3R - 138

GENERAL CORRESPONDENCE

YEAR(S):
1996

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 [redacted]-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
[redacted]-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

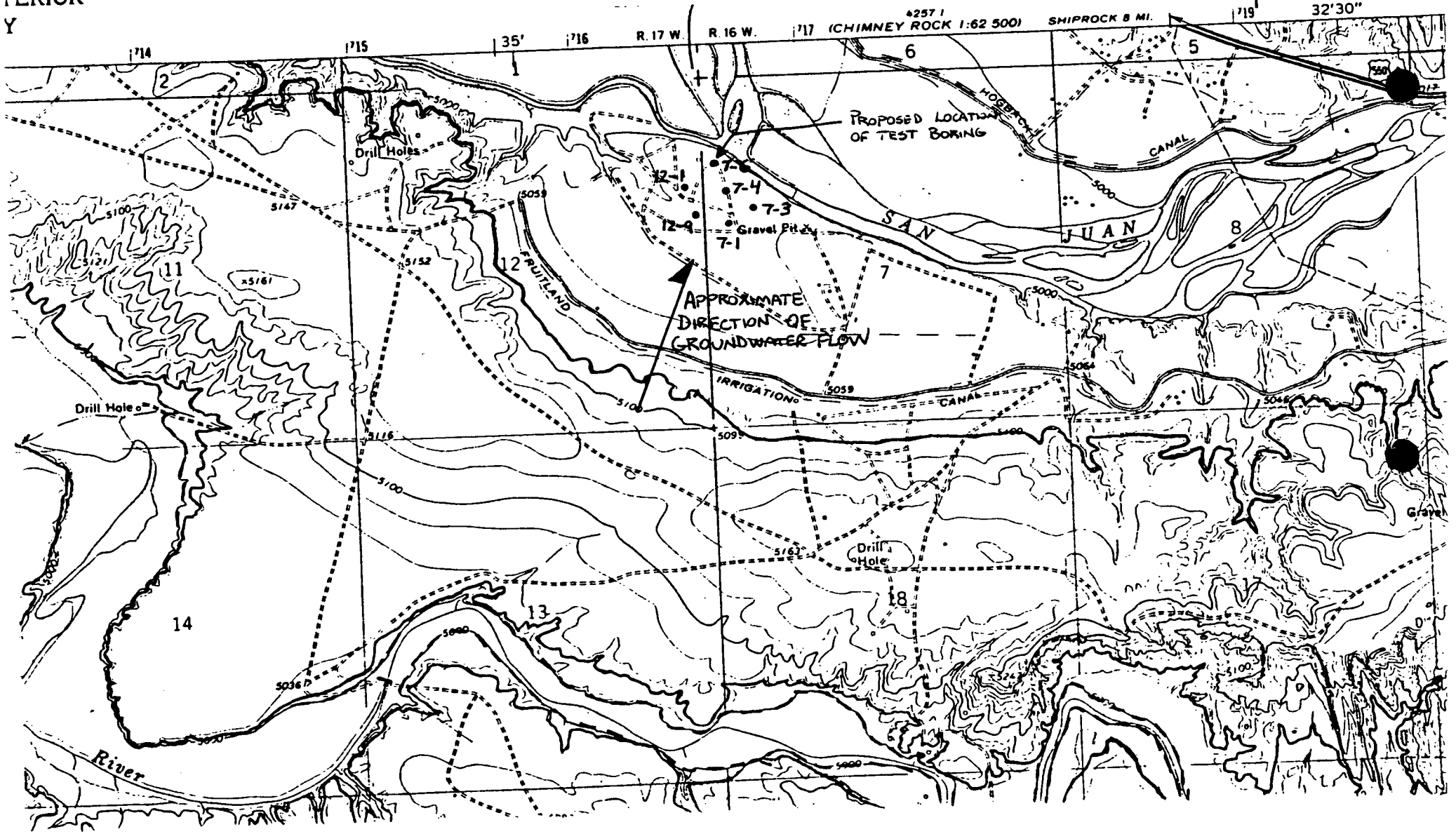
Jeffrey C. Blagg, PE
President

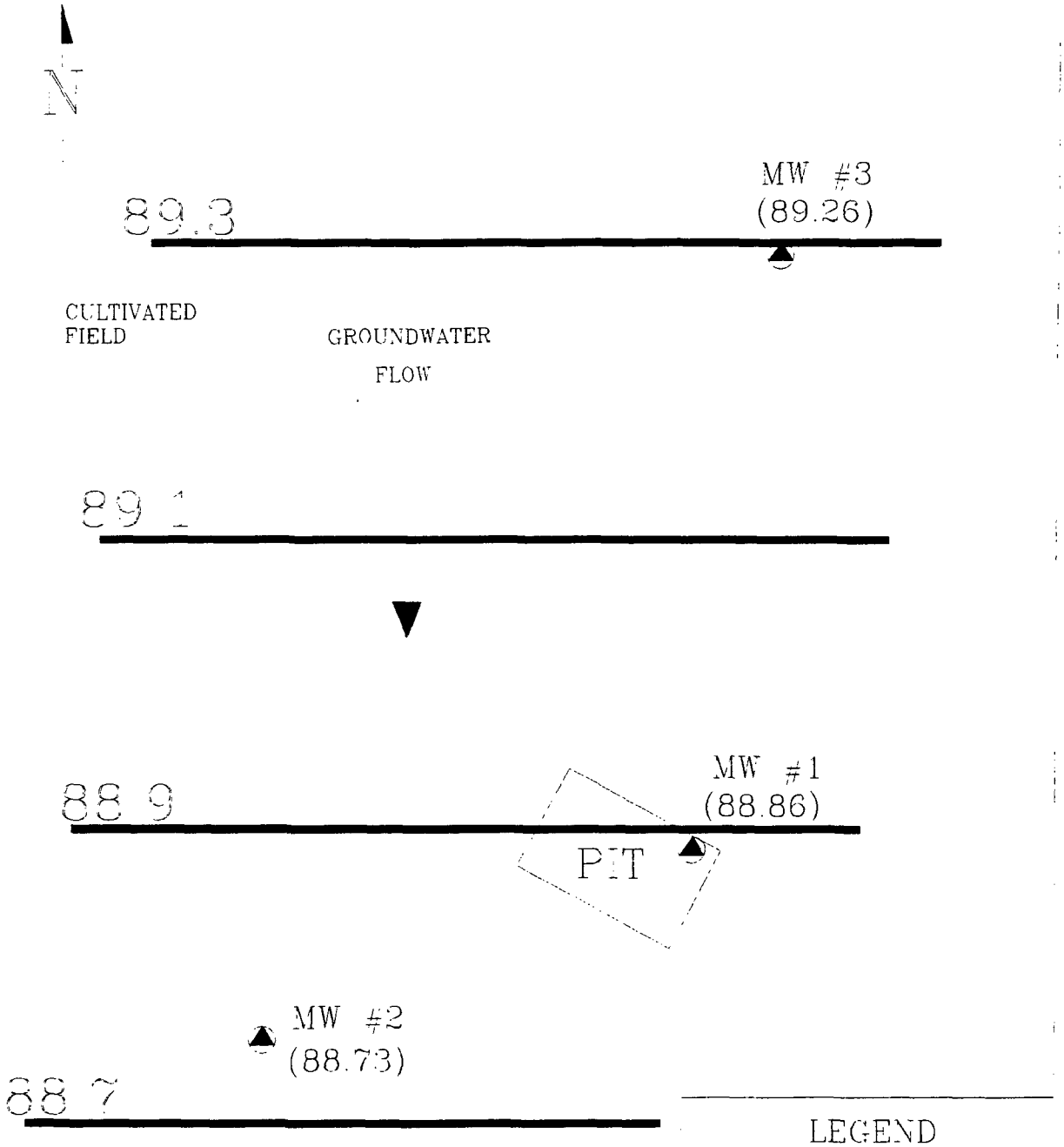
Attachments: Site Diagrams
Laboratory Reports
QA/QC

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)





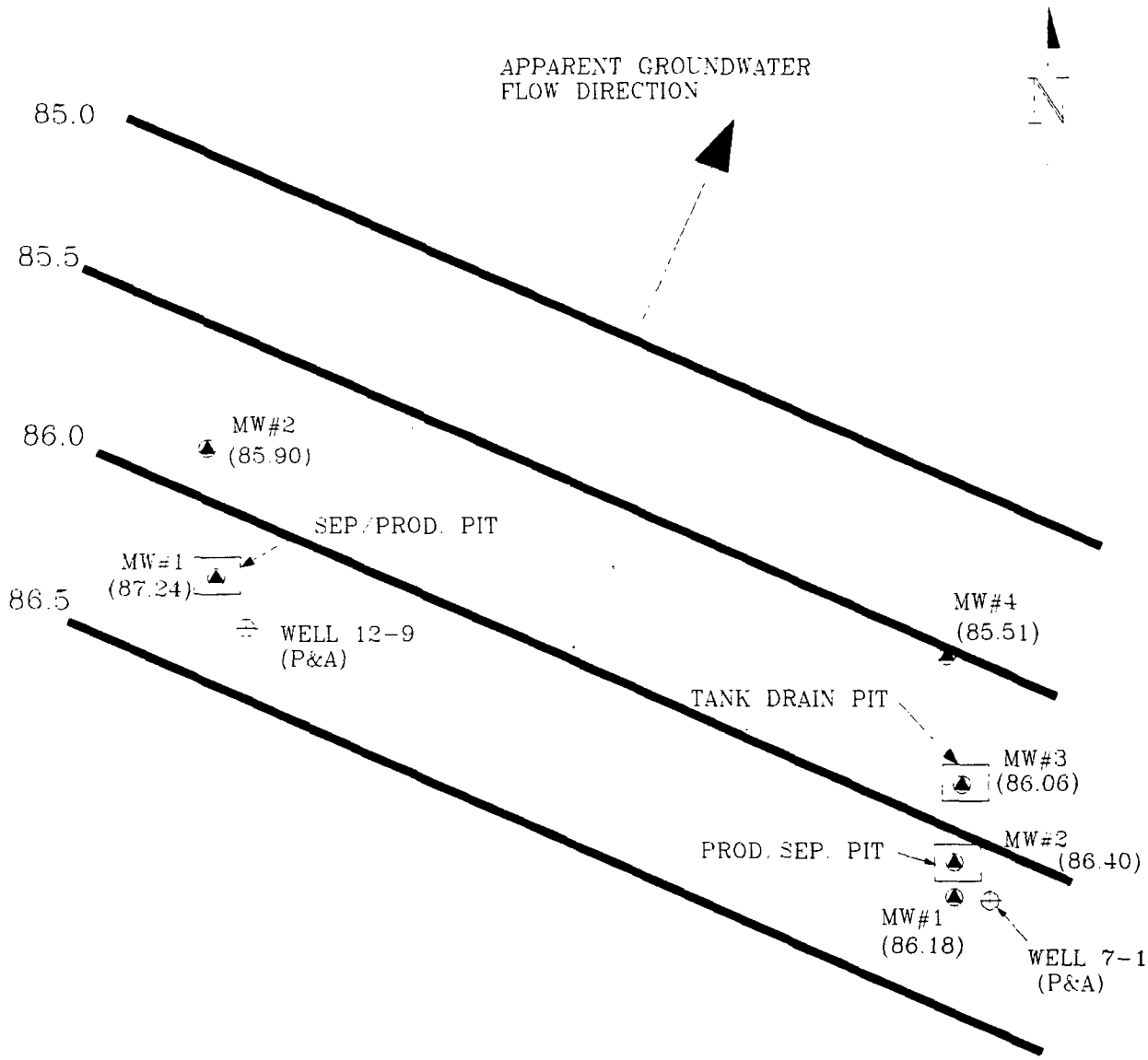
NORTH HOGBACK UNIT
WELL 6-6
SEC. 6, T29N, R16W
SAN JUAN COUNTY, NM

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: JL 9[illegible]
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 HOGBACK 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	REJ	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' = GRAVEL CONTAMINATION - BLACK + HEAVY ODOR HEAVY COBBLE TO 18"
4					GW + COBBLE	
6						
8						
10						
12						
14						
16						
18	GRAB	1	-	-		BTEX - 8015
					T.D.	MAXIMUM DEPTH 18'
20					SHALE MEDIUM HARD	SHALE LAYER AT 18" - BROWN - (LIGHT) NO ODOR - NO SHALE,
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: [signature]
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: JA

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: DAH

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: 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.:*	*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: JC

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: Jack

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: Dale

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

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
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 #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

Analyst

Review

BLAGG ENGINEERING, INC.
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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'Neil
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 @ 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. L. 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) R. E O'Neill	Chain of Custody Tape No. 04034	

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	BTEX	8015					Remarks
~~N. HOGBACK 7#6 T.B. #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. Spencer	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

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.: 4722/4723 | Job No. 2-1000

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					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
	12-9	MW1-2		0920	2	✓	✓	✓	304732 11359
	7-6	MW1-1		0850	2	✓	✓	✓	304733 11360
	6-6	MW1-1	7/1/96	1140	2	✓	✓	✓	304734 1384-4223
	6-6	MW1-2		1050	2	✓	✓	✓	304735 1385
	6-6	MW1-3		1115	2	✓	✓	✓	304736 11386

Relinquished by:	Date/Time 7/2/96 1400	Received by:	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: _____ Date 7/2/96
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:
			PLEASE FAX ASAP Thank you Jack

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

4222

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 [illegible]

Page 1 of 1

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

Sampling Location: [illegible]

Sampler: [illegible]

ANALYSIS REQUESTED

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

Relinquished by: [illegible]	Date/Time [illegible]	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:

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

Authorized by: [illegible] Date 6 [illegible] 90
(Client Signature Must Accompany Request)

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

CHAIN OF CUSTODY RECORD

4223

ON SITE TECHNOLOGIES, LTD.

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

Date: 7-2-16

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:		Number of Containers	ANALYSIS REQUESTED
Sampler:			

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers										LAB ID
MW-1	7-2				4	✓	✓	✓							
MW-2	7-2				4	✓	✓	✓							
MW-3	7-2				4	✓	✓	✓							

Relinquished by:	Date/Time 7-2-16	Received by:	Date/Time 7/2/16
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: _____ Date 7-2-16
(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

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

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

96 JAN -4 AM 8 52

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 #7-6, #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

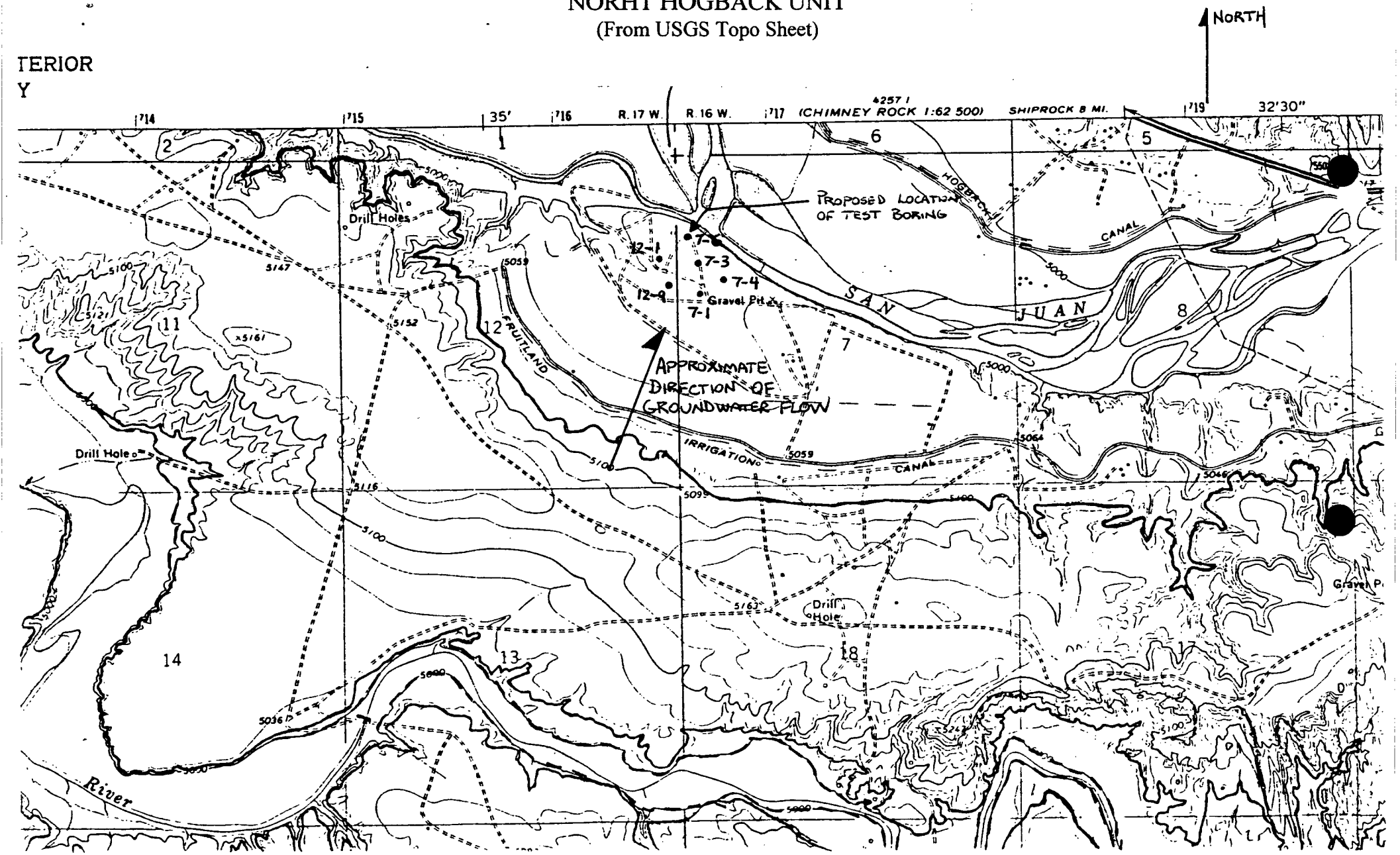
JCB

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

See SJB main file for report

JCB

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