3R - 23

REPORTS

DATE:

Oct. 11, 1995

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

October 11, 1995

Mr. William C. Olson, Hydrologist
New Mexico Oil Conservation Division
Environmental Bureau
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Re: Quarterly Monitoring Report
Amoco Production Company
Gallegos Canyon Unit (K) #162, Sec. 36-T29N-R12W
San Juan County, New Mexico

Dear Mr. Olson:

Amoco Production Company has retained Blagg Engineering, Inc. to conduct environmental monitoring of groundwater reclamation at Gallegos Canyon Unit (K) Well No. 162 (Figure 1). Following are quarterly monitoring results as required by the New Mexico Oil Conservation Division (NMOCD), pursuant to reclamation plan approval by the NMOCD with letter dated January 27, 1994.

An air injection/vapor extraction system has been installed and is currently in operation at the GCU 162 site. This system is designed to treat soils and groundwater that could not be accessed by excavation. Four inch diameter perforated PVC horizontal air injection/extraction piping has been placed at the water table interface, found at approximately 19 feet below ground surface, and at a depth of approximately 13 feet below ground surface (Figures 4 and 5). Construction of air injection/vapor extraction equipment was completed on August 8, 1995 and operation began on that date. Header design allows air injection or extraction into either the upper or lower piping system. Initial operation of the system has been by air injection into the lower piping and extraction from the upper piping. It is anticipated to reverse this flow pattern during the 4th quarter of 1995.

Summary Laboratory Analytical Results

Groundwater monitor wells at the site were sampled on September 27, 1995. A summary of laboratory analytical results for this and previous sample events is included in Table 1 on the following page and laboratory data reports are included in Appendix B. Analytical data indicates that contaminated groundwater has not migrated down gradient to monitor wells MW-9 or MW-10.

TABLE 1
Summary Laboratory Analytical Results
Amoco Production Company GCU Com "F" No. 162

Sample ID	Benzene ug/L	Toluene ug/L	Ethyl Benzene ug/L	Total Xylenes ug/L	Naptha-lene ug/L	Benzo(a) pyrene ug/L	Cations meq/L	Anions meq/L	As mg/L	Ba mg/L	Cd mg/L	Cr mg/L	Pb mg/L	Hg mg/L	Se mg/L	Ag mg/L
MW-3																
2/25/94	476	0.7	ND	1.9	ND	ND	15.80	15.49	ND	3.27	0.0001	ND	0.0034	ND	0.0011	ND
6/17/94	13.6	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/94	20.9	3.4	0.9	10.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	241.5	101.1	12.7	223.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-4																
2/25/94	240	3.1	40.2	469	ND	ND	17.74	18.50	0.0022	5.09	0.0016	ND	0.0373	ND	0.0015	ND
6/17/94	273	2.2	34.7	113	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/94	355	0.7	59.4	352	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	1694	7.6	241.3	1575	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MW-5																
2/25/94	ND	1.0	ND	2.2	ND	ND	34.59	33.50	0.0064	3.16	0.0034	ND	ND	ND	0.0037	ND
6/17/94	2.1	2.7	4.5	32.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/94	1.3	0.5	1.0	5.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	0.8	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/8/95	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/12/95	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/95	ND	ND	ND	ND												
MW-6																
2/25/94	15.9	3.2	5.3	140	ND	ND	13.39	12.34	ND	2.68	0.0002	ND	ND	ND	0.0007	ND
6/17/94	15.3	1.9	2.6	98	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/94	70.1	3.7	1.9	109	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	154.8	44.9	0.2	212.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/8/95	7.0	ND	ND	8.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/12/95	2.38	0.86	ND	12.6												
9/27/95	12.0	ND	ND	15.33												
MW-9																
2/25/94	ND	1.1	ND	1.4	ND	ND	13.73	13.47	ND	1.17	0.0011	ND	ND	ND	0.0012	ND
6/17/94	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
9/27/94	0.8	0.4	0.6	3.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/8/95	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/12/95	ND	ND	ND	ND												
9/27/95	ND	ND	ND	ND												
MW-10																
2/25/94	ND	0.7	ND	1.7	ND	ND	15.04	15.45	ND	2.64	0.0140	ND	0.0012	ND	0.0018	ND
6/17/94	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA
9/27/94	0.8	0.3	0.2	3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
12/7/94	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3/8/95	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6/12/95	ND	ND	ND	ND												
9/27/95	ND	ND	ND	ND												
WQCC LIMITS	10	750	750	620	30	0.7	------	------	0.1	1.0	0.01	0.05	0.05	0.002	0.05	0.05

ug/L = micrograms per liter, equivalent to parts per billion (ppb) mg/L= milligrams per liter, equivalent to parts per million (ppm) ND=not detected NA=not analyzed

Water Table Elevations

Depth to groundwater measurements in monitor wells was measured during the September 27, 1995 sample event. Table 2 includes water depth measurements, surface casing relative elevations and groundwater elevations. A contour map of relative water table elevations for this sample event is included in Figure 2.

TABLE 2

Relative Groundwater Elevations
Amoco Production Company GCU Com "F" No. 162
June 12, 1995

Monitor Well	Total Depth (feet)	Depth to Fluid (feet)	Relative Casing Elevation (feet)	Relative Groundwater Elevation (feet)
MW-1	Well	abandoned	during	excavation
MW-2	23.1	na	100.16	na
MW-3	Well	abandoned	during	excavation
MW-4	Well	abandoned	during	excavation
MW-5	25.1	22.10	102.50	80.40
MW-6	26.8	20.48	98.68	78.20
MW-7	25.3	na	97.39	na
MW-8	Well	abandoned	during	excavation
MW-9	19.6	12.13	88.50	76.37
MW-10	20.3	13.60	90.25	76.65

na = water table elevation not measured

Current and Proposed Activities

Contaminated soil and groundwater at the GCU 162 site that could not be accessed by excavation are presently being remediated with the active air injection/vapor extraction system. Operation of this system is on-going.

Methods to further enhance natural biodegradation of remaining contaminated soil and groundwater at the site are currently under evaluation. These methods include placement of proprietary microbes

in and around hydrocarbon contaminated subsurface soils to augment degradation rates. Under the direction of Amoco Production Company, Blagg Engineering, Inc. hereby requests NMOCD approval to perform placement of a proprietary hydrocarbon degrading microbial material at the site. This proposed material, if approved by NMOCD, will be installed by Applied Bioscience, Inc. of Farmington, New Mexico. Product information and material safety data sheets for the material are included with this transmittal.

Summary

This report has been prepared by Blagg Engineering, Inc. on behalf of Amoco Production Company. Questions or comments may be directed to Jeff Blagg at (505)632-1199.

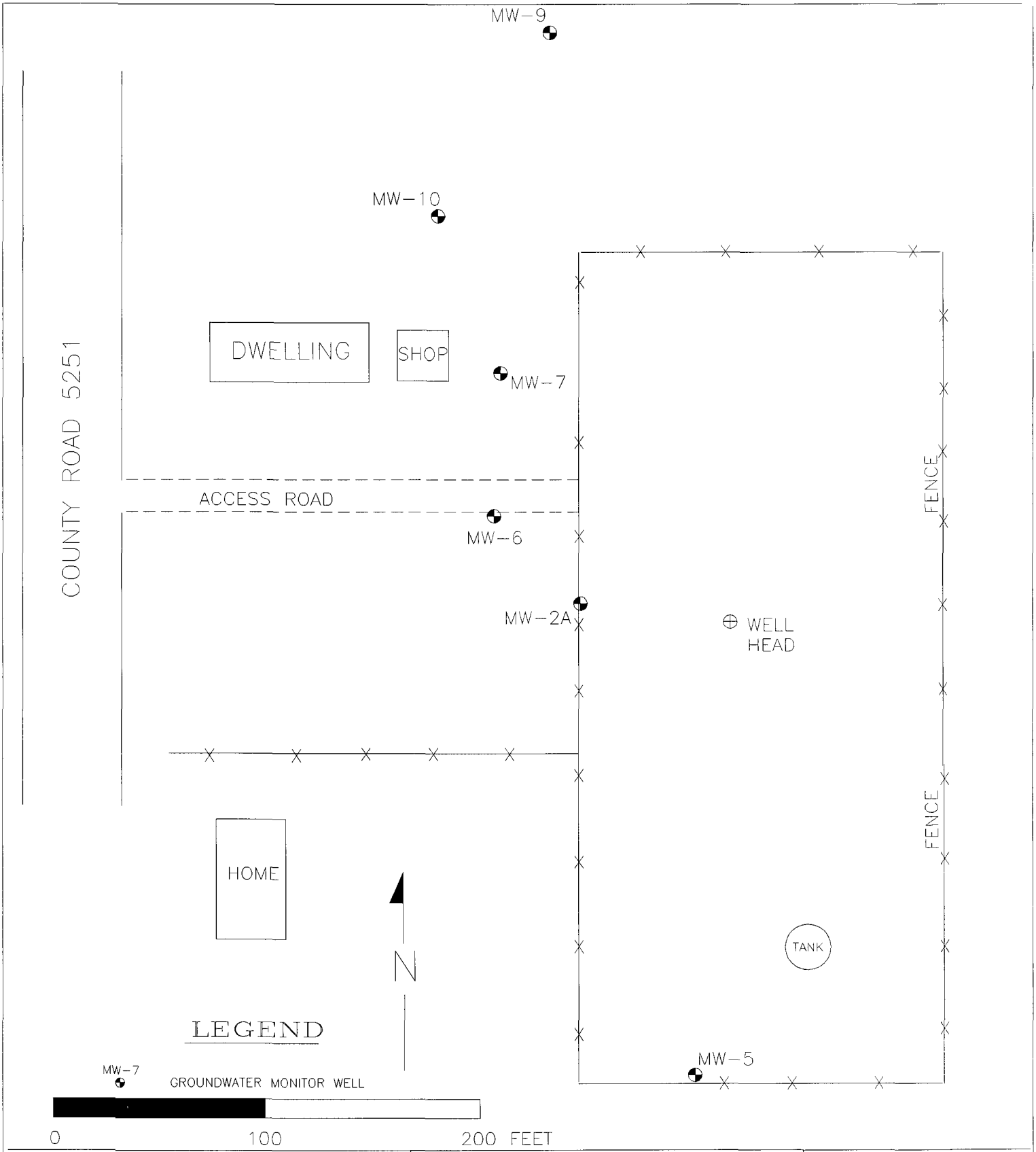
Respectfully submitted:
Blagg Engineering, Inc.

Jeffrey C. Blagg, P.E.
President

cc: Mr. Denny Foust, NMOCD
Mr. Buddy Shaw, Amoco Production Company

APPENDIX A

FIGURES



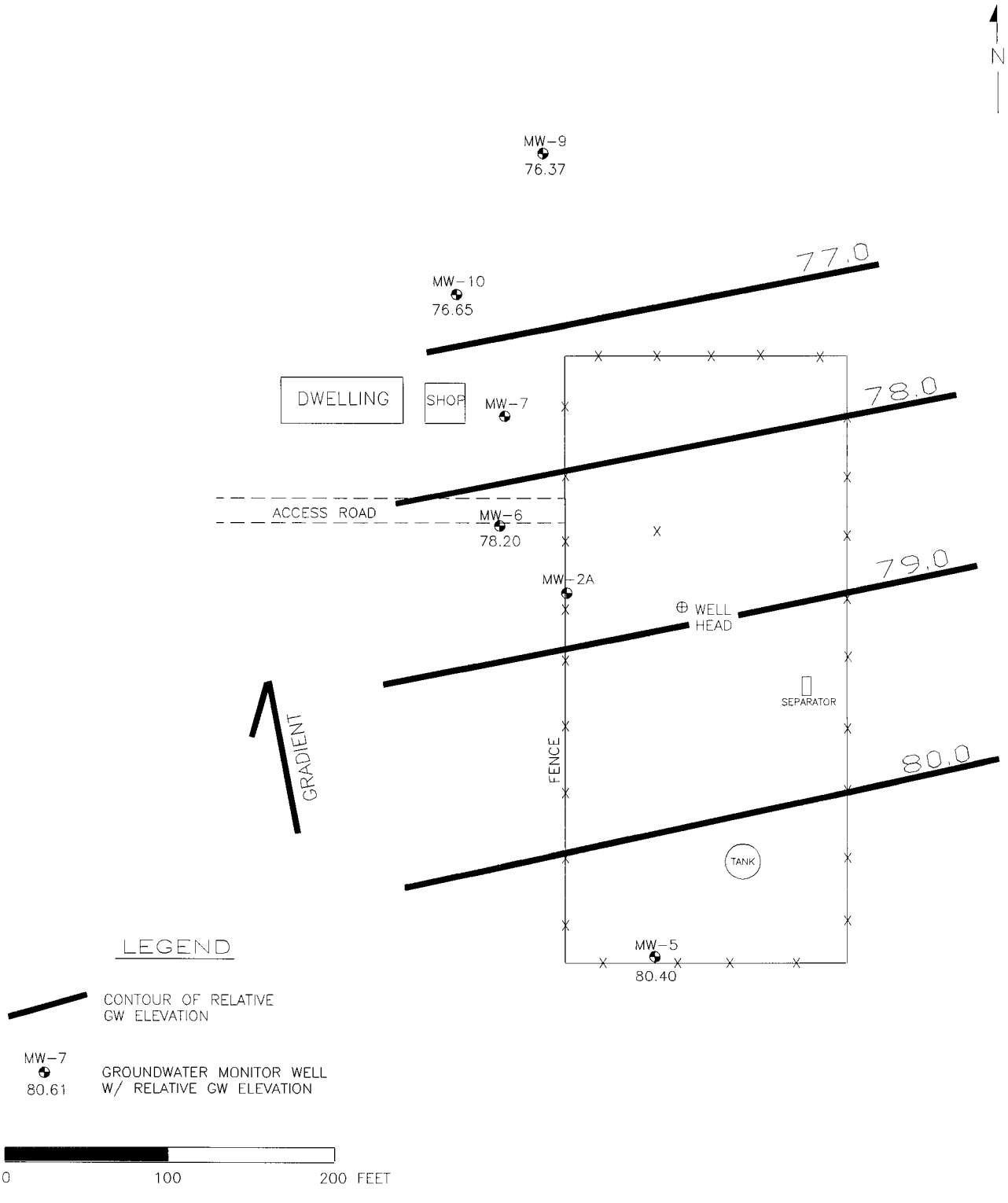
AMOCO PRODUCTION CO.
GCU 162 WELL SITE
SAN JUAN CO., NEW MEXICO

SEPTEMBER, 1995

BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES
P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413
PHONE: (505) 632-1199

SITE PLAN

FIGURE 1	DRWN BY: JCB
162REV	PROJ MGR: JCB



AMOCO PRODUCTION CO.
GCU 162 WELL SITE
SAN JUAN CO., NEW MEXICO

SEPTEMBER, 1995

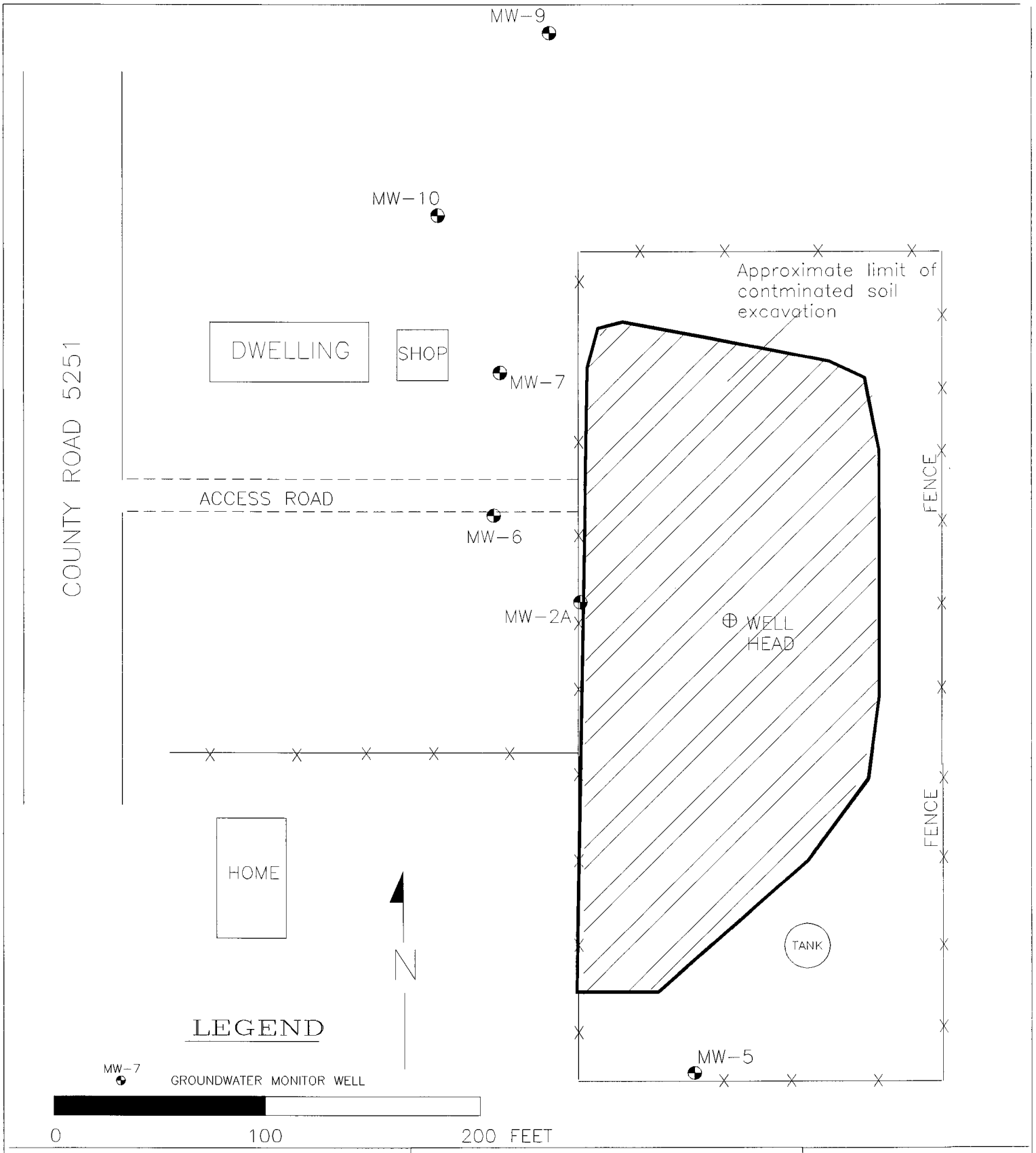
BLAGG ENGINEERING, INC.
CONSULTING ENGINEERING SERVICES

P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413

PHONE:(505)632-1199

GW SURFACE CONTOUR 9/27/95

FIGURE 2	DRWN BY: JCB
162SITE6	PROJ MANG: JCB



AMOCO PRODUCTION CO.
GCU 162 WELL SITE
SAN JUAN CO., NEW MEXICO

SEPTEMBER, 1995

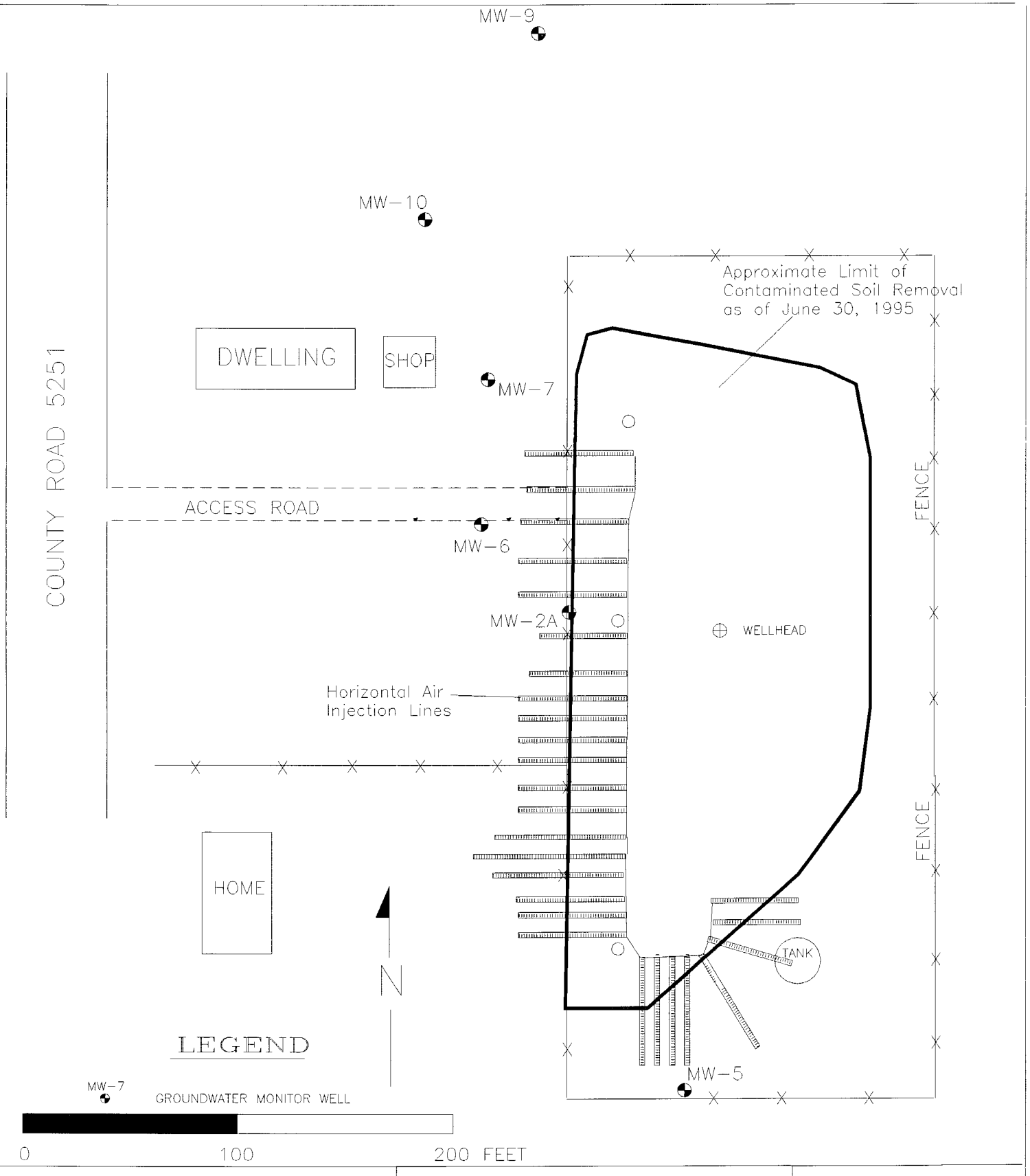
BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

REMEDIATED SOILS

FIGURE 3	DRWN BY: JCB
162REV	PROJ MGR: JCB



AMOCO PRODUCTION CO.
GCU 162 WELL SITE
SAN JUAN CO., NEW MEXICO

OCTOBER, 1995

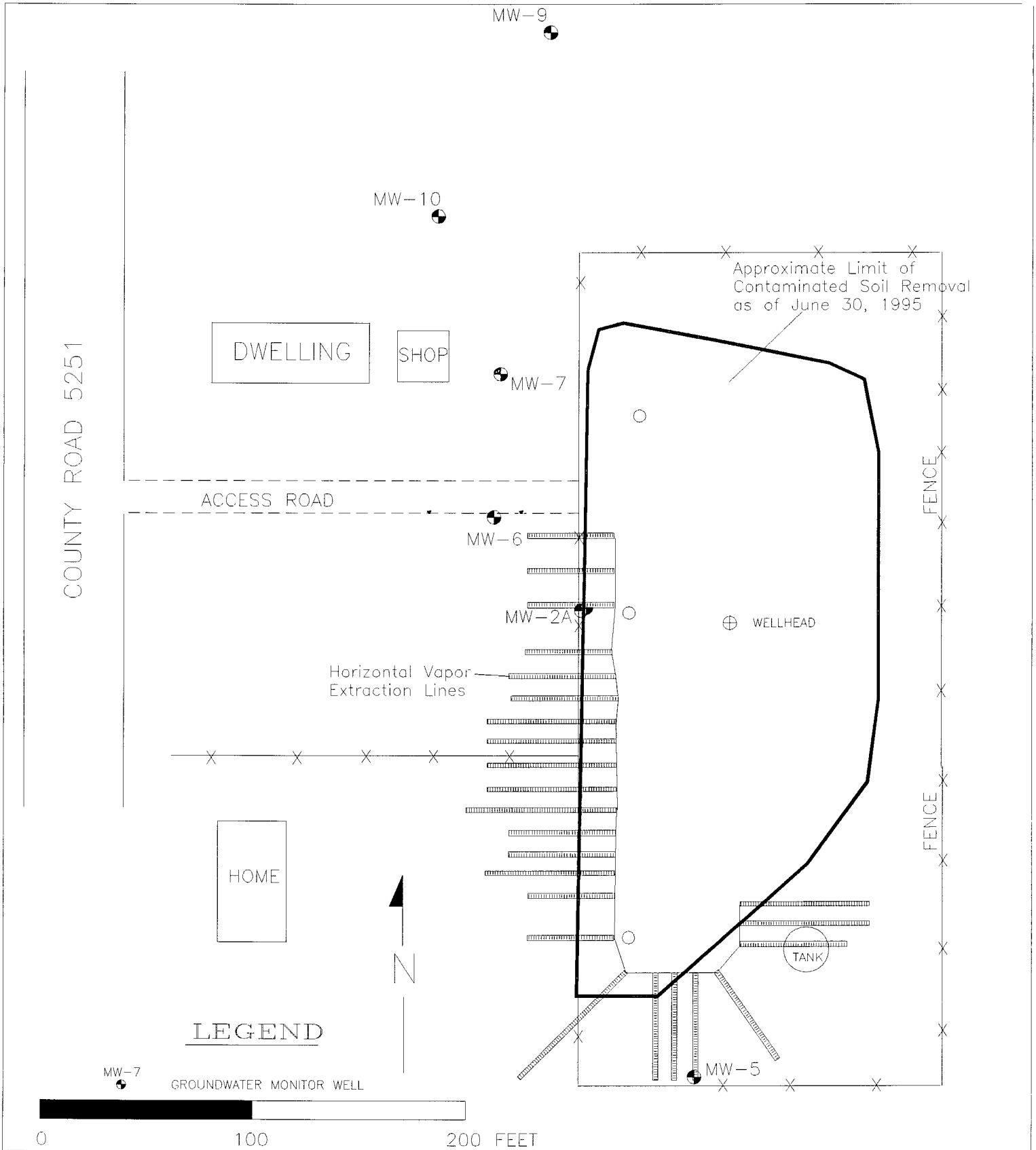
BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES

P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413

PHONE: (505) 632-1199

RECLAMATION PLAN
AS-BUILT

FIGURE 4 AIR INJECTION	DRWN BY: REO
162-AI	PROJ. MGR: JCB



AMOCO PRODUCTION CO.
GCU 162 WELL SITE
SAN JUAN CO., NEW MEXICO

OCTOBER, 1995

BLAGG ENGINEERING, INC.
CONSULTING PETROLEUM / RECLAMATION SERVICES
P.O. BOX 87
BLOOMFIELD, NEW MEXICO 87413
PHONE: (505) 632-1199

RECLAMATION PLAN
AS-BUILT

FIGURE 5 VAPOR EXTRACTION	DRWN BY: REO
162-VE	PROJ MGR: JCB

APPENDIX B

LABORATORY ANALYTICAL DATA REPORTS

ANALYTICA
ENVIRONMENTAL LABORATORY

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	GCU Com F162	Report Date:	10/04/95
Sample ID:	MW # 5	Date Sampled:	09/27/95
Lab ID:	1556	Date Received:	09/27/95
Sample Matrix:	Water	Date Analyzed:	10/03/95
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50
Total BTEX	**ND**	

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	98	88 - 110%
Bromofluorobenzene	89	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANALYTICA
ENVIRONMENTAL LABORATORY

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	GCU Com F162	Report Date:	10/04/95
Sample ID:	MW # 6	Date Sampled:	09/27/95
Lab ID:	1557	Date Received:	09/27/95
Sample Matrix:	Water	Date Analyzed:	09/29/95
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	12.0	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	14.0	1.00
o-Xylene	1.33	0.50
Total BTEX	**27.3**	

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	128	88 - 110%
Bromofluorobenzene	91	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments: *High toluene-d8 recovery is due to matrix interference at the d8 retention time.*

Analyst

Review

ANALYTICA
ENVIRONMENTAL LABORATORY

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	GCU Com F162	Report Date:	10/04/95
Sample ID:	MW # 9	Date Sampled:	09/27/95
Lab ID:	1558	Date Received:	09/27/95
Sample Matrix:	Water	Date Analyzed:	10/03/95
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50
Total BTEX	**ND**	

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	100	88 - 110%
Bromofluorobenzene	90	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

ANALYTICA
ENVIRONMENTAL LABORATORY

PURGEABLE AROMATICS

Blagg Engineering, Inc.

Project ID:	GCU Com F162	Report Date:	10/04/95
Sample ID:	MW # 10	Date Sampled:	09/27/95
Lab ID:	1559	Date Received:	09/27/95
Sample Matrix:	Water	Date Analyzed:	10/03/95
Preservative:	Cool, $HgCl_2$		
Condition:	Intact		

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50
Total BTEX	**ND**	

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	99	88 - 110%
Bromofluorobenzene	89	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

PURGEABLE AROMATICS

Quality Control Report

Method Blank Analysis

Sample Matrix:	Water	Report Date:	10/04/95
Lab ID:	MB34971	Date Analyzed:	09/29/95

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	98	88 - 110%
Bromofluorobenzene	89	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

PURGEABLE AROMATICS

Quality Control Report

Method Blank Analysis

Sample Matrix:	Water	Report Date:	10/04/95
Lab ID:	MB34975	Date Analyzed:	10/03/95

Target Analyte	Concentration (ug/L)	Detection Limit (ug/L)
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	1.00
o-Xylene	ND	0.50

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	102	88 - 110%
Bromofluorobenzene	95	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

Purgeable Aromatics

Duplicate Analysis

Lab ID:	1561Dup	Report Date:	10/04/95
Sample Matrix:	Water	Date Sampled:	09/27/95
Preservative:	Cool	Date Received:	09/27/95
Condition:	Intact	Date Analyzed:	09/29/95

Target Analyte	Original Conc. (ug/L)	Duplicate Conc. (ug/L)	Acceptance Range (ug/L)
Benzene	2.59	2.46	0.89 - 4.16
Toluene	2.16	2.32	0.87 - 3.60
Ethylbenzene	ND	ND	NA
m,p-Xylenes	2.15	2.17	NE
o-Xylene	ND	0.48	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Duplicate acceptance range not established by the EPA.

	Surrogate	Percent Recovery	Acceptance Limits
Quality Control:	Trifluorotoluene	98	88 - 110%
	Bromofluorobenzene	89	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

Purgeable Aromatics

Matrix Spike Analysis

Lab ID:	1561Spk	Report Date:	10/04/95
Sample Matrix:	Water	Date Sampled:	09/27/95
Preservative:	Cool	Date Received:	09/27/95
Condition:	Intact	Date Analyzed:	09/29/95

Target Analyte	Spike Added (ug/L)	Original Conc. (ug/L)	Spiked Sample Conc. (ug/L)	% Recovery	Acceptance Limits (%)
Benzene	10	2.59	12.3	97%	39 -150
Toluene	10	2.16	11.8	96%	46 - 148
Ethylbenzene	10	ND	9.93	97%	32 - 160
m,p-Xylenes	20	2.15	21.1	95%	NE
o-Xylene	10	ND	10.1	96%	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Spike acceptance range not established by the EPA.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	98	88 - 110%
Bromofluorobenzene	92	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

Purgeable Aromatics

Matrix Spike Analysis

Lab ID:	1563Spk	Report Date:	10/04/95
Sample Matrix:	Water	Date Sampled:	09/27/95
Preservative:	Cool	Date Received:	09/27/95
Condition:	Intact	Date Analyzed:	10/03/95

Target Analyte	Spike Added (ug/L)	Original Conc. (ug/L)	Spiked Sample Conc. (ug/L)	% Recovery	Acceptance Limits (%)
Benzene	10	ND	10.6	105%	39 -150
Toluene	10	ND	10.7	105%	46 - 148
Ethylbenzene	10	ND	10.7	106%	32 - 160
m,p-Xylenes	20	ND	21.1	105%	NE
o-Xylene	10	ND	10.8	108%	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Spike acceptance range not established by the EPA.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	99	88 - 110%
Bromofluorobenzene	101	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

VOLATILE AROMATIC HYDROCARBONS

Matrix Spike Duplicate Analysis

Lab ID:	1563Spkdup	Report Date:	10/04/95
Sample Matrix:	Water	Date Sampled:	09/27/95
Preservative:	Cool	Date Received:	09/27/95
Condition:	Intact	Date Analyzed:	10/03/95

Target Analyte	Spike Added (ug/L)	Sample Spike Recovery (%)	Duplicate Spike Recovery (%)	Acceptance Limits (%)
Benzene	10	105%	102%	84 - 123
Toluene	10	105%	104%	85 - 124
Ethylbenzene	10	106%	103%	68 - 141
m,p-Xylenes	20	105%	103%	NE
o-Xylene	10	108%	103%	NE

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.
NE - Spike acceptance range not established by the EPA.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Trifluorotoluene	100	88 - 110%
Bromofluorobenzene	100	86 - 115%

Reference: Method 602.2, Purgeable Aromatics; Federal Register, Vol. 49, No. 209, Oct. 1984.

Comments:

Analyst

Review

0542

ANALYTICA
ENVIRONMENTAL LABORATORY

807 S. CARLTON • FARMINGTON, NM 87401 • (505) 326-2395

CHAIN OF CUSTODY

PROJECT MANAGER: NJV
Analytica Lab I.D.:

Company: BLAGG ENGINEERING
Address: P.O. Box 87, BLFD, NM 87413

Phone: (505) 632-1199
Fax: (505) 632-3903

Bill To: SAME AS ABOVE
Company:
Address:

Sample ID	Date	Time	Matrix	Lab ID	Petroleum Hydrocarbons (418.1)	Gasoline / Diesel (mod. 8015)	Gasoline (GRO)	Aromatic HCs BTEX/MTBE (602/8020)	Chlorinated Hydrocarbons (8010)	SDWA Volatiles (502.1/503.1)	Chlorinated Pesticides / PCBs (608 / 8080)	Herbicides (615 / 8150)	Volatiles GC/MS (624 / 8240 / 8260)	Base / Neutral / Acid GC/MS (625 / 8270)	Polynuclear Aromatic Hydrocarbons (8100)	TCLP Extraction	Other (specify):	Cation / Anion	Specific Cations (specify):	Specific Anions (specify):	BOD / Fecal / Total Coliform	Solids : TDS / TSS / SS	Nutrients: NH4+ / NO2- / NO3- / TKN	Oil and Grease	Other (specify):	Priority Pollutants	RCRA Metals (Total)	RCRA Metals TCLP (1311)
MW #5	9/27/95	1350	WATER					✓																			
MW # 6	9/27/95	1525	WATER					✓																			
MW # 9	9/27/95	1455	WATER					✓																			
MW # 10	9/27/95	1440	WATER					✓																			

Project Information	Sample Receipt
Proj. #:	No. Containers: 8
Proj Name: Gcu com F 162	Custody Seals: Y / N / NA
P.O. No.	Received Intact:
Shipped Via:	Received Cold
Required Turnaround Time (Prior Authorization Required for Rush)	

Sampled by:	Relinquished by:	Relinquished by:
Signature: Nelson Velez	Signature: Nelson Velez	Signature:
Date: 9/27/95	Date: 9/27/95	Date:
Company: BLAGG ENG.	Company: BLAGG ENG.	Company:
Time: SEE SAMPLES	Time: 1605	Time:
Received By:	Received By:	Received By:
Signature:	Signature:	Signature:
Date:	Date:	Date:
Company:	Company:	Company: ANALYTICA
Time:	Time:	Time: 16:[illegible]

APPENDIX C

PROPRIETARY MICROBE PRODUCT INFORMATION

National Environmental Technology Applications Center
UNIVERSITY OF PITTSBURGH APPLIED RESEARCH CENTER
615 William Pitt Way • Pittsburgh, PA 15238
Facsimile (412) 826-5552
(412) 826-5511
NETAC

COPY

August 19, 1993

Alpha Environmental, Inc.
P.O. Box 90218
Austin, TX 78709

Subject: *ALPHA BIOSEA Methods Validation Data*

Enclosed is the efficacy and toxicity data generated with ALPHA BIOSEA from the development and validation of our oil spill response bioremediation evaluation methods.

On behalf of NETAC and all the members of our Oil Spill Product Protocol Development Panel, we wish to express our appreciation for the contribution of your bioremediation agent for use in validating these methods and for your availability to answer questions about how this agent was intended to be used. Your patience and cooperation over the past two years has been commendable.

As you are aware, these experiments were conducted by the NETAC and EPA Office of Research and Development laboratories in Cincinnati, OH and in Gulf Breeze, FL. These data give you a general idea of how your product may behave in an open environment. Note that these data were obtained during the development of our methods. Numerous refinements have been made to increase the sensitivity of these tests, therefore, your product may provide different results in future tests due to this increased sensitivity as well as from the natural variability of the product and the constituent(s) used in the test sequence.

Please bear in mind that, although the Tier II methods have been finalized, we anticipate that all of the methods will be refined and updated periodically as we learn more about these systems. This means that data which was incidentally obtained for your product during the development of the protocols as it currently stands may change as the protocol is further refined. We must emphasize the research nature of the data we are providing to you today!

These data are provided to give you an indication of how your product behaved in this particular phase of the research. Different results may occur with the newly refined methods. We recommend that you evaluate this information as another set of intermediate data. We strongly suggest that you initiate additional testing applying the final Tier II method to develop a product performance baseline.

Please note that the enclosed information was gathered and remains as a coded data set. None of the investigators nor our scientific panel have any knowledge of the coding. The contributed bioremediation agents were used to develop and validate the methods. We are providing these data for your information.

We also wish to emphasize that the participation of any bioremediation agent in the development or validation of the protocol does not constitute endorsement, approval or recommendation on the part of either NETAC or the EPA Office of Research and Development.

Enclosed for your convenience are the tabulated results of the Day 21 shaker flask experiment for efficacy testing (GC/MS), and acute and chronic estimator toxicity values (96-hour and 7-day LC_{50}, respectively). The Statistical Method Summary used to generate data about your product can be found in the July 1993 issue of the *Evaluation Methods Manual for Oil Spill Response Bioremediation Agents* which we have enclosed.

Although NETAC's funding for this project has lapsed, we intend to remain active in this field. Should you have any questions about the data which we have provided, its potential use or application, or development of the protocol please call either Marie Mayer or me at (412) 826-5511. Questions regarding the further development of these protocols may be referred to Mike Mastracci of EPA's Office of Research and Development.

Sincerely,

Tom Merski

A. Thomas Merski
Vice-Chairman,
Treatability Protocol Development Subcommittee,
Bioremediation Action Committee

ATM\MRM:tmw
Enclosure
H:\BPEC\MANUAL\ALPHA.LTR
300-2015-141

cc: W.M. Griffin

OIL SPILL RESPONSE BIOREMEDIATION AGENTS
EVALUATION METHODS VALIDATION TESTING
DISCUSSION OF RESULTS

The following data are provided for the oil spill response bioremediation agent producer as a means to begin to assess how this bioremediation agent may behave in response to an oil spill in the environment.

The data we are providing include gas chromatographic/mass spectrometer (GC/MS) results. Note that a total of 69 analytes (components naturally occurring in oil) were measured in these experiments. These analytes constitute a small but highly representative fraction of the toxic and biodegradable portion of oil. We are providing you with a summary of the ultimate results and a summary of the most germane analytes to facilitate our reporting of this information and to reduce confusion in reporting caused by the modification of the selected test dates.

The following table of GC/MS results indicate the percent reduction of analyte(s) versus the same analyte(s) present in the control (i.e., product results/control results x 100). For example, if 100 percent of an analyte is present at Day 21 after mixing oil, seawater and product as compared to the control (oil and seawater only) then the product did not stimulate the decomposition of hydrocarbons in oil. Note, that the greater the number of analytes with a low percentage the more capable the product of enhancing the biodegradation of oil.

The results of all testing indicated that there was sufficient comparability of the data between the laboratories conducting these experiments. The resultant GC/MS data presented for your bioremediation agent and the comparative nutrient treatment did show statistical difference between the product mean and the control mean at the $p \leq 0.05$ level of significance. That is, biodegradation was occurring faster than the control.

The data generated from these tests were compiled and analyzed using the procedures found in the Statistical Method Summary found in Section 4, Method #8, page 40, of the manual. Note, that this approach also reflects a significant improvement in the statistical evaluation of the data over the previously used statistical methods.

The Tier II 96-hour acute toxicity test was conducted with Mysidopsis bahia test species. Mortality was the single measure response, therefore, survival data were used to calculate the 96-hour LC_{50}. LC_{50} is the lowest concentration effecting 50% mortality of the test organism during a 96 hour exposure period. ALPHA BIOSEA had an LC_{50} above 10,000 mg/L (22,793 mg/L).

ALPHA BIOSEA was shown to cause a statistically significant reduction ($p = 0.05$) in the survival of Mysidopsis when exposed during a 7 day chronic estimator test. Exposure of M. bahia to your product had significant effect on survival but at a high concentration. In general, 7 day exposure (22,944 mg/L) correlated well with values calculated following the 96 hour exposure (22,793 mg/L).

To help you better understand the toxicity data presented, we are including a description of the procedure which was used to gather the above bioassay information, entitled, "Protocol for Evaluation of Commercial Bioremediation Agent Toxicity," from the US EPA Environmental Research Laboratory, Gulf Breeze, FL.

RESULTS:

TIER II EFFICACY DATA

PERCENT REDUCTION vs. CONTROL

ANALYTE	ALPHA BIOSEA (Day 21) (n=3) (%)	NUTRIENT TREATMENT (Day 21) (n=3) (%)
PRISTANE	53	97
C18	3*	100
PHYTANE	50*	97
C30	11*	96
TOTAL n-PARAFFINS	10*	98
FLUORENE	2*	91
PHENANTHRENE	0*	93
CHRYSENE	108	147
TOTAL AROMATICS	37*	89

* = Indicates a statistically significant difference is observed between the product and control mean (n=3) at the 0.05 level.

NETAC

TIER II TOXICITY DATA

TABLE 1

ACUTE TOXICITY VALUES FOR 96 HOUR LC_{50} - *MYSIDOPSIS BAHIA*

Product	Max. Test Concentration (mg/L)	96 hour LC_{50} (mg/L)	Confidence Interval (95%)
ALPHA BIOSEA	60,000	22,793[a]	(19,154-27,123)

LC_{50} = Lethal concentration of product that will cause the death of 50% of the test species population within a defined exposure time.

a = LC_{50} presented as a single, numerical value since data were from a definitive 96-hour acute toxicity test.

TABLE 2

CHRONIC TOXICITY VALUES FOR 7 DAY LC_{50} - *MYSIDOPSIS BAHIA*

Product	Endpoints (mg/L)		Effects Measurement	7 Day LC_{50} mg/L (95% CI)
	NOEC	LOEC		
ALPHA BIOSEA	20,000 2,222 2,222	60,000 6,667 6,667	Survival Growth Fecundity	22,944 (18,810-27,985)

NOEC = No Observable Effect Concentration
LOEC = Lowest Observable Effect Concentration
CI = Confidence Interval
Fecundity = Egg Production

MATERIAL SAFETY DATA SHEET

Alpha Environmental, Inc.
7748 Hwy 290 West, Suite 110
Austin, Texas 78736

Date: 01/20/92

Emergency Phone: (512) 288-7500
FAX Number: (512) 288-1995

SECTION I - IDENTITY

NAME: Alpha Microbial Cultures (BIOSEA, MICROX & PETROLOGIC)
D.O.T.: Class Not Regulated
FORMULA: Proprietary
CHEMICAL FAMILY: A mixture of dehydrated natural salt tolerant soil/marine microorganisms in combination with inert clay and/or commercial vegetable extract. No hazardous components.

SECTION II - PHYSICAL & CHEMICAL CHARACTERISTICS FIRE & EXPLOSION DATA

BOILING POINT:	N/A	FIRE EXTINGUISHER MEDIA:	Water
SPECIFIC GRAVITY:	N/A	MELTING POINT:	N/A
PERCENT VOLATIVE BY VOL:	N/A	VAPOR PRESSURE mm/Hg:	N/A
FLAMMABLE LIMIT:	N/A	VAPOR DENSITY, AIR = 1:	1.5
REACTIVITY WITH WATER:	N/A	SOLUBILITY IN WATER:	Negligible
AUTO-IGNITE TEMP.:	N/A	EVAPORATION RATE:	N/A

APPEARANCE: White to Beige Powder
ODOR: Mild Hydrocarbon Aroma

SPECIAL FIRE FIGHTING PROCEDURES:
SPECIAL FIRE FIGHTING PROCEDURES: None
UNUSUAL FIRE AND EXPLOSION HAZARDS: Hazardous mixture with air, 0.04 oz/cu. ft. minimum explosive limit. Minimum ignition temperature 715° F.

SECTION III - PHYSICAL HAZARDS

STABILITY:	Stable	INCOMPATIBLE SUBSTANCE:	None Known
POLYMERIZATION:	NO	HAZARDOUS DECOMPOSITION:	NO

SECTION IV - HEALTH HAZARDS

HEALTH HAZARDS, ACUTE AND CHRONIC:	None
CONDITIONS AGGRAVATED BY EXPOSURE:	Membrane Irritation By Dry Powder
CARCINOGENICITY:	None
NOT FOR HUMAN CONSUMPTION	
EMERGENCY FIRST AID PROCEDURES:	Wash and/or Irrigate With Water

---

SECTION V - SPECIAL PROTECTION

RESPIRATORY PROTECTION:	Not Necessary
VENTILATION REQUIRED:	Normal
LOCAL EXHAUST REQUIRED:	NO
PROTECTIVE CLOTHING:	Plastic Gloves & Safety Glasses

SECTION VI - PRECAUTIONS FOR HANDLING & USE

PRECAUTIONS TO BE TAKEN IN HANDLING:	None
PRECAUTIONS TO BE TAKEN IN CASE OF SPILL:	Dry Sweep For Disposal
DISPOSAL PROCEDURES:	Follow all Federal, State & Local regulations for non-hazardous waste disposal
STORAGE REQUIREMENTS:	Clean, Dry, Normal Room Temperature

THE INFORMATION ON THE MATERIAL SAFETY DATA SHEET REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARDS, PROPERTIES AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE. THIS MATERIAL SAFETY DATA SHEET WAS PREPARED TO COMPLY WITH 29 CFR 1910.1200.

Prepared By
Alpha Environmental, Inc. JK

æ msds/bmp

MATERIAL SAFETY DATA SHEET

Alpha Environmental, Inc.
7748 Hwy 290 West, Suite 110
Austin, Texas 78736

Date: 01/20/92

Emergency Phone: (512) 288-7500
FAX Number: (512) 288-1995

SECTION I - IDENTITY

NAME: Alpha BioCatalyst
D.O.T.: Class Not Regulated
FORMULA: Proprietary
CHEMICAL FAMILY: Aqueous solution of various natural extracts and micro-nutrients, Biodegradable.

SECTION II - PHYSICAL & CHEMICAL CHARACTERISTICS
FIRE & EXPLOSION DATA

BOILING POINT:	100° C	FIRE EXTINGUISHER MEDIA:	N/A
SPECIFIC GRAVITY:	1.00 ± .01	MELTING POINT:	N/A
PERCENT VOLATIVE BY VOL:	N/A	VAPOR PRESSURE mm/Hg:	N/A
FLAMMABLE LIMIT:	N/A	VAPOR DENSITY, AIR = 1:	N/A
REACTIVITY WITH WATER:	N/A	SOLUBILITY IN WATER:	Complete
AUTO-IGNITE TEMP.:	N/A		

EVAPORATION RATE: Same as Water
APPEARANCE: Clear, Odorless, Colorless
ODOR: None

SPECIAL FIRE FIGHTING PROCEDURES:
SPECIAL FIRE FIGHTING PROCEDURES: N/A
UNUSUAL FIRE AND EXPLOSION HAZARDS: None

SECTION III - PHYSICAL HAZARDS

STABILITY:	Stable	INCOMPATIBLE SUBSTANCE:	None Known
POLYMERIZATION:	NO	HAZARDOUS DECOMPOSITION:	NO

SECTION IV - HEALTH HAZARDS

HEALTH HAZARDS, ACUTE AND CHRONIC:	None
CONDITIONS AGGRAVATED BY EXPOSURE:	None
CARCINOGENICITY:	None

NOT FOR HUMAN CONSUMPTION

EMERGENCY FIRST AID PROCEDURES: None

SECTION V - SPECIAL PROTECTION

RESPIRATORY PROTECTION:	None
VENTILATION REQUIRED:	None
LOCAL EXHAUST REQUIRED:	None
PROTECTIVE CLOTHING:	None

SECTION VI - PRECAUTIONS FOR HANDLING & USE

PRECAUTIONS TO BE TAKEN IN HANDLING: None

PRECAUTIONS TO BE TAKEN IN CASE OF SPILL: None

DISPOSAL PROCEDURES: None - Environmentally compatible to living organisms, soil and water. Follow all Federal, State and local regulations for non-hazardous waste disposal.

STORAGE REQUIREMENTS: Normal Room Temperature

THE INFORMATION ON THE MATERIAL SAFETY DATA SHEET REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARDS, PROPERTIES AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE. THIS MATERIAL SAFETY DATA SHEET WAS PREPARED TO COMPLY WITH 29 CFR 1910.1200.

Prepared By
Alpha Environmental, Inc. JK

æ msds/bc

MATERIAL SAFETY DATA SHEET

ALPHA ENVIRONMENTAL, INC.
7748 Hwy. 290 West Suite 110
Austin, Texas 78736

Date 9/15/91

Emergency Phone (512) 288-7500
Fax (512) 288-1995

SECTION I - IDENTITY

Name Alpha Micro Nutrient
Formula 36 - 6 - 6 NKP plus micronutrients
Water soluble fertilizer concentrate

SECTION II - PHYSICAL & CHEMICAL CHARACTERISTICS

Monoammonium phosphate	9.9%
Urea	63.8%
Potassium Nitrate	13.1%
Ammonium Nitrate	11.3%
Various Micronutrients	1.9%

SECTION III - PHYSICAL HAZARDS & DATA

Boiling Point: N/A
Water Solubility: Completely Soluble
Appearance: Lime Green
Salting - Out Temperature: N/A
% Volatile by Volume: N/A

Specific Gravity: N/A
pH of Solution: N/A
Odor: N/A
Vapor Pressure: N/A

SECTION IV - FIRE & EXPLOSION DATA

Flash Point: N/A
Flammable Limit - Level: N/A
Extinguishing Media: Water

SPECIAL FIRE FIGHTING PROCEDURES: Firemen must wear self-contained breathing apparatus. Heat can cause emission of highly toxic fumes. Heat can cause the nitrate present to act as an oxidizing agent which can support combustion or cause detonation of other products. Persons should be evacuated from down wind areas.

UNUSUAL FIRE & EXPLOSION HAZARDS: Nitrates may decompose violently when mixed with ammonium salts.

SECTION V - HEALTH & FIRST AID DATA

Threshold Limit Values: Not applicable - non toxic material
Effects Of Over Exposure: Not under normal usage and conditions. Oral ingestion of large amounts may cause nitrate poisoning resulting in dizziness, abdominal cramps, vomiting, bloody diarrhea, weakness, convulsions and collapse.

Skin: If irritation occurs, wash skin with water and mild detergent. Remove contaminated clothing and wash before re-use. If irritation persists seek medical attention.

Eyes: If eye irritation occurs, flush with flowing water for at least 30 minutes. Seek medical attention if irritation persists.

Inhalation: If breathing difficulty occurs due to dust inhalation remove to fresh air. If discomfort continues seek medical attention.

Ingestion: If person is conscious give large amounts of water and induce vomiting. Seek medical attention.

SECTION VI - REACTIVITY DATA

Stability: Yes
Conditions To Avoid If Unstable: Fire conditions and nitrites
Incompatibility With Other Materials: Corrosive to metals
Hazardous Decomposition Products: Highly toxic fumes of POX and oxides of nitrogen.
Hazardous Polymerization: Will not occur.
Conditions To Avoid Uncontrolled Polymerization: N/A

SECTION VII - SPILL & DISPOSAL PROCEDURES

Steps to be taken to handle spills or release: Pick or sweep up material and store in plastic bags away from combustibles.

Waste Disposal Procedures: Dispose of in an approved landfill in accordance with State, Federal and local regulations.

SECTION VIII - SPECIAL PROTECTION

Respiratory Protection: A Niosh approved dust respirator should be worn when applicable dust standards are exceeded.

Ventilation: Adequate ventilation should be available to maintain dust levels below applicable standard total nuisance dust.

Eye Protection: Safety glasses with side shields.

Protective Gloves: Yes

Other Protective Equipment: Body covering clothing

SECTION IX - SPECIAL PRECAUTIONS

Do not store near intense heat.

THE INFORMATION ON THIS MATERIAL SAFETY SHEET REFLECTS THE LATEST INFORMATION AND DATA THAT WE HAVE ON HAZARD, PROPERTIES AND HANDLING OF THIS PRODUCT UNDER THE RECOMMENDED CONDITIONS OF USE.