BLANK ✓	105	104	91
2	890.19770 SAMPLE ✓	105	104	95
3	890.19771 SAMPLE ✓	111	103	95
4	890.19771 SAMPLE ✓	130	102	96
5	890.19772 SAMPLE ✓	130	103	100
6	890.19773 SAMPLE ✓	110	105	99
7	890.19773 SAMPLE ✓	112	102	109
8	890.19766 SAMPLE ✓	117	105	95
9	890.19767 SAMPLE ✓	127 *	106	99
10	890.19767 MATRIX SPIN ✓	122 *	101	95
11	890.19767 MATRIX SF-D ✓	129 *	99	98
12	890.19772 BLANK ✓	82	88	83
13	890.19769 SAMPLE ✓	84	83	88
14	890.19761 SAMPLE ✓	92	85	82
15	890.19768 SAMPLE ✓	99	83	87
16	890.19790 SAMPLE ✓	95	89	90
17	890.19791 SAMPLE ✓	100	94	86
18	890.19785 SAMPLE ✓	95	90	86
19	890.19758 SAMPLE ✓	92	90	86
20	890.19757 SAMPLE ✓	93	90	84
21	890.19786 SAMPLE ✓	96	92	86
22	890.19762 SAMPLE ✓	305 *	65 *	182 *
Average % Surrogate Recovery...		117	103	98
Defined Lower QC Limits (%)....		70	81	74
Defined Upper QC Limits (%)....		121	107	131
Observed Lower QC Limits (%)...		105	101	94
Observed Upper QC Limits (%)...		137	108	109

\*% of % Surrogate Recovery is followed by a "\*", it is out of QC Limits.

Followed by:

LOS ALAMOS NATIONAL LABORATORY  
 HEALTH, SAFETY AND ENVIRONMENT DIVISION  
 HSE-9  
 SURROGATE RECOVERIES FOR VOLATILES  
 SOIL

REQUEST #: 11044  
 NUMBER OF SAMPLES: 9  
 MATRIX: S  
 ANALYST: LAT  
 Date: 12/19/90

*KT*  
*11/4/90*  
*1-10-91*

SURROGATE RECOVERIES

SURROGATE  
 RECOVERIES IN PERCENT (%)

SAMPLE NUMBERS	TYPE	d4-1,2- dichloro- ethene	toluene- (d8)	4-bromo- fluoro- benzene
1	B90.19794 BLANK	91	89	84
2	S90.19792 SAMPLE	92	90	85
3	S90.19793 SAMPLE	88	89	90
4	S90.19789 SAMPLE	91	89	86
5	S90.19783 SAMPLE	103	87	98
6	S90.19782 SAMPLE	95	87	88
7	S90.19781 SAMPLE	92	91	95
8	S90.19764 SAMPLE	102	92	88
9	S90.19784 SAMPLE	93	86	96
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
Average % Surrogate Recovery...		94	89	90
Defined Lower QC Limits (%)....		70	81	74
Defined Upper QC Limits (%)....		121	117	121
Observed Lower QC Limits (%)...		88	86	84
Observed Upper QC Limits (%)...		103	92	88

"\*" If % Surrogate Recovery is Followed by a "\*", it is out of QC Limits.

Reviewed By:

LOS ALAMOS NATIONAL LABORATORY  
 HEALTH, SAFETY AND ENVIRONMENT DIVISION  
 HSE-9  
 MATRIX SPIKE RECOVERIES FOR VOLATILES

REQUEST #:	11044	DRY WT/VOL (G or ML)	DILUTION FACTOR	AMOUNT SPIKED	LOQ (UG/KG OR UG/	
NUMBER OF SAMPLES:	21					
SPIKE ID: (STARTS M OR E)	M90.19767	SPIKE	5.1607	1	48	5
SPIKE DUF ID: (STARTS D OR F)	D90.19767	SPIKE-DUP	5.0149	1	50	5
RAW DATA WITH:	---					
ANALYST:	LAT					

U-T  
1/4/91

	SPIKE REC.	SPIKE-DUP REC.	SPIKE %	SPIKE-DUP %	RPD	LOW. REC. LIM.	UPP. REC. LIM.	RPD LIM.
1,1-Dichloroethene	47	51	97%	102%	5%	59	172	22
Benzene	54	54	111%	108%	3%	66	142	21
Trichloroethene	44	47	91%	94%	4%	62	137	24
Toluene	45	46	93%	92%	1%	59	139	21
Chlorobenzene	46	47	95%	94%	1%	60	133	21

\*\* If % Matrix Recovery is Followed by a "\*\*, it is out of QC Limits.

Reviewed By: *Suzanne Bell* 1-10-91

To: Dave McInroy, EM-8

From: <sup>UL</sup> Suzanne Bell, EM-9 Acting Organic Analysis Section  
Leader

Date: April 2, 1992

Subject: Request sheet 11044 Surrogate Recoveries,  
Volatiles

I have examined this data package as per your request. The low recoveries are attributable to matrix effects as demonstrated by matrix spike recovery data. I have included copies of our internal QC documentation as well as a copy of our cover report which discusses the low recoveries.

Specifically, the matrix effects were most likely due to the high level of target and non-target volatiles present in the sample, to the soil matrix itself, or most likely a combination of these factors. This is clearly demonstrated by an examination of surrogate spike recoveries, matrix spike recoveries, and internal standard areas. The surrogate and corresponding matrix spike compounds are often more soluble in the matrix than in water, leading to lower than expected recoveries. The reason for analyzing a matrix spike and matrix spike duplicate is to uncover matrix effects such as was encountered in these samples. The analytical techniques used were correct and all QA/QC requirements were met. The QA/QC requirements used by EM-9 are more stringent than those required by SW-846 methods, and are specified in EM-9 method E0730. The data is valid and defensible.