3R - 137

GENERAL CORRESPONDENCE

YEAR(S):
1996-1992

BLAGG ENGINEERING, INC.

P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505) 632-1199 Fax: (505) 632-3903

September 4, 1996

Mr. James D. Walker
Navajo Nation EPA
P.O Box 1979
Shiprock, NM 87420

Re: Duncan Oil, Inc. - North Hogback Unit Earthen Pits Supplemental Investigation

Dear Mr. Walker:

On behalf of Duncan Oil, Inc., Blagg Engineering, Inc. (BEI) is pleased to submit the results of a supplemental investigation of the extent of hydrocarbon impact at the North Hogback Unit commenced June 24, 1996. This investigation was completed according to a plan submitted to the Navajo Nation Environmental Protection Agency (NN EPA) by BEI dated December 18, 1995 and approved by the NN EPA in a letter to Dugan Production Corp. dated January 23, 1996.

An initial evaluation of the extent and magnitude of soil and groundwater contamination at the field was performed in June and July, 1995. The results of that testing was presented in a report submitted to the NN EPA dated September 14, 1995.

Additional Evaluation of Hydrocarbon Impacts

The vertical extent of hydrocarbon contamination at the most down-gradient earthen pit in the North Hogback Unit was determined by excavation and drilling. The pit tested was the North Hogback #7-6 North Tank Drain Pit. A test hole was dug through the pit center using a track excavator contracted through Envirotech, Inc. Heavy cobble was encountered during excavation to a depth of 18' from the ground surface. Hydrocarbon contamination was apparent the entire depth evidenced by black staining and hydrocarbon odor. At 18' a hard shale layer was encountered which precluded further excavation. The excavator was able to penetrate several inches into the brown shale layer and a sample was collected for laboratory analysis of hydrocarbons. BTEX analysis of this sample using EPA Method 8020 showed a hydrocarbon concentration of 94.8 ug/Kg (0.0948 ppm). Total Petroleum Hydrocarbon (TPH) analysis was performed using EPA Method 8015 with a result of 1.4 mg/Kg (1.4 ppm). Laboratory results indicate the hydrocarbons were limited in their vertical penetration of the shale layer.

A piece of 24" culvert was set on top of the shale layer and backfilled on the outside to provide a conduit for drilling. A drilling rig was then contracted through Envirotech, Inc. to drill to groundwater. Groundwater was encountered at a depth of approximately 31' from the ground surface. Samples collected during drilling indicated no hydrocarbon staining. Soil samples collected at 5' intervals and field tested for headspace organic vapor content using a calibrated photo-ionization detector (PID) indicated readings of 45 ppm at 25' and 18 ppm at 30'. A 2" groundwater monitoring well was set for future groundwater sampling. A field boring log is attached to this report.

Groundwater Sampling

Groundwater sampling of all monitor wells in the North Hogback unit was done on June 28 and July 2, 1996. Samples were analyzed for volatile hydrocarbons using US EPA Method 8020, nitrates, and selenium. Sample results are found in Table 1. Sampling will be conducted quarterly during the first year of remediation at the #7-1, #7-6, and #12-9 locations. Additional sampling at the #6-6 location is deemed unnecessary due to all constituents registering well below New Mexico groundwater standards.

Table 1
Groundwater sampling Results
Duncan Oil
North Hogback Unit

WELL	DATE	BENZENE ppb	TOLUENE ppb	ETHYL-BENZENE ppb	TOTAL XYLENES ppb	NITRATE mg/L	SELENIUM mg/L
#6-6, MW-1	7/3/95	1.8	0.9	1	4.6		
	7/2/96	<0.2	0.7	0.2	0.9	<0.2	<0.02
MW-2	7/3/95	ND	ND	ND	0.4		
	7/2/96	<0.2	<0.2	<0.2	<0.2	<0.2	<0.02
MW-3	7/3/95	4.8	7.8	2.9	14.6		
	7/2/96	<0.2	0.2	<0.2	<0.2	<0.2	<0.02
#7-1, MW-1	6/28/96	<0.2	<0.2	<0.2	<0.2	2.3	<0.02
MW-2	7/3/95	7.5	13.6	83.9	493.6		
	6/28/96	<0.2	2.3	5.2	6.7	36	<0.02
MW-3	7/3/95	ND	13.1	39.4	292.2		
	6/28/96	0.5	2.4	8.5	26.9	<0.2	<0.02
MW-4	6/28/96	<0.2	<0.2	<0.2	<0.2	17.1	<0.02
#7-6, MW-1	6/28/96	0.8	2.6	1.1	3.5	14.1	0.09
#12-9, MW-1	7/3/95	ND	4.4	ND	29.5		
	6/28/96	<0.2	0.3	1.5	2.4	<0.2	<0.02
MW-2	6/28/96	<0.2	<0.2	<0.2	<0.2	<0.2	<0.02

Implementation of In-Situ Soil Reclamation

Prior to implementation of in-situ reclamation procedures as previously outlined, soil samples were collected from the bottoms of each pit and field tested for TPH using US EPA Method 418.1. This will establish a baseline for future evaluation of the reclamation program. Following are those TPH results:

Well Location	Pit Identification	TPH Results (ppm)
North Hogback #6-6	Production/Separator Pit	690
North Hogback #7-1	Production/Separator Pit	440
	Tank Drain Pit	6400
North Hogback #7-3	Production/Separator Pit	38000
North Hogback #7-4	Production/Separator Pit	180
North Hogback #7-6	Production/Separator Pit	68000
	North Tank Drain Pit	(need backhoe to sample)
	South Tank Drain Pit	4400
North Hogback #12-1	Production/Separator Pit	59000
North Hogback #12-9	Production/Separator Pit	13100

Performance of initiation of in-situ reclamation procedures is planned within the next month followed by periodic sampling of soils as previously outlined.

If you have any questions or comments concerning this report, Blagg Engineering, Inc. may be contacted at (505) 632-1199.

Respectfully submitted,
Blagg Engineering, Inc.

Robert E. O'Neill

Robert E. O'Neill, M.S.
Civil Engineering, Environmental

Reviewed by:

Jeffrey C. Blagg

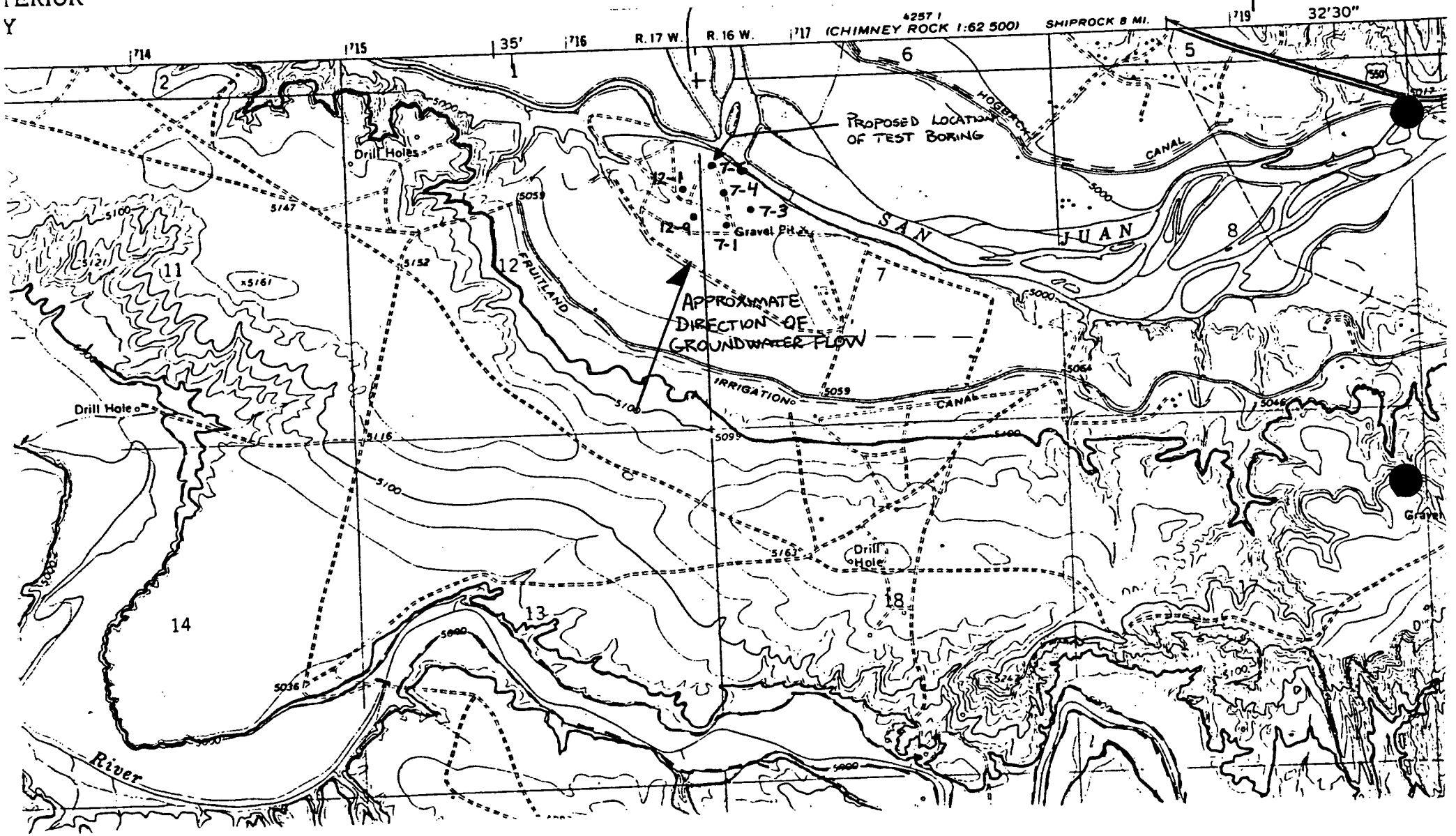
Jeffrey C. Blagg, PE
President

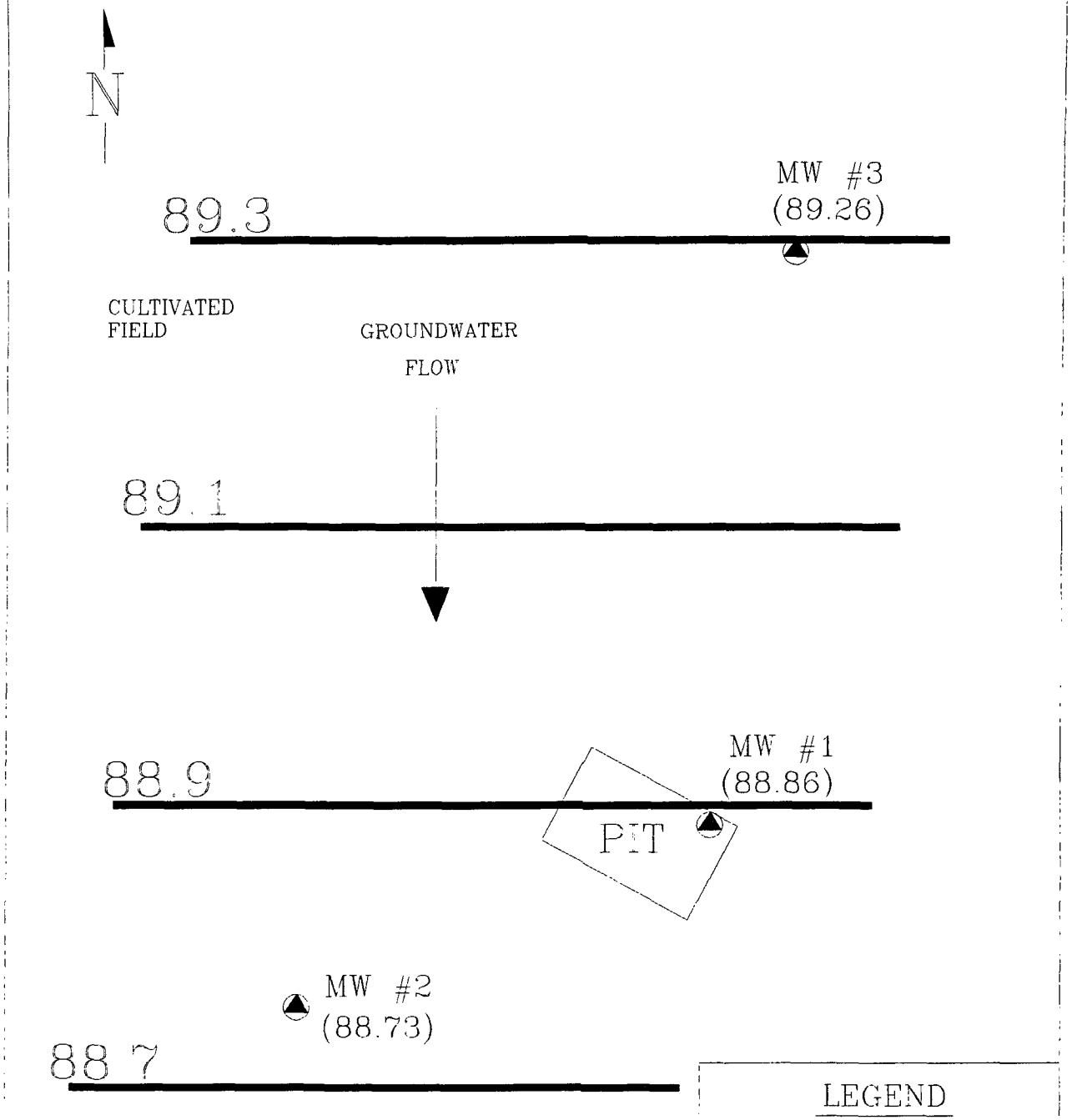
Attachments: Site Diagrams
Laboratory Reports
QA/QC

cc: Mr. John Bettridge, Duncan Oil, Inc.
Mr. John Alexander, Dugan Production
Mr. Denny G. Foust, N.M.O.C.D.
Mr. William C. Olson, N.M.O.C.D.
Ms. Linda Taylor, BIA
Mr. James Miles, BIA
Mr. Bill Liess, BLM

FIGURE 1

DUNCAN OIL, INC.
NORHT HOGBACK UNIT
(From USGS Topo Sheet)





LEGEND

GROUNDWATER MONITORING WELL

(88.86) GROUNDWATER ELEVATION

0 10 20 30 40

FEET

NORTH HOGBACK UNIT
WELL 6-6
SEC. 6, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

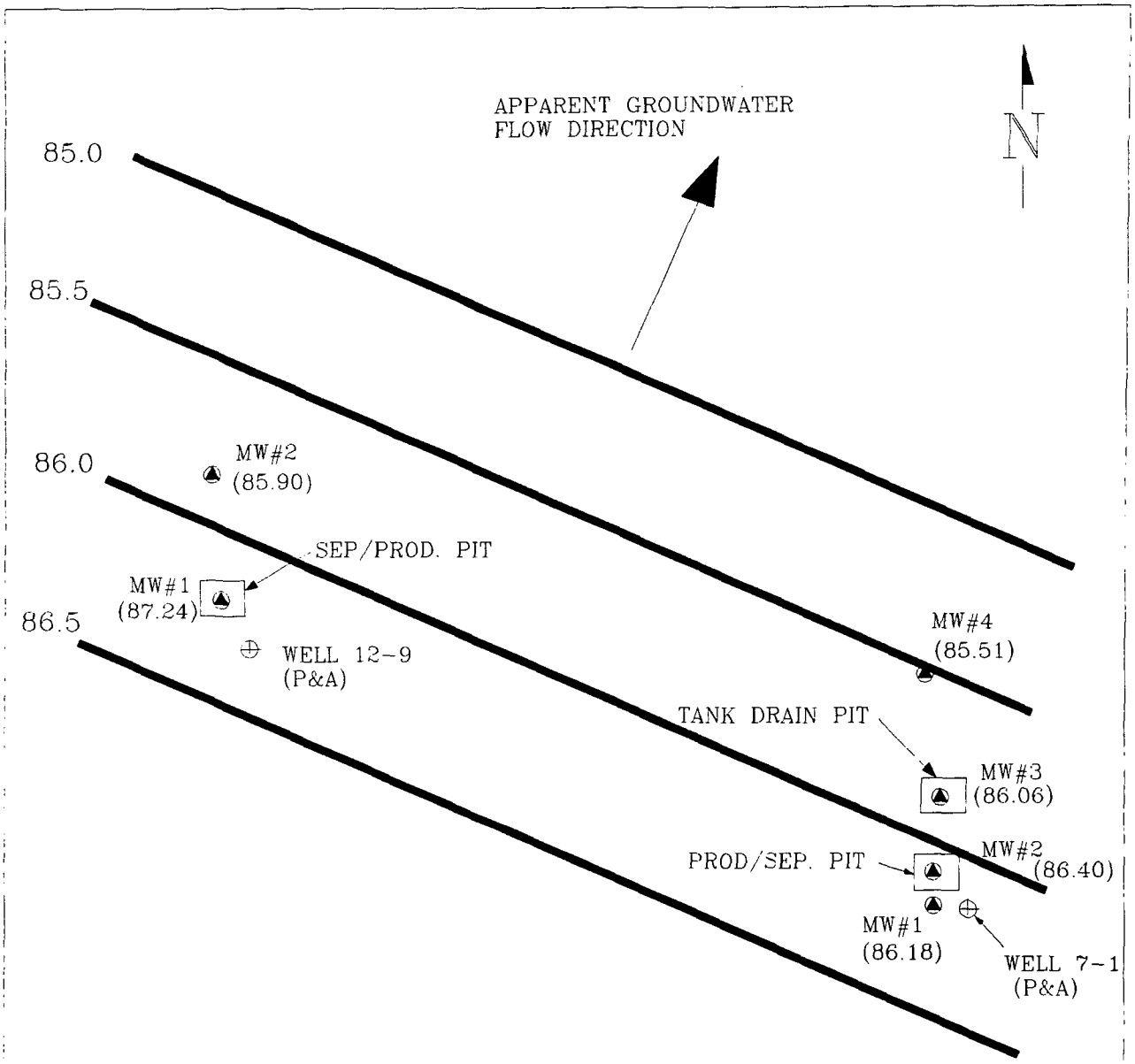
BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE DIAGRAM

SHEET: A1 | DRWN: JULY 95 | REV: JULY 96

DRWN BY: REO | REV BY: REO | PRJ MGR: JCB



LEGEND

GROUNDWATER MONITORING WELL

(86.64) GROUNDWATER ELEVATION

0 100 200
FEET

NOTE: GROUNDWATER ELEVATION IN PITS MAY BE INACCURATE DUE TO RAINWATER INFLOW.

NORTH HOGBACK UNIT
WELLS 12-9 & 7-1
SEC. 7&12, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE DIAGRAM

SHEET: A1	DRWN: JULY 95 REV: JULY 96
DRWN BY: REO REV BY: REO	PRJ MGR: JCB

BLAGG ENGINEERING, INC.

FIELD BORING LOG

TEST BORING No.	MONITOR WELL No.	PROJECT No.	PROJECT NAME:	SHEET:
1	A		DUNCAN OIL INC,	1 OF 1

MFG. DESIGNATION OF DRILL:	PROJECT LOCATION:
EXCAVATOR / MOBILE DRILL - B-61	NORTH HOBBACK SECTION 7, WELL #6

TYPE OF BIT:	SURFACE ELEVATION OF TB OR MW:	TOTAL DEPTH OF HOLE:
8" AUGER - SPLIT SPOON SAMPLER	0	EXCAVATE TO 18' DRILL 18'

DATE	STARTED	COMPLETED	DRILLING Co.:
	6-24-96 8:30-10:30	6-26-96 8:30-12:00	ENVIROTECH

COMPLETION TYPE:	ENGINEER:	CREW:	GROUNDWATER DEPTH:	TIME:
MONITOR WELL 15' SCREEN	REV	N		

SURFACE CONDITIONS: COBBLE

DIST FROM SURF.	SAMPLE TYPE	SAMPLE No.	OVM READ IN PPM	BLOWS PER 6 IN.	USCS	LOG OF MATERIAL/COMMENTS
2						0 - 18' = GRASS CONTAMINATION - BLACK + HEAVY ODOR
4					GW + COBBLE	HEAVY COBBLE TO 18"
6						
8						
10						
12						
14						
16						
18	GRB	1	-	-		BTEX - 8015
20					T.D. SHALE MEDIUM HARD	MAXIMUM DEPTH 18' SHALE LAYER AT 18" - BROWN (LIGHT) - NO ODOR - NO STAIN,
22						
24						
26	SPN	2	45	17	SHALE	53 BLOWS/18" MOIST → DRY, DARK BROWN, FINE SHALE - NO ODOR
28						
30	SPN	3	18	~75	SHALE	50 BLOWS/4"
32					G.W.	GROUNDWATER AT ~ 30'6"
34						
36						TD = 35'6" - SET WELL - 10' SCREEN SAND TO 23'2" BENTONITE TO 21'2" (2 FOOT PLUG)
38						
40						
42						
44						

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	Blagg / Duncan Oil	Project #:	04034
Sample ID:	TH 1 @ 18'	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	06-24-96
Chain of Custody:	4813	Date Received:	06-24-96
Sample Matrix:	Soil	Date Analyzed:	06-25-96
Preservative:	Cool	Date Extracted:	06-24-96
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	**ND**	**11.7**
Toluene	**33.8**	**11.1**
Ethylbenzene	**ND**	**10.1**
p,m-Xylene	**38.1**	**14.4**
o-Xylene	**22.9**	**6.9**
Total BTEX	**94.8**	

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**98 %**
	Bromofluorobenzene	**100 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **North Hogback 7 #6 T. B. #1 North.**

Analyst

Review

5796 U.S. Highway 64-3014 • Farmington, NM 87401 • Tel 505 • 632 • 0615 • Fax 505 • 632 • 1865

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Client:	Blagg / Duncan Oil	Project #:	04034
Sample ID:	TH 1 @ 18'	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	06-24-96
Chain of Custody No:	4813	Date Received:	06-24-96
Sample Matrix:	Soil	Date Extracted:	06-24-96
Preservative:	Cool	Date Analyzed:	06-25-96
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	**ND**	**0.2**
Diesel Range (C10 - C28)	**1.4**	**0.1**
Total Petroleum Hydrocarbons	**1.4**	**0.2**

ND - Parameter not detected at the stated detection limit.

References: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Comments: **North Hogback 7 #6 T. B. #1 North.**

Analyst

Review

5796 U.S. Highway 64-3014 • Farmington, NM 87401 • Tel 505 • 632 • 0615 • Fax 505 • 632 • 1865

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4223*
Address:	*P.O. Box 87*	*Sample No.*	*11384*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 6-6; MW-1***				
Sampled by:	REO	Date:	2-Jul-96	Time:	11:40
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	0.7	ug/L	0.2	ug/L
Ethylbenzene	0.2	ug/L	0.2	ug/L
m,p-Xylene	0.6	ug/L	0.2	ug/L
o-Xylene	0.3	ug/L	0.2	ug/L
TOTAL	1.9	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by:
Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4223*
Address:	*P.O. Box 87*	*Sample No.*	*11385*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 6-6; MW-2***				
Sampled by:	REO	Date:	2-Jul-96	Time:	10:50
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	<0.2	ug/L	0.2	ug/L
Ethylbenzene	<0.2	ug/L	0.2	ug/L
m,p-Xylene	<0.2	ug/L	0.2	ug/L
o-Xylene	<0.2	ug/L	0.2	ug/L
TOTAL	<0.2	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: JaC

Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4223*
Address:	*P.O. Box 87*	*Sample No.*	*11386*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 6-6; MW-3***				
Sampled by:	REO	Date:	2-Jul-96	Time:	11:15
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	0.2	ug/L	0.2	ug/L
Ethylbenzene	<0.2	ug/L	0.2	ug/L
m,p-Xylene	<0.2	ug/L	0.2	ug/L
o-Xylene	<0.2	ug/L	0.2	ug/L
TOTAL	0.2	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by:

Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11354*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 7-#1; MW-1***				
Sampled by:	REO	Date:	28-Jun-96	Time:	10:05
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	<0.2	ug/L	0.2	ug/L
Ethylbenzene	<0.2	ug/L	0.2	ug/L
m,p-Xylene	<0.2	ug/L	0.2	ug/L
o-Xylene	<0.2	ug/L	0.2	ug/L
TOTAL	<0.2	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: JaS

Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11355*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 7-#1; MW-2***				
Sampled by:	REO	Date:	28-Jun-96	Time:	10:25
Analyzed by:	DC	Date:	3-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	2.3	ug/L	0.2	ug/L
Ethylbenzene	5.2	ug/L	0.2	ug/L
m,p-Xylene	6.0	ug/L	0.2	ug/L
o-Xylene	0.7	ug/L	0.2	ug/L
TOTAL	14.3	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DAC

Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11356*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 7-#1; MW-3***				
Sampled by:	REO	Date:	28-Jun-96	Time:	10:50
Analyzed by:	DC	Date:	3-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	0.5	ug/L	0.2	ug/L
Toluene	2.4	ug/L	0.2	ug/L
Ethylbenzene	8.5	ug/L	0.2	ug/L
m,p-Xylene	25.9	ug/L	0.2	ug/L
o-Xylene	1.0	ug/L	0.2	ug/L
TOTAL	38.4	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by:
Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11357*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 7-#1; MW-4***				
Sampled by:	REO	Date:	28-Jun-96	Time:	11:15
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	<0.2	ug/L	0.2	ug/L
Ethylbenzene	<0.2	ug/L	0.2	ug/L
m,p-Xylene	<0.2	ug/L	0.2	ug/L
o-Xylene	<0.2	ug/L	0.2	ug/L
TOTAL	<0.2	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Jaf
Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11360*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 7-#6; MW-1***				
Sampled by:	REO	Date:	28-Jun-96	Time:	8:50
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	0.8	ug/L	0.2	ug/L
Toluene	2.6	ug/L	0.2	ug/L
Ethylbenzene	1.1	ug/L	0.2	ug/L
m,p-Xylene	2.0	ug/L	0.2	ug/L
o-Xylene	1.5	ug/L	0.2	ug/L
TOTAL	8.1	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: JG
Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11358*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 12-#9; MW-1***				
Sampled by:	REO	Date:	28-Jun-96	Time:	9:40
Analyzed by:	DC	Date:	3-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	0.3	ug/L	0.2	ug/L
Ethylbenzene	1.5	ug/L	0.2	ug/L
m,p-Xylene	1.1	ug/L	0.2	ug/L
o-Xylene	1.3	ug/L	0.2	ug/L
TOTAL	4.1	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: JaG
Date: 7/8/96

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

AROMATIC VOLATILE ORGANICS

Attn:	*Bob O'Neill*	Date:	8-Jul-96
Company:	*Blagg Engineering*	*COC No.:*	*4222*
Address:	*P.O. Box 87*	*Sample No.*	*11359*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Well 12-#9; MW-2***				
Sampled by:	REO	Date:	28-Jun-96	Time:	9:20
Analyzed by:	DC	Date:	2-Jul-96		
Sample Matrix:	*Liquid*				

Laboratory Analysis

Parameter	*Result*	*Unit of Measure*	*Detection Limit*	*Unit of Measure*
Benzene	<0.2	ug/L	0.2	ug/L
Toluene	<0.2	ug/L	0.2	ug/L
Ethylbenzene	<0.2	ug/L	0.2	ug/L
m,p-Xylene	<0.2	ug/L	0.2	ug/L
o-Xylene	<0.2	ug/L	0.2	ug/L
TOTAL	<0.2	ug/L		

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Dave

Date: 7/8 96

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

RECEIVED JUL 15 1996

Report Number
96-192-2024

REPORT OF ANALYSIS

For: (6833) ON SITE TECHNOLOGIES LTD
(505)325-5667

Date Reported: 07/10/96
Date Received: 07/03/96
Date Sampled: 07/02/96

Mail to: **ON SITE TECHNOLOGIES LTD**
657 WEST MAPLE
P.O. BOX 2606
FARMINGTON NM 87499-

PO/Proj. #: 4223
DUNCAN OIL

Lab number: 304734

Analysis	Level Found	Units	Detection Limit	Method	Analyst-Date
Sample ID: N. HOGBACK 6-6 MW-1					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 6-6 MW-2					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 6-6 MW-3					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10

Notes:
n.d. - Not Detected.
cc: Account(s) -669 DAVID COX

Respectfully Submitted

Heather Ramig

Heather Ramig/Lisa Dworak
Client Services

The above analytical results apply only to the sample(s) submitted.

Midwest Laboratories, Inc.
13611 "B" Street • Omaha, Nebraska 68144-3693 • (402) 334-7770 • FAX (402) 334-9121

RECEIVED JUL 15 1996

Report Number
96-192-2023

REPORT OF ANALYSIS

For: (6833) ON SITE TECHNOLOGIES LTD
(505)325-5667

Date Reported: 07/10/96
Date Received: 07/03/96
Date Sampled: 06/28/96

Mail to: **ON SITE TECHNOLOGIES LTD**
657 WEST MAPLE
P.O. BOX 2606
FARMINGTON NM 87499-

PO/Proj. #: 4222
DUNCAN OIL

Lab number: 304727

Analysis	Level Found	Units	Detection Limit	Method	Analyst-Date
Sample ID: N. HOGBACK 7-1 MW-1					
Nitrate nitrogen	2.3	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 7-1 MW-2					
Nitrate nitrogen	36	mg/L	2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 7-1 MW-3					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 7-1 MW-4					
Nitrate nitrogen	17.4	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 12-9 MW-1					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10
Sample ID: N. HOGBACK 12-9 MW-2					
Nitrate nitrogen	n.d.	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	n.d.	mg/L	0.02	EPA 270.2	pmb-07/10

The above analytical results apply only to the sample(s) submitted.

Midwest Laboratories, Inc.
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REPORT OF ANALYSIS

Account: 6833 ON SITE TECHNOLOGIES LTD
Report Number: 96-192-2023

Analysis	Level Found	Units	Detection Limit	Method	Analyst-Date
Sample ID: N. HOGBACK 7-6 MW-1					
Nitrate nitrogen	14.1	mg/L	0.2	EPA 353.2	lmb-07/03
Selenium (total)	0.09	mg/L	0.02	EPA 270.2	pmb-07/10

Notes:
n.d. - Not Detected.
cc: Account(s) -669 DAVID COX

Respectfully Submitted

Heather Ramig

Heather Ramig/Lisa Dworak
Client Services

The above analytical results apply only to the sample(s) submitted.

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 6'	Date Analyzed:	7-23-96
Project Location:	North Hogback 6#6	Date Reported:	7-24-96
Laboratory Number:	TPH #1741	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**690**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: *Production/Separator Pit*

R. E. O'Neill
Analyst

J. C. Blagg
Review

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 5'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#1	Date Reported:	7-24-96
Laboratory Number:	TPH #1742	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**440**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

R. E. O'Neill
Analyst

J. L. Blagg
Review

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 5'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#1	Date Reported:	7-24-96
Laboratory Number:	TPH #1743	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**6,400**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Tank Drain Pit

R. E. O'Neal
Analyst

J. C. Blagg
Review

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 4'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#3	Date Reported:	7-24-96
Laboratory Number:	TPH #1744	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**38,000**	**1,000**

ND = Not Detectable at stated detection limits.

QA/QC:

QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 4'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#4	Date Reported:	7-24-96
Laboratory Number:	TPH #1745	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**180**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 4'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#6	Date Reported:	7-24-96
Laboratory Number:	TPH #1740	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**4,400**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Tank Drain Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 4'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#6	Date Reported:	7-24-96
Laboratory Number:	TPH #1740 Duplicate	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**3,600**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Tank Drain Pit

R. E. O'Neill
Analyst

J. C. Blagg
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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 2'	Date Analyzed:	7-23-96
Project Location:	North Hogback 7#6	Date Reported:	7-24-96
Laboratory Number:	TPH #1746	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**68,000**	**1,000**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

R. E O'Neill
Analyst

J. C. Blagg
Review

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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 5'	Date Analyzed:	7-23-96
Project Location:	North Hogback 12#1	Date Reported:	7-24-96
Laboratory Number:	TPH #1747	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**59,000**	**1,000**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

P. E. O'Neill
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J. C. Blagg
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FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	Center Bottom @ 6'	Date Analyzed:	7-23-96
Project Location:	North Hogback 12#9	Date Reported:	7-24-96
Laboratory Number:	TPH #1748	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**13,100**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	4,440	3,640	20

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production/Separator Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

QUALITY ASSURANCE / QUALITY CONTROL

DOCUMENTATION

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS
QUALITY ASSURANCE REPORT

Client:	QA/QC	Project #:	N/A
Sample ID:	Laboratory Blank	Date Reported:	06-25-96
Laboratory Number:	06-25-BTEX.BLANK	Date Sampled:	N/A
Sample Matrix:	Water	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	06-25-96
Condition:	N/A	Analysis Requested:	BTEX

Parameter	Concentration (ug/L)	Det. Limit (ug/L)
Benzene	**ND**	**0.2**
Toluene	**ND**	**0.2**
Ethylbenzene	**ND**	**0.2**
p,m-Xylene	**ND**	**0.2**
o-Xylene	**ND**	**0.1**

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Trifluorotoluene	**98 %**
	Bromofluorobenzene	**100 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Duplicate	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Preservative:	Cool	Date Analyzed:	06-25-96
Condition:	Cool and Intact	Analysis Requested:	BTEX

Parameter	Sample Result (ug/Kg)	Duplicate Result (ug/Kg)	Det. Limit (ug/Kg)	Percent Difference
Benzene	**ND**	**ND**	**11.7**	**0.0%**
Toluene	**33.8**	**33.7**	**11.1**	**0.2%**
Ethylbenzene	**ND**	**ND**	**10.1**	**0.0%**
p,m-Xylene	**38.1**	**38.3**	**14.4**	**0.6%**
o-Xylene	**22.9**	**23.1**	**6.9**	**1.1%**

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria:	Parameter	Maximum Difference
	8020 Compounds	**30 %**

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8020
AROMATIC VOLATILE ORGANICS

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Spike	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Preservative:	Cool	Date Extracted:	06-24-96
Condition:	Cool and Intact	Date Analyzed:	06-25-96

Parameter	Sample Result (ug/Kg)	Spike Added (ug/Kg)	Spiked Sample Result (ug/Kg)	Det. Limit (ug/Kg)	Percent Recovery	SW-846 % Rec. Accept. Range
Benzene	**ND**	**50.0**	**47.9**	**11.7**	**96%**	**39-150**
Toluene	**33.8**	**50.0**	**81.1**	**11.1**	**97%**	**46-148**
Ethylbenzene	**ND**	**50.0**	**56.2**	**10.1**	**100%**	**32-160**
p,m-Xylene	**38.1**	**100**	**137**	**14.4**	**99%**	**46-148**
o-Xylene	**22.9**	**50.0**	**73.2**	**6.9**	**100%**	**46-148**

ND - Parameter not detected at the stated detection limit.

References: Method 5030, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8020, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, Sept. 1994.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA Method 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	Laboratory Blank	Date Reported:	06-25-96
Laboratory Number:	06-25-TPH.BLANK	Date Sampled:	N/A
Sample Matrix:	Methylene Chloride	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	06-25-96
Condition:	N/A	Analysis Requested:	TPH

Parameter	Concentration (mg/L)	Det. Limit (mg/L)
Gasoline Range C5 - C10	**ND**	**0.2**
Diesel Range C10 - C28	**ND**	**0.1**
Total Petroleum Hydrocarbons	**ND**	**0.2**

ND - Parameter not detected at the stated detection limit.

References: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons
Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Duplicate	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Preservative:	Cool	Date Analyzed:	06-25-96
Condition:	Cool and Intact	Analysis Requested:	TPH

Parameter	Sample Result (mg/Kg)	Duplicate Result (mg/Kg)	Percent Difference
Gasoline Range (C5 - C10)	**ND**	**ND**	**0.0%**
Diesel Range (C10 - C28)	**1.4**	**1.3**	**2.8%**
Total Petroleum Hydrocarbons	**1.4**	**1.3**	**2.8%**

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria:	Parameter	Max Difference
	Petroleum Hydrocarbons	**30%**

References: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Hydrocarbons
Total Petroleum Hydrocarbons
Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	Matrix Spike	Date Reported:	06-25-96
Laboratory Number:	A271	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Analysis Requested:	TPH	Date Analyzed:	06-25-96
Condition:	N/A		

Parameter	Sample Result (mg/kg)	Spike Added (mg/kg)	Spiked Sample Result (mg/kg)	Det. Limit (mg/kg)	Percent Recovery
Gasoline Range (C5 - C10)	**ND**	**250**	**249**	**0.2**	**100%**
Diesel Range (C10 - C28)	**1.4**	**250**	**251**	**0.1**	**100%**
Total Petroleum Hydrocarbons	**1.4**	**500**	**500**	**0.2**	**100%**

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria:	Parameter	Acceptance Range
	Petroleum Hydrocarbons	**75 - 125%**

References: Method 8015, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Comments: **QA/QC for samples A271 - A272.**

Analyst

Review

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4813

CHAIN OF CUSTODY RECORD

Client/Project Name	Project Location	ANALYSIS/PARAMETERS
BLAGG / Duncan Oil	T. B. #1 NORTH NORTH HOGBACK 7# 6	

Sampler: (Signature)	Chain of Custody Tape No.
R. E O'Neill	04034

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX	8015					Remarks
~~N. HOGBACK 7#6 TB #1 NORTH~~	6-24-96	1000	A271	SOIL	1	✓	✓					
TH1 @ 18'												

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
R. E O'Neill	6-24-96	1132	Glenn L. Spence	6/24/96	1132
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.
5796 U.S. Highway 64-3014
Farmington, New Mexico 87401
(505) 632-0615

san juan repro Form 578-81

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 2-Jul-96

Internal QC No.: 0444-STD
Surrogate QC No.: 0445-STD
Reference Standard QC No.: 0355-STD

Method Blank

Parameter	Result	Unit of Measure
Average Amount of All Analytes In Blank	<0.2	ppb

Calibration Check

Parameter	Unit of Measure	True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20.0	19.2	4	15%
Toluene	ppb	20.0	21.9	10	15%
Ethylbenzene	ppb	20.0	18.6	7	15%
m,p-Xylene	ppb	40.0	36.4	9	15%
o-Xylene	ppb	20.0	20.2	1	15%

Matrix Spike

Parameter	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	112	129	(39-150)	10	20%
Toluene	111	128	(46-148)	10	20%
Ethylbenzene	112	129	(32-160)	10	20%
m,p-Xylene	109	126	(35-145)	10	20%
o-Xylene	105	121	(35-145)	10	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered
Limit Percent Recovered	(70-130)		Limit Percent Recovered	(70-130)	
11354-4222	99				
11357-4222	99				
11359-4222	100				
11360-4222	100				

S1: Flourobenzene

OFF: (505) 325-5667

ON SITE

LAB: (505) 325-1556

TECHNOLOGIES, LTD.

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 3-Jul-96

Internal QC No.: 0444-STD
Surrogate QC No.: 0445-STD
Reference Standard QC No.: 0355-STD

Method Blank

Parameter	Result	Unit of Measure
Average Amount of All Analytes In Blank	<0.2	ppb

Calibration Check

Parameter	Unit of Measure	True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20.0	21.6	8	15%
Toluene	ppb	20.0	21.4	7	15%
Ethylbenzene	ppb	20.0	21.3	6	15%
m,p-Xylene	ppb	40.0	41.5	4	15%
o-Xylene	ppb	20.0	21.0	5	15%

Matrix Spike

Parameter	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	100	105	(39-150)	3	20%
Toluene	100	103	(46-148)	2	20%
Ethylbenzene	98	102	(32-160)	3	20%
m,p-Xylene	96	100	(35-145)	2	20%
o-Xylene	97	100	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered
Limit Percent Recovered	(70-130)		Limit Percent Recovered	(70-130)	
11355-4222	98				
11356-4222	91				
11358-4222	99				

S1: Flourobenzene

OFF: (505) 325-5667

ON SITE

TECHNOLOGIES, LTD.

LAB: (505) 325-1556

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 2-Jul-96

Internal QC No.: 0444-STD
Surrogate QC No.: 0445-STD
Reference Standard QC No.: 0355-STD

Method Blank

Parameter	Result	Unit of Measure
Average Amount of All Analytes In Blank	<0.2	ppb

Calibration Check

Parameter	Unit of Measure	True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20.0	19.2	4	15%
Toluene	ppb	20.0	21.9	10	15%
Ethylbenzene	ppb	20.0	18.6	7	15%
m,p-Xylene	ppb	40.0	36.4	9	15%
o-Xylene	ppb	20.0	20.2	1	15%

Matrix Spike

Parameter	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	112	129	(39-150)	10	20%
Toluene	111	128	(46-148)	10	20%
Ethylbenzene	112	129	(32-160)	10	20%
m,p-Xylene	109	126	(35-145)	10	20%
o-Xylene	105	121	(35-145)	10	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered
Limit Percent Recovered	(70-130)		Limit Percent Recovered	(70-130)	
11384-4223	97				
11385-4223	96				
11386-4223	99				

S1: Flourobenzene

4249

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7/2/96

Page 1 of 1

Purchase Order No.: 4222 / 4223 | Job No. 2-1000.2

SEND INVOICE TO
Name: ACCOUNTS PAYABLE
Company: ON SITE | Dept.
Address: P.O. BOX 2606
City, State, Zip: FARMINGTON, NM 87499

REPORT RESULTS TO
Name: DAVID COX | Title
Company: ON SITE TECH
Mailing Address: 612 E. MURRAY
City, State, Zip: FARMINGTON, NM 87401
Telephone No.: 505-325-7432 | Telefax No.: 505-325-6258

Sampling Location: DUNCAN OIL

Sampler: REO

[redacted]

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION		Date	Time	Matrix	Number of Containers	NITRATE	TOTAL SELENIUM	QA/QC REPORTS		LAB ID
N. HOGBACK	7-1 MW1-1	6/20/96	1005	H2O	2	✓	✓	✓	304727	1354-4222
	7-1 MW1-2		1025		2	✓	✓	✓	304728	11355
	7-1 MW1-3		1050		2	✓	✓	✓	304729	11356
	7-1 MW1-4		1115		2	✓	✓	✓	304730	11357
	12-9 MW1-1		0940		2	✓	✓	✓	304731	11358
	17-9 MW1-2		0920		2	✓	✓	✓	304732	11359
	7-6 MW1-1		0850		2	✓	✓	✓	304733	11360
	6-6 MW1-1	7/2/96	1140		2	✓	✓	✓	304734	1384-4222
	6-6 MW1-2		1050		2	✓	✓	✓	304735	1385
	6-6 MW1-3		1115		2	✓	✓	✓	304736	11386

Relinquished by: [signature]	Date/Time 7/2/96 1400	Received by: [signature]	Date/Time 7-3-96 1115
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: [signature] Date 7/2/96
(Client Signature Must Accompany Request)

Rush | 24-48 Hours | 10 Working Days

Special Instructions:
PLEASE FAX ASAP Thank you
Dick

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

4222

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

Date: 6 [illegible] 16

Page 1 of 1

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Purchase Order No.:	Job No.		
SEND INVOICE TO — Name	[illegible] JEFF [illegible]	REPORT RESULTS TO — Name	[illegible] Title
Company	[illegible]	Company	[illegible]
Address	[illegible]	Dept.	Mailing Address
City, State, Zip	[illegible] NM [illegible]	City, State, Zip	
Sampling Location:	N [illegible] UNIT [illegible]	Telephone No.	Telefax No.
Sampler:	[illegible]		

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	NITRATE	CHLORIDE	LAB ID
[illegible] 7a [illegible] "1 MW-1	6-21	[illegible]	water		4	✓	✓	✓	
" 7 "1 MW-2	"	[illegible]	"		4	✓	✓	✓	
" 7 "1 MW-3	"	1030	"		4	✓	✓	✓	
" 7 "1 MW-4	"	1115	"		4	✓	✓	✓	
[illegible] 12 "4 MW-1	"	0944	"		4	✓	✓	✓	
MW-2	"	0920	"		4	✓	✓	✓	
[illegible] 7 "6 MW-1	"	0935	"		4	✓	✓	✓	

Relinquished by: [illegible]	Date/Time 6-21-16	Received by: [illegible]	Date/Time [illegible]
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: [illegible] Date 6-21-16
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

4223

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7-2-96

Page 1 of 1

Purchase Order No.:	Job No.		
SEND INVOICE TO: Name		REPORT RESULTS TO: Name	Title
Company	Dept.	Company	
Address		Mailing Address	
City, State, Zip		City, State, Zip	
		Telephone No.	Telefax No.
Sampling Location:			
Sampler:			

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	ANALYSIS REQUESTED	LAB ID
MW-1	7-2	1114	W		4	✓ ✓ ✓	
MW-2	7-2	1135	W		4	✓ ✓ ✓	
MW-3	7-2	1115	W		4	✓ ✓ ✓	

Relinquished by:	Date/Time 7-2-96 1215	Received by:	Date/Time 7/2/96 1215
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: _____ Date 7-2-96
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

December 18, 1995

Mr. James D. Walker
Navajo Nation EPA
P.O. Box 1979
Shiprock, NM 87420

Re: Duncan Oil, Inc. - North Hogback Unit Earthen Pit Reclamation Program

Dear Mr. Walker:

Referencing our meeting on October 25, 1995, Navajo Nation EPA requested additional earthen pit evaluations at the southern end of the abandoned North Hogback Unit, San Juan County, New Mexico. Included below is a plan prepared by Blagg Engineering for Duncan Oil to perform the requested supplemental investigation of the extent of hydrocarbon impact at the North Hogback Unit. Additionally included is a request to implement reclamation activities for in-situ treatment of contaminated media.

An initial evaluation of the extent and magnitude of soil and groundwater contamination at the field was performed in June and July, 1995. The results of this testing was presented in a report submitted to the Navajo EPA dated September 14, 1995.

Additional Evaluation of Hydrocarbon Impacts

Duncan Oil, Inc. proposes to determine the vertical extent of hydrocarbon contamination at the most down-gradient earthen pit in the North Hogback Unit. The pit identified for this testing is the North Hogback #7-6 separator pit which is located down-gradient from the remaining earthen pits in the field (Figure 1). The groundwater gradient in the area is indicated to be in a northeast direction based on groundwater data collected from monitor wells placed at the #7-1 and #12-9 well locations. Note that there are no known domestic water supply sources located between the earthen pits in the field and the San Juan River.

There is a severe layer of river cobbles and boulders beginning at the ground surface and extending to an unknown depth. It is proposed to contract a drilling unit to bore or drive a hole through this boulder layer. Soil samples collected while advancing the boring with the rig may not be representative due to the possible use of water that may be required during drilling operations. After penetrating the cobble layer surface conductor pipe will be set in the hole and the boring will be further advanced with a conventional auger type drill unit. Soil samples will be collected at 5 foot intervals and field tested for headspace organic vapor content using a calibrated photo-ionization detector (PID). Certain soil samples may be field tested for total petroleum hydrocarbon (TPH) content using U.S. EPA Method 418.1. Advancement of the boring will be terminated when both

PID and TPH readings are recorded at less than 100 parts per million (ppm).

If groundwater is encountered during advancement of the bore hole, a groundwater monitoring well be set using slotted piping across the water table interface. Following installation the well will be developed by hand bailing until returns are relatively clear of fines. Water samples will be collected into appropriate sample containers supplied by the analytical laboratory, preserved, cooled in an ice chest and then delivered to the laboratory for testing. Proper chain-of-custody documentation will follow the samples.

The initial groundwater sample collected from the well will be submitted for testing of volatile hydrocarbons using U.S. EPA Method 8020, API water analysis for cations/anions and total dissolved solids, nitrates (NO_3) and selenium. Future samples collected from the well will only include analyses for those constituents identified in excess of applicable water quality standards during the initial water testing.

Implementation of In-Situ Reclamation

The assessment report on the North Hogback Unit submitted to the Navajo EPA on September 14, 1995 outlined a recommended earthen pit reclamation program. Navajo EPA authorization of this remediation program is requested. It is proposed to perform in-situ reclamation by enhancing natural bio-degradation with moisture and nutrients (common fertilizer). The initial recommended treatment program is quarterly stimulation of each of the unlined surface pits using 10 barrels of fresh water mixed with nutrients. Effectiveness of the program will be monitored to determine if a change in the volume or frequency of stimulation may be necessary. A pre-treatment sampling of each pit bottom for analysis of TPH will be performed, followed by quarterly sampling for the first year. Note that after the first year annual sampling may be indicated. (Included with this transmittal are several U.S. EPA and industry reports on natural and enhanced biodegradation of hydrocarbons.)

Groundwater at the monitor wells placed at the #7-1, #12-9 and the proposed well at #7-6 will be sampled quarterly during the first year of remediation. Initial water testing will include U.S. EPA Method 8020, API water analysis for cations/anions and total dissolved solids, nitrates (NO_3) and selenium. Future samples will only include analyses for those constituents identified in excess of applicable water quality standards during the initial water testing. Note that annual water testing may be indicated.

Evaluation of Remediation and Assessment Program

Following well installation and sampling at the #7-6 separator pit location the effectiveness of the test program will be evaluated. Lithology types and thickness, groundwater depth and water quality will be known. Risk assessment of potential impacts at other earthen pit locations can be determined and the reclamation program can be re-evaluated. Note that groundwater testing at the #6-6, #7-1 and #12-9 well locations found only trace concentrations of BTEX constituents in groundwater, as reported in the September 14, 1995 report submitted to Navajo EPA. Note also that the proposed

monitor well to be placed at the #7-6 location will be down-gradient from the other pits in the North Hogback Unit and will serve as a field wide down-gradient monitoring point.

The remediation program will be evaluated following the first year of stimulation and testing. If hydrocarbon decay rates indicate probable decline to acceptable regulatory standards, no changes in the remediation program will be initiated. If hydrocarbon decay rates indicate standards will not be achieved, alternative bioremediation processes will be evaluated.

If you have questions or comments concerning this transmittal, Blagg Engineering, Inc. may be contacted at (505)632-1199.

Respectfully,
Blagg Engineering, Inc.

Jeffrey C. Blagg, PE
President

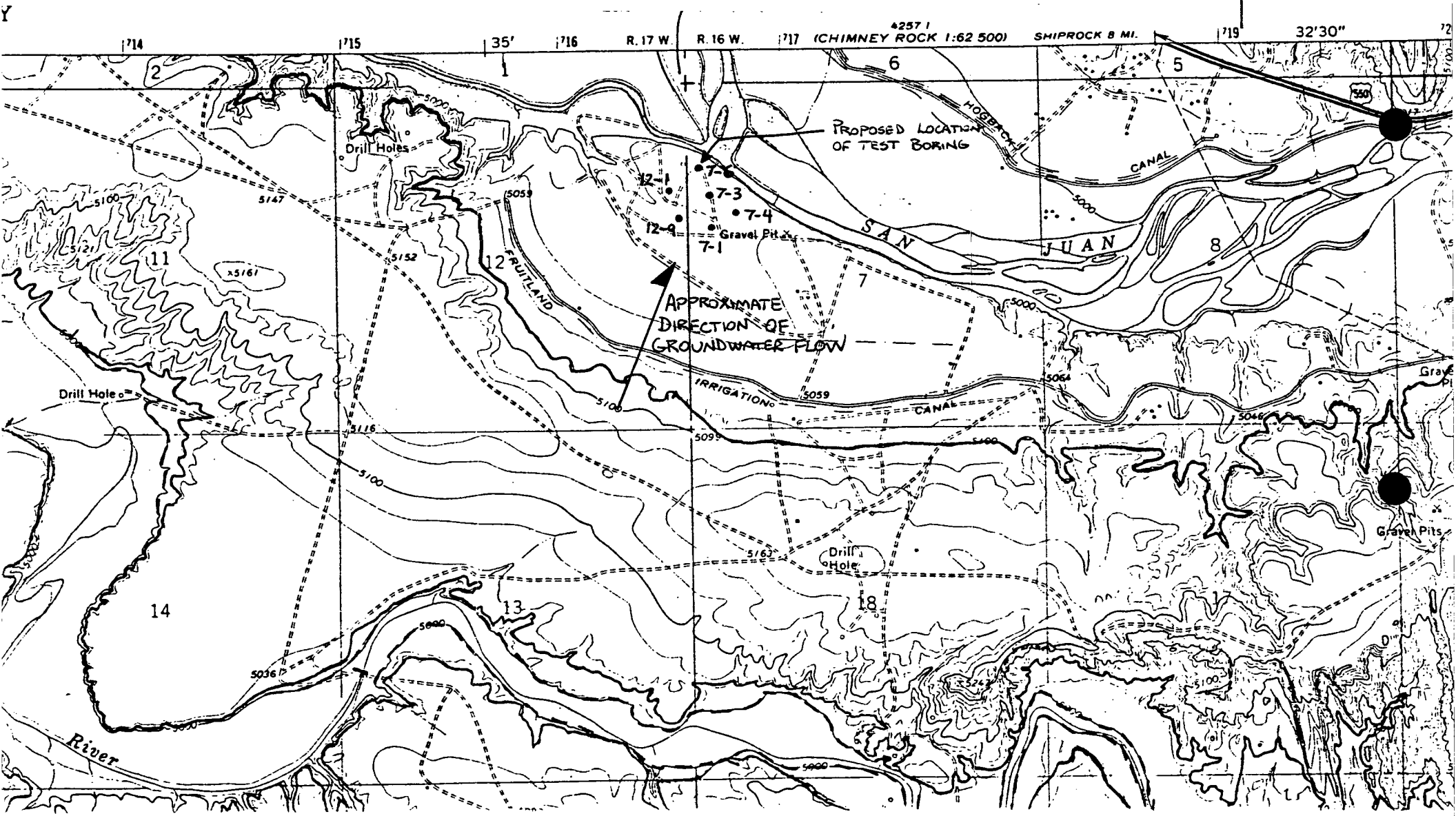
JCB

cc: John Bettridge - Duncan Oil, Inc./w attach.
Bill Liess - BLM/w attach.
James Miles - BIA/wo attach.
William C. Olson - OCD/wo attach.
Linda Taylor - BIA/wo attach.
Denny Foust - OCD/w attach.
John Alexander - Dugan Production Corp/wo attach.

Attachments: Figure 1: Site Topo Sheet
U.S. EPA and Industry Papers on Bioremediation

FIGURE 1

DUNCAN OIL, INC.
NORHT HOGBACK UNIT
(From USGS Topo Sheet)



BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

September 14, 1995

Mr. James D. Walker
Navajo Nation EPA
P.O. Box 1979
Shiprock, NM 87420

Mr. James Miles
Bureau of Indian Affairs
1400 La Plata Highway
Farmington, NM 87401

Mr. Denny Foust
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

Mr. William C. Olson
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

Mr. Bill Liess
Bureau of Land Management
U.S. Department of the Interior
1235 La Plata Highway
Farmington, NM 87401

Ms. Linda Taylor
Bureau of Indian Affairs
1400 La Plata Highway
Farmington, NM 87401

Re: Duncan Oil, Inc. - North Hogback Unit Pit Assessments

Enclosed, please find one copy of initial pit assessments for the Duncan Oil, Inc. North Hogback Unit, located on the Navajo Nation in San Juan County, New Mexico. These assessments were conducted pursuant to the Pit Closure Plan submitted by Dugan Production Company and Blagg Engineering, Inc. on March 23, 1995.

If you have additional questions or comments concerning this transmittal, Blagg Engineering, Inc. may be contacted at (505)632-1199.

Respectfully,
Blagg Engineering, Inc.

Jeffrey C. Blagg

Jeffrey C. Blagg, PE
President

JCB

cc: John Bettridge - Duncan Oil, Inc.
John Alexander - Dugan Production Corporation

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

September 14, 1995

Mr. John Bettridge
Duncan Oil, Inc.
1777 South Harrison Street - Penthouse One
Denver, Colorado 80210 - 3925

Re: Initial Pit Assessment Results & Recommended Remediation Program
Unlined Surface Impoundments at PxA Well Locations
Duncan Oil, Inc. North Hogback Unit - Navajo Tribal Lands

Dear Mr. Bettridge:

Blagg Engineering, Inc. (BEI) is pleased to submit initial pit assessment results and recommendations for remediation of unlined surface impoundments at the Duncan Oil, Inc. North Hogback Unit. Initial assessment of 10 pits located at the abandoned unit were conducted pursuant to the Pit Closure Plan submitted by Dugan Production Company and BEI on March 23, 1995. This closure plan was approved by the Navajo Nation EPA with letter dated April 25, 1995, by the U.S. Bureau of Land Management with letter dated May 31, 1995 and by the New Mexico Oil Conservation Division with letter dated May 22, 1995.

The pit assessment investigation was initiated on June 13, 1995. Regulatory agencies, including the Navajo EPA, U.S. BLM and the Bureau of Indian Affairs were provided 48 hours advanced notice of intent to begin pit assessment work. Mr. James Walker of the Navajo EPA was present to observe excavation and testing activities on the mornings of June 13 - 14, during which a total of 10 pits on 7 separate PxA well locations were identified and assessed. The PxA well locations and pits were labelled as follows:

PxA Well Location	Pit Identification
North Hogback #6-6	1 Production (separator) Pit
North Hogback #7-1	1 Production (separator) Pit 1 Tank Drain Pit
North Hogback #7-3	1 Production (separator) Pit
North Hogback #7-4	1 Production (separator) Pit
North Hogback #7-6	1 Production (separator) Pit 2 Tank Drain Pits
North Hogback #12-1	1 Production (separator) Pit

North Hogback #12-6	No Pits Present
North Hogback #12-9	1 Production (separator) Pit

Note that the prior closure plan submittal and BLM Sundry Notices identified one production pit at each of the PxA well locations listed above. During assessment activities, one previously missed tank drain pit was found at the North Hogback #7-1 location and two previously missed tank drain pits were found at the North Hogback #7-6 location. Additionally, there were no pits associated with the North Hogback #12-6 location.

The Navajo Nation EPA set a closure standard of 100 ppm total petroleum hydrocarbons (TPH) at all of the North Hogback pits due to the proximity of the San Juan River.

ASSESSMENT METHODOLOGY

Each of the unlined surface impoundments located in the Section 7 and Section 12 leases were evaluated using a backhoe. These pits are found in a rural area south of the San Juan River with the nearest residence located more than 1/2 mile to the east. The soil lithology at the pits, beginning from the ground surface and extending to the total reach of the backhoe of approximately 15 feet, was found to be cobbles and boulders with diameters of up to 2.5 feet. Soil samples were collected for testing by the field headspace method using an organic vapor meter, and for TPH testing using USEPA Method 418.1. Additionally, at certain pit locations groundwater was encountered and water samples were collected from the open excavations for laboratory testing by USEPA Method 8020 for BTEX. Groundwater monitor wells were installed in some of these open excavations prior to backfilling to facilitate water quality testing and gradient determination. Following assessment all of the pits were backfilled and contoured to approximately match their original depression size and shape.

The unlined surface impoundment at the North Hogback #6-6 site is isolated from the remaining pits in the closure program and it is the only site located north of the San Juan River. The #6-6 pit is found in a rural residential area and is surrounded with cultivated crops. Due to this active farming and the need to minimize surface disturbance, this pit was assessed using a mobile pickup mounted EarthProbe auger rig. Soil borings were advanced immediately adjacent to and surrounding the perimeter of the pit and evaluated for hydrocarbon content using the field headspace method. Additionally, certain samples were tested for TPH content pursuant to USEPA Method 418.1. Groundwater was encountered at a depth of approximately 14 feet below ground surface at this site and three groundwater monitor wells were set for water quality testing and determination of gradient. These wells were sampled and tested for BTEX content on July 3, 1995.

PIT ASSESSMENT RESULTS

Discussion of assessment results for each of the 10 unlined surface impoundments included in the closure program are presented below. Field Reports including site plans, laboratory data sheets and other field data is included separately as an attachment to this report.

North Hogback #6-6 Separator Pit

A total of 8 test holes were drilled with a pickup mounted EarthProbe mobile drill unit using a 2-inch diameter auger. Test holes were placed immediately adjacent to and around the separator pit. Adjacent to the pit, black hydrocarbon contaminated soil with a strong odor was found beginning at a depth of 5 feet below ground surface and extending to a depth of 14 feet below ground surface. Test hole TH1, located on the northeast edge of the pit, tested a TPH value of 1,900 parts per million (ppm) at a depth of 10 feet below ground surface. Test hole TH8, located approximately 80 feet northeast of the pit, registered a TPH value of 62 ppm at 13 feet below ground surface. The applicable regulatory standard for TPH at this site is 100 ppm. Test hole TH6 located 20 feet east of the pit, and test holes TH4 and TH5, located between 33 feet and 42 feet southwest of the pit, presented no odor or stain of contamination, with field headspace values all below 12 ppm.

The soil lithology from the ground surface to a depth of approximately 15 feet was a sand to clay mixture. Boulders and/or cobbles were encountered at the 15 foot depth below ground surface and drill holes could not be advanced below this depth. Groundwater was found at depths ranging from 13 to 15 feet below ground surface.

Groundwater monitor wells were placed in test holes TH7 (MW#1), TH5(MW#2) and TH8(MW#3). These wells were sampled on July 3, 1995 and submitted for laboratory determination of benzene, toluene, ethylbenzene and total xylenes (BTEX) by USEPA Method 8020. Laboratory analytical results on the water samples were as follows:

Table 1
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #6-6 Separator Pit
July 3, 1995

Monitor Well	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
MW#1	1.8	0.9	1	4.6
MW#2	ND	ND	ND	0.4
MW#3	4.8	7.8	2.9	14.6
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

As indicated in Table 1, none of the groundwater samples collected from the North Hogback #6-6 location were in excess of water quality standards for any of the BTEX constituents. Although soil impacts immediately adjacent to the pit were in excess of allowable standards, groundwater impacts appear to be minimal. Blagg Engineering, Inc. has observed similar minimal groundwater impacts at other locations where low gravity oils, as those associated with the North Hogback Unit, are encountered.

The groundwater gradient was determined by surveying well tops and measuring the static depth to water in each of the three groundwater monitor wells. Water level measurements indicate that groundwater is flowing towards the northwest.

North Hogback #7-1 Separator Pit

The assessment at the North Hogback #7-1 location was conducted with a backhoe due to the presence of large cobbles and boulders beginning at the ground surface and extending to the total 15 feet reach of the backhoe. The separator pit bottom contained black stained soils with a strong odor. This contamination extended to the total depth of the hole of 10 feet, where groundwater was encountered. Three additional test pits were dug around the separator pit, with one hole dug to the south and two holes to the north, to determine the extent of contamination migration. There was no contamination apparent approximately 15 feet south of the pit. One test hole dug 10 feet north of the pit encountered contamination immediately above the water table at 10 feet below ground surface, and another test hole dug 25 feet north east of the pit indicated minimal to no contamination. No TPH tests were run on the soil samples.

Water samples were collected from the open test holes within the separator pit, to the north and to the south. These samples were submitted for laboratory determination of BTEX, with results as follows:

Table 2
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #7-1 Separator Pit
Water Samples Collected From Open Test Holes
June 14, 1995

Test Hole	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
TH1, in sep. pit	18.3	309.4	113	168.8
TH3, 15' S of pit	ND	ND	ND	ND
TH4, 25' NE of pit	0.9	3.9	0.9	3.8
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Due to indications of benzene levels above water quality standards, additional testing was performed at this site. Groundwater monitoring wells were placed in TH3 (identified as monitor well MW#1, located south of the separator pit) and TH1 (identified as monitor well MW#2, located within the separator pit) during backfill operations. Monitor well MW#2 was subsequently sampled on July 3, 1995 with test results as indicated in Table 3:

Table 3
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #7-1 Separator Pit
July 3, 1995

Monitor Well	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
MW#2	7.5	13.6	83.9	493.6
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Benzene in monitor well MW#2 (placed in test hole TH1) was found to test below water quality standards. Original sampling in the open pit may have tested high due to sampling methodology in the open pit. Monitor well MW#1 was not sampled due to non-detect results of the original test hole TH3 water sampling.

Water sample test results for this site indicate that groundwater has had minimal impact. A survey of relative groundwater elevations for monitor wells placed at this and adjacent pits indicates that groundwater is flowing in a northeast direction.

North Hogback #7-1 Tank Pit

At the North Hogback #7-1 location there is a tank pit located approximately 40 feet north of the separator pit. In test hole TH1 located in the tank pit, black, contaminated soil with a strong odor was present from the pit bottom and extending to a depth of approximately 13 feet, where groundwater was encountered. Additional test holes were dug with TH2 at 25 feet north of the tank pit (odor and soil staining between 10 -11 feet below ground surface), TH3 at 60 feet north of the tank pit (no odor or staining) and TH4 at 20 feet west of the tank pit (no odor or staining). Groundwater was encountered in all the test holes and water samples were collected from TH1, TH3 and TH4 and submitted for laboratory determination of BTEX. Results were as follows:

Table 4
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #7-1 Tank Pit
Water Samples Collected From Open Test Holes
June 14, 1995

Test Hole	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
TH1, in tank pit	1.1	8.9	4.05	372.3
TH3, 60' N of pit	ND	ND	ND	ND
TH4, 20" W of pit	ND	ND	ND	ND
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Groundwater monitoring wells were placed in TH1 (identified as monitor well MW#3, located in the tank pit) and TH4 (identified as monitor well MW#4, located approximately 60 feet north of the tank pit) during backfill operations. Monitor well MW#3 was subsequently sampled on July 3, 1995 with test results as indicated in Table 5:

Table 5
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #7-1 Tank Pit
July 3, 1995

Monitor Well	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
MW#3	ND	13.1	39.4	292.2
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Monitor well MW#4 was not sampled due to non-detect results of the original test hole TH4 water sampling.

Water sample test results for this site indicate that groundwater has had minimal impact. A survey of relative groundwater elevations for monitor wells placed at this and adjacent pits indicates that groundwater is flowing in a northeast direction.

North Hogback #7-3 Separator Pit

A single test hole was excavated with a backhoe in the North Hogback #7-3 separator pit. Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 15 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. A TPH was run on a soil sample collected at the base of the hole with test results of 17,200 ppm. Note that the closure standard for this site is 100 ppm.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #7-4 Separator Pit

A single test hole was excavated with a backhoe in the North Hogback #7-4 separator pit. Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 15 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. A TPH was run on a soil sample collected at the base of the hole with test results of 8,800 ppm. The closure standard for this site is 100 ppm.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #7-6 Separator Pit

A single test hole was excavated with a backhoe in the North Hogback #7-6 separator pit. Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 12 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. A TPH was run on a soil sample collected at the base of the hole with test results of 15,200 ppm. Again, the closure standard for this site is 100 ppm.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #7-6 Tank Pit (North)

The North Hogback #7-6 location was found to have 2 tank pits in addition to a single separator pit. The tanks pits were labelled by Blagg Engineering as the North pit and the South pit and they were likely associated with the Section 12 lease.

A single test hole was excavated with a backhoe in the North Hogback #7-6 tank pit (North). Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 14 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. A TPH was run on a soil sample collected at the base of the hole with test results of 12,700 ppm. Again, the closure standard for this site is 100 ppm.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #7-6 Tank Pit (South)

A single test hole was excavated with a backhoe in the North Hogback #7-6 tank pit (South). Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 14 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. No TPH samples were run on this pit, but it is estimated that a value in excess of 10,000 ppm would be likely based on samples run in similar contamination on other nearby pits.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #12-1 Separator Pit

A single test hole was excavated with a backhoe in the North Hogback #12-1 separator pit. Lithology was cobbles and boulders extending from the pit surface to the total reach of the backhoe of 15 feet below ground surface. Gross hydrocarbon contamination with a strong odor was encountered in the entire interval. A TPH was run on a soil sample collected at the base of the hole with test results of 4,200 ppm. As with all locations in the North Hogback Unit, the closure standard for this site is 100 ppm.

The excavation equipment was not capable of extending the investigation to a deeper depth and the hole was backfilled and contoured to its approximate original condition. No groundwater was encountered.

North Hogback #12-9 Separator Pit

The assessment at the North Hogback #12-9 location was conducted with a backhoe. The separator pit bottom contained black stained soils with a strong odor. This contamination extended to a depth of 11 feet, where groundwater was encountered. Four additional test pits were dug around the separator pit, with one hole dug to the west and three holes to the north, to determine the extent of

contamination migration. Test hole TH2 to the west did not encounter soil contamination at a distance of 15 feet from the west boundary of the separator pit. Test hole TH3 (20 feet north of the separator pit), test hole TH4 (40 feet north of the separator pit) and test hole TH5, (60 feet north of the separator pit) all indicated light hydrocarbon staining and odor immediately above the water table surface, located approximately 8 - 9 feet below ground surface. No TPH tests were run on the soil samples.

Water samples were collected from the open test holes within the separator pit (TH1), to the west (TH2) and to the south (TH5). These samples were submitted for laboratory determination of BTEX, with results as follows:

Table 6
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #12-9 Separator Pit
Water Samples Collected From Open Test Holes
June 14, 1995

Test Hole	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
TH1, in sep. pit	1.1	7.7	2.5	7.8
TH2, 15' W of pit	ND	ND	ND	ND
TH5, 60' N of pit	ND	ND	ND	ND
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Groundwater monitoring wells were placed in TH1 (identified as monitor well MW#1, located in the separator pit) and TH5 (identified as monitor well MW#2, approximately 60 feet north of the separator pit) during backfill operations. Monitor well MW#1 was subsequently sampled on July 3, 1995 with test results as indicated in Table 7:

Table 7
Groundwater Quality
Duncan Oil, Inc. North Hogback Well #12-9 Separator Pit
July 3, 1995

Monitor Well	Benzene ug/L or ppb	Toluene ug/L or ppb	Ethylbenzene ug/L or ppb	Total Xylenes ug/L or ppb
MW#1	ND	4.4	ND	29.5
Allowable Limit	10	750	750	620

ND = below laboratory detection limits

Monitor well MW#2 was not sampled due to non-detect results of the original test hole TH5 water sampling.

Water sample test results for this site indicate that groundwater has had minimal impact. A survey of relative groundwater elevations for monitor wells placed at this and adjacent pits indicates that groundwater is flowing in a northeast direction.

PIT ASSESSMENT SUMMARY

Each of the 10 unlined surface impoundments at the North Hogback Unit evaluated by Blagg Engineering, Inc. indicated soil contamination was present in excess of allowable standards. Test holes advanced around pits determined that the areal extent of contamination to be limited, and that contamination appears to advance vertically. No thick clays, shales or bedrocks were encountered to prevent vertical migration or cause horizontal spreading. Where groundwater was encountered, soil contamination appeared to travel in the down-gradient direction of the water table surface. This is a normally expected occurrence.

Due to equipment limitations and extreme subsurface conditions of large cobbles and boulders, the vertical extent of soil contamination at the #7-3 (separator pit), #7-4 (separator pit), #7-6 (one separator and two tank pits), and #12-1 (separator pit) could not be determined.

Although soil contamination was found outside of allowable limits at locations where groundwater was encountered, there was limited impact on water quality. A total of 15 separate water samples were collected and submitted for BTEX analysis during the investigation. Only the sample from the Well #7-1 test hole excavation in the separator pit indicated contamination in excess of standards, with a value of 18.3 ppb benzene. A groundwater monitor well subsequently placed in this test pit and sampled for BTEX analysis indicated a benzene concentration of 7.5 ppb. The regulatory standard for benzene is 10 ppb. The sample collected from within the monitor well is believed to be representative of actual water quality and shows benzene to be within regulatory standards.

RECOMMENDED REMEDIATION PROGRAM

Treatment of groundwater is neither recommended or required at the North Hogback Unit since no groundwater contamination in excess of regulatory limits was found. Treatment of soil is required to meet regulatory standards. Blagg Engineering, Inc. recommends an in-situ treatment program to enhance microbial activity for natural bio-degradation of hydrocarbons. A program including application of fresh water mixed with nutrients (common fertilizer) can be expected to accelerate the natural bioremediation process.

The initial recommended treatment program is quarterly stimulation of each of the unlined surface impoundments at the North Hogback Unit using 10 barrels of fresh water mixed with common nutrients. It is recommended to evaluate the effectiveness of this program to determine if a change in the volume or frequency of stimulation may be necessary. A pre-treatment sampling of each pit

bottom with analysis of TPH by USEPA Method 418.1 should be performed, followed by annual pit bottom sampling and analysis by the same method. If hydrocarbon decay rates indicate probable decline to acceptable regulatory standards, no changes in the remediation program will be initiated. If hydrocarbon decay rates indicate standards will not be achieved, alternate bioremediation processes should be investigated.

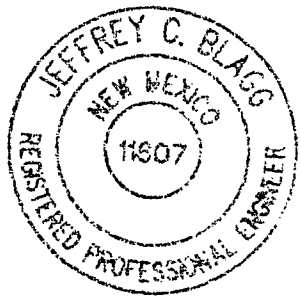
Final closure of a pit will not be conducted until laboratory analyses of soil samples for TPH and BTEX meet regulatory standards.

Please contact Blagg Engineering, Inc. at (505)632-1199 for additional information or clarification.

Respectfully submitted,
Blagg Engineering, Inc.

Jeffrey C. Blagg, PE
President

JCB/



Attachments: Field reports & analytical data results for each pit

NORTH HOGBACK #6-6

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN Oil

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: _____
PAGE No: 1 of 2

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: GEO PROBE/OVM/TPH UNIT

DATE STARTED: 6-14-95
DATE FINISHED: _____
ENVIRO. SPCLT: JCB
OPERATOR: BLAGG

LOCATION: NAME: NORTH HOGBACK SEC 6 WELL #: 6 PIT: PRODUCTION (SEPARATOR)
QUAD/UNIT: SEC: 6 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: PRIVATE FARM LEASE #: _____
SURFACE CONDITIONS: DRY Soil - Cultivated CROP

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 300 FEET NE OF WELLHEAD.
DEPTH TO G.W: 14' NEAREST WATER SOURCE: <500' NEAREST SURFACE WATER <500'
RANKING SCORE: 20 CLOSURE STD: 100 ppm

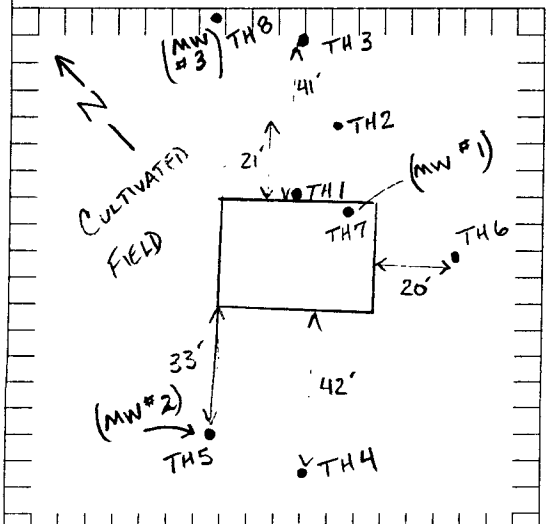
SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
TH#1@10'	GRB	TPH (1,864)
TH#8@13'	GRB	TPH (62)

NOTE: WELLHEAD HAS BEEN REMOVED & NO MARKER PLACED, TO FACILITATE FARMING.

SCALE
0 FEET

PIT
40' x 27' x 4' DEEP

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1 — SOIL TYPE: S; SMPL TYPE: GRB; OVM: 14.3; C; ODOR & STAIN; GRB 437; GRB 217; C; COBBLES; TD 15'

TH#: 2 — SOIL TYPE: S; C; ODOR & STAIN; GRB 402; 59; 16 COBBLE; TD 16'

TH#: 3 — SOIL TYPE: S; C; LITE ODOR NO STAIN; GRB 323; 125; 1; 16 COBBLE; TD 16'

TH#: 4 — SOIL TYPE: S; C; NO ODOR; NO STAIN; GRB 5.5; 2.5; Cobble; TD 15'

SOIL TYPE: C = Clay, M = Silt, S = Sand, G = Gravel Plasticity: L = None, H = Plastic Grading: P = Poorly, W = Well

CLIENT: _____	BLAGG ENGINEERING, INC. P.O. BOX 87, BLOOMFIELD, NM 87413 (505) 632-1199	LOCATION NO: _____

FIELD REPORT: SITE ASSESSMENT

PAGE No: 2 of 2

PROJECT: PIT ASSESSMENT

CONTRACTOR: BLAGG ENGINEERING

DATE STARTED: 6-14-95

DATE FINISHED: _____

LOCATION: NAME: N HOGBACK SEC 6 WELL #: 6 PIT: PRODUCTION

QUAD/UNIT: SEC: 6 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM

FIELD NOTES & REMARKS:

TEST HOLE LOGS

(MW #2) (MW #1) (MW #3)

TH#: 5

SOIL TYPE	SMPL TYPE	OVM/TPH
S	GRB	2.0
C	GRB	12.0

LITE STAIN

COBBLES

TD 15'

TH#: 6

SOIL TYPE	SMPL TYPE	OVM/TPH
S		
C		
	GRB	0.4
	GRB	0.0

NO ODOR

NO STAIN

COBBLES

TD 15'

TH#: 7

SOIL TYPE	SMPL TYPE	OVM/TPH
S		
C		NONE ANALYZED

BLACK

STRONG ODOR

COBBLES

TD 15'

TH#: 8

SOIL TYPE	SMPL TYPE	OVM/TPH
S		
C	GRB	2.6

NO ODOR

NO STAIN

COBBLES

TD 15'

TH#: _____

SOIL TYPE	SMPL TYPE	OVM/TPH

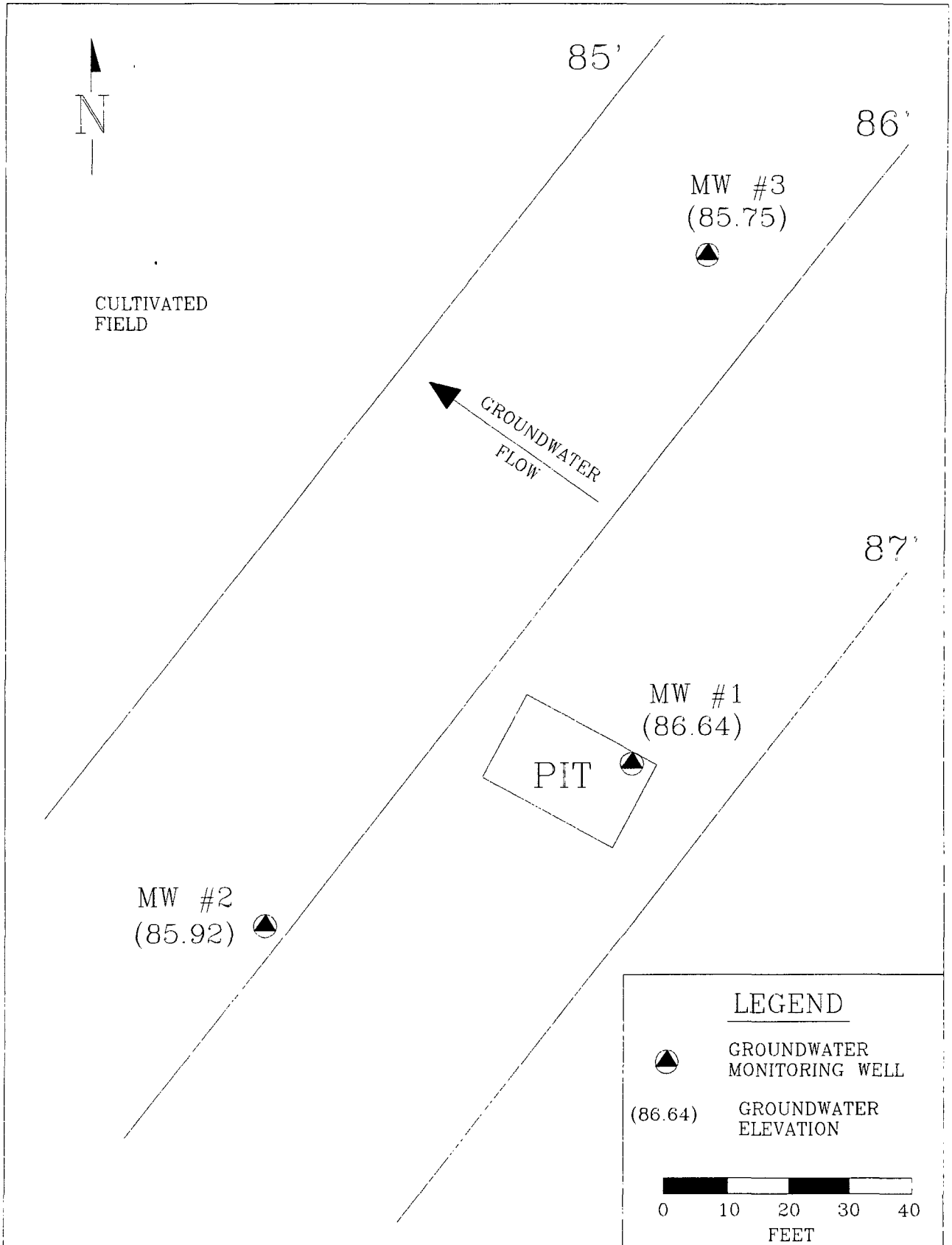
TH#: _____

SOIL TYPE	SMPL TYPE	OVM/TPH

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel

Plasticity: L - None, H - Plasitc

Grading: P - Poorly, W - Well



NORTH HOGBACK UNIT
WELL 6-6
SEC. 6, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE
DIAGRAM

SHEET: A1 | DRWN: JULY 95
REV:

DRWN BY: REO | PRJ. MGR: JCB
REV BY:

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 10'	Date Analyzed:	6-15-95
Project Location:	North Hogback 6 #6	Date Reported:	6-20-95
Laboratory Number:	TPH-1537	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**1,900**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

J. C. Blagg
Analyst

R. E. O'Neill
Review

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH8 @ 13'	Date Analyzed:	6-30-95
Project Location:	North Hogback 6 #6	Date Reported:	6-30-95
Laboratory Number:	TPH-1538	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**62**	**10**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

J. C. Blagg
Analyst

Nelson Velez
Review

CHAIN OF CUSTODY RECORD

3127

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7-3-95

Page 1 of 1

Purchase Order No.: | Job No. DUNCAN OIL

SEND INVOICE TO
Name
Company BLAGG ENGINEERING | Dept.
Address P.O. BOX 87
City, State, Zip BLOOMFIELD NM 87413

REPORT RESULTS TO
Name JEFF BLAGG | Title
Company SAME
Mailing Address
City, State, Zip
Telephone No. 632-1199 | Telefax No. 632-3903

Sampling Location: NORTH HOGBACK LOCATIONS

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	LAB ID
WELL 6-6, M.W. #1	7-3	0840	water	HgCl2	2	✓	7117-3127
WELL 6-6, M.W. #2	7-3	0857	"	"	2	✓	7118
WELL 6-6, M.W. #3	7-3	0917	"	"	2	✓	7119
WELL 12-9, MW #1	7-3	1133	"	"	2	✓	7120
WELL 7-1, MW #2	7-3	1040	"	"	2	✓	7121
WELL 7-1, MW #3	7-3	1050	"	"	2	✓	7177

ANALYSIS REQUESTED

Relinquished by: R E. O'Neill	Date/Time 7-3 1245	Received by:	Date/Time 7/5 1145
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 7-3-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7117*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 6-6, MW#1***				
Sampled by:	REO	Date:	7/3/95	Time:	8:40
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	1.8	*0.2*
Toluene	0.9	*0.2*
Ethylbenzene	1.0	*0.2*
m,p-Xylene	3.0	*0.2*
o-Xylene	1.6	*0.2*
	TOTAL 8.3 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: CJA
Date: 7/5/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7118*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 6-6, MW#2***				
Sampled by:	REO	Date:	7/3/95	Time:	8:57
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	0.4	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.4 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DaK
Date: 7/5/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7119*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 6-6, MW#3***				
Sampled by:	REO	Date:	7/3/95	Time:	9:17
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	4.8	*0.2*
Toluene	7.8	*0.2*
Ethylbenzene	2.9	*0.2*
m,p-Xylene	1.3	*0.2*
o-Xylene	13.3	*0.2*
	TOTAL 30.1 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DaGx
Date: 7/5/95

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 7/5/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	19	3	15%
Toluene	ppb	20	19	5	15%
Ethylbenzene	ppb	20	19	7	15%
m,p-Xylene	ppb	40	38	5	15%
o-Xylene	ppb	20	18	9	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	100	96	(39-150)	3	20%
Toluene	96	94	(46-148)	2	20%
Ethylbenzene	99	97	(32-160)	1	20%
m,p-Xylene	98	96	(35-145)	2	20%
o-Xylene	86	84	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
7117-3127	98		

S1: Flourobenzene

NORTH HOGBACK #7-1

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN OIL

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: 3086

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: CAT BACKHOE / OVM / TPH UNIT

DATE STARTED: 6-13-95
DATE FINISHED: 6-14-95
ENVIRO. SPCLT: JCB / REO
OPERATOR: EPC

LOCATION: NAME: N. HOGBACK UNIT SEC. 7 WELL #: 1 PIT: PRODUCTION (SEPARATOR) SOUTH
QUAD/UNIT: 2310' N. 330' W. SEC: 7 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: OIL STAINED GRAVEL / COBBLE - DRY

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 25' FEET N 15°W OF WELLHEAD.
DEPTH TO G.W: 250' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100 ppm

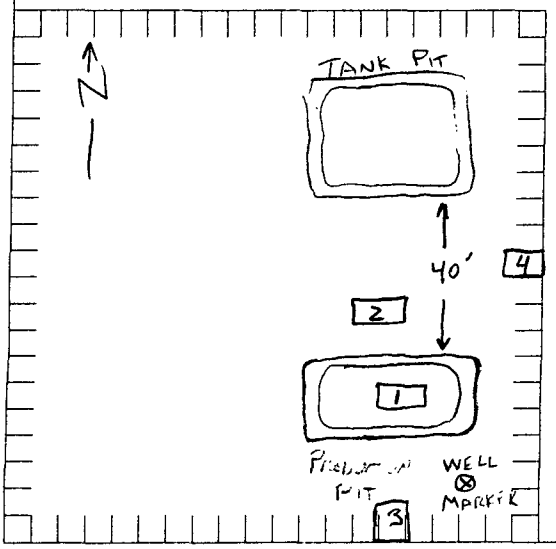
BLACK STAIN ~ 1' BENEATH PIT BOTTOM.
GROSS CONTAMINATION TO WATER TABLE.
TH2 WATER: SLIGHT ODOR + SHEEN (10' FROM PIT)
TH 3 WATER: NO ODOR / SHEEN. (15' FROM PIT)
TH 4 WATER: NO SHEEN, SWAMPY ODOR. (~25' FROM EACH PIT)

SAMPLE INVENTORY

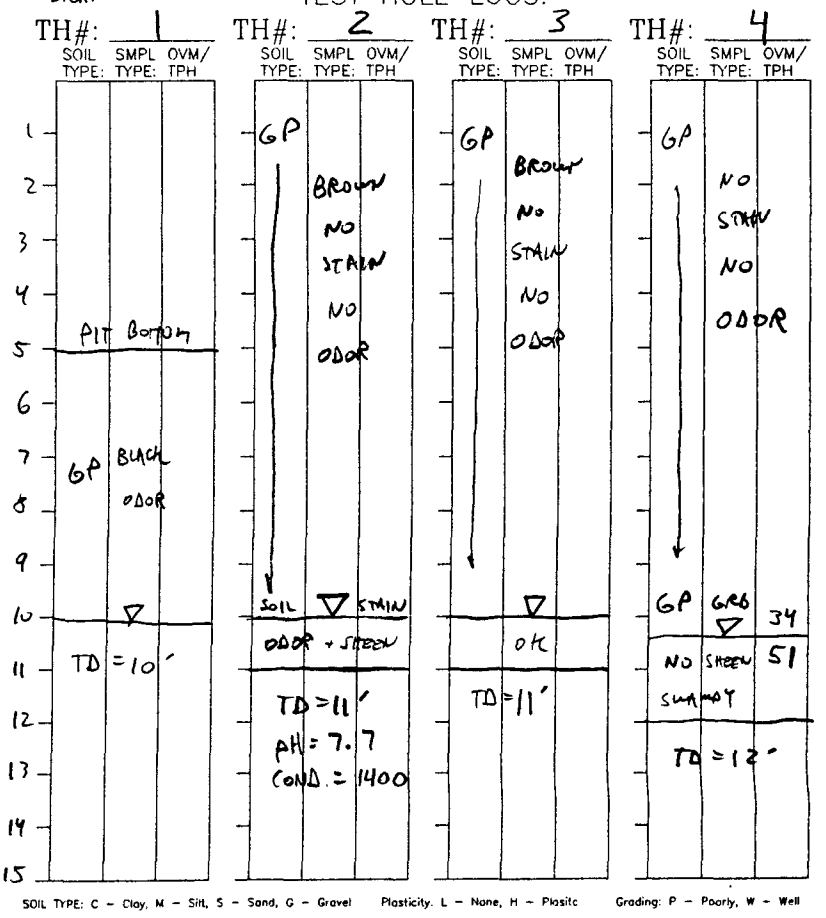
	SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
	TH1@10'	WATER	BTEX
6-14	TH3 @10'	WATER	BTEX
6-14	TH4 @10.5'	WATER	BTEX

SCALE
0 10 20 FEET
12'×25'×5' DEEP

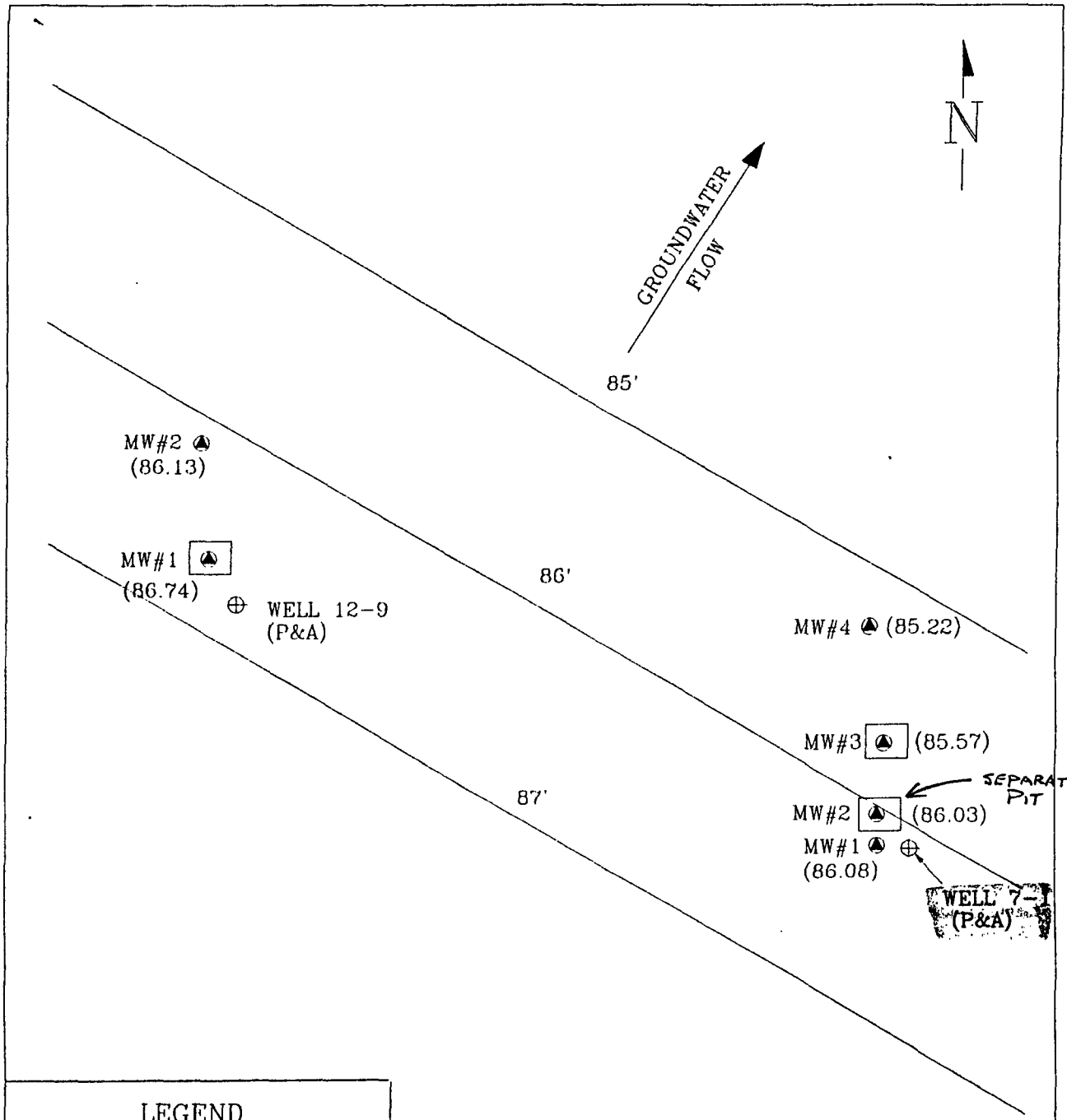
SITE DIAGRAM



TEST HOLE LOGS:



SOIL TYPE: C – Clay, M – Silt, S – Sand, G – Gravel Plasticity: L – None, H – Plastic Grading: P – Poorly, W – Well



LEGEND

GROUNDWATER MONITORING WELL

(86.64) GROUNDWATER ELEVATION

0 100 200

FEET

NORTH HOGBACK UNIT
WELLS 12-9 & 7-1
SEC. 7&12, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE DIAGRAM

SHEET: A1	DRWN: JULY 95 REV:
DRWN BY: REO REV BY:	PRJ MGR: JCB

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/14/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample ID:*	*6785*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*4-1183*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Prod. Pit - TH1 @ 10'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:45
Analyzed by:	DC	Date:	6/14/95		
Sample Matrix:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	18.3	*0.2*
Toluene	309.4	*0.2*
Ethylbenzene	113.0	*0.2*
m,p-Xylene	134.5	*0.2*
o-Xylene	34.3	*0.2*
	TOTAL 609.6 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Ja 4
Date: 6/14/95

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*2947*
Address:	*P.O. Box 87*	*Sample No.*	*6852*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Production Pit - TH3 @ 10'***				
Sampled by:	REO	Date:	6/14/95	Time:	12:00
Analyzed by:	DC	Date:	6/19/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	ND	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.0 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Da 4

Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*2947*
Address:	*P.O. Box 87*	*Sample No.*	*6853*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Production Pit - TH4 @ 10.5'***				
Sampled by:	REO	Date:	6/14/95	Time:	12:50
Analyzed by:	DC	Date:	6/19/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	***Measured Concentration ug/L***	***Detection Limit Concentration ug/L***
Benzene	0.9	*0.2*
Toluene	3.9	*0.2*
Ethylbenzene	0.9	*0.2*
m,p-Xylene	0.6	*0.2*
o-Xylene	3.2	*0.2*
	TOTAL 9.5 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DaG
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7121*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 7-1, MW#2***				
Sampled by:	REO	Date:	7/3/95	Time:	10:40
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	7.5	*0.2*
Toluene	13.6	*0.2*
Ethylbenzene	83.9	*0.2*
m,p-Xylene	396.0	*0.2*
o-Xylene	97.6	*0.2*
	TOTAL 598.6 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DAK
Date: 7/5/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 7/5/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	19	3	15%
Toluene	ppb	20	19	5	15%
Ethylbenzene	ppb	20	19	7	15%
m,p-Xylene	ppb	40	38	5	15%
o-Xylene	ppb	20	18	9	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	100	96	(39-150)	3	20%
Toluene	96	94	(46-148)	2	20%
Ethylbenzene	99	97	(32-160)	1	20%
m,p-Xylene	98	96	(35-145)	2	20%
o-Xylene	86	84	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
7117-3127	98		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

3127

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7-3-95

Page 1 of 1

Purchase Order No.: | Job No. DUNCAN OIL

SEND INVOICE TO
Name:
Company: BLAGG ENGINEERING | Dept.:
Address: P.O. BOX 87
City, State, Zip: BLOOMFIELD NM 87413

REPORT RESULTS TO
Name: JEFF BLAGG | Title:
Company: SAME
Mailing Address:
City, State, Zip:
Telephone No.: 632-1199 | Telefax No.: 632-3903

Sampling Location: NORTH HOGBACK LOCATIONS

Sampler: R. E. O'NEILL

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	LAB ID
WELL 6-6, M.W. #1	7-3	0840	water	HgCl2	2	✓	7117-3127
WELL 6-6, M.W. #2	7-3	0857	"	"	2	✓	7118
WELL 6-6, M.W. #3	7-3	0917	"	"	2	✓	7119
WELL 12-9, MW #1	7-3	1133	"	"	2	✓	7120
WELL 7-1, MW #2	7-3	1040	"	"	2	✓	7121
WELL 7-1, MW #3	7-3	1050	"	"	2	✓	7177

Relinquished by: R E. O'Neill	Date/Time 7-3 1245	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 7-3-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/14/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	*Amount*
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	*Units of Measure*	**True Value*	*Analyzed Value*	*% Diff*	*Limit*
Benzene	ppb	20	21	4	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	5	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	*1- Percent Recovered*	*2 - Percent Recovered*	*Limit*	*%RSD*	*Limit*
Benzene	105	108	(39-150)	2	20%
Toluene	89	91	(46-148)	2	20%
Ethylbenzene	49	52	(32-160)	4	20%
m,p-Xylene	-128	-125	(35-145)	-1	20%
o-Xylene	92	95	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	*S1 Percent Recovered*	*S2 Percent Recovered*	*S3 Percent Recovered*
Limits	(70-130)		
6783-3086	102		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

3086

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-13-95

Page 1 of 1

Purchase Order No.:	Job No. DUNCAN OIL		
SEND INVOICE TO: Name		REPORT RESULTS TO: Name R. E. O'NEILL	Title
Company BLAGG ENGINEERING	Dept.	Company SAME	
Address		Mailing Address	
City, State, Zip		City, State, Zip	
		Telephone No.	Telefax No.

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	TDS	CHLORIDE	LAB ID
UNIT 12-9, PROD. PIT - TH2 @ 9'	6-13	1210	WATER	H/Cl	3	✓	✓	✓	6782 - 3086
UNIT 12-9, PROD. PIT - TH1 @ 11'	6-13	1215	WATER	H/Cl	3	✓	✓	✓	6784 - 3086
UNIT 7-1, PROD. PIT - TH1 @ 10'	6-13	1245	WATER	H/Cl	2	✓			6785 - 3086
UNIT 7-1, ANNEX BATT. PIT - TH1 @ 13'	6-13	1310	WATER	H/Cl	2	✓			6786 - 3086

ANALYSIS REQUESTED

Relinquished by: R. E. O'Neill	Date/Time 6-13 1510	Received by:	Date/Time 6/13/95 1510
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-13-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/19/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	20	2	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	4	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	116	123	(39-150)	4	20%
Toluene	107	110	(46-148)	2	20%
Ethylbenzene	108	111	(32-160)	2	20%
m,p-Xylene	111	112	(35-145)	1	20%
o-Xylene	101	104	(35-145)	3	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
6850-2947	102		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-16-95

Purchase Order No.:		Job No.	DUNCAN OIL
SEND INVOICE TO	Name		
	Company	BLAGG ENGINEERING	Dept.
	Address	P.O. BOX 87	
	City, State, Zip	BLOOMFIELD	
REPORT RESULTS TO	Name	R. E. O'NEILL	Title
	Company	SAME	
	Mailing Address		
	City, State, Zip		
	Telephone No.		Telefax No.

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	LAB ID
UNIT 7-1, TANK BATTERY PIT, TH3 @ 10'	6-14	1035	WATER	ICE	2	✓	6850-7947
UNIT 7-1, TANK BATT. PIT, TH4 @ 10'	"	1125	"	"	2	✓	6851
UNIT 7-1, PROD. PIT, TH3 @ 10'	"	1200	"	"	2	✓	6852
UNIT 7-1, PROD. PIT, TH4 @ 10.5'	"	1250	"	"	2	✓	6853
UNIT 12-9, PROD. PIT, TH5 @ 9'	"	1420	"	"	2	✓	6854

ANALYSIS REQUESTED

Relinquished by:	R. E. O'Neill	Date/Time 6-16 0746	Received by: Nelson Velez
Relinquished by:	Nelson Velez	Date/Time 6/17/95 1105	Received by:
Relinquished by:		Date/Time	Received by: Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-16-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

NORTH HOGBACK #7-1

TANK PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: 3086

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: CAT BACKHOE/OVM/TPH UNIT

DATE STARTED: 6-13-95
DATE FINISHED: 6-14-95
ENVIRO. SPCLT: JCB/RFO
OPERATOR: EPC

LOCATION: NAME: N. HOGBACK UNIT SEC 7 WELL #: 1 PIT: TANK BATTERY (NORTH)
QUAD/UNIT: 2310' N. 330' W. SEC: 7 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-10019
SURFACE CONDITIONS: OIL STAINED GRAVEL/COBBLE - BLACK LIQUID IN PIT BOTTOM

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 85 FEET DUE NORTH OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

GROSS, BLACK CONTAMINATION - HEAVY ODOR. TO WATER TABLE.
COBBLE/SAND MIXTURE.

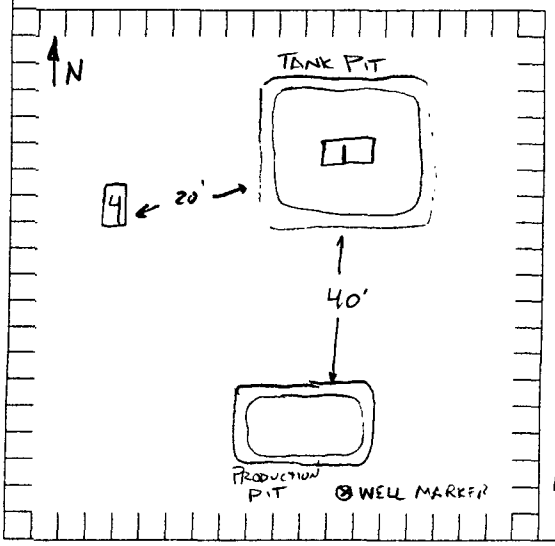
TH2: SLIGHT SHEEN + ODOR (25' FROM PIT)
TH 3: NO ODOR/SHEEN (60' FROM PIT)
TH 4: NO ODOR/SHEEN (20' FROM PIT)

SAMPLE INVENTORY

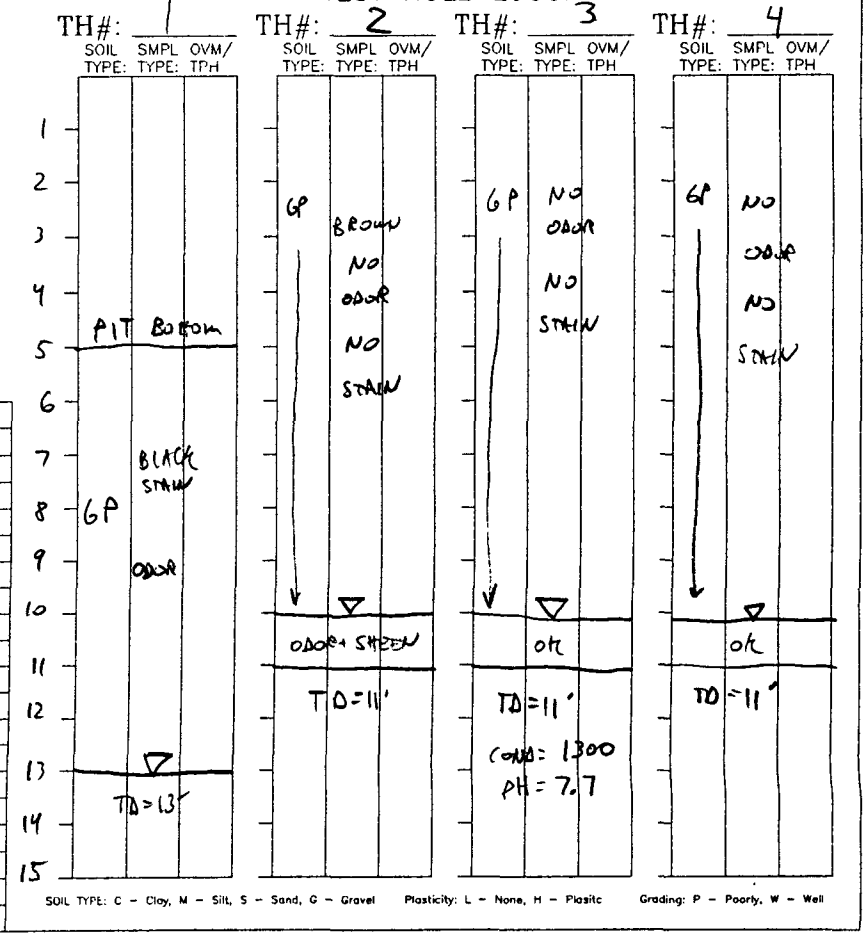
	SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
6-13	TH1@13'	WATER	BTEX
6-14	TH3@10'	"	BTEX
	TH4@10'	"	BTEX
			3

SCALE
0 10 20 FEET
18' x 18' x 5'

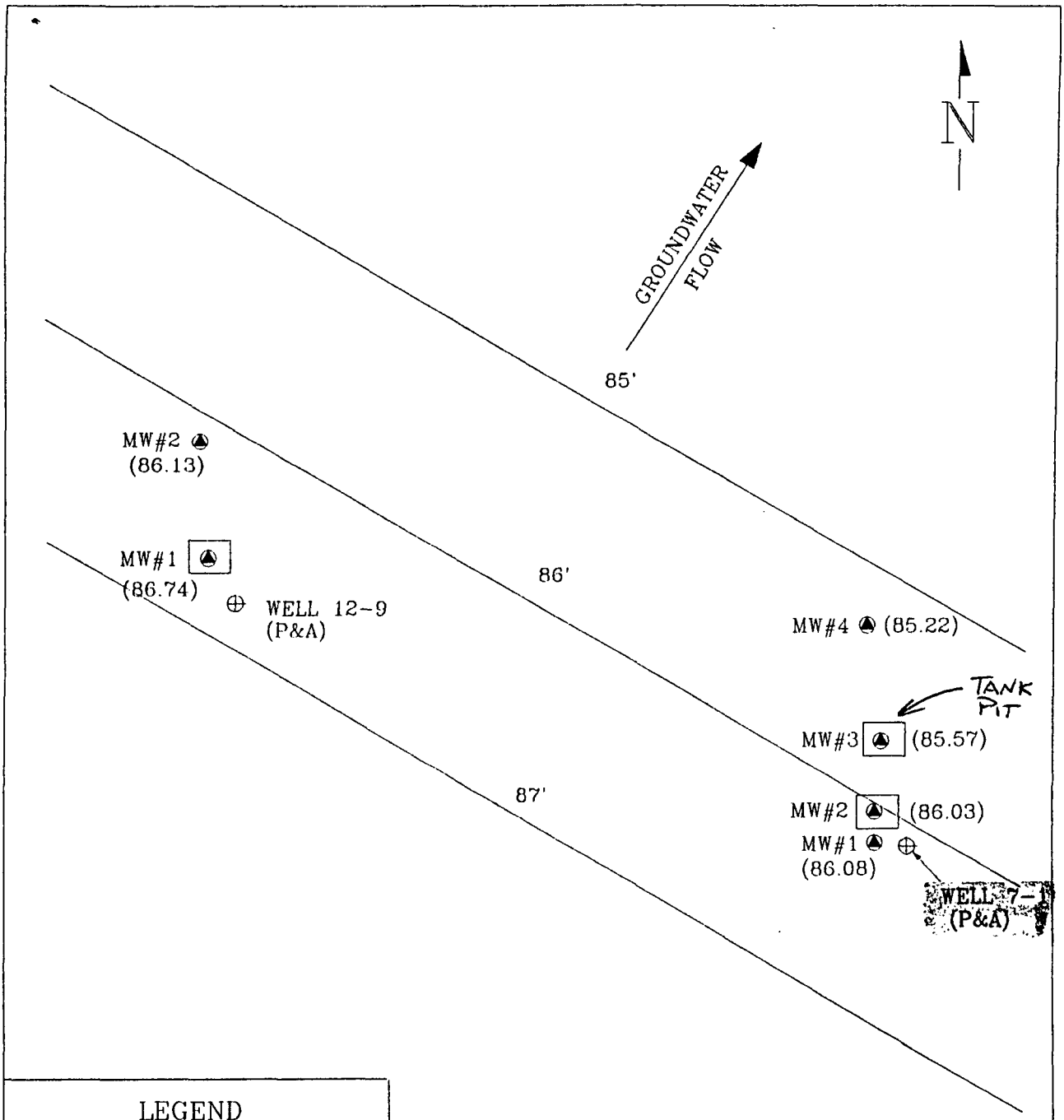
SITE DIAGRAM



TEST HOLE LOGS:



SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plastic Grading: P - Poorly, W - Well



LEGEND

GROUNDWATER MONITORING WELL

(86.64) GROUNDWATER ELEVATION

0 100 200

FEET

NORTH HOGBACK UNIT
WELLS 12-9 & 7-1
SEC. 7&12, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE DIAGRAM

SHEET: A1	DRWN: JULY 95 REV:
DRWN BY: REO REV BY:	PRJ MGR: JCB

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/14/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample ID:*	*6786*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*4-1183*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Tank Batt. Pit - TH1 @ 13'***				
Sampled by:	REO	Date:	6/13/95	Time:	13:10
Analyzed by:	DC	Date:	6/14/95		
Sample Matrix:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	1.1	*0.2*
Toluene	8.9	*0.2*
Ethylbenzene	40.5	*0.2*
m,p-Xylene	371.7	*0.2*
o-Xylene	0.6	*0.2*
	TOTAL 422.7 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: JK
Date: 6/14/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*2947*
Address:	*P.O. Box 87*	*Sample No.*	*6850*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Tank Battery Pit - TH3 @ 10'***				
Sampled by:	REO	Date:	6/14/95	Time:	10:35
Analyzed by:	DC	Date:	6/19/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	ND	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.0 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Da G
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*2947*
Address:	*P.O. Box 87*	*Sample No.*	*6851*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 7-1, Tank Battery Pit - TH4 @ 10'***				
Sampled by:	REO	Date:	6/14/95	Time:	11:25
Analyzed by:	DC	Date:	6/19/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	ND	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.0 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: DaG
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7122*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 7-1, MW#3***				
Sampled by:	REO	Date:	7/3/95	Time:	10:50
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	13.1	*0.2*
Ethylbenzene	39.4	*0.2*
m,p-Xylene	282.1	*0.2*
o-Xylene	10.1	*0.2*
	TOTAL 344.7 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Dale
Date: 7/5/95

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7-3-95

Page 1 of 1

Purchase Order No.: | Job No. DUNCAN OIL

SEND INVOICE TO
Name
Company BLAGG ENGINEERING | Dept.
Address P.O. BOX 87
City, State, Zip BLOOMFIELD NM 87413

REPORT RESULTS TO
Name JEFF BLAGG | Title
Company SAME
Mailing Address
City, State, Zip
Telephone No. 632-1199 | Telefax No. 632-3903

Sampling Location: NORTH HOGBACK LOCATIONS

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	LAB ID
WELL 6-6, M.W. #1	7-3	0840	WATER	H2SO4	2	✓	7117-7127
WELL 6-6, M.W. #2	7-3	0857	"	"	2	✓	7118
WELL 6-6, M.W. #3	7-3	0917	"	"	2	✓	7119
WELL 12-9, MW #1	7-3	1133	"	"	2	✓	7120
WELL 7-1, MW #2	7-3	1040	"	"	2	✓	7121
WELL 7-1, MW #3	7-3	1050	"	"	2	✓	7122

ANALYSIS REQUESTED

Relinquished by: R E. O'Neill | Date/Time 7-3 1245 | Received by: | Date/Time
Relinquished by: | Date/Time | Received by: | Date/Time
Relinquished by: | Date/Time | Received by: | Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 7-3-95
(Client Signature Must Accompany Request)

Rush | 24-48 Hours | 10 Working Days | Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 7/5/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	19	3	15%
Toluene	ppb	20	19	5	15%
Ethylbenzene	ppb	20	19	7	15%
m,p-Xylene	ppb	40	38	5	15%
o-Xylene	ppb	20	18	9	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	100	96	(39-150)	3	20%
Toluene	96	94	(46-148)	2	20%
Ethylbenzene	99	97	(32-160)	1	20%
m,p-Xylene	98	96	(35-145)	2	20%
o-Xylene	86	84	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
7117-3127	98		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

3086

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-13-95

Page 1 of 1

Purchase Order No.:	Job No. DUNCAN OIL		
SEND INVOICE TO: Name			
Company BLAGG ENGINEERING	Dept.		
Address			
City, State, Zip			
REPORT RESULTS TO: Name R E O'NEILL	Title		
Company SAME			
Mailing Address			
City, State, Zip			
Telephone No.	Telefax No.		

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	TDS	CHLORIDE	LAB ID
UNIT 12-9, PROD. PIT - TH2 @ 9'	6-13	1210	WATER	H,Cl2	3	✓	✓	✓	6783-3086
UNIT 12-9, PROD. PIT - TH1 @ 11'	6-13	1215	WATER	H,Cl2	3	✓	✓	✓	6781-3086
UNIT 7-1, PROD. PIT - TH1 @ 10'	6-13	1245	WATER	H,Cl2	2	✓			6785-3086
UNIT 7-1, NAVAJO BATT. PIT - TH1 @ 13'	6-13	1310	WATER	H,Cl2	2	✓			6756-3086

Relinquished by: R E O'Neill	Date/Time 6-13 1510	Received by:	Date/Time 6/13/95 1510
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-13-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/14/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	*Amount*
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	*Units of Measure*	**True Value*	*Analyzed Value*	*% Diff*	*Limit*
Benzene	ppb	20	21	4	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	5	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	*1- Percent Recovered*	*2 - Percent Recovered*	*Limit*	*%RSD*	*Limit*
Benzene	105	108	(39-150)	2	20%
Toluene	89	91	(46-148)	2	20%
Ethylbenzene	49	52	(32-160)	4	20%
m,p-Xylene	-128	-125	(35-145)	-1	20%
o-Xylene	92	95	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	*S1 Percent Recovered*	*S2 Percent Recovered*	*S3 Percent Recovered*
Limits	(70-130)		
6783-3086	102		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-16-95

Page 1 of 1

Purchase Order No.:	Job No. DUNCAN OIL		
SEND INVOICE TO: Name		REPORT RESULTS TO: Name R. E. O'NEILL	Title
Company BLAGG ENGINEERING	Dept.	Company SIMCE	
Address P.O. BOX 87		Mailing Address	
City, State, Zip BLOOMFIELD		City, State, Zip	
		Telephone No.	Telefax No.

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	ANALYSIS REQUESTED: BTEX	LAB ID
UNIT 7-1, TANK BATTERY PIT, TH3 @ 10'	6-14	1035	WATER	HNO3	2	✓	6850-7947
UNIT 7-1, TANK BAT. PIT, TH4 @ 10'	"	1125	"	"	2	✓	6851
UNIT 7-1, PROD. PIT, TH3 @ 10'	"	1200	"	"	2	✓	6852
UNIT 7-1, PROD. PIT, TH4 @ 10.5'	"	1250	"	"	2	✓	6853
UNIT 12-9, PROD. PIT, TH5 @ 9'	"	1420	"	"	2	✓	6854

Relinquished by: R. E. O'Neill	Date/Time 6-16 0746	Received by: Nelson Velez	Date/Time 6/16/95 0746
Relinquished by: Nelson Velez	Date/Time 6/17/95 1105	Received by:	Date/Time 6/F/95 1105
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-16-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/19/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	*Amount*
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	*Units of Measure*	**True Value*	*Analyzed Value*	*% Diff*	*Limit*
Benzene	ppb	20	20	2	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	4	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	*1- Percent Recovered*	*2 - Percent Recovered*	*Limit*	*%RSD*	*Limit*
Benzene	116	123	(39-150)	4	20%
Toluene	107	110	(46-148)	2	20%
Ethylbenzene	108	111	(32-160)	2	20%
m,p-Xylene	111	112	(35-145)	1	20%
o-Xylene	101	104	(35-145)	3	20%

Surrogate Recoveries

Laboratory Identification	*S1 Percent Recovered*	*S2 Percent Recovered*	*S3 Percent Recovered*
Limits	(70-130)		
6850-2947	102		

S1: Flourobenzene

NORTH HOGBACK #7-3

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: BACKHOE - EPC
RAYMOND T. DUNCAN

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: FED/JCB
OPERATOR: EPC

LOCATION: NAME: N. HOGBACK 7 WELL #: 3 PIT: PRODUCTION (SEPARATOR)
QUAD/UNIT: I 810'N, 330'W, SEC: 7 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: DRY - LIGHT STAINING

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 35 FEET WEST OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

GROSS, BLACK CONTAMINATION, TO TD of 15'

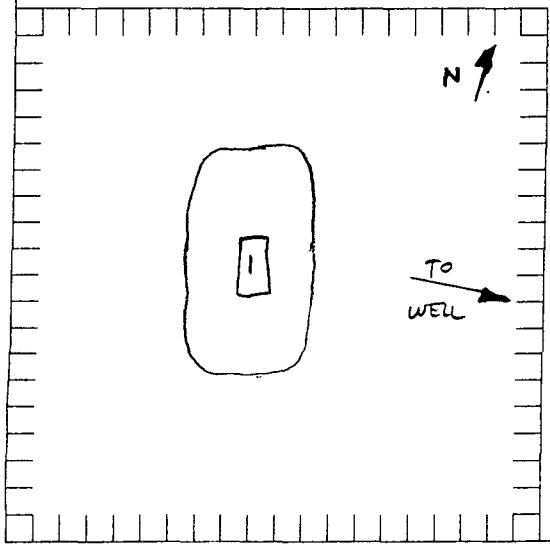
860 x 10 x 2 = 17,200

SAMPLE INVENTORY

SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
TH1@15'	GRAB	TPH

SCALE
0 5 10 FEET
10' x 20' x 3' DEEP

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
PIT BOTTOM		
GP		
GP	GRB	318

TD = 15'

TH#: _____ TH#: _____ TH#: _____

SOIL TYPE:	SMPL TYPE:	OVM/TPH

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plastic Grading: P - Poorly, W - Well

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 15'	Date Analyzed:	6-13-95
Project Location:	North Hogback 7 #3	Date Reported:	6-20-95
Laboratory Number:	TPH-1535	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**17,200**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

NORTH HOGBACK #7-4

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: CAT BACKHOE / OVM / TPH UNIT

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: ACS/REO
OPERATOR: FPC

LOCATION: NAME: N HOGBACK UNIT SEC 7 WELL #: 4 PIT: PRODUCTION
QUAD/UNIT: 2070 FNL 740 FWL SEC: 7 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: SAND / GRAVEL

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 35' FEET N135°W OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

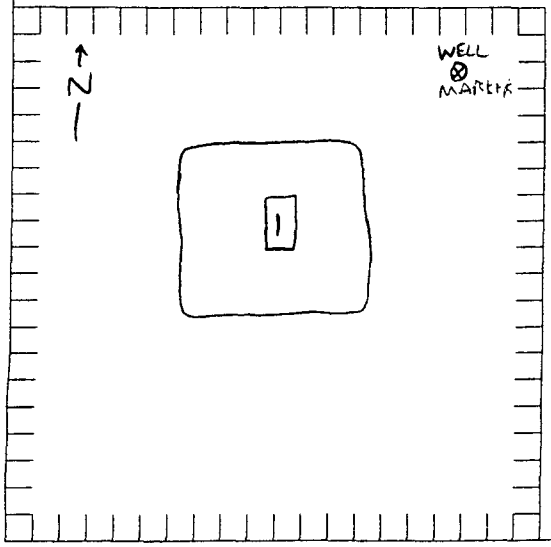
SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
TH1@15'	GRAB	TPH

440 x 2 x 10 = (8,800)

SCALE
0 FEET

PIT
12' x 12' x 4' Deep

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	GRAB	319

TD = 15'

TH#: _____ TH#: _____ TH#: _____

SOIL TYPE: C – Clay, M – Silt, S – Sand, G – Gravel Plasticity: L – None, H – Plastic Grading: P – Poorly, W – Well

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 15'	Date Analyzed:	6-13-95
Project Location:	North Hogback 7 #4	Date Reported:	6-20-95
Laboratory Number:	TPH-1536	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**8,800**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

NORTH HOGBACK #7-6

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN OIL

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____

C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: BACKHOE - EPC

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: REG/JCB
OPERATOR: EPC

LOCATION: NAME: N. HOGBACK 7 WELL #: 6 PIT: PRODUCTION (SEPARATOR)
QUAD/UNIT: I 295 N, 100 W, SEC: 7 TWP: 29 N RNG: 16 W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE / FARMING LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: COBBLE - OIL STAINED - SEVERAL INCHES OF LIQUIDS.

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 35 FEET SOUTH OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: 71000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

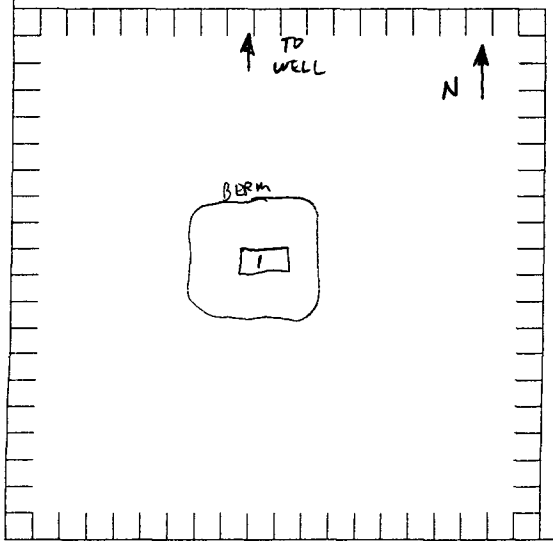
GROSS CONTAMINATION TO MAXIMUM BACKHOE DEPTH ~12'
BLACK STAINED, HEAVY ODOR.

760 x2 x10 = (15,200)

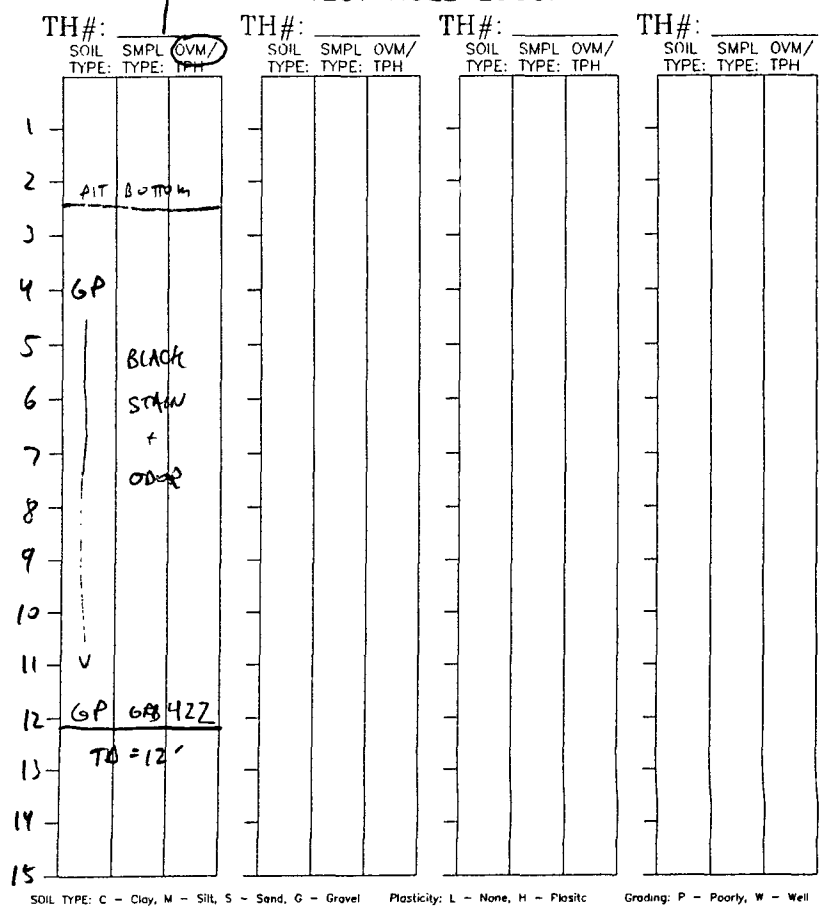
SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
T1@12'	GRAB	418.1

SCALE 10' x 10' x 2.5'
0 5 10 FEET

SITE DIAGRAM



TEST HOLE LOGS:



SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plasitc Grading: P - Poorly, W - Well

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 12'	Date Analyzed:	6-13-95
Project Location:	North Hogback 7 #6	Date Reported:	6-20-95
Laboratory Number:	TPH-1532	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**15,200**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

R. E. O'Neill
Analyst

J.C. Blagg
Review

NORTH HOGBACK #7-6

TANK PIT (NORTH)

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN OIL

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: BACKHOE - EPC

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: RED / JCS
OPERATOR: EPC

LOCATION: NAME: N. HOG BACK 7 WELL #: 6 PIT: TANK BATTERY #1 (NORTH)
QUAD/UNIT: 1295 N. 100 W SEC: 7 TWP: 29 N RNG: 16 W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE / LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: COBBLE - OIL STAINED - MINOR LIQUIDS

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 145 FEET N90°W OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

SEC. 12 LEASE TANK BATTERY PIT #1 (NORTH)
GROSS CONTAMINATION TO MAXIMUM BACKHOE DEPTH ~ 14'
BLACK, STAINED, STRONG ODOR

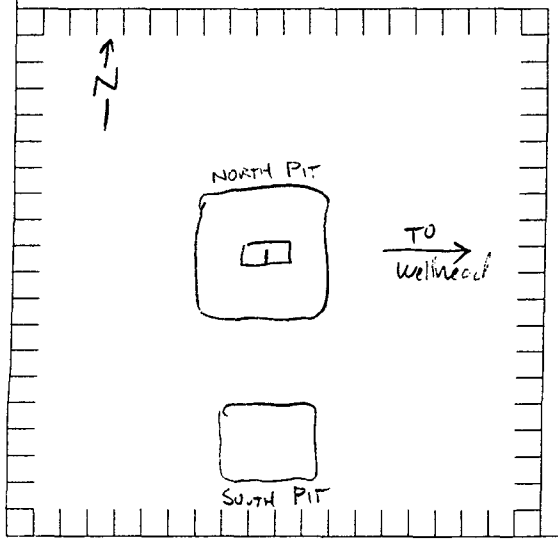
635 x 10 x 2 = (12,700)

SAMPLE INVENTORY

SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
T1@14'	GRB	418.1

SCALE 15' x 10' x 6' DEEP
0 5 10 FEET

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	GRB	441
TD 14'		

Pit Bottom (6)
GP (7)
BLACK STAIN + ODOR (9–11)

TH#: _____ SOIL TYPE: SMPL TYPE: OVM/TPH

TH#: _____ SOIL TYPE: SMPL TYPE: OVM/TPH

TH#: _____ SOIL TYPE: SMPL TYPE: OVM/TPH

SOIL TYPE: C – Clay, M – Silt, S – Sand, G – Gravel Plasticity: L – None, H – Plastic Grading: P – Poorly, W – Well

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 14'	Date Analyzed:	6-13-95
Project Location:	North Hogback 7 #6	Date Reported:	6-20-95
Laboratory Number:	TPH-1533	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**12,700**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Tank Battery (North Pit)

R. E. O'Neill
Analyst

J. C. Blagg
Review

NORTH HOGBACK #7-6

TANK PIT (SOUTH)

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN OIL

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: _____
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: BACKHOE - EPC

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: REO/JCB
OPERATOR: EPC

LOCATION: NAME: N HOGBACK 7 WELL #: 6 PIT: TANK BATTERY #2 (SOUTH)
QUAD/UNIT: 1295N 100W SEC: 7 TWP: 29N RNG: 16W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-10009
SURFACE CONDITIONS: COBBLE - OIL STAINED

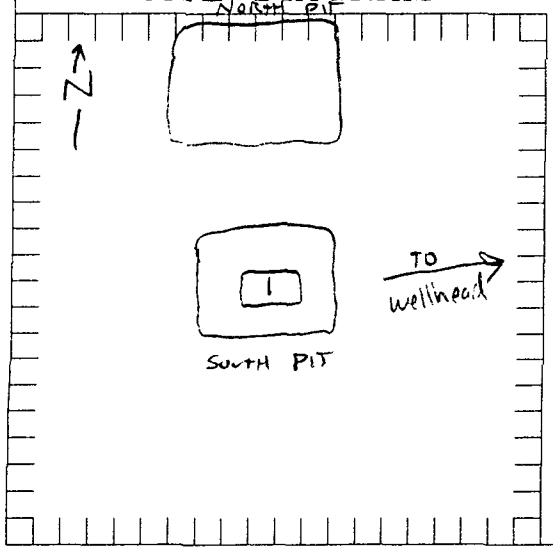
FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 145' FEET N105°W OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:

SEC 12 LEASE TANK BATTERY PIT #2 (SOUTH)
GROSS CONTAMINATION TO MAXIMUM BACKHOE DEPTH ~14'
BLACK, STAINED, STRONG ODOR
DID NOT RUN TPH - EXPECT >10,000 ppm based on appearance.

SCALE 0 5 10 FEET — 10'x10'x4' DEEP

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
PIT BOTTOM		
GP		
BLACK STAIN + ODOR		
GP	GRB	506
TD 14'		

TH#: _____

SOIL TYPE:	SMPL TYPE:	OVM/TPH

TH#: _____

SOIL TYPE:	SMPL TYPE:	OVM/TPH

TH#: _____

SOIL TYPE:	SMPL TYPE:	OVM/TPH

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plastic Grading: P - Poorly, W - Well

NORTH HOGBACK #12-1

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN OIL

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: _____

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 1

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: BACKHOE - EPC (WALTER DUNCAN)

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: RED / JCB
OPERATOR: EPC

LOCATION: NAME: N. HOGBACK 12 WELL #: 1 PIT: PRODUCTION (SEPARATOR)
QUAD/UNIT: 1650' N, 330' E SEC: 12 TWP: 29 N RNG: 17 W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: NA-14-20-0603-10010
SURFACE CONDITIONS: COBBLE - OIL STAINED - ~ 6" LIQUIDS IN PIT

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 100 FEET N70°E OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

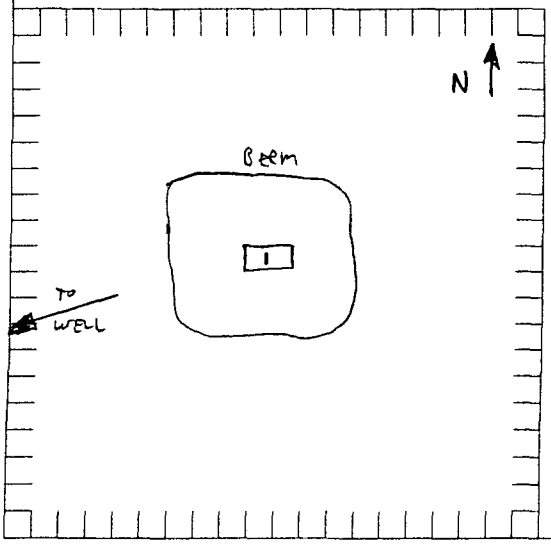
SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
T1@15'	GRB	418.1

GROSS HYDROCARBON STAINING - HEAVY, BLACK W. ODOR.

212 × 2 × 10 = (4,240)

SCALE 0 10 20 FEET — 30' X 30' X 6' DEEP

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
	PIT Bottom	
GP		
	BLACK STAIN	
	ODOR	
GP	GRB	490

TD = 15'

TH#: _____ | SOIL TYPE: | SMPL TYPE: | OVM/TPH |

TH#: _____ | SOIL TYPE: | SMPL TYPE: | OVM/TPH |

TH#: _____ | SOIL TYPE: | SMPL TYPE: | OVM/TPH |

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plastic Grading: P - Poorly, W - Well

BLAGG ENGINEERING, INC.
P.O. Box 87, Bloomfield, New Mexico 87413
Phone: (505)632-1199 Fax: (505)632-3903

FIELD MODIFIED EPA METHOD 418.1
TOTAL PETROLEUM HYDROCARBONS

Client:	Duncan Oil	Project #:	
Sample ID:	TH1 @ 15'	Date Analyzed:	6-13-95
Project Location:	North Hogback 12 #1	Date Reported:	6-20-95
Laboratory Number:	TPH-1534	Sample Matrix:	Soil

Parameter	Result, mg/kg	Detection Limit, mg/kg
Total Recoverable Petroleum Hydrocarbons	**4,200**	**100**

ND = Not Detectable at stated detection limits.

QA/QC:	QA/QC Sample TPH mg/kg	Duplicate TPH mg/kg	% *Diff.
	1,248	1,224	2

*Administrative Acceptance limits set at 30%.

Method: Modified Method 418.1, Petroleum Hydrocarbons, Total Recoverable, Chemical Analysis of Water and Waste, USEPA Storet No.4551, 1978

Comments: Production Pit

R. E. O'Neill
Analyst

J. C. Blagg
Review

NORTH HOGBACK #12-9

SEPARATOR PIT

FIELD REPORTS & ANALYTICAL RESULTS

CLIENT: DUNCAN

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

PIT NO: _____
C.O.C. NO: 3086

FIELD REPORT: SITE ASSESSMENT

JOB No: —
PAGE No: 1 of 2

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING
EQUIPMENT USED: CAT BACKHOE / OVM / TPH UNIT

DATE STARTED: 6-13-95
DATE FINISHED: _____
ENVIRO. SPCLT: JCC / REO
OPERATOR: EFC

LOCATION: NAME: N. HOGBACK UNIT #12 WELL #: 9 PIT: PRODUCTION (SEPARATOR)
QUAD/UNIT: J 2140 FNL 165 FEL SEC: 12 TWP: 29N RNG: 17W PM: NM CNTY: SJ ST: NM
LAND USE: RANGE LEASE #: 14-20-0603-1010
SURFACE CONDITIONS: OIL STAINED GRAVEL - DRY

FIELD NOTES & REMARKS: PIT IS LOCATED APPROXIMATELY 30 FEET N60°W OF WELLHEAD.
DEPTH TO G.W: <50' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER >1000'
RANKING SCORE: 20 CLOSURE STD: 100

WATER FLOWED INTO HOLE @ ~ 12'. GROSS CONTAMINATION TO WATER. ~ 12" COBBLE IN WATER.

TH 2 - NO STAIN / ODOR WATER @ ~ 9'.

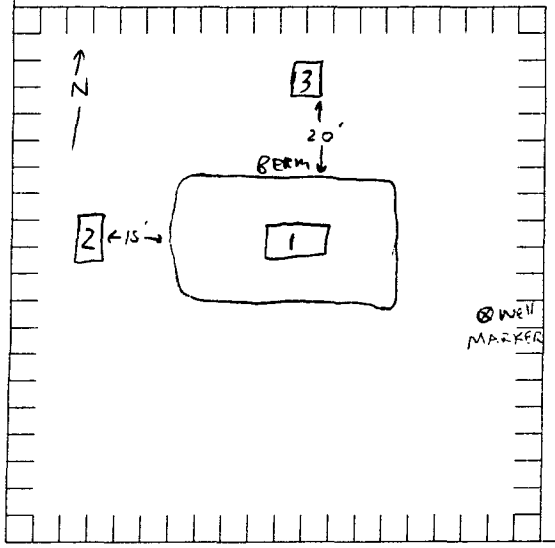
TH 3: SOILS STAINED AT WATER TABLE - SLIGHT ODOR -

SAMPLE INVENTORY		
SMPL ID:	SMPL TYPE:	LABORATORY ANALYSIS:
TH1@11'	WATER	TDS, BTEX/CHLORIDES
TH2@9'	WATER	TDS, BTEX/CHLORIDES
6-14 TH5@9'	WATER	BTEX
		5

SCALE 0 10 20 FEET 4

33' x 21' x 6' Deep

SITE DIAGRAM



TEST HOLE LOGS:

TH#: 1

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	PIT BOTTOM	
	BLACK STAIN ODOR	
GW		
GW		174
TD = 12'		

TH#: 2

SOIL TYPE:	SMPL TYPE:	OVM/TPH
	BROWN	
	NO	
GP	ODOR	
GW		
TD = 9'		

TH#: 3

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	BROWN	
	NO	
	STAIN	
	NO	
	ODOR	
	SLIGHT	
STAIN	ODOR	
SHEEN +	ODOR	
TD = 9'		

TH#: 4

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	NO	
	STAIN	
	NO	
	ODOR	
STAIN	ODOR	
SHEEN +	ODOR	
TD = 9'		

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plastic Grading: P - Poorly, W - Well

CLIENT: DUNCAN

BLAGG ENGINEERING, INC.
P.O. BOX 87, BLOOMFIELD, NM 87413
(505) 632-1199

LOCATION NO: _____

FIELD REPORT: SITE ASSESSMENT

PAGE No: 2 of 2

PROJECT: PIT ASSESSMENT
CONTRACTOR: BLAGG ENGINEERING

DATE STARTED: 6-14-95
DATE FINISHED: _____

LOCATION: NAME: N. HOGBACK UNIT 12 WELL #: 9 PIT: PRODUCTION
QUAD/UNIT: SEC: 12 TWP: 29N RNG: 17W PM: NM CNTY: SJ ST: NM

FIELD NOTES & REMARKS:
THIS: BLACK STAIN AT WATER TABLE - SHEEN ON WATER - SET WELL.

TEST HOLE LOGS:

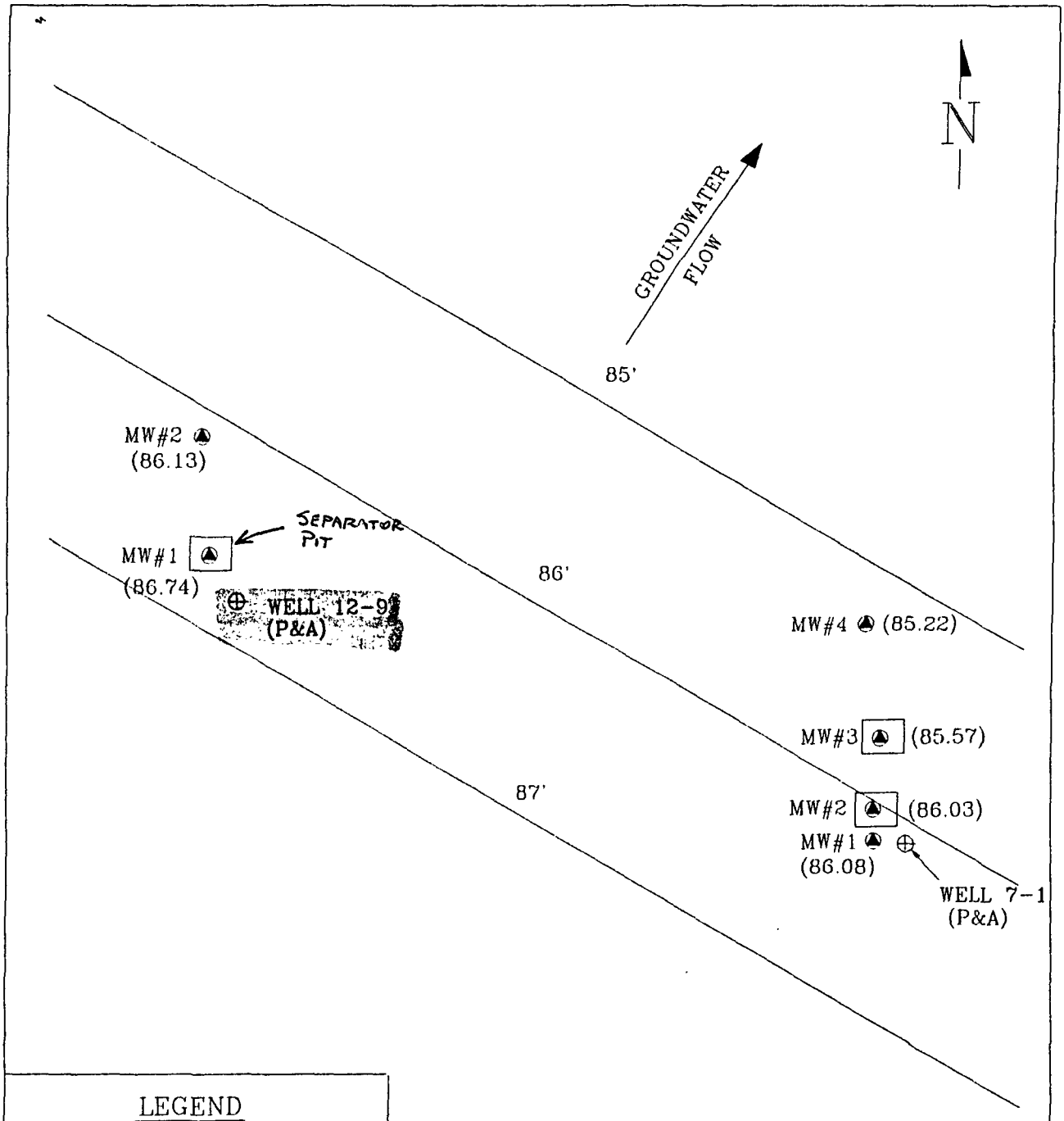
TH#: 5

SOIL TYPE:	SMPL TYPE:	OVM/TPH
GP	NO STAIN	
BLACK STAIN		
SHEEN - WATER		
TD = 10'		

TH#: _____ | TH#: _____ | TH#: _____ | TH#: _____ | TH#: _____

(SOIL TYPE / SMPL TYPE / OVM/TPH)

SOIL TYPE: C - Clay, M - Silt, S - Sand, G - Gravel Plasticity: L - None, H - Plasitc Grading: P - Poorly, W - Well



LEGEND

GROUNDWATER MONITORING WELL

(86.64) GROUNDWATER ELEVATION

0 100 200

FEET

NORTH HOGBACK UNIT
WELLS 12-9 & 7-1
SEC. 7&12, T29N, R16W
SAN JUAN COUNTY, NM

DUNCAN ENERGY COMPANY

BLAGG ENGINEERING, INC.

P.O. BOX 87, BLOOMFIELD, NM 87413
PHONE: (505) 632-1199
FAX: (505) 632-3903

SITE DIAGRAM

SHEET: A1	DRWN: JULY 95 REV:
DRWN BY: REO REV BY:	PRJ MGR: JCB

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/14/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample ID:*	*6784*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*4-1183*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH1 @ 11'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:15
Analyzed by:	DC	Date:	6/14/95		
Sample Matrix:	*Water*				

Aromatic Volatile Organics

Component	***Measured Concentration ug/L***	***Detection Limit Concentration ug/L***
Benzene	1.1	*0.2*
Toluene	7.7	*0.2*
Ethylbenzene	2.5	*0.2*
m,p-Xylene	7.4	*0.2*
o-Xylene	0.4	*0.2*
	TOTAL 19.2 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Jack

Date: 6/14/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

CHLORIDE ANALYSIS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample No.*	*6784*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH1 @ 11'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:15
Analyzed by:	DC	Date:	6/20/95		
Type of Sample:	*Water*				

Laboratory Analysis

Laboratory Identification	***Sample Identification***	***Total Chloride (Cl-)***
6784-3086	*Duncan Oil - North Hogback Unit* ***Unit 12-9, Prod. Pit - TH1 @ 11'***	21.8 *mg/L*

Method - *Ion Specific Electrode - Direct Measurement*

Approved by: Jack
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

TOTAL DISSOLVED SOLIDS ANALYSIS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample No.*	*6784*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH1 @ 11'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:15
Analyzed by:	DC	Date:	6/20/95		
Type of Sample:	*Water*				

Laboratory Analysis

Laboratory Identification	***Sample Identification***	***Total Dissolved Solids***
6784-3086	*Duncan Oil - North Hogback Unit* ***Unit 12-9, Prod. Pit - TH1 @ 11'***	1,014 *mg/L*

Method - *Standard Methods Method 2540 C. Total Dissolved Solids Dried at 180C*

Approved by: Da 4
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/14/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample ID:*	*6783*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*4-1183*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH2 @ 9'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:10
Analyzed by:	DC	Date:	6/14/95		
Sample Matrix:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	ND	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.0 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Jack
Date: 6/14/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

CHLORIDE ANALYSIS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample No.*	*6783*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH2 @ 9'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:10
Analyzed by:	DC	Date:	6/20/95		
Type of Sample:	*Water*				

Laboratory Analysis

Laboratory Identification	***Sample Identification***	***Total Chloride (Cl-)***
6783-3086	*Duncan Oil - North Hogback Unit* ***Unit 12-9, Prod. Pit - TH2 @ 9'***	49.8 *mg/L*

Method - *Ion Specific Electrode - Direct Measurement*

Approved by: Daf
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

TOTAL DISSOLVED SOLIDS ANALYSIS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*3086*
Address:	*P.O. Box 87*	*Sample No.*	*6783*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Prod. Pit - TH2 @ 9'***				
Sampled by:	REO	Date:	6/13/95	Time:	12:10
Analyzed by:	DC	Date:	6/20/95		
Type of Sample:	*Water*				

Laboratory Analysis

Laboratory Identification	***Sample Identification***	***Total Dissolved Solids***
6783-3086	*Duncan Oil - North Hogback Unit* ***Unit 12-9, Prod. Pit - TH2 @ 9'***	1,162 *mg/L*

Method - *Standard Methods Method 2540 C. Total Dissolved Solids Dried at 180C*

Approved by: Da 4
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	6/20/95
Company:	*Blagg Engineering*	*COC No.:*	*2947*
Address:	*P.O. Box 87*	*Sample No.*	*6854*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Unit***				
Project Location:	***Unit 12-9, Production Pit - TH5 @ 9'***				
Sampled by:	REO	Date:	6/14/95	Time:	14:20
Analyzed by:	DC	Date:	6/19/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	*Measured Concentration ug/L*	*Detection Limit Concentration ug/L*
Benzene	ND	*0.2*
Toluene	ND	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	ND	*0.2*
o-Xylene	ND	*0.2*
	TOTAL 0.0 *ug/L*	

ND - Not Detectable

Method *- SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Da G
Date: 6/20/95

OFF: (505) 325-8786

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667

AROMATIC VOLATILE ORGANICS

Attn:	*R.E. O'Neill*	Date:	7/5/95
Company:	*Blagg Engineering*	*COC No.:*	*3127*
Address:	*P.O. Box 87*	*Sample No.*	*7120*
City, State:	*Bloomfield, NM 87413*	*Job No.*	*2-1000*

Project Name:	***Duncan Oil - North Hogback Locations***				
Project Location:	***Well 12-9, MW#1***				
Sampled by:	REO	Date:	7/3/95	Time:	11:33
Analyzed by:	DC	Date:	7/5/95		
Type of Sample:	*Water*				

Aromatic Volatile Organics

Component	***Measured Concentration ug/L***	***Detection Limit Concentration ug/L***
Benzene	ND	*0.2*
Toluene	4.4	*0.2*
Ethylbenzene	ND	*0.2*
m,p-Xylene	21.6	*0.2*
o-Xylene	7.9	*0.2*
	TOTAL 33.9 *ug/L*	

ND - Not Detectable

Method - *SW-846 EPA Method 8020 Aromatic Volatile Organics by Gas Chromatography*

Approved by: Jack
Date: 7/5/95

CHAIN OF CUSTODY RECORD

3127

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 7-3-95

Page 1 of 1

Purchase Order No.: | Job No. DUNCAN OIL

SEND INVOICE TO
Name:
Company: BLAGG ENGINEERING | Dept.:
Address: P.O. BOX 87
City, State, Zip: BLOOMFIELD NM 87413

REPORT RESULTS TO
Name: JEFF BLAGG | Title:
Company: SAME
Mailing Address:
City, State, Zip:
Telephone No.: 632-1199 | Telefax No.: 632-3903

Sampling Location: NORTH HOGBACK LOCATIONS

Sampler: R. E. O'NEILL

ANALYSIS REQUESTED

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	LAB ID
WELL 6-6, M.W. #1	7-3	0840	water	HgCl2	2	✓	7117-3127
WELL 6-6, M.W. #2	7-3	0857	"	"	2	✓	7118
WELL 6-6, M.W. #3	7-3	0917	"	"	2	✓	7119
WELL 12-9, MW #1	7-3	1133	"	"	2	✓	7120
WELL 7-1, MW #2	7-3	1040	"	"	2	✓	7121
WELL 7-1, MW #3	7-3	1050	"	"	2	✓	7122

Relinquished by: R E. O'Neill	Date/Time 7-3 1245	Received by:	Date/Time 7/3/95 1245
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 7-3-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 7/5/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	19	3	15%
Toluene	ppb	20	19	5	15%
Ethylbenzene	ppb	20	19	7	15%
m,p-Xylene	ppb	40	38	5	15%
o-Xylene	ppb	20	18	9	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	100	96	(39-150)	3	20%
Toluene	96	94	(46-148)	2	20%
Ethylbenzene	99	97	(32-160)	1	20%
m,p-Xylene	98	96	(35-145)	2	20%
o-Xylene	86	84	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
7117-3127	98		

S1: Flourobenzene

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/14/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	21	4	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	5	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	105	108	(39-150)	2	20%
Toluene	89	91	(46-148)	2	20%
Ethylbenzene	49	52	(32-160)	4	20%
m,p-Xylene	-128	-125	(35-145)	-1	20%
o-Xylene	92	95	(35-145)	2	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
6783-3086	102		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

3086

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-13-95

Page 1 of 1

Purchase Order No.:	Job No. DUNCAN OIL		
SEND INVOICE TO: Name		REPORT RESULTS TO: Name R E. O'NEILL	Title
Company BLAGG ENGINEERING	Dept.	Company SAME	
Address		Mailing Address	
City, State, Zip		City, State, Zip	
		Telephone No.	Telefax No.

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	BTEX	TDS	CHLORIDE	LAB ID
UNIT 12-9, PROD. PIT - TH2 @ 9'	6-13	1210	WATER	H_2Cl_2	3	✓	✓	✓	6793 - 3086
UNIT 12-9, PROD. PIT - TH1 @ 11'	6-13	1215	WATER	H_2Cl_2	3	✓	✓	✓	6791 - 3086
UNIT 7-1, PROD. PIT - TH1 @ 10'	6-13	1245	WATER	H_2Cl_2	2	✓			6795 - 3086
UNIT 7-1, NEW BKR. PIT - TH1 @ 13'	6-13	1310	WATER	H_2Cl_2	2	✓			6796 - 3086

Relinquished by: R. E. O'Neill	Date/Time 6-13 1510	Received by:	Date/Time 6/13/95 1510
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-13-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White - On Site Yellow - LAB Pink - Sampler Goldenrod - Client

OFF: (505) 325-8786

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-5667

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 6/19/95

Internal QC No.: 0379-STD
Surrogate QC No.: 0378-STD
Reference Standard QC No.: 0355-STD

Method Blank

Analytes in Blank	Amount
Average Amount of All Analytes In Blank	<0.2 ppb

Calibration Check

Calibration Standards	Units of Measure	*True Value	Analyzed Value	% Diff	Limit
Benzene	ppb	20	20	2	15%
Toluene	ppb	20	20	1	15%
Ethylbenzene	ppb	20	20	0	15%
m,p-Xylene	ppb	40	42	4	15%
o-Xylene	ppb	20	20	1	15%

Spike Results

Analyte	1- Percent Recovered	2 - Percent Recovered	Limit	%RSD	Limit
Benzene	116	123	(39-150)	4	20%
Toluene	107	110	(46-148)	2	20%
Ethylbenzene	108	111	(32-160)	2	20%
m,p-Xylene	111	112	(35-145)	1	20%
o-Xylene	101	104	(35-145)	3	20%

Surrogate Recoveries

Laboratory Identification	S1 Percent Recovered	S2 Percent Recovered	S3 Percent Recovered
Limits	(70-130)		
6850-2947	102		

S1: Flourobenzene

CHAIN OF CUSTODY RECORD

ON SITE TECHNOLOGIES, LTD.

657 W. Maple • P. O. Box 2606 • Farmington NM 87499
LAB: (505) 325-5667 • FAX: (505) 325-6256

Date: 6-16-95

Page 1 of 1

Purchase Order No.:		Job No.	DUNCAN OIL
SEND INVOICE TO	Name		
	Company	BLAGG ENGINEERING	Dept.
	Address	P.O. BOX 87	
	City, State, Zip	BLOOMFIELD	

REPORT RESULTS TO	Name	R. E. O'NEILL	Title
	Company	SAME	
	Mailing Address		
	City, State, Zip		
	Telephone No.		Telefax No.

Sampling Location: NORTH HOGBACK UNIT

Sampler: R. E. O'NEILL

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	ANALYSIS REQUESTED: BTEX	LAB ID
UNIT 7-1, TANK BATTERY PIT, TH3 @ 10'	6-14	1035	WATER	1½	2	✓	6850-7947
UNIT 7-1, TANK BATT. PIT, TH4 @ 10'	"	1125	"	"	2	✓	6851
UNIT 7-1, PROD. PIT, TH3 @ 10'	"	1200	"	"	2	✓	6852
UNIT 7-1, PROD. PIT, TH4 @ 10.5'	"	1250	"	"	2	✓	6853
UNIT 12-9, PROD. PIT, TH5 @ 9'	"	1420	"	"	2	✓	6854

Relinquished by:	R E O'Neill	Date/Time 6-16 0746	Received by: Nelson Velez
Relinquished by:	Nelson Velez	Date/Time 6/17/95 1105	Received by:
Relinquished by:		Date/Time	Received by:

Method of Shipment:

Authorized by: R. E. O'Neill Date 6-16-95
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

Distribution: White – On Site Yellow – LAB Pink – Sampler Goldenrod – Client

Roger Anderson

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

'92 AUG 5 AM 8 48
OIL CONSERV. DIV.
AZTEC, NM

July 31, 1992

President
Duncan Oil Company
1777 South Harrison Street P-1
Denver, Colorado 80202

certified mail
Return Receipt Req.

RE: Oil release and discharge at the North Hogback Tank Battery, Navajo Nation Lease 14-20-0603-9591.

Dear Sir:

The United States Environmental Protection Agency ("EPA") and the Navajo Nation Environmental Protection Administration ("NEPA") conducted a site inspection on July 30, 1992 at your North Hogback Tank Battery located on the SW1/4,NE1/4, Section 1, Township 29N, Range 17W of the New Mexico Principle Meridian (the "Site"). During the inspection it became apparent that there has been a significant discharge and release of oil into the surrounding environment that threatens the Hogback irrigation canal system and the San Juan River; navigable water ways of the United States. The Hogback irrigation canal is utilized throughout the Hogback community to irrigate local crops. The San Juan River is considered to be a sensitive ecosystem and is utilized by the Navajo Tribal Utility as a drinking water source. EPA has been informed by the Navajo Fish and Wildlife Department that the San Juan River basin is home to several Federal and Navajo endangered species such as the Bald Eagle and Colorado squawfish.

Oil has been documented to be released from the on-site heater-treater and two unlined surface pits. EPA has documented oil contaminated soil and debris throughout the Site (see enclosed photos).

Duncan Oil was issued a Notice of Incidents of Noncompliance by the Navajo Nation Minerals Department concerning the release of oil at the Site on July 15, 1992. In addition, the Bureau of Land Management and the NEPA were informed of the release. EPA understands that Duncan Oil has begun to conduct limited clean-up actions to address the release and has currently removed the leaking heater-treater.

Under Section 311(c) of the Clean Water Act, 33 U.S.C. 1321 et seq., (CWA), as amended by Section 4201(a) of the Oil Pollution Act of 1990 (OPA), the Federal government must ensure the effective and immediate removal of a discharge or a

substantial threat of discharge of oil or hazardous substance into or on navigable waters and adjoining shorelines and discharges that may impact natural resources of the United States.

EPA believes that there is a substantial threat of discharge of oil into both neighboring water ways, through the migration and dispersion of oil through the groundwater, as a result of the past continuous discharge of oil into the environment from your facility.

The purpose of this letter is to inform you of your potential liability under Section 1002 of OPA with respect to this Site. Section 1002(a) of OPA provides that the responsible party for a vessel or facility from which oil is discharged into navigable water and/or adjoining shorelines, or which poses a substantial threat of a discharge, is liable for: 1) certain specified damages resulting from the threat or the discharge of oil; and 2) removal costs incurred by any person for acts taken by the person which are consistent with the National Contingency Plan (NCP).

The damages for which oil dischargers may be liable pursuant to Section 1002 of OPA include:

* Natural resources damages, including the reasonable costs of assessing these damages;

* Loss of subsistence use natural resources;

* Real or personal property damages;

* Net loss of tax and other revenues;

* Loss of profits or earning capacity; and

* Net cost of additional public services provided during or after removal actions.

Pursuant to Section 1001(20) of OPA, "natural resources" includes land, fish, wildlife, biota, air, water, ground water, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States, any State, or Indian Tribe, or local government.

In addition, this facility and others along the San Juan River are subjected to the provisions and requirements outlined in Sections 311(j)(1)(C), 311(j)(2), 501(a) of the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq. (40 CFR Part 112 - Oil Pollution Prevention). Pursuant to this Act, (specifically 40 CFR Section 112.7(ii)(B)), secondary containment around the on-site tanks should be able to contain the entire contents of the largest single tank. In the event of a tank failure, the

present earthen berms would not be able to contain and prevent the off-site migration from a release.

EPA is requesting that Duncan Oil conduct the following activities within the set timeframes in order to adequately address the release and/or threatened release from the Site:

1) Within forty-eight hours (48) of receipt of this letter, Duncan Oil shall verbally inform EPA, NEPA and the BLM of its intent to assume full responsibility to perform the necessary response actions outlined herein this letter. Duncan shall follow the verbal notification with a written response.

2) Within twenty-four hours (24) of receipt of this letter, Duncan Oil shall erect a site perimeter fence around the Site in order to restrict assess by the public and neighboring livestock. In addition, containment berms should be constructed around the Site to prevent further off-site migration of oil.

3) By no later than August 10, 1992, Duncan Oil should submit for review and approval to the US EPA, NEPA, and BLM, a Site Characterization Plan. This plan should contain sufficient information and detail on how you intend to define, sample and delineate the extent of soil and groundwater contamination resulting from the discharge of oil from the Site. Sampling should identify areas containing elevated concentrations of total petroleum hydrocarbon, benzene, toluene, xylene, ethylbenzene, heavy metals and selenium. The plan should include the name of your project manager and contractor that you intend to utilize to conduct the assessment. If the plan meets all regulatory requirements, EPA may grant verbal approval. Site characterization activities should take no longer than three weeks to complete. If the approved activities require additional time to complete, EPA may grant an extension of time.

4) Duncan Oil shall incorporate and address all comments provided by the regulatory agencies and begin implementation of the plan by no later than one week after approval.

5) Upon completion of the assessment, Duncan Oil shall submit a detailed report summarizing its assessment data and finding to US EPA, NEPA and the BLM. Duncan Oil shall submit for agency review and approval a Site Remediation Plan to address the removal, excavation, treatment and disposal of contaminated soil and waters resulting from the release of oil from the Site. The Site shall be cleaned up to levels protective of public health and the environment and pose no further long term environmental hazard.

6) Duncan Oil shall incorporate and address all agencies comments and begin to implement the Site Remediation Plan within seven (7) days after agency approval.

7) During the implementation of both the Site

Characterization Plan and Site Remediation Plan, Duncan Oil shall submit to US EPA, NEPA and the BLM by the close of business (5:00 pm) each Friday, weekly progress report documenting the events of the past week and documenting upcoming plans.

All sampling and analysis shall be consistent with the "Removal Program Quality Assurance/Quality Control Interim Guidance:Sampling, QA/QC Plan and Data Validation," EPA OSWER Directive 9360.4-01, dated February 2, 1989.

All submittals should be addressed to the following:

Robert Bornstein
United States Environmental Protection Agency
c/o Navajo Superfund Office
P.O. Box 2946
Window Rock, AZ 86515
602-871-6284

Sadie Hoskie
Navajo EPA
P.O. Box 308
Window Rock, AZ 86515
602-871-6352

Donald Elsworth
Bureau of Land Management
Farmington Resource Area
1235 La Plata Highway
Farmington, NM 87491
505-327-5344

If Duncan Oil Company fails to undertake the appropriate actions outlined in this letter, EPA may be forced into issuing you a formal enforcement order under the authority of OPA. Failure to comply with a Federal Removal Order can result in civil penalties of up to $25,000 for each day of violation or three times the resulting costs incurred by the Oil Pollution Trust Fund if the EPA assumes responsibility for clean-up actions. In addition, EPA also has the authority to administratively assess civil penalties against violators of the Oil Pollution Prevention Regulations (40 CFR Part 112).

If you have any questions or concerns, please feel free to contact me at 602-871-6284 or 415-744-2298.

NA
10/21/92
MD

Sincerely,

Robert E. Bornstein
Federal On-Scene-Coordinator

cc: Terry Brubaker, USEPA-ERS
Bill Block, USEPA
Clancy Tenley, USEPA
Sadie Hoskie, NEPA
Arlene Luther, NEPA
Jim Walker, USEPA
Akhtar Zaman, Director, Minerials Department
Don Elsworth, BLM