3R - 97

GENERAL CORRESPONDENCE

YEAR(S): 2004-1997

3R97

SMA

Souder, Miller & Associates ♦ 1201 Parkway Drive ♦ Santa Fe, NM 87507-7258
(505) 473-9211 ♦ fax (505) 471-6675

February 3, 2004 #5114224

Mr. William C. Olson
Environmental Bureau
Oil Conservation Division
New Mexico Energy, Minerals & Natural Resources Department
1220 South St. Francis Dr.
Santa Fe, NM 87505

RE: PLAN FOR FUTURE WORK, CONOCOPHILLIPS SHEPHARD & KELSEY #1

Dear Mr. Olson:

Souder, Miller & Associates (SMA) has prepared this letter on behalf of ConocoPhillips to confirm the results of the January 27, 2004 meeting between ConocoPhillips and the Oil Conservation Division (OCD). The meeting established a plan for future work on the ConocoPhillips Shephard & Kelsey #1 site. ConocoPhillips and SMA understand that the plan consists of:

1. Continue to sample impacted well SB-12 for benzene, toluene, ethylbenzene and total xylenes by EPA method 8021B until four quarters of water contaminant concentrations below New Mexico Water Quality Control Commission standards are achieved. Other site wells will be monitored in the final, fourth quarter to verify site closure.

If this is not OCD's understanding of the plan for future work, please inform me within 10 business days (505-473-9211, rsa@soudermiller.com). ConocoPhillips and SMA appreciated the opportunity to meet with you and establish a path towards closure for this project.

Sincerely,

SOUDER, MILLER & ASSSOCIATES

Reid S. Allan
Vice President/Senior Scientist

Cc: Mr. Neal Goates, ConocoPhillips

SMA
CIVIL/ENVIRONMENTAL
SCIENTISTS & ENGINEERS

RECEIVED
FEB 28 2003
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

February 26, 2003

Bill Olsen,
New Mexico Oil Conservation Division
1200 S. St. Francis Drive
Santa Fe, NM 87505

RE: Conoco Groundwater Report Summary

On behalf of ConocoPhillips ***Souder Miller and Associates***, is submitting the enclosed 2002 Annual Groundwater report for five (5) locations. Salmon #1 is included on this table although no Annual Report is being submitted.

LOCATION NAME	LEGAL DESCRIPTION	RECOMMENDATION
Farmington B Com 1	Unit H, S 12, T29N, R12W	BTEX has been at or below NMWQCC standards, for four quarters: need to sample for closure during March 2003, and submit Pit Closure forms to OCD.
Nell-Hall # 1	Unit M, S 07, T30N, R11W	Continue to monitor as required in NMCOD letter dated September, 1998.
Farmington C Com 1	Unit L, S 15, T29N, R13W	BTEX has been at or below NMWQCC standards, for four quarters: closure sampling has been accomplished, Pit Closure Forms are attached.
Farmington B Com 1E	Unit O, S 15, T29N, R13W	Free product is still present in MW-1. Sampling stopped at this time IAW NMOCD direction, more aggressive recovery program being investigated.
Salmon # 1	Unit P, S 30, T29N, R11W	Site has been closed and monitoring wells have been properly plugged and abandoned.
S&K # 1	Unit L, S 29, T29N, R11W	MW-NE and SB 12 have high Benzene levels all others at or below NMWQCC standards, continue monitoring of MW-NE and SB 12.

If there are any questions or concerns on this matter, feel free to contact me at (505) 325-5667.
Thank you for your time and considerations.

Respectfully submitted,

John Hagstrom
Environmental Technician
Souder Miller and Associates

CC:
Neal Goates, RM&R Site Manager, ConocoPhillips, PO Box 2197, Houston, TX 77252-2197
Denny Foust, New Mexico Oil Conservation Division, 1000 Rio Brazos, Aztec, NM 87410
Bill Liess, BLM, 1235 La Plata Hwy., Farmington, NM 87401
Michael Nelson, ConocoPhillips, PO Box 2197, Houston, TX 77252-2197
File

Tel. (505) 325-5667 Fax (505) 327-1496
P. O. BOX 2606 • FARMINGTON, NM 87499
-TECHNOLOGY BLENDING INDUSTRY WITH THE ENVIRONMENT-

3R97

ON SITE TECHNOLOGIES, LTD.

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FEB 25 2002

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

February 22, 2002

Bill Olson
New Mexico Oil Conservation Division
1220 South St. Francis Drive.
Santa Fe, New Mexico 87505

RE: Conoco Groundwater Report Summary

On behalf of Conoco ***On Site Technologies Limited Partnership***, is submitting the enclosed 2001 Annual Groundwater report for Ten (10) sites.

LOCATION NAME	LEGAL DESCRIPTION	RECOMMENDATION
Farmington B Com 1	Unit H, S 12, T29N, R12W	WSP-1 still has high BTEX, all other at or below NMWQCC standards, continue monitoring of WSP #1
Nell-Hall#1	Unit M, S 07, T30N, R11W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington C Com 1	Unit L, S 15, T29N, R13W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington B Com 1E	Unit O, S 15, T29N, R13W	Free product is still present in MW-1. Sampling stopped at this time IAW NMOCD direction, more aggressive recovery program being investigated.
Salmon # 1	Unit P, S 30, T29N, R11W	DG#2 has had BTEX levels below NMWQCC standards for the last six quarters. Close site and properly plug and abandon monitoring wells.
S&K1	Unit L, S 29, T29N, R11W	SB 12 still has high BTEX, all others at or below NMWQCC standards, continue monitoring of SB 12.

If there are any questions or concerns on this matter, feel free to contact me at (505) 325-5667.

Thank you for your time and considerations.

Respectfully submitted,

John Hagstrom
Environmental Technician
On Site Technologies Limited Partnership

CC:
Gary Ledbetter, SHEAR, Conoco Inc., 3315 Bloomfield HWY, Farmington, NM 87401
Bill Liess, BLM 1235 La Plata HWY, Farmington, NM 87401
Denny Foust, NMOCD 1000 Rio Brazos, Aztec, NM 87410
John Cofer, Sr. Environmental Specialist, Conoco Inc., 3315 Bloomfield HWY, Farmington, NM 87401
File

PO Box 2606
Farmington, NM 87499

505-325-5667

FAX: 505-327-1496

ON SITE
TECHNOLOGIES, LTD.

February 27, 2001

Mr. Bill Olson
New Mexico Oil Conservation Division.
2040 South Pacheco
Santa Fe, New Mexico 87505

RE: Conoco Groundwater Report Summary

On behalf of Conoco ***On Site Technologies Limited Partnership***, is submitting the enclosed 2000 Annual Groundwater report for Ten (10) sites.

LOCATION NAME	LEGAL DESCRIPTION	RECOMMENDATION
Farmington B Com 1	Unit H, S 12, T29N, R12W	WSP-1 still has high BTEX, all other at or below NMWQCC standards, continue monitoring of WSP #1
Nell-Hall#1	Unit M, S 07, T30N, R11W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington C Com 1	Unit L, S 15, T29N, R13W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington B Com 1E	Unit O, S 15, T29N, R13W	Free product is still present in MW-1. Sampling stopped at this time IAW NMOCD direction, more aggressive recovery program being investigated.
Salmon # 1	Unit P, S 30, T29N, R11W	DG#2 still has high BTEX, Continue monitoring in accordance with NMOCD letter dated September, 1998.
San Juan 28-7#126	Unit M, S 1, T27N, R7W	Research is being done to complete and submit the Pit closure forms and final reports
San Juan 28-7#219	Unit N, S 20, T28N, R7W	Research is being done to complete and submit the Pit closure forms and final reports
S&K1	Unit L, S 29, T29N, R11W	Research is being done to complete and submit the Pit closure forms and final reports
San Juan 28-7#19	Unit G, S 25, T28N, R7W	research is being done to complete and submit the Pit closure forms and final reports
San Juan 28-7#47	Unit A, S 20, T28N, R7W	Research is being done to complete and submit the Pit closure forms and final reports
Farmington Com #1	Unit P, Sec 11, T29N, R13W	Monitoring wells and piezometer plug and abandoned IAW NMOCD Letter dated December 13, 2000
Shephard & Kelsey #1E	Unit D, Sec. 29, T29N, R11W	Monitoring wells plug and abandoned IAW NMOCD Letter dated December 14, 2000

PO Box 2606
Farmington, NM 87499
505-325-5667 FAX: 505-327-1496

If there are any questions or concerns on this matter, feel free to contact me at (505) 325-5667.

Thank you for your time and considerations.

Respectfully submitted,

Larry Trujillo, CHMM
Environmental Specialist
On Site Technologies Limited Partnership

CC:
Gary Ledbetter, SHEAR, Conoco Inc., 3315 Bloomfield HWY, Farmington, NM 87401
John Cofer, Sr. Environmental Specialist, Conoco Inc., 3315 Bloomfield HWY, Farmington, NM 874
Denny Foust, NMOCD 1000 Rio Brazos, Aztec, NM 87410
Bill Liess, BLM 1235 La Plata HWY, Farmington, NM 87401
File

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

September 28, 1999

Ms. Shirley Ebert
Conoco, Inc.
10 Desta Dr., Suite 100W
Midland, Texas 79705-4500

RE: FINAL SAN JUAN BASIN PIT CLOSURE REPORTS

Dear Ms. Ebert:

The New Mexico Oil Conservation Division (OCD) has reviewed Conoco's August 9, 1999 "CONOCO GROUNDWATER REPORT SUMMARY" which was received by the OCD on September 11, 1999. This document which was submitted on behalf of Conoco by their consultant On Site Technologies, Ltd. requests the status of approval of the corrective actions at a number of pit sites in the San Juan Basin.

A review of the case files on these sites shows there have been recommendations from On Site Technologies to Conoco that Conoco seek closure of the remedial actions at some of the sites. However, the OCD has no record of receiving any closure requests from Conoco. If Conoco wishes to seek closure of the pits at these sites, Conoco will need to submit a completed OCD "Pit Remediation and Closure Report" form for each site. The report should include the results of all soil and ground water remediation actions and information on the current operator of the site.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Denny Foust, OCD Aztec District Office
Larry Trujillo, On Site Technologies, Ltd.

ON SITE
TECHNOLOGIES, LTD.

SEP - , 1999

August 9, 1999

Mr. Wm. "Bill" Olsen, Hydrologist
NMOCD
2040 S. PACHECO ST
Santa Fe, NM, 87505

RE: Conoco Groundwater Report Summary

On behalf of Conoco Inc., ***On Site Technologies Limited Partnership*** requests a status of approval for the corrective actions on the following list of well locations.

RECOMMEND	**CONTINUED**	**MONITORING**
Farmington B Com 1	Unit H, S 12, T29N, R12W	WSP-1 still has high BTEX, all other at or below NMWQCC standards, continue monitoring of WSP #1
San Juan 28-7#19	Unit G, S 25, T28N, R7W	Continue monitoring, BTEX levels still above NMWQCC standards
San Juan 28-7#47	Unit A, S 20, T28N, R7W	Continue monitoring, BTEX levels still above NMWQCC standards
Nell-Hall#1	Unit M, S 07, T30N, R11W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington C Com 1	Unit L, S 15, T29N, R13W	Continue to monitor as required in NMCOD letter dated September, 1998
Farmington B Com 1E	Unit O, S 15, T29N, R13W	Continue to monitor as required in NMCOD letter dated September, 1998
Salmon # 1	Unit P, S 30, T29N, R11W	DG#2 still has high BTEX, Continue monitoring in accordance with NMOCD letter dated September, 1998
RECOMMEND	**CLOSURE**	
San Juan 28-7#126	**Unit M, S 1, T27N, R7W**	**4 quarters of sampling below NMWQCC standards, recommend closure**
San Juan 28-7#219	**Unit N, S 20, T28N, R7W**	**4 quarters of sampling below NMWQCC standards, recommend closure**
S&K1	**Unit L, S 29, T29N, R11W**	**4 quarters of sampling below NMWQCC standards recommend closure.**
Farmington Com 1	**Unit P, S 11, T29N, R13W**	**Contamination level in MW 1 below OCD action levels for the last four quarters, MW2 and MW3 historically have not had any contamination above NMWQCC standards. Recommend closure of the location.**
S&K1E	**Unit D, S 29, T29N, R11W**	**4 quarters of sampling below OCD action levels recommend closure.**

PO Box 2606
Farmington, NM

505-325-5667

FAX: 505-327-1496

Recommendations listed above were included in the 1997 and 1998 Conoco Annual Ground Water Reports. Please advise ***On Site*** and Conoco of NMOCD's approval, as we are only scheduling the sites requiring continued monitoring.

If there are any questions or concerns on this matter, feel free to contact me at (505) 325-5667.

Thank you for your time and considerations.

Respectfully submitted,

Larry Trujillo CHMM
Senior Environmental Technician
On Site Technologies Limited Partnership

CC:

Shirley Ebert, SHEAR, Conoco Inc., Farmington Office
Neal Goates, Sr. Environmental Specialist, Conoco Inc.

ON SITE
TECHNOLOGIES, LTD.

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FEB 19 1999
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Letter of Transmittal

ATTENTION:

DATE: February 17, 1999

Mr. Bill Olson
New Mexico Oil Conservation Division.
2040 South Pacheco
Santa Fe, New Mexico 87505

RE: Conoco's 1998 Annual Groundwater Report

Dear Mr. Olson:
On behalf of Conoco ***On Site Technologies Limited Partnership***, is submitting the enclosed 1998 Annual Groundwater report for ten (10) sites.

Number of Originals	Description
1	Shephard & Kelsey #1E Unit D, Sec. 29, T29N, R11W
1	Shephard & Kelsey #1 Unit L, Sec. 29, T29N, R11W
1	Salmon #1 Unit P, Sec. 30, T29N, R7W
1	Nell-Hall #1 Unit, M, Sec 7, T30N, R11W
1	San Juan 28-7-19 Unit G, Sec. 25, T28N, R7W
1	San Juan 28-7-47 Unit A, Sec. 20, T28N, R7W
1	Farmington Com #1 Unit P, Sec 11, T29N, R13W
1	Farmington B Com #1 Unit H, T29N R13W
1	Farmington C Com 1 Unit L, Sec. 15, T29N, R13W
1	Farmington B Com 1E Unit O, Sec 15, T29, R13W

Thank you,

Larry Trujillo
Sr. Environmental Technician

CC:
Shirley Ebert
Neal Goates
Denny Foust
File

PO Box 2606
Farmington, NM

505-325-5667

FAX: 505-327-1496

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 5, 1998

CERTIFIED MAIL
RETURN RECEIPT NO. Z-235-437-284

Ms. Shirley Ebert
Conoco, Inc.
3315 Bloomfield Hwy.
Farmington, New Mexico 87401

RE: GROUND WATER INVESTIGATIONS
SAN JUAN BASIN PIT CLOSURES

Dear Ms. Ebert:

The New Mexico Oil Conservation Division (OCD) has completed a review of Conoco, Inc.'s (Conoco) February 4, 1998 "CONOCO'S 1997 ANNUAL GROUNDWATER REPORT" which was received by the OCD on February 27, 1998. This document, which was submitted on behalf of Conoco by their consultant On Site Technologies, Ltd., contains the results of Conoco's investigation, remediation and monitoring at 12 unlined oil and gas production pit sites with resulting ground water contamination.

Upon a review of the above referenced documents, the OCD has the following comments and requirements:

1. The data in the reports for the sites listed below show that the complete extent of ground water contamination has not been determined. The OCD requires that Conoco complete the definition of the extent of ground water contamination at these sites pursuant to Conoco's prior approved ground water investigation and remediation plan for the San Juan Basin.

-	Farmington B Com #1	Unit H, Sec. 12, T29N, R12W.
-	Farmington C Com #1	Unit L, Sec. 15, T29N, R13W.
-	Farmington Com #1	Unit P, Sec. 11, T29N, R13W.
-	Nell-Hall #1	Unit M, Sec. 07, T30N, R11W.
-	Salmon #1	Unit P, Sec. 30, T29N, R11W.

2. The ground water metals data for the site listed below shows that the concentrations of barium, chromium and lead in ground water are above the New Mexico Water Quality Control Commission (WQCC) ground water standards. The OCD requires that Conoco conduct additional metals sampling at this site

-	Farmington Com #1	Unit P, Sec. 11, T29N, R13W.

3. Some of the report site maps do not show the former locations of the pits, the excavated areas nor the locations of all monitor wells (former and current) . The OCD requires that Conoco include this information in future reports.

4. Some of the reports do not contain quarterly ground water potentiometric maps. The OCD requires that Conoco's future reports include ground water potentiometric maps for each sampling event. The maps will be created using the water table elevation in all site monitor wells.

5. Some of the report summary tables do not contain the results of all past water quality sampling. It is difficult for the OCD to evaluate remedial progress at a site without this data. The OCD requires that Conoco's future reports include summary tables that contain the results of all past and present water quality sampling.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Denny Foust, OCD Aztec District Office
Larry Trujillo, On Site Technologies, Ltd.

On Site Technologies, Ltd.

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FEB 27 1998

Environmental Bureau
Oil Conservation Division

Letter of Transmittal

ATTENTION:

DATE: February 4, 1998

Mr. Bill Olson
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

RE: Conoco's 1997 Annual Groundwater Report.

REMARKS:

Dear Mr. Olson:

On behalf of Conoco, ***On Site Technologies Limited Partnership***, is submitting the enclosed 1997 Annual Groundwater report for the twelve (12) sites

We are sending you:

No. Originals	No. Copies	Description
1		Farmington B Com 1, Unit H, Sec. 12, T29N, R12W
1		San Juan 28-7-19, Unit G, Sec. 25, T28N, R7W
1		San Juan 28-7-47, Unit A, Sec.20, T28N, R7W
1		San Juan 28-7-126, Unit M, Sec.1, T27N, R7W
1		San Juan 28-7-219, Unit N, Sec. 20, T28N, R7W
1		Shephard & Kelsey #1, Unit L, Sec. 29, T29N, R11W
1		Nell-Hall #1, Unit , Sec. 1, T30N, R11W
1		Farmington Com #1, Unit P, Sec. 11, T29N, R13W
1		Farmington C Com #1, Unit L, Sec. 15, T29N, R13W
1		Farmington B Com #1E, Unit O, Sec. 15, T29N, R13W
1		Salmon #1, Unit P Sec. 30, T29N, R11W
1		Shephard & Kelsey 1E, Unit D, Sec. 29, T29W, R11W

SIGNATURE:

Larry Trujillo
Sr. Environmental Technician
cc:

Denny Foust
Shirley Ebert
Neal Goates

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

July 28, 1997

CERTIFIED MAIL
RETURN RECEIPT NO. P-410-431-198

Mr. Neal Goates
Conoco, Inc.
10 Desta Dr., Suite 100W
Midland, Texas 79705-4500

RE: ANNUAL PIT CLOSURE SUMMARY AND GROUND WATER IMPACTS

Dear Mr. Goates:

The New Mexico Oil Conservation Division (OCD) has reviewed Conoco's undated "ANNUAL PIT CLOSURES AND GROUND WATER IMPACT UPDATES, STATE OF NEW MEXICO, 1996" which was received by the OCD on May 20, 1997. This document contains the results of Conoco's recent work on the investigation and remediation of contamination from unlined production pits in the San Juan Basin. The document also contains Conoco's recommendations for future remedial actions.

The recommendations as contained in the above referenced document are approved with the following conditions:

1. General Conditions

   a. The ground water reports for each site do not include the cations/anions, metals and PAH ground water sample analyses that were supposed to be taken at each site. The OCD requires that Conoco conduct this sampling pursuant to Conoco's March 24, 1995 San Juan Basin ground water assessment plan which was conditionally approved by the OCD on April 5, 1995. The results of these analyses will be included in subsequent annual reports.

b. Upon review of Conoco's file, the OCD noted that Conoco does not have a long term ground water monitoring plan nor a ground water remediation plan for pit closure sites with ground water contamination. The OCD requires that Conoco submit a comprehensive ground water remediation plan and long term ground water monitoring plan to the OCD by October 10, 1997.

c. All future annual ground water reports will be submitted to the OCD by March 1 of each respective year. The ground water reports will present the information on each site as a separate case. Each ground water case report will contain:

I. A brief summary of all ground water remediation and monitoring activities which occurred during the prior calendar year.

ii. Summary tables of all past and present ground water quality sampling analytical results and copies of the laboratory analytical data sheets for samples taken during the last year.

iii. A site map showing the locations of relevant site features (ie. wellhead, pit, monitor wells, etc.)

iv. A quarterly ground water potentiometric map using the water table elevation in all site monitor wells.

v. A geologic log and well completion diagram for each monitor well.

2. <u>Farmington Com #1, Farmington C Com #1, Farmington B Com #1E and Farmington B Com #1</u>

Due to the potential for public impacts from soil and ground water contamination at these sites, the OCD requires that Conoco conduct the following actions:

a. By August 29, 1997, Conoco will complete the remediation of contaminated soils at each site according to Conoco's previously approved pit closure plan. Final reports containing the results of the soil remedial actions will be submitted to the OCD by September 26, 1997.

b. By August 29, 1997, Conoco will submit a ground water remediation work plan for each site to the OCD. The work plan will include information on how Conoco plans to remediate the contaminated ground water, a long term ground water monitoring plan, an implementation schedule and, if not already completed, a plan to define the full extent of ground water contamination at each site.

3. Shepherd & Kelsey #1E (Separator pit)

The report recommends no further actions except additional ground water monitoring for this site. However, a review of the report data shows that the extent of ground water contamination at this site has not been determined. Therefore, the OCD requires that Conoco investigate the extent of ground water contamination pursuant to Conoco's March 24, 1995 San Juan Basin ground water assessment plan which was conditionally approved by the OCD on April 5, 1995.

To simplify the approval process for both Conoco and OCD, the OCD requests that future annual reports only address the ongoing actions related to ground water investigation, remediation and monitoring. Pit closure actions involving only contaminated soils need to be reported to the OCD only upon completion of all pit soil remedial actions when Conoco submits a final pit closure report to the OCD for approval. Pit closure actions involving only contaminated soils do not need to be reported to the OCD on an interim basis.

Please be advised that OCD approval does not relieve Conoco of liability if remaining contaminants pose a future threat to surface water, ground water, human health or the environment. In addition, OCD approval does not relieve Conoco of responsibility for any federal, state, tribal, or local laws and/or regulations.

If you have any questions, please contact me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Denny Foust, OCD Aztec District Office
Bill Liess, BLM Farmington District Office
John Andersen, Conoco, Inc.
Robert J. Bowie, City of Farmington

SHEPHERD & KELSEY #1 -- BIOSCREEN MODELING

- Figure 1 -- Shepherd and Kelsey Base Map -- Showing the locations of the soil samples and the monitor-wells.

- Figure 2 -- Topographic map of site -- Notice the depression in the center of the site just north of the oil well location; c.i. = 0.5 feet with a floating datum.

- Figure 3 -- Contour map of groundwater elevation measured relative to the floating datum of the topographic map (Figure 2).

- Figure 4 -- Benzene concentration in soil in parts per million estimated from OVM, BETX screening procedure; c.i. = 50 ppm.

- Figure 5 -- Concentration of benzene in groundwater for Monitor Well DG-01 as a function of time.

- Figure 6 -- As above for Monitor Well 01

- Figure 7 -- As above for Monitor Well 02

- Figure 8 -- BIOSCREEN Natural Attenuation Software

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Environmental Bureau
Oil Conservation Division

- Figure 9 -- Input Parameters for BIOSCREEN Model:

  Seepage Velocity of 5.8 feet/year computed from:
  - Porosity -- 0.3 assumed
  - Hydraulic Gradient -- 0.013 measured from Figure 3
  - Hydraulic Conductivity -- 1.3 X 10^{-5} cm/sec.

  Dispersion -- program estimates from 50 foot plume length

  Retardation factor of 1.2 (dimensionless) computed from:
  - Soil Bulk Density -- 1.7 kg/L (or gm/cm^3) program default
  - K_{oc} -- 38 L/kg is program default value for benzene
  - f_{oc} -- 0.001 is conservative, defensible value (0.1%)

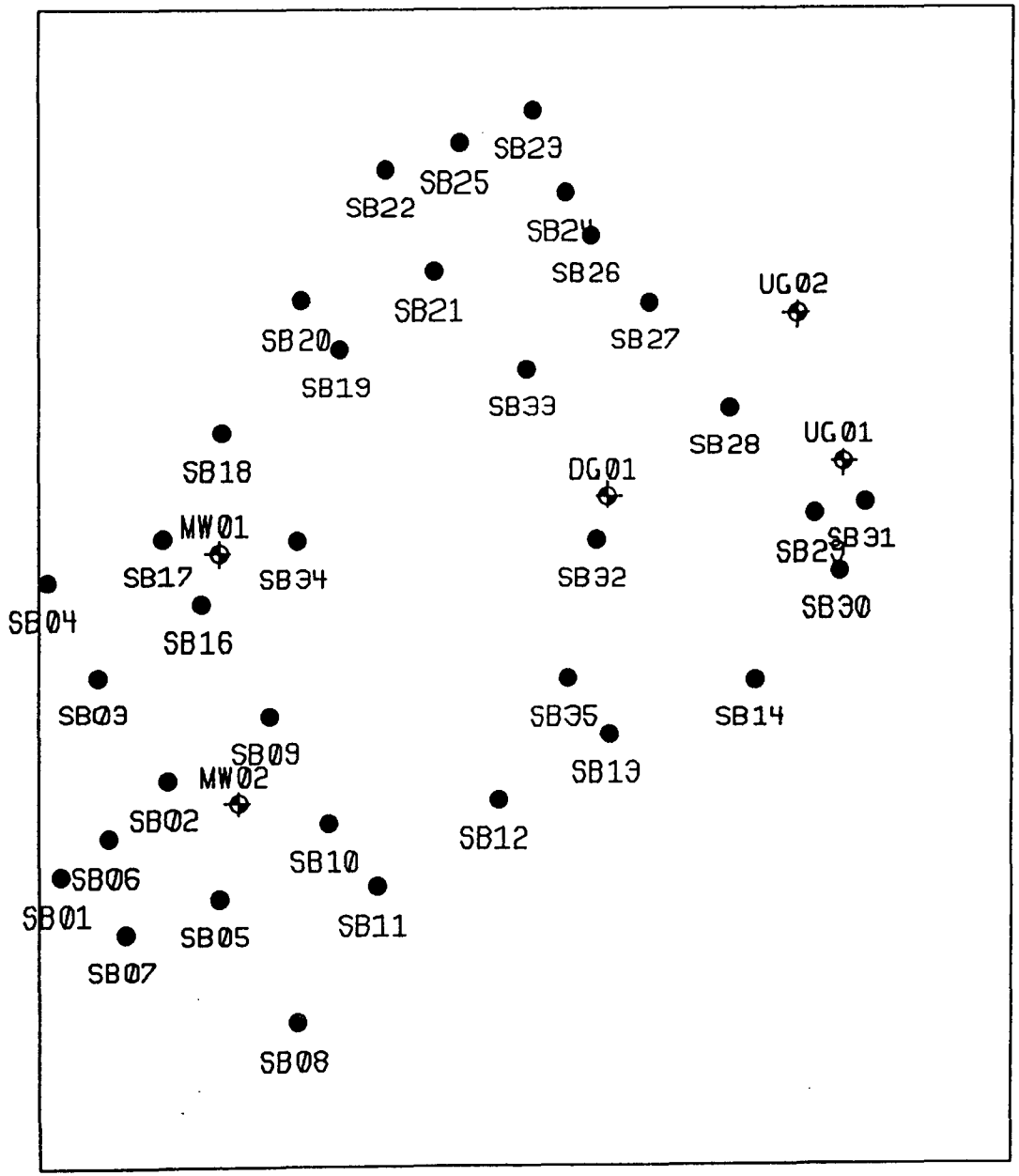
  Biodegradation -- used defensible $T_{1/2}$ of one year for benzene
  (Note: Instantaneous Reaction Model not used -- no data)

General -- Simulation time of ten years; there will be ten "snapshots" of the plume centerline taken at 1-year intervals

Source data -- Plume assumed to be ten feet thick in saturated zone; assumed to be 150 feet wide with central core 50 feet wide at 250,000 ppb.

- Model Results (1-10-year snapshots) -- For all of these snapshots, the Instantaneous Reaction Model data (green) are meaningless; framed cell indicates first detectable benzene predicted by model.

SHEPHERD KELSEY BASE MAP



0 —— 50

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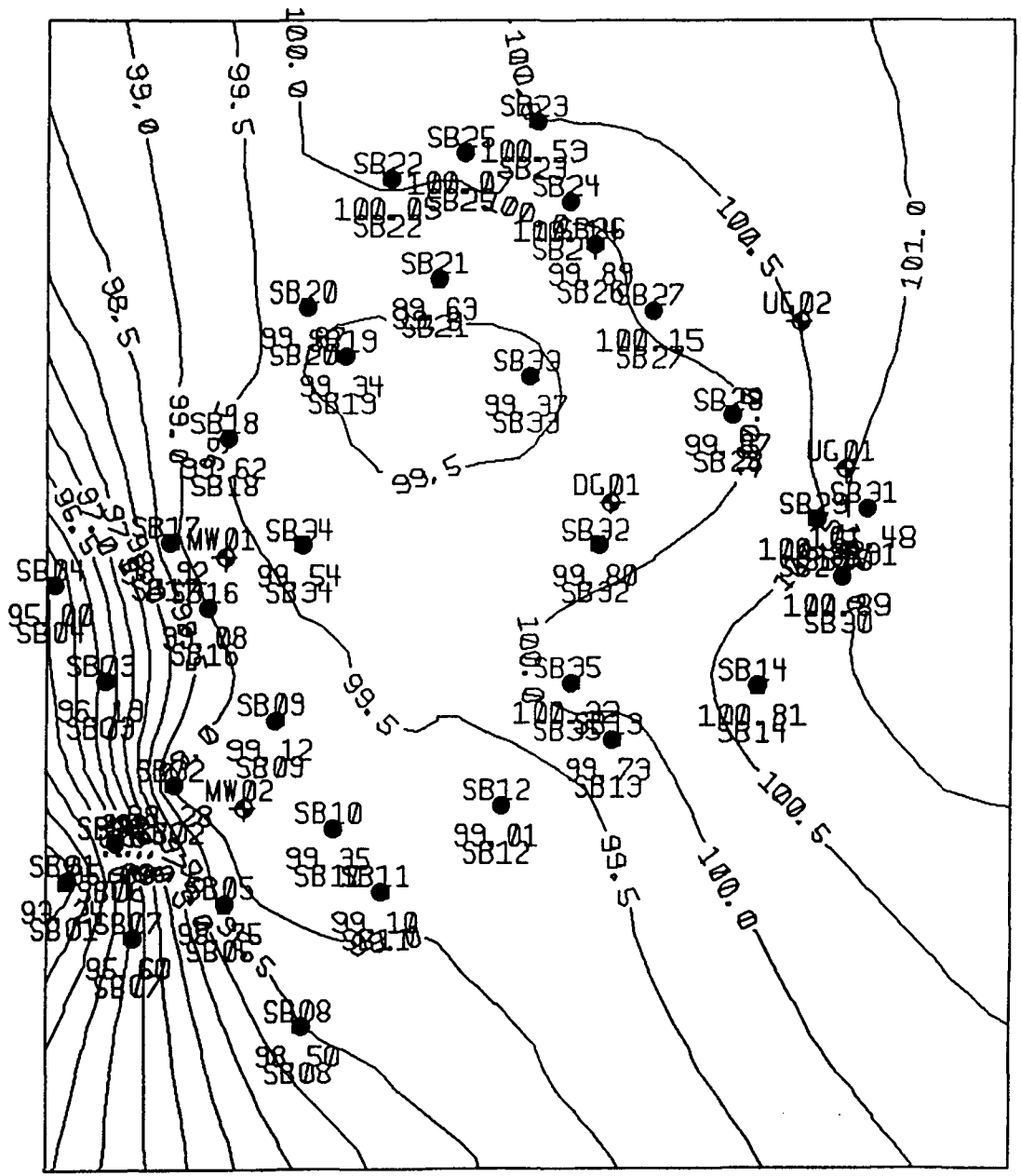
Figure 1

SHEPHERD KELSEY 1 TOPO

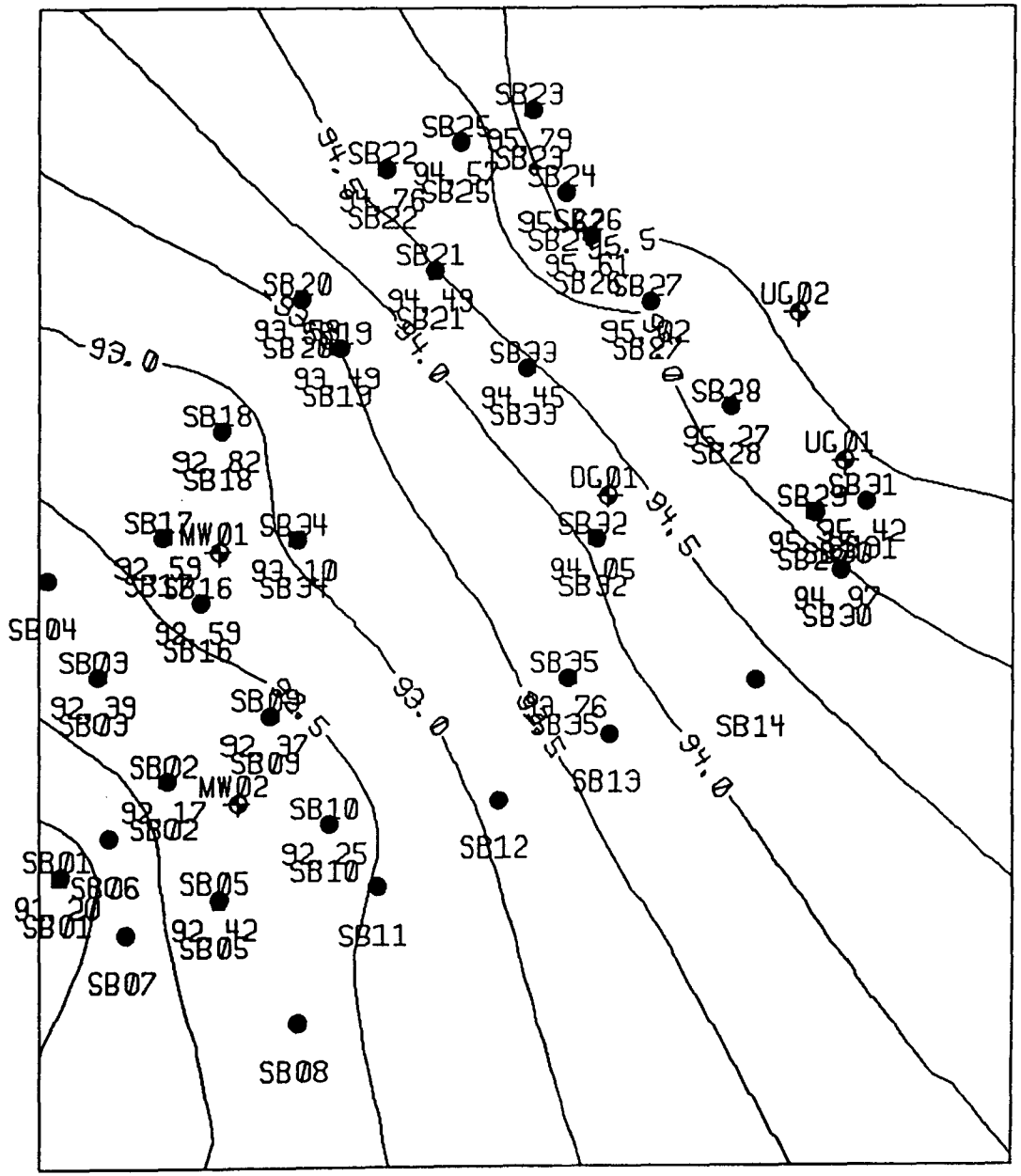


0 50

FEET

Figure 2

SHEPHERD KELSEY WATER ELEV



0 —— 50

FEET

Figure 3

SOIL CONCENTRATIONS

Id	Sample Depth	Species Name	Concentratio	Sample Inter
SB01	5.0000	B	0.0000	0.0000
SB02	5.0000	B	201.0000	0.0000
SB03	5.0000	B	8.0000	0.0000
SB04	5.0000	B	1.0000	0.0000
SB05	5.0000	B	257.0000	0.0000
SB06	5.0000	B	288.0000	0.0000
SB07	5.0000	B	2.0000	0.0000
SB08	5.0000	B	1.0000	0.0000
SB09	5.0000	B	315.0000	0.0000
SB10	5.0000	B	261.0000	0.0000
SB11	5.0000	B	0.0000	0.0000
SB12	5.0000	B	0.0000	0.0000
SB13	5.0000	B	10.0000	0.0000
SB14	5.0000	B	1.5000	0.0000
SB16	5.0000	B	221.0000	0.0000
SB17	5.0000	B	16.0000	0.0000
SB18	5.0000	B	33.0000	0.0000
SB19	5.0000	B	302.0000	0.0000
SB20	5.0000	B	0.0000	0.0000
SB21	5.0000	B	3.0000	0.0000
SB22	5.0000	B	0.0000	0.0000
SB23	5.0000	B	1.0000	0.0000
SB24	5.0000	B	0.0000	0.0000
SB25	5.0000	B	1.0000	0.0000
SB26	5.0000	B	0.0000	0.0000
SB27	5.0000	B	0.0000	0.0000
SB28	5.0000	B	0.0000	0.0000
SB29	5.0000	B	230.0000	0.0000
SB30	5.0000	B	0.0000	0.0000
SB31	5.0000	B	0.0000	0.0000
SB32	5.0000	B	278.0000	0.0000
SB33	5.0000	B	258.0000	0.0000
SB34	5.0000	B	301.0000	0.0000
SB35	5.0000	B	255.0000	0.0000

Project S & K

Location Farmington NM

Date 10-24-94

Drilling Method Power Auger

Bore Diameter 4"

Casing

Screen

Plugging Method Bentonite 2'

Boring Well No. SB5

Ground Elev.

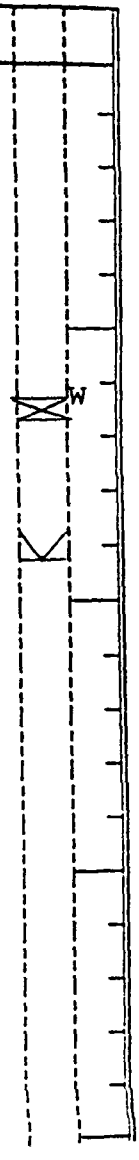
Top of Casing Elev.

Static Water Level

Method

Personnel

Depth	Sample	Method	Soil Classification
1 feet			
2			
3			
4			
5			
6	546PPM	Cuttings	Med Gray, Med. Sand, HC Smell 6'
7	65°	OVM	Brown
8	15	Hand Aug	6.5' Darker Gry. courser Sand
9	64° ppm	OVM	7" Clay Lense
10			Sand with gravel 7½'
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			



Project S & K

Location Farmington NM

Date 10-24-94

Drilling Method Hand Auger

Bore Diameter 2 3/4"

Casing

Screen

Plugging Method Benonite 2'

Boring Well No. SB6

Ground Elev.

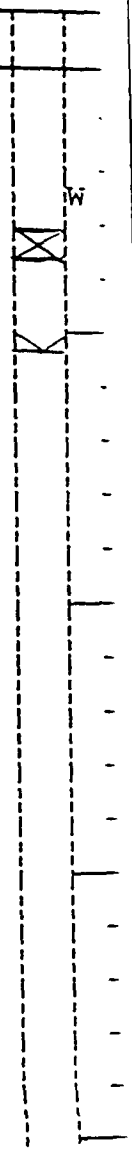
Top of Casing Elev.

Static Water Level

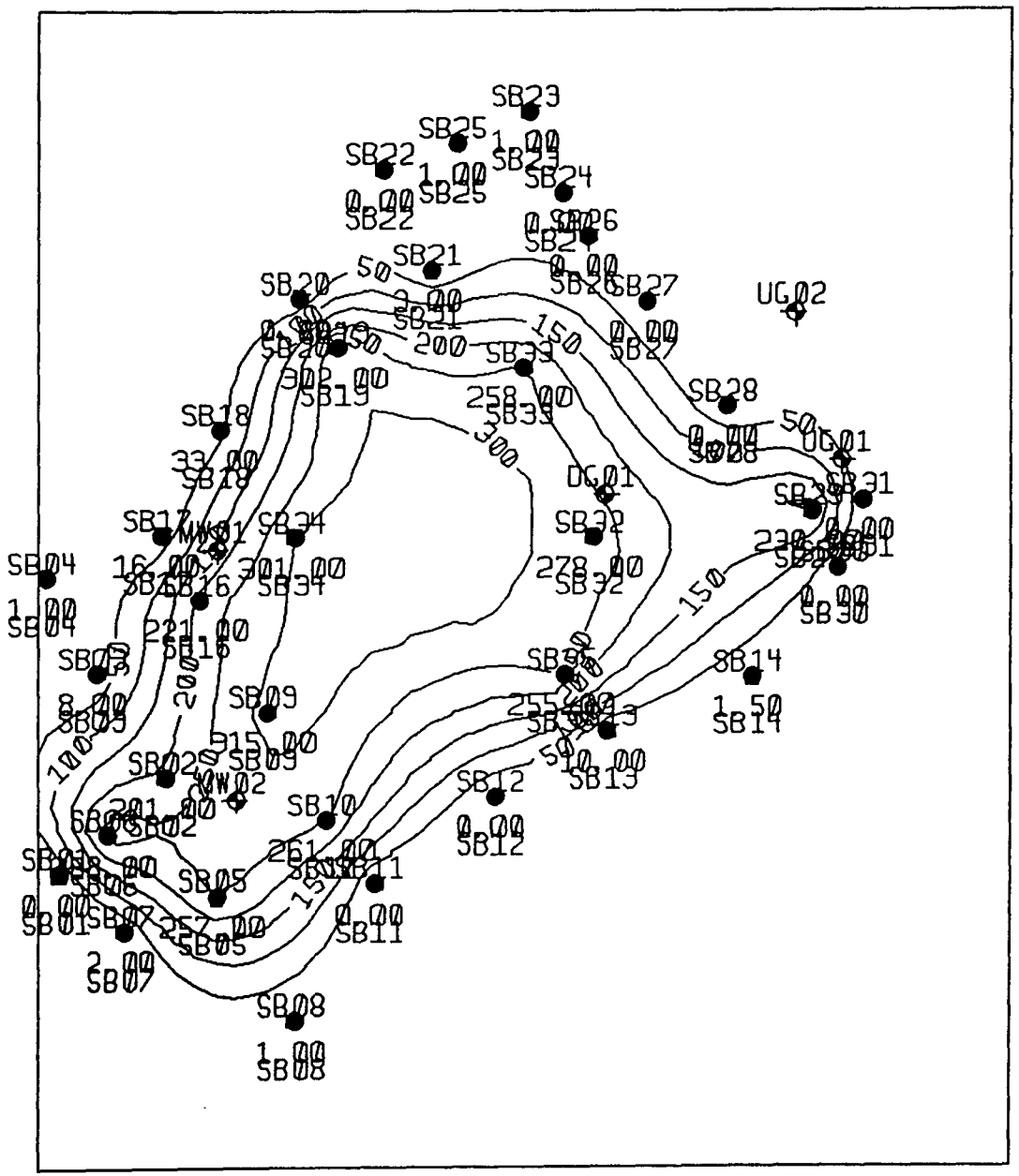
Method

Personnel

Depth	Sample	Method	Soil Classification	
1 feet				
2				
3	612ppm 57°	OVM	Black med. sand & clay HC smell	3'
4			Sand med. lt. gray, clean smell 3½'	
5				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				



BENZENE IN SOIL (PPM) 10/94



0 —— 50

FEET

Figure 4

GROUND WATER CONCENTRATION

Id	Sample Dat	Species	Concentratio
DG01	05/09/1995	B	287.0000
DG01	05/23/1995	B	174.0000
DG01	06/09/1995	B	134.0000
DG01	06/26/1995	B	113.0000
DG01	07/20/1995	B	26.8000
DG01	08/04/1995	B	83.8000
DG01	08/01/1996	B	10.5000
MW01	05/09/1995	B	1820.0000
MW01	05/23/1995	B	2000.0000
MW01	06/09/1995	B	1850.0000
MW01	06/26/1995	B	241.0000
MW01	07/20/1995	B	926.0000
MW01	08/04/1995	B	410.0000
MW01	08/01/1996	B	191.0000
MW02	05/09/1995	B	5550.0000
MW02	05/23/1995	B	933.0000
MW02	06/09/1995	B	756.0000
MW02	07/20/1995	B	0.0000
MW02	08/04/1995	B	0.4000
MW02	08/01/1996	B	159.0000
UG01	05/09/1995	B	0.0000
UG01	05/23/1995	B	0.0000
UG01	06/09/1995	B	0.0000
UG01	06/26/1995	B	0.0000
UG01	07/20/1995	B	0.0000
UG01	08/04/1995	B	0.0000
UG01	08/01/1996	B	0.0000
UG02	05/09/1995	B	0.0000
UG02	05/23/1995	B	0.0000
UG02	06/09/1995	B	0.0000
UG02	06/26/1995	B	0.0000
UG02	07/20/1995	B	0.0000
UG02	08/04/1995	B	0.0000
UG02	08/01/1996	B	0.0000

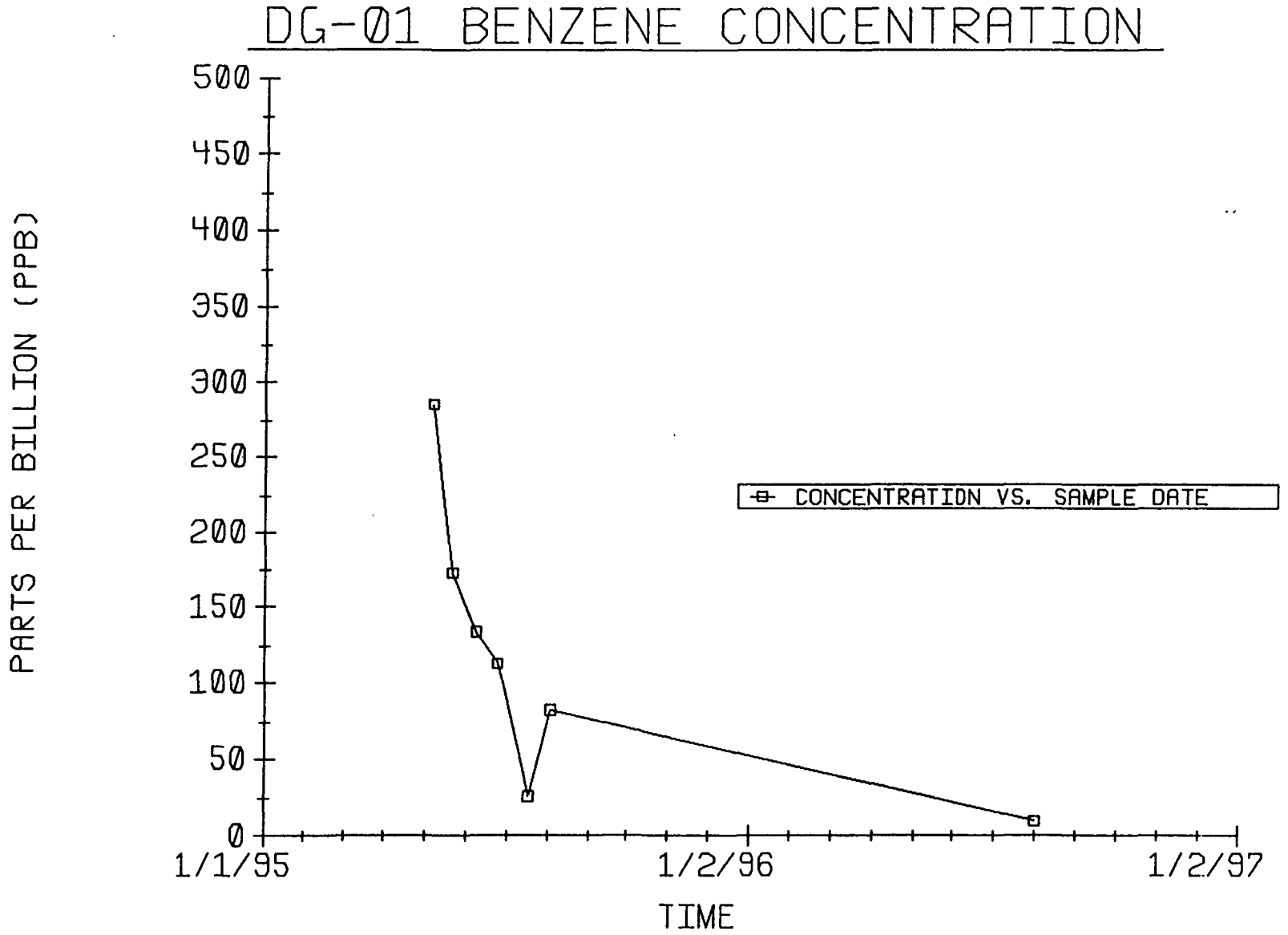

DG-01 BENZENE CONCENTRATION
PARTS PER BILLION (PPB)
500
450
400
350
300
250
200
150
100
50
0
1/1/95
1/2/96
1/2/97
TIME
CONCENTRATION VS. SAMPLE DATE

Figure 5

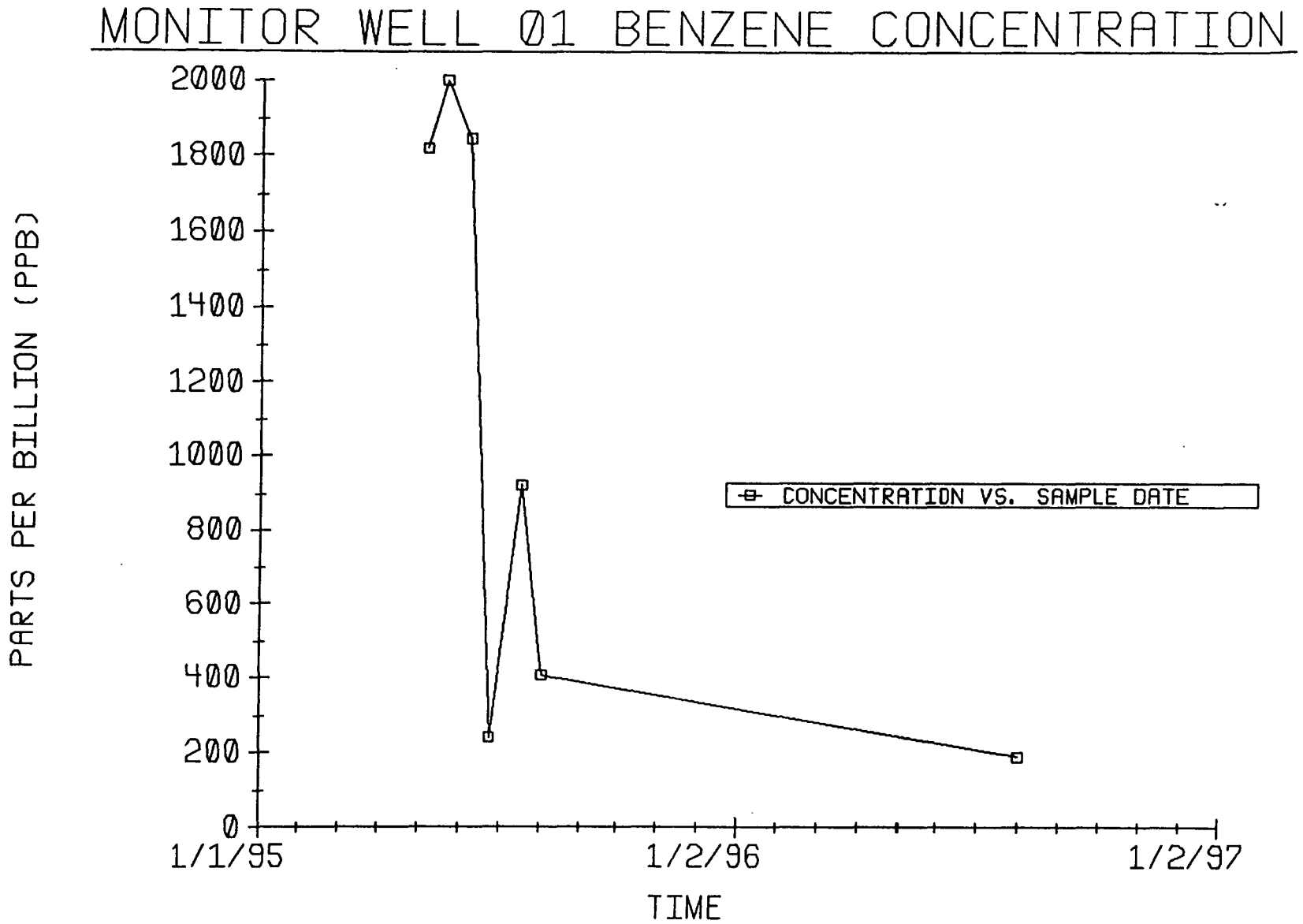

MONITOR WELL 01 BENZENE CONCENTRATION
PARTS PER BILLION (PPB)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
1/1/95
1/2/96
1/2/97
TIME
CONCENTRATION VS. SAMPLE DATE

Figure 6

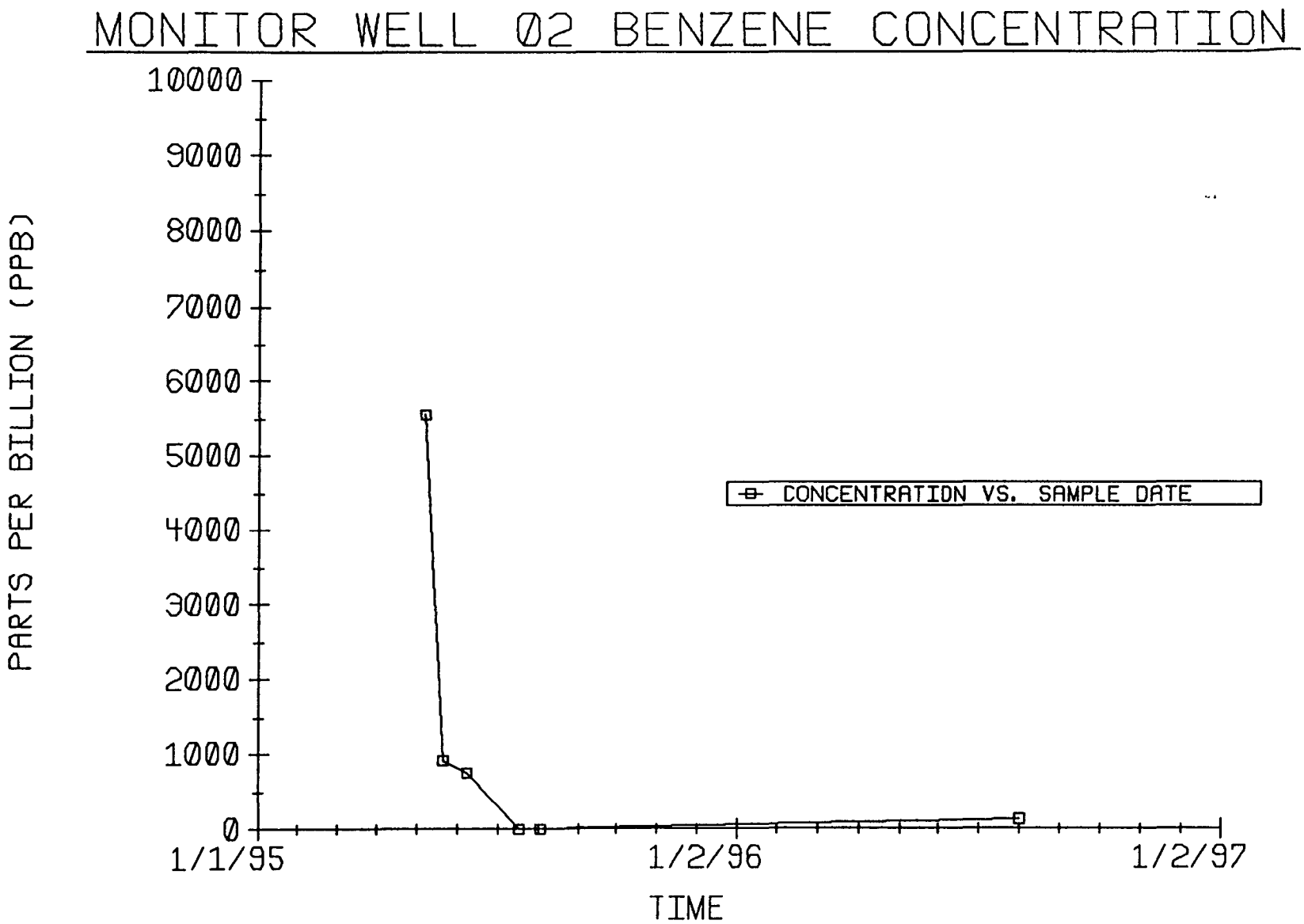

MONITOR WELL 02 BENZENE CONCENTRATION
PARTS PER BILLION (PPB)
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1/1/95
1/2/96
1/2/97
TIME
CONCENTRATION VS. SAMPLE DATE

Figure 7

BIOSCREEN Natural Attenuation Software

BIOSCREEN is an easy-to-use screening tool for simulating natural attenuation of dissolved hydrocarbons at petroleum fuel release sites. The software, programmed in the Microsoft® Excel spreadsheet environment and based on the Domenico analytical solute transport model, has the ability to simulate advection, dispersion, adsorption, and aerobic decay as well as anaerobic reactions which have been shown to be the dominant biodegradation processes at many petroleum release sites. BIOSCREEN includes three different model types: 1) solute transport without decay, 2) solute transport with first order decay, and 3) solute transport with biodegradation assuming an "instantaneous" biodegradation reaction (see Model Types). The model is designed to simulate biodegradation by both aerobic and anaerobic reactions.

This help file covers the following topics:

Model Background and Theory

BIOSCREEN Input Parameters

BIOSCREEN Output

Troubleshooting and Configuration

Developed for the Air Force Center for Environmental Excellence, Brooks AFB, Texas
by Groundwater Services, Inc., Houston, Texas.

Groundwater Services, Inc., 5252 Westchester, Suite 270, Houston, Texas, 77005

Figure 8

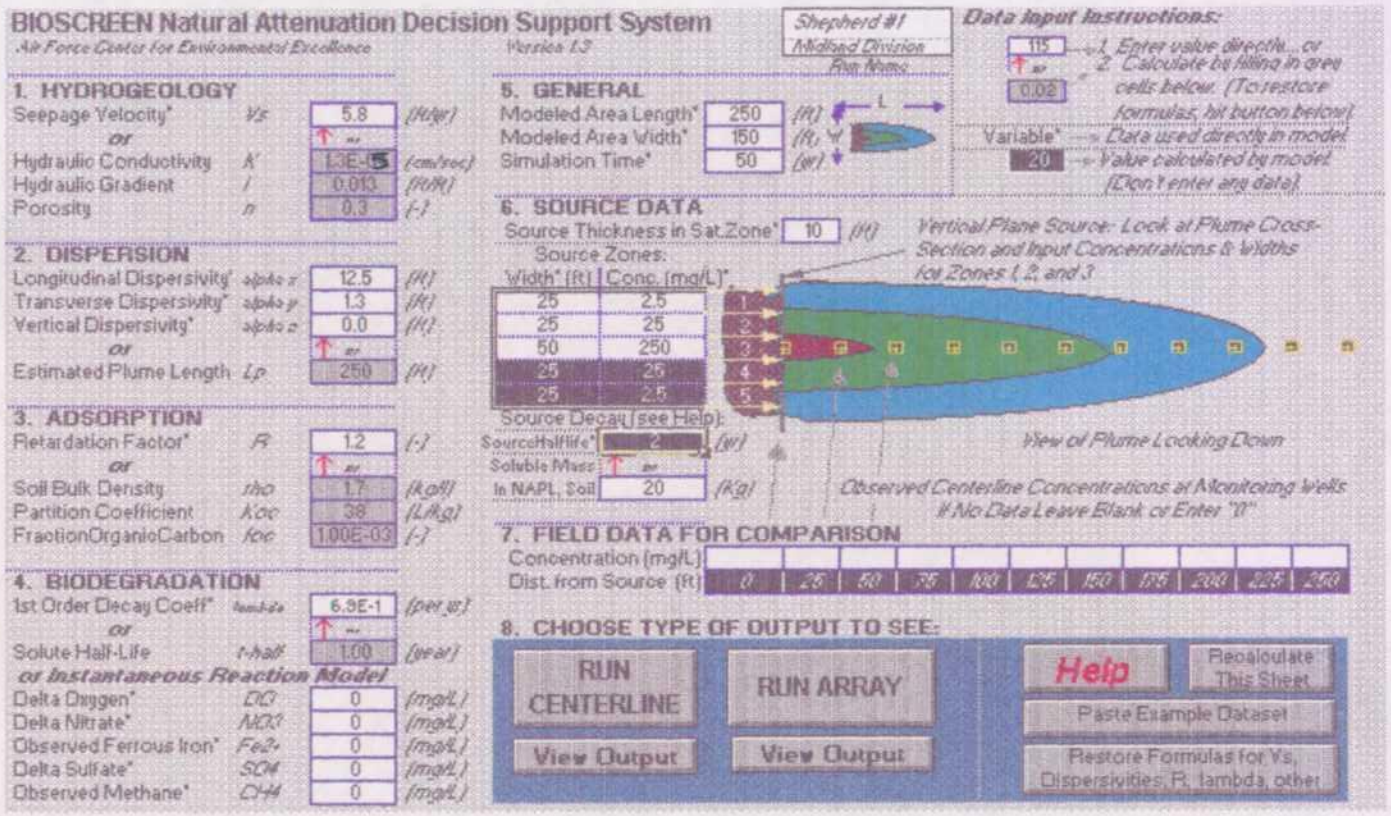
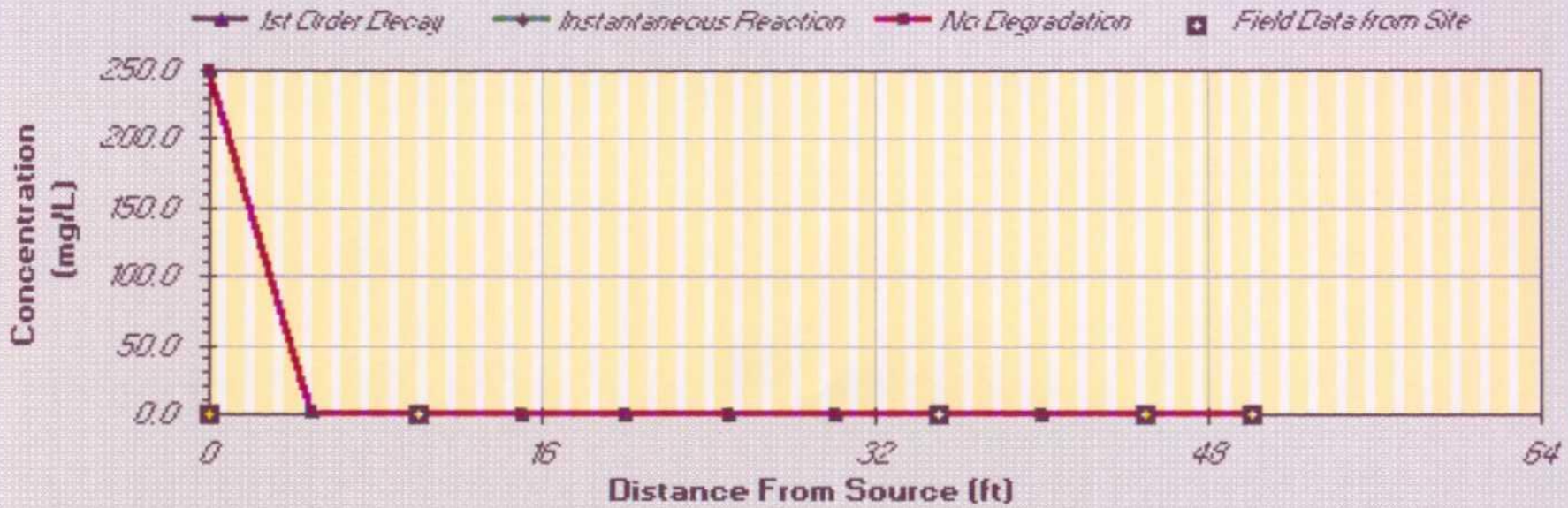

BIOSCREEN Natural Attenuation Decision Support System
Air Force Center for Environmental Excellence
Version 1.3
Shepherd #1
Midland Division
Run Name
Data Input Instructions:
1. Enter value directly, or
2. Calculate by filling in grey cells below. (To restore formulas, hit button below)
Variable* = Data used directly in model
= Value calculated by model (Don't enter any data)
1. HYDROGEOLOGY
Seepage Velocity* Vs 5.8 (ft/yr)
or
Hydraulic Conductivity K 1.3E-05 (cm/sec)
Hydraulic Gradient I 0.013 (ft/ft)
Porosity n 0.3 (-)
2. DISPERSION
Longitudinal Dispersivity* alpha x 12.5 (ft)
Transverse Dispersivity* alpha y 1.3 (ft)
Vertical Dispersivity* alpha z 0.0 (ft)
or
Estimated Plume Length Lp 250 (ft)
3. ADSORPTION
Retardation Factor* R 1.2 (-)
or
Soil Bulk Density rho 1.7 (kg/l)
Partition Coefficient Koc 38 (L/kg)
FractionOrganicCarbon foc 1.00E-03 (-)
4. BIODEGRADATION
1st Order Decay Coeff* lambda 6.3E-1 (per yr)
or
Solute Half-Life t-half 1.00 (year)
or Instantaneous Reaction Model
Delta Oxygen* DO 0 (mg/L)
Delta Nitrate* NO3 0 (mg/L)
Observed Ferrous Iron* Fe2+ 0 (mg/L)
Delta Sulfate* SO4 0 (mg/L)
Observed Methane* CH4 0 (mg/L)
5. GENERAL
Modeled Area Length* 250 (ft)
Modeled Area Width* 150 (ft)
Simulation Time* 50 (yr)
6. SOURCE DATA
Source Thickness in Sat.Zone* 10 (ft)
Source Zones:
Width* (ft) Conc. (mg/L)*
25 2.5
25 25
50 250
25 25
25 2.5
Source Decay (see Help):
SourceHalfLife* 2 (yr)
Soluble Mass In NAPL, Soil 20 (Kg)
Vertical Plane Source: Look at Plume Cross-Section and Input Concentrations & Widths for Zones 1, 2, and 3
1
2
3
4
5
View of Plume Looking Down
Observed Centerline Concentrations at Monitoring Wells
If No Data Leave Blank or Enter "0"
7. FIELD DATA FOR COMPARISON
Concentration (mg/L)
Dist. from Source (ft) 0 25 50 75 100 125 150 175 200 225 250
8. CHOOSE TYPE OF OUTPUT TO SEE:
RUN CENTERLINE
View Output
RUN ARRAY
View Output
Help
Recalculate This Sheet
Paste Example Dataset
Restore Formulas for Vs, Dispersivities, R, lambda, other

Figure 9

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	2.799	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	2.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	2.799	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



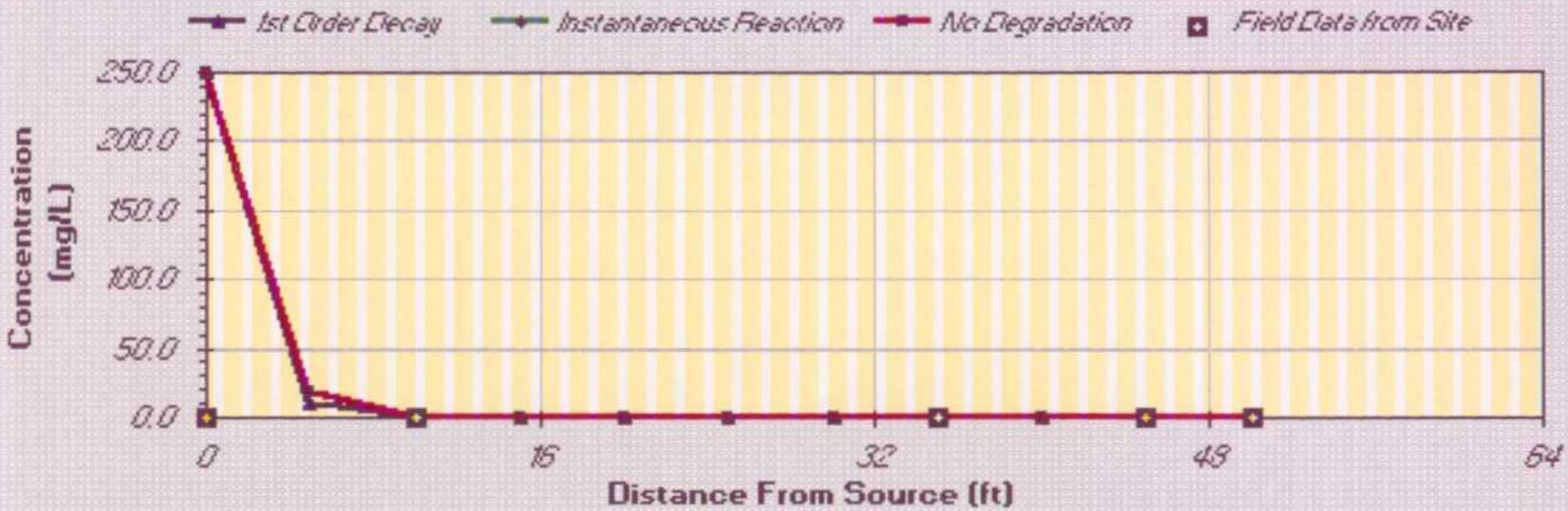
Replay Animation | Next Timestep | Prev Timestep

Time: 1 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	18.612	0.155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	10.309	0.060	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	18.612	0.155	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



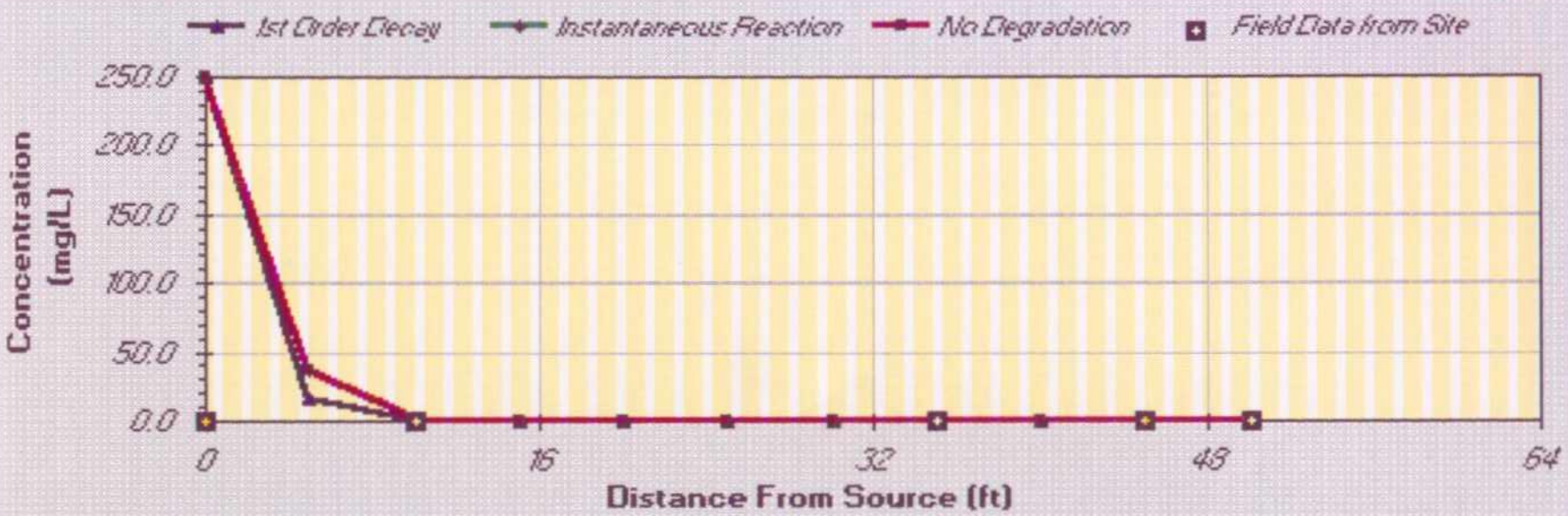
Replay Animation | Next Timestep | Prev Timestep

Time: 2 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	37.369	1.566	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	16.241	0.396	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	37.369	1.566	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



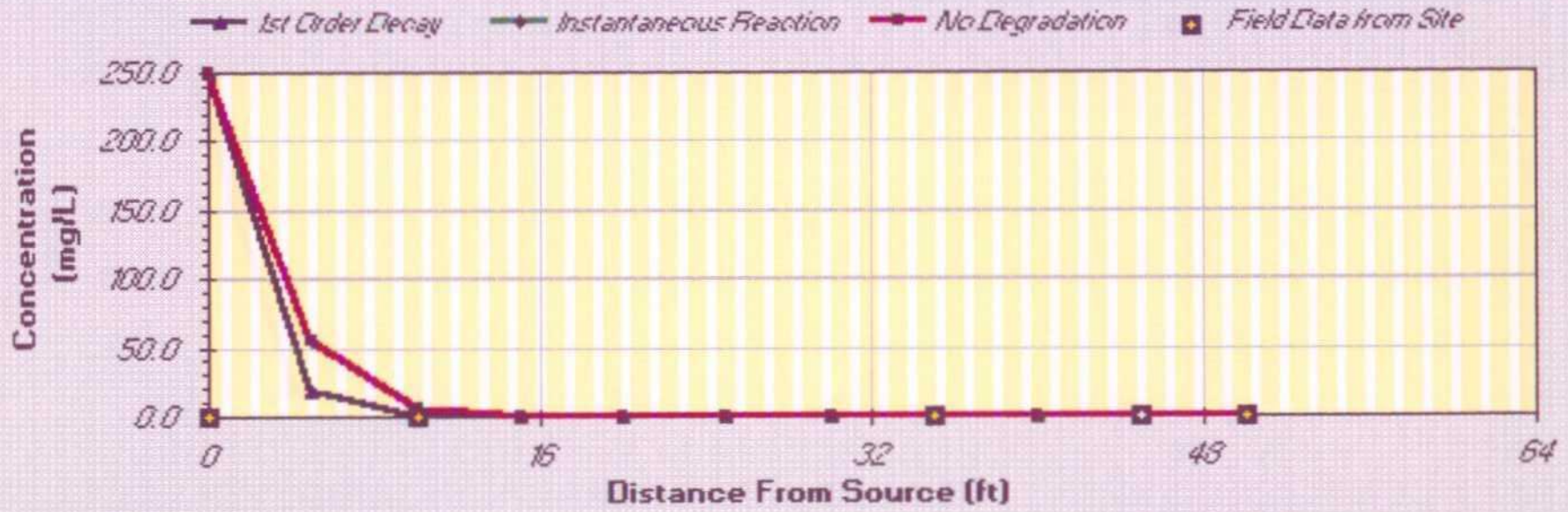
Replay Animation | Next Timestep | Prev Timestep

Time: 3 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	54.542	5.152	0.119	0.001	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	19.330	0.885	0.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	54.542	5.152	0.119	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



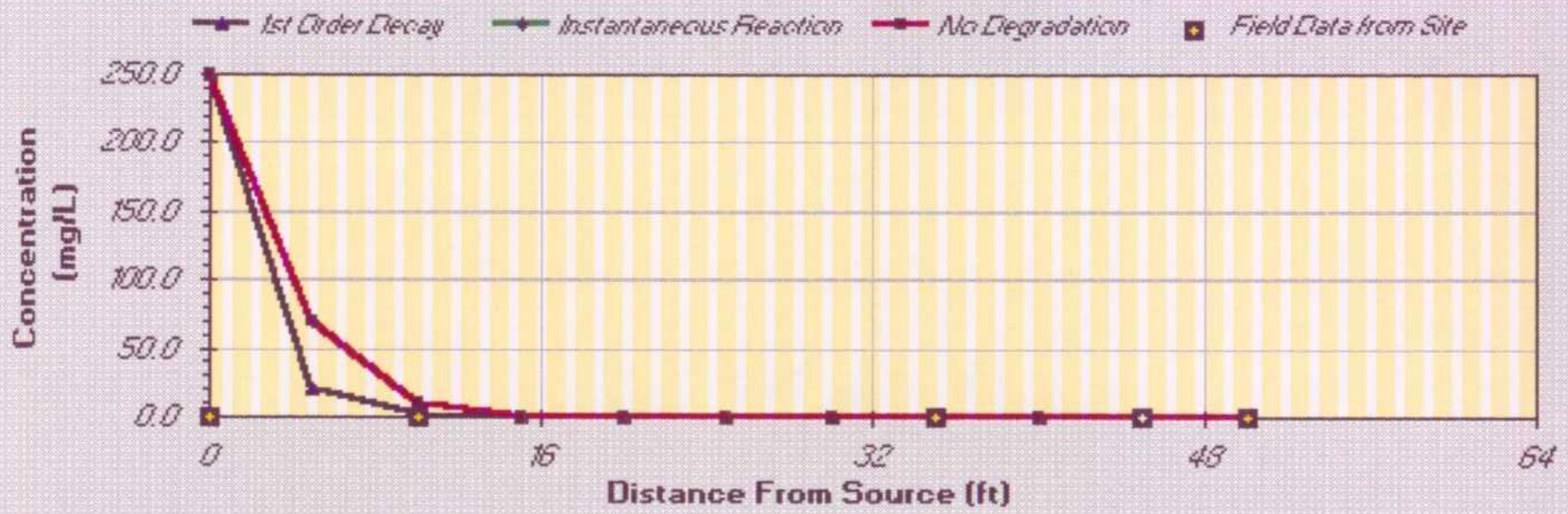
Replay Animation | Next Timestep | Prev Timestep

Time: 4 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft)										
	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	69.577	10.736	0.552	0.009	0.000	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	20.821	1.306	0.042	0.001	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	69.577	10.736	0.552	0.009	0.000	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



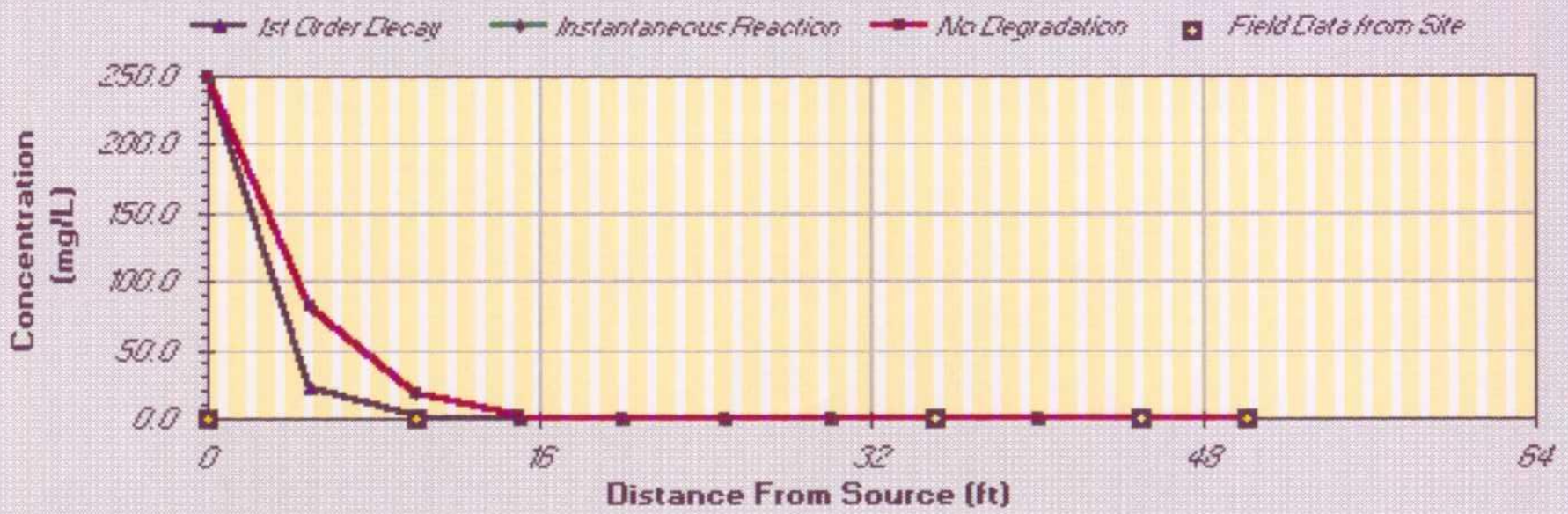
Replay Animation | Next Timestep | Prev Timestep

Time: 5 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	82.697	17.732	1.552	0.052	0.001	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	21.524	1.590	0.077	0.002	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	82.697	17.732	1.552	0.052	0.001	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



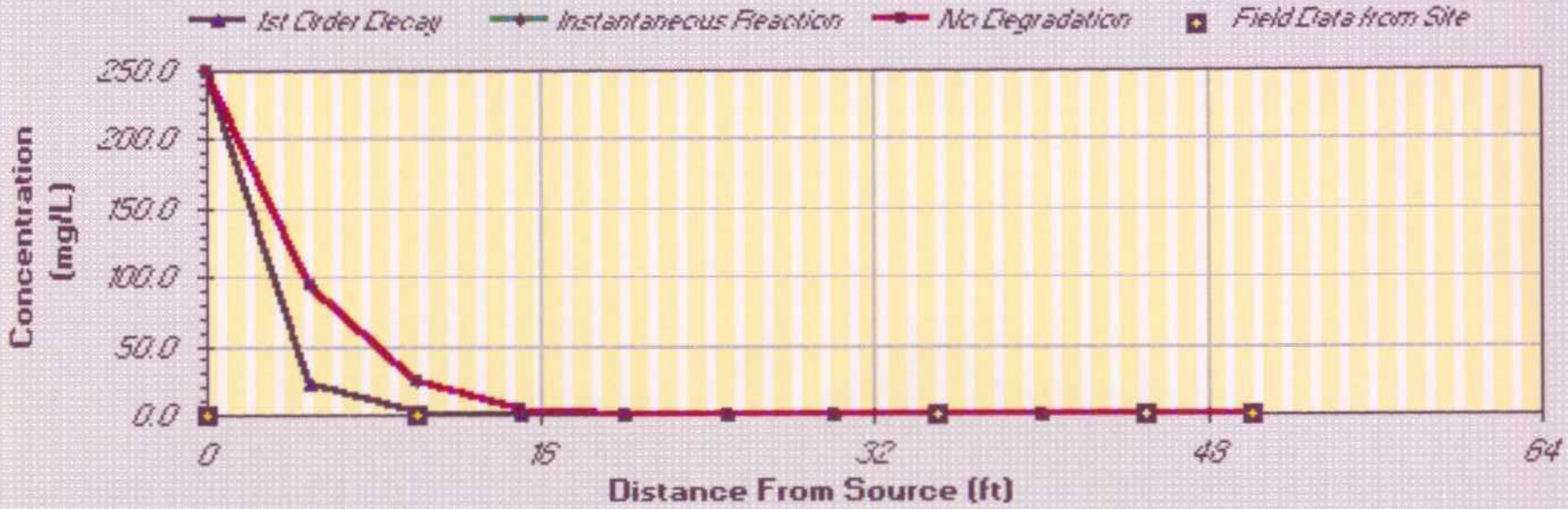
Replay Animation | Next Timestep | Prev Timestep

Time: 6 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	94.219	25.582	3.276	0.186	0.004	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	21.852	1.761	0.108	0.004	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	94.219	25.582	3.276	0.186	0.004	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



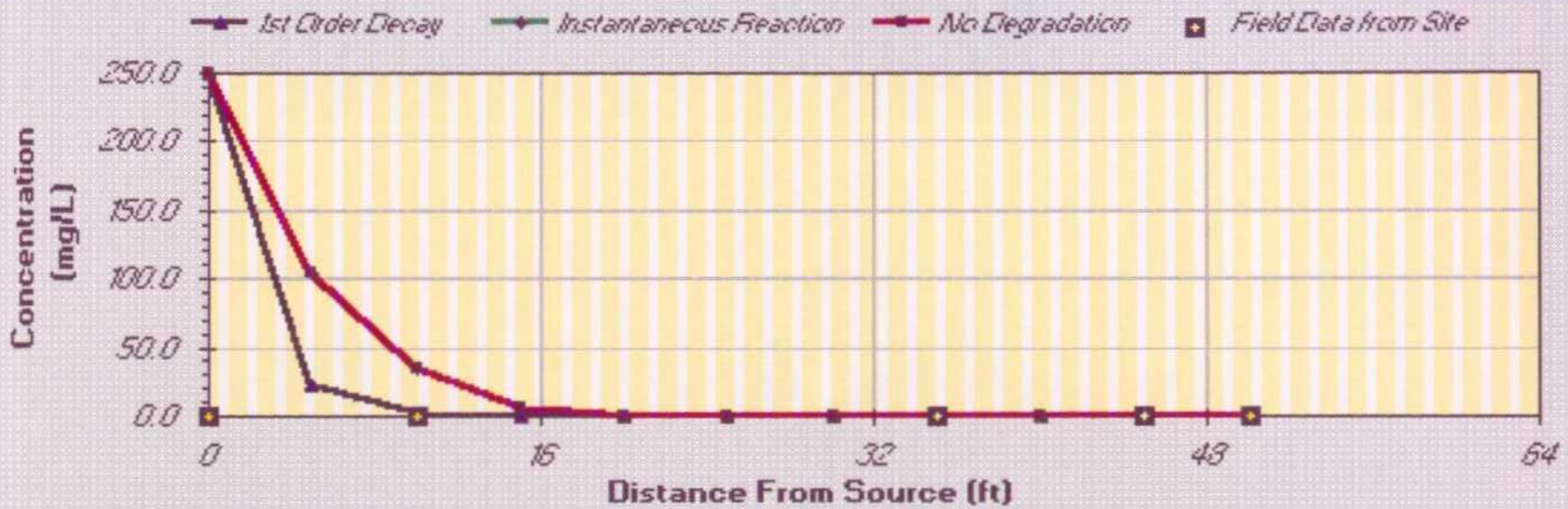
Replay Animation | Next Timestep | Prev Timestep

Time: 7 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	104.425	33.872	5.771	0.486	0.020	0.000	0.000	0.000	0.000	0.000
1st Order Decay	250.000	22.006	1.856	0.133	0.007	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	104.425	33.872	5.771	0.486	0.020	0.000	0.000	0.000	0.000	0.000
Field Data from Site											



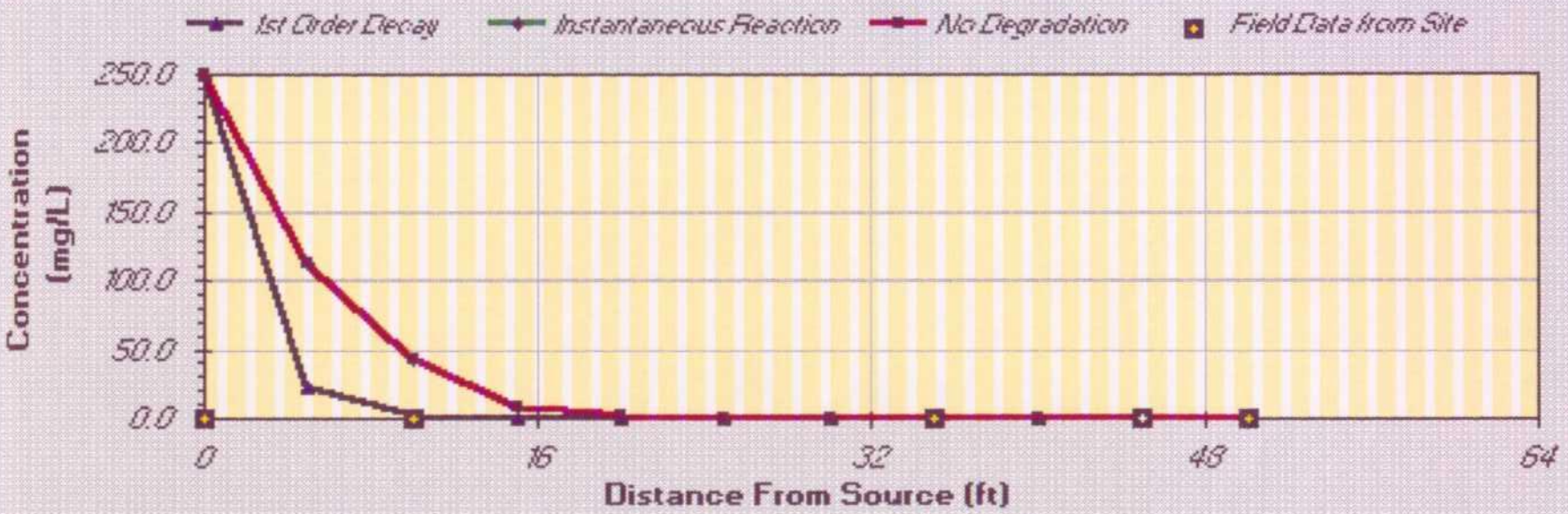
Replay Animation | Next Timestep | Prev Timestep

Time: 8 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

TYPE OF MODEL	Distance from Source (ft) 0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	113.542	42.314	9.001	1.033	0.062	0.002	0.000	0.000	0.000	0.000
1st Order Decay	250.000	22.077	1.907	0.149	0.009	0.000	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	113.542	42.314	9.001	1.033	0.062	0.002	0.000	0.000	0.000	0.000
Field Data from Site											



Replay Animation | Next Timestep | Prev Timestep

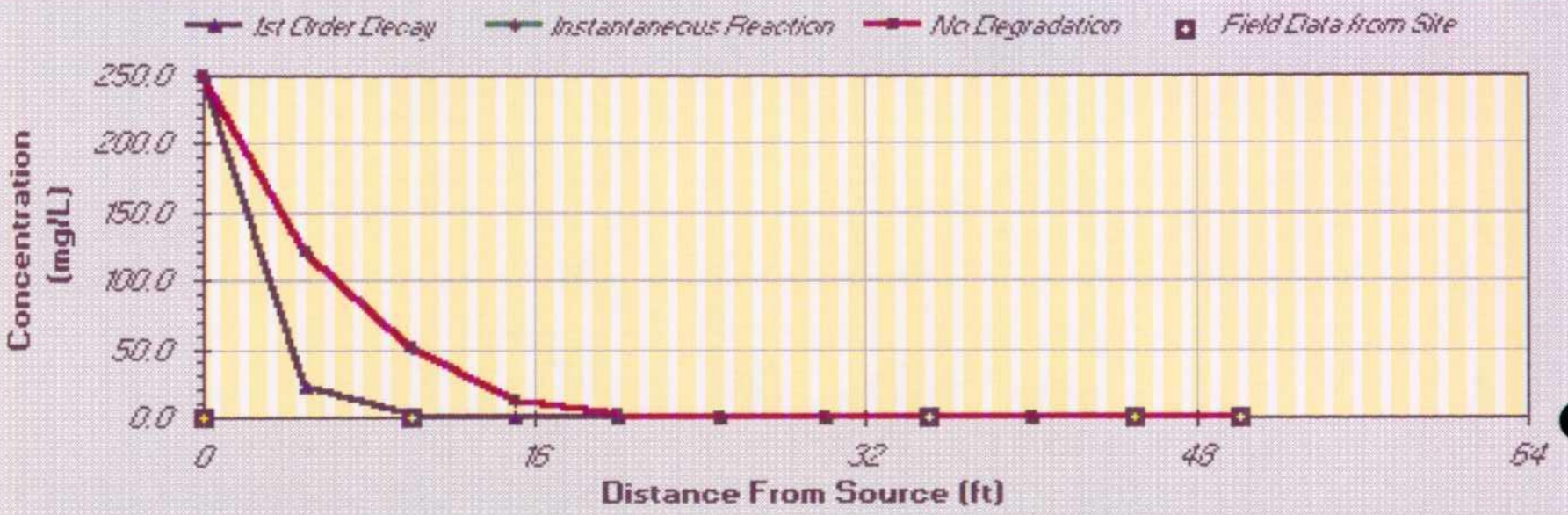
Time: 9 Years

Return to Input | Recalculate This Sheet

DISSOLVED HYDROCARBON CONCENTRATION ALONG PLUME CENTERLINE (mg/L at Z=0)

Distance from Source (ft)

TYPE OF MODEL	0	5	10	15	20	25	30	35	40	45	50
No Degradation	250.000	121.747	50.720	12.884	1.893	0.156	0.007	0.000	0.000	0.000	0.000
1st Order Decay	250.000	22.111	1.934	0.160	0.011	0.001	0.000	0.000	0.000	0.000	0.000
Inst. Reaction	250.000	121.747	50.720	12.884	1.893	0.156	0.007	0.000	0.000	0.000	0.000
Field Data from Site											



Replay Animation | Next Timestep | Prev Timestep

Time: 10 Years

Return to Input | Recalculate This Sheet

OFFICE: (505) 327-8786
FAX: (505) 327-1496

ON SITE
TECHNOLOGIES, LTD.

LAB: (505) 325-5667
FAX: (505) 325-6256

March 21, 1997

Mr. C. John Coy, SHEAR Specialist
CONOCO, Inc.
Bloomfield Highway
Farmington, NM 87401

RE: Monitor Well Installation & Status of Sampling
Shepherd & Kelsey #1
San Juan County, NM

Project No: 2-1362

This correspondence is to update you on the status of the installation and sampling of a new monitor well at the referenced Conoco well location.

On March 4, 1997, On Site installed an additional monitor well at a location estimated to be down-gradient of the ground water contaminate plume. The test hole was hand dug with a stainless steel auger to 4.5 feet below the ground surface. Soils from surface to 2.5 feet were silty clays overlying fine to medium sand with thin clay stringers. Soils were wet and slightly plastic. Ground water was measured at 2.8 feet below the ground surface. No discoloration or petroleum odor was noted during the augering.

The monitor well was constructed in the test hole of 2 inch Sch. 40 PVC with 4 feet of 0.010 inch slotted pipe. The annular space was sand packed with 10-20 mesh clean sand. Due to the shallow depth to ground water and anticipated rise in the water table, the top of the screen was located within 12 inches of the surface, and only a thin bentonite seal was placed around each well at the surface. The well was secured with a steel 6 inch well protector and locking 2 inch plug. The well was developed by removing approximately ten well volumes.

Following installation, a level survey was completed to establish relative elevation for the monitor well top of casing. The bottom flange at the well head was used as the reference with elevation (100.00). Also surveyed were the north two monitor wells. Water levels were then measured from the top of casing for each well and the three piezometers, and the water table elevations were calculated. Using earlier maps prepared by On Site for Bio-Rem, the ground water surface contoured, refer to Sheet 1.

On March 20, 1997, the water samples were collected from the "new" down-gradient well. Prior to sampling the well was purged by bailing approximately three well volumes. Water samples were placed in 40 ml VOA glass vials, labeled and placed on ice for delivery to the lab. Samples were analyzed for BTEX per EPA Method 8020. As of this writing, we are waiting for the laboratory analytical results.

We will be forwarding you the lab results as soon as they become available .

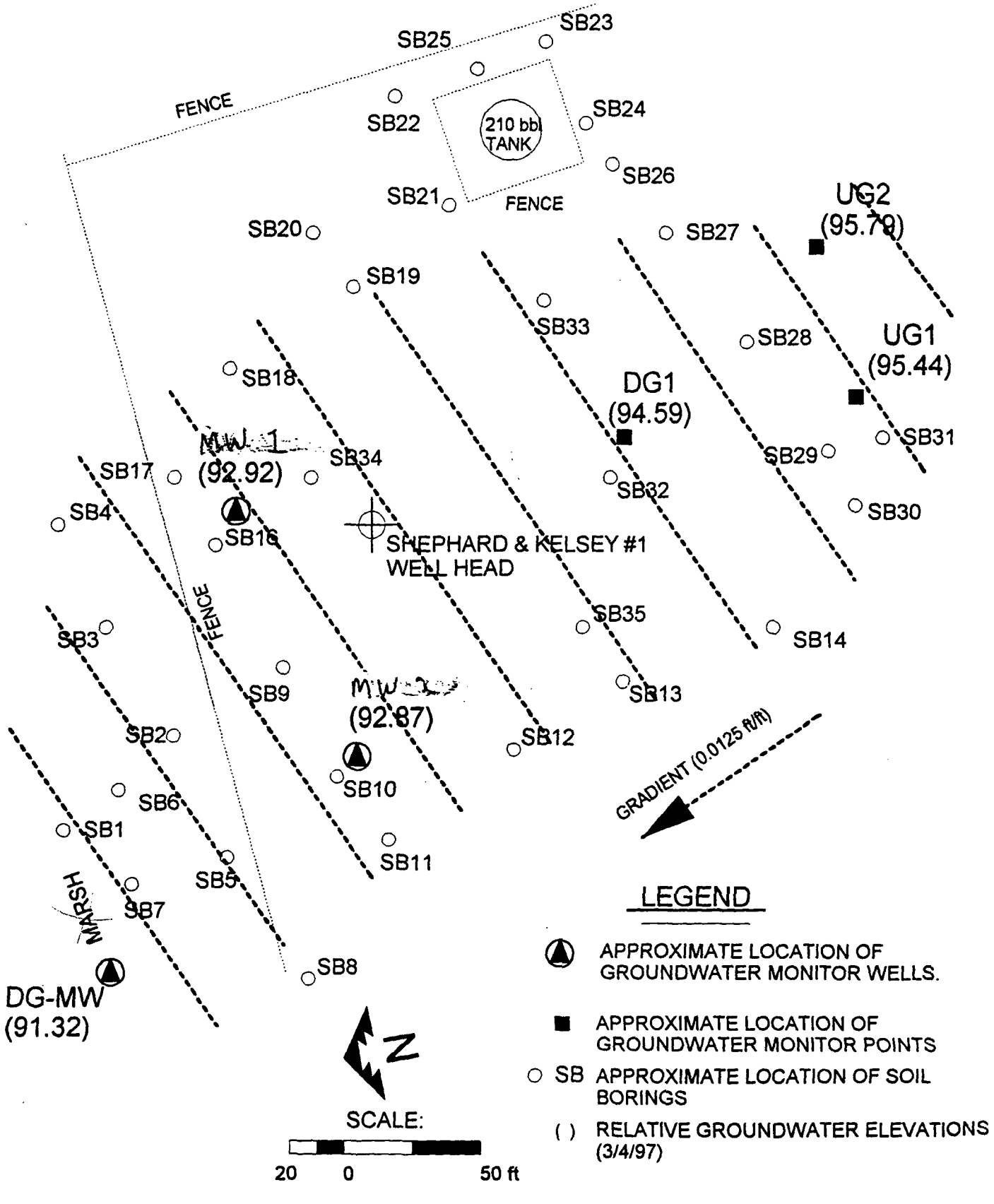
Respectfully submitted,
On Site Technologies, Ltd.

Michael K. Lane, P.E.
Senior Engineer

Attachments: Sheet 1: Site Sketch and Ground Water Surface Contour

MKL/mkl: 21362sts.rpt

CONOCO INC. SHEPHARD & KELSEY #1 SAN JUAN BASIN, NM		SITE SKETCH	ON SITE TECHNOLOGIES, LTD. P O BOX 2606, FARMINGTON, NM 87499 (505) 325-5667
PROJECT: SITE ASSESSMENT		DRWN: DEC 20, 1994	
PROJECT NO: 4-1140		DRWN BY: MKL	
SHEET: 1	FILE: 41140S&K	REVISED: Mar. 19, 1997	



OFF: (505) 325-5667

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-1556

ANALYTICAL REPORT

Attn:	*Michael Lane*	Date:	26-Mar-97
Company:	*On Site Technologies, Ltd. c/o Conoco*	COC No.:	*5062*
Address:	*612 E. Murray Drive*	Sample No.:	*14002*
City, State:	*Farmington, NM 87401*	Job No.:	*2-1362*

Project Name:	***Conoco - Shepherd & Kelsey #1***				
Project Location:	***MW-DG***				
Sampled by:	MKL	Date:	20-Mar-97	Time:	8:30
Analyzed by:	DC	Date:	24-Mar-97		
Sample Matrix:	*Liquid*				

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: DC

Date: 3/26/97

OFF: (505) 325-5667

ON SITE TECHNOLOGIES, LTD.

LAB: (505) 325-1556

QUALITY ASSURANCE REPORT

for EPA Method 8020

Date Analyzed: 24-Mar-97

Internal QC No.: 0527-STD
Surrogate QC No.: 0528-STD
Reference Standard QC No.: 0529/30-QC

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	18.6	7	15%
Toluene	ppb	20.0	19.4	3	15%
Ethylbenzene	ppb	20.0	19.8	1	15%
m,p-Xylene	ppb	40.0	38.2	4	15%
o-Xylene	ppb	20.0	19.5	2	15%

Matrix Spike

Parameter	*1- Percent Recovered*	*2 - Percent Recovered*	*Limit*	*%RSD*	*Limit*
Benzene	89	88	(39-150)	1	20%
Toluene	92	92	(46-148)	0	20%
Ethylbenzene	94	94	(32-160)	0	20%
m,p-Xylene	90	90	(35-145)	0	20%
o-Xylene	93	93	(35-145)	0	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)	
14002-5062	95				

S1: Flourobenzene

3/26/97

CHAIN OF CUSTODY RECORD

5062

ON SITE TECHNOLOGIES, LTD.

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

Date: 3/20/97

Page 1 of

Purchase Order No.:	Job No. 2-1362		
SEND INVOICE TO: Name	% Michael Lane - On Site	REPORT RESULTS TO: Name	Michael Lane — Title Jamrir
Company	Conoco — Dept.	Company	On Site
Address		Mailing Address	
City, State, Zip		City, State, Zip	
		Telephone No.	Telefax No.
Sampling Location:	Jicarilla #Kelly #1		
Sampler:	Michael K. Lane		

SAMPLE IDENTIFICATION	SAMPLE DATE	SAMPLE TIME	MATRIX	PRES.	Number of Containers	8020	LAB ID
MW-D6	3/20	0830	Wtr	H_2SO_4	2	✓	41007-5017

ANALYSIS REQUESTED

Relinquished by:	Date/Time 3/20 1030	Received by:	Date/Time 3/21 1150
Relinquished by:	Date/Time	Received by:	Date/Time
Relinquished by:	Date/Time	Received by:	Date/Time

Method of Shipment:

Authorized by: Date 3/20/97

(Client Signature Must Accompany Request)

Rush	24-48 Hours	10 Working Days	Special Instructions:

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

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Conoco, Inc.

Project ID:	Not Given	Report Date:	08/01/96
Sample ID:	Shephard Kelsey DG 1	Date Sampled:	07/18/96
Lab ID:	0396G01420	Date Received:	07/18/96
Sample Matrix:	Water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	07/30/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	10.5	10.0
Toluene	36.3	10.0
Ethylbenzene	280	10.0
m,p-Xylenes	981	10.0
o-Xylene	97.6	10.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	108.3%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Conoco, Inc.

Project ID:	Not Given	Report Date:	08/01/96
Sample ID:	Shephard Kelsey MW 1	Date Sampled:	07/18/96
Lab ID:	0396G01419	Date Received:	07/18/96
Sample Matrix:	Water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	07/30/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	191	10.0
Toluene	ND	10.0
Ethylbenzene	77.9	10.0
m,p-Xylenes	100	10.0
o-Xylene	ND	10.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	89.5%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Conoco, Inc.

Project ID:	Not Given	Report Date:	08/01/96
Sample ID:	Shephard Kelsey MW 2	Date Sampled:	07/18/96
Lab ID:	0396G01421	Date Received:	07/18/96
Sample Matrix:	Water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	07/29/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	159	10.0
Toluene	ND	10.0
Ethylbenzene	17.2	10.0
m,p-Xylenes	302	10.0
o-Xylene	135	10.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	105.0%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Conoco, Inc.

Project ID:	Not Given	Report Date:	08/01/96
Sample ID:	Shephard Kelsey SW 22	Date Sampled:	07/18/96
Lab ID:	0396G01417	Date Received:	07/18/96
Sample Matrix:	Water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	07/29/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	0.3	0.2
Toluene	ND	0.2
Ethylbenzene	ND	0.2
m,p-Xylenes	0.3	0.2
o-Xylene	ND	0.2

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	104.9%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS

Conoco, Inc.

Project ID:	Not Given	Report Date:	08/01/96
Sample ID:	Shephard Kelsey SW 21	Date Sampled:	07/18/96
Lab ID:	0396G01418	Date Received:	07/18/96
Sample Matrix:	Water	Date Extracted:	NA
Condition:	Cool/Intact	Date Analyzed:	07/30/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	ND	1.0
Toluene	7.3	1.0
Ethylbenzene	5.3	1.0
m,p-Xylenes	4.5	1.0
o-Xylene	ND	1.0

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	123.9%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

CONOCO

Environmental Sample Chain of Custody and [illegible]
Research and Engineering

No. 99378

Project Number

Type or Print Data

Facility Name: Conoco	Telephone Number: (505) 324-5813	Transporter Name:	Telephone Number: ( ) -
Facility Address: 3315 Bloomfield Hwy		Transporter Address:	
Facility Supervisor: John Coy		Method of Shipping:	
Process Producing Sample:		Special Shipping Instructions:	
Employee(s) Sampling: Neal Goates ; Brent Dunagan		Remarks:	
Other Employee(s) Handling:			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Analysis Req. ▶ Preservative	BTEX	TPH	TDS
Shepard Kelsey SW22	7/18/96	12:30	Water	40 mL	glass	1	HCl 1:1	1		
Shepard Kelsey SW21	7/18/96	12:40	Water	40 mL	glass	1	HCl 1:1	1		
Shepard Kelsey MW1	7/18/96	11:30	Water	40 mL	glass	1	HCl 1:1	1		
Shepard Kelsey DG1	7/18/96	11:00	Water	40 mL	glass	1	HCl 1:1	1		
Shepard Kelsey MW2	7/18/96	11:45	Water	40 mL	glass	1	HCl 1:1	1		
Maddox 1 -LDP	7/18/96	920am	Soil	802	glass	1	none		1	
Dustin 1E -LDP	7/18/96	945am	Soil	802	glass	1	none		1	

Cool + int[illegible]

Signatures

	Date/Time		Date/Time	
Relinquished by: [signature]	7/18/96 4:10pm	Received by: Chris Rayner	7-18-96 1610	Condition of Samples Upon Arrival at Final Destination
Relinquished by	Date/Time	Received by	Date/Time	
Relinquished by	Date/Time	Received by	Date/Time	Signature / Date
Relinquished by	Date/Time	Received by	Date/Time	Temp. of Samples on Arrival (Temp. sensitive analysis only)
Relinquished by	Date/Time	Received by	Date/Time	
Relinquished by	Date/Time	Received by	Date/Time	Signature / Date

5-157 X3. 4-90

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

Quality Control / Quality Assurance

Known Analysis
BTEX

Client: **Conoco, Inc.**
Project: Not Given

Date Reported: 08/01/96
Date Analyzed: 07/30/96

Known Analysis

Parameter	Found Concentration (ppb)	Known Concentration (ppb)	Percent Recovery	Acceptance Limits
Benzene	6.2	6.0	**104%**	70-130%
Toluene	6.7	6.0	**111%**	70-130%
Ethylbenzene	6.9	6.0	**116%**	70-130%
m+p-Xylene	14.7	12.0	**123%**	70-130%
o-Xylene	7.1	6.0	**118%**	70-130%

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	107.5%	75-125%

Reference: Method 5030, Purge and Trap: Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Reported by _____

Reviewed by _____

Inter·Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Method Blank Analysis

Sample Matrix:	Water	Report Date:	08/01/96
Lab ID:	Method Blank	Date Analyzed:	07/29/96

Target Analyte	Concentration (ppb)	Detection Limit (ppb)
Benzene	ND	0.2
Toluene	ND	0.2
Ethylbenzene	ND	0.2
m,p-Xylenes	ND	0.2
o-Xylene	ND	0.2

ND - Analyte not detected at the stated detection limit.

Quality Control:

Surrogate	Percent Recovery	Acceptance Limits
Bromofluorobenzene	97.0%	75-125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Matrix Spike Analysis

Lab ID: 0396G01421
Sample Matrix: Water
Condition: Cool/Intact

Report Date: 08/01/96
Date Analyzed: 07/29/96

Target Analyte	Spiked Sample Result in ng	Sample result in ng	Spike Added (ng)	% Recovery	Acceptance Limits (%)
Benzene	42.6	7.68	30.0	116.3%	70-130
Toluene	36.1	0.58	30.0	118.3%	70-130
Ethylbenzene	39.3	0.85	30.0	128.3%	70-130
m,p-Xylenes	90.9	13.7	60.0	128.6%	70-130
o-Xylene	40.6	6.40	30.0	114.1%	70-130

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	Bromofluorobenzene	115.1%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

VOLATILE AROMATIC HYDROCARBONS
QUALITY CONTROL REPORT

Duplicate Analysis

Lab ID: 0396G01421
Sample Matrix: Water
Condition: Cool/Intact

Report Date: 08/01/96
Date Analyzed: 07/29/96

Target Analyte	Duplicate Concentration (ppb)	Original Concentration (ppb)	% Difference
Benzene	162	159	1.9
Toluene	ND	ND	NA
Ethylbenzene	17.8	17.2	3.4
m,p-Xylenes	310	302	2.6
o-Xylene	139	135	2.9

ND - Analyte not detected at the stated detection limit.
NA - Not applicable or not calculated.

Quality Control:	Surrogate	Percent Recovery	Acceptance Limits
	Bromofluorobenzene	105.1%	75 -125%

Reference: Method 5030, Purge and Trap; Method 8020, Aromatic Volatile Organics; Test Methods for Evaluating Solid Wastes, SW-846, United States Environmental Protection Agency, September 1986.

Comments:

Analyst

Review

Inter-Mountain Laboratories, Inc.

2506 W. Main Street
Farmington, New Mexico 87401

TOTAL PETROLEUM HYDROCARBONS
Quality Assurance/Quality Control

Client:	**Conoco, Inc.**	Date Reported:	08/01/96
Project:	Not Given	Date Sampled:	07/18/96
Matrix:	Soil	Date Received:	07/18/96
Condition:	Intact/Cool	Date Extracted:	07/30/96
		Date Analyzed:	07/30/96

Duplicate Analysis

Lab ID	Sample Result	Duplicate Result	Units	% Difference
0396G01479	323	310	mg/Kg	4.3%

Method Blank Analysis

Lab ID	Result	Units	Detection Limit
Method Blank	ND	mg/Kg	20

Spike Analysis

Lab ID	Found Conc. mg/Kg	Sample Conc. mg/Kg	Spike Amount mg/Kg	Percent ecover	Acceptance Limits
0396G01422	386	101	250	114%	70-130%

Known Analysis

Lab ID	Found Conc. mg/Kg	Known Conc. mg/Kg	Percent ecover	Acceptance Limits
QC	20.0	20.6	97%	70-130%

References:

Method 418.1: Petroleum Hydrocarbons, Total Recoverable, USEPA Chemical Analysis of Water and Waste, 1978.

Method 3550: Ultrasonic Extraction of Non-Volatile and Semi-Volatile Organic Compounds from Solids, USEPA SW-846, Rev. 1, July 1992.

Analyst: _____ Reviewed: _____

Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

August 26, 1995

Mr. William C. Olson
Environmental Bureau
New Mexico Oil Conservation Divison
Post Office Box 3088
Santa Fe, NM 87504

Dear Mr. Olson:

GROUNDWATER TREATMENT PLAN ADDENDUM, SHEPHARD KELSEY #1

Enclosed is the nutrient enhancement needs for final BTEX biodegradation. We are pleased with the current rate of remediation at our site monitoring points. Listed below is a segment of our ongoing analytical results.

Date	Monitor Point	B (PPB) Std 10	T (PPB) STD 750	E (PPB) STD 750	X (PPB) STD 620	O_2 (PPM)	water levels
5/09/95	MW 1	1820	3120	528	1062	.40	6'7"
8/04/95	MW1	410	49.1	57.6	350	.35	
5/09/95	MW2	5550	11000	678	10030	.40	6'
8/04/95	MW2	.4	2.4	1.6	9.2	4.5	
5/09/95	DG1	287	433	617	4131		
8/04/95	DG1	83.8	100	297	2193	.70	
5/09/95	UPG2	ND	ND	ND	ND	.90	5'6"
5/23/95	UPG2					1.50	
5/11/95	ASW8					1.50	
5/23/95	ASW8					.50	
5/11/95	ASW10					1.50	
5/23/95	ASW10					.50	
5/23/95	ASW23					1.0	
6/09/95	ASW23					.40	
5/23/95	ASW24					.70	
6/09/95	ASW24					.50	

Though biodegradation measurements reveal positive results, we are concerned that asymptotic levels have been reached without nutrient enhancement. Please review the following attachment for approval. Should you have any questions, please call me at (915)686-5488.

Yours very truly

R.N. Goates
Environmental Specialist

cc: Mr. Denny Foust
NM Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

John Coy (w/o enclosure)

Nutrient Enhancement for Shepard and Kelsey #1

In order to stimulate bacterial growth and BTEX biodegradation, nutrient balance at the remediation site must be maintained. In general, a C:N:P ratio of 100-5-2 has been shown to keep bacteria biodegradation and cell growth near maximum rates under the existing environmental conditions. Although both nitrogen and phosphorous are required for a balanced C:N:P nutrient ratio, the most limiting nutrient appears to be nitrogen. When appropriate nutrients are supplied, the time required to obtain site closure is significantly reduced.

In this bio-air sparging process (PC BioRem process), the nitrogen is supplied as nitrous oxide (N_2O). Nitrous oxide is soluble in water, is a nonflammable gas, and nontoxic. For bio-air sparging, a non-certified grade is utilized. The non-certified grade is a cost-effective nitrogen source.

The nitrous oxide can be purchased as a mixed gas with nitrogen gas as the gas carrier. Cost of the non-certified nitrous oxide is approximately $75.00 to $100.00 per A-sized cylinder (209 cu. ft.).

Nitrous oxide can also be purchased as 99% liquid-phase material. The technical grade (99.0%) should be used for the bio-air sparging process. The A-sized cylinder contains 60 lbs. of nitrous oxide. Cost of the A-sized cylinder is approximately $162.00.

To deliver the nitrous oxide, a flow meter and a two-stage regulator are needed.

- Flow meter delivery range: 0.01 to 0.1 cfm
  Cost: Approximately $85.00

- Two-stage regulator with 1-50 psig delivery pressure range
  Cost: Approximately $226.00

When using super-critical fluid (liquid nitrous oxide), a regulator heater may be considered. Cost of a regulator heater is approximately $164.00

The amount of N_2O required for nutrient balance at the Shepard and Kelsey #1 leases is 9 lbs of nitrous oxide per bank. The 9 lbs is approximately equal to 3 ppm nitrogen. A total of 27 lbs of nitrogen will be added to the contaminated area.

Following the nitrogen addition the lease will be shut-in and complete the last 1 to 2% of the residual BTEX biodegradation. There is in place sufficient oxygen and micro-nutrients to complete the site remediation. The last 1-2% of the residual BTEX cleanup is the most difficult and time consuming of remediation. Passive remediation of low level BTEX contamination will be completed in less than 3 months.

There are many advantages of using nitrous oxide as a nitrogen source in bio-air sparging. The system does not require any special piping tanks or pumps. The nitrogen source is delivered into the manifold to be distributed with the air injection. The DOE sponsored research showed the nutrient gas - addition results in a zone of influence extending 60 ft. above and each size of a horizontal injection well. Due to the high diffusivity of the gaseous nutrient the distribution is far greater than liquid nutrient. This efficient distribution of nutrient make bio-air sparging an environmentally compatible and cost-effective remediation process.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

June 9, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-274

Mr. Mark Kratzer
Conoco, Inc.
10 Desta Drive, Suite 100W
Midland, Texas 79705-4500

RE: GROUND WATER REMEDIATION PLAN
SHEPHERD & KELSEY #1 WELL SITE

Dear Mr. Kratzer:

The New Mexico Oil Conservation Division (OCD) has completed a review of Conoco's April 17, 1995 "GROUNDWATER TREATMENT PLAN, SHEPHERD & KELSEY 1, S29-29N-11W (L)". This document contains Conoco's plan for installation of the "BIO AIR SPARGING SYSTEM" to remediate contaminated ground water at the Shepherd & Kelsey #1 well site. The document also contains Conoco's plan for installation of additional monitoring wells and a ground water monitoring plan.

The above referenced remediation system, monitor well installation and ground water monitoring plan is approved with the following conditions:

1. If the monitor wells proposed do not determine the downgradient limits of the ground water contamination at the site, Conoco will install additional monitor wells to determine the downgradient limits of ground water contamination.

2. Ground water in monitor wells at the downgradient limit of the plume will be sampled and analyzed on a quarterly basis for concentrations of benzene, toluene, ethylbenzene, xylene (BTEX) using EPA approved methods.

3. Ground water from all site monitor wells will initially, and annually thereafter, be sampled and analyzed for concentrations of polynuclear aromatic hydrocarbons (PAH) and major cations and anions using EPA approved methods.

4. Conoco will submit semiannual reports on the site ground water monitoring to the OCD by January 1 and July 1 of each respective year with the first report due on January 1, 1996. The reports will contain:

   a. A description of all monitoring activities which occurred during the previous semiannual period.

   b. A summary of the laboratory analytic results of water quality sampling of the monitor wells. The data will be presented in tabular form showing past and present sampling results.

   c. A water table elevation map using the water table elevation of the ground water in all monitor wells as measured on a quarterly basis.

5. Conoco will notify the OCD at least one week in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples.

6. Conoco will submit all original documents to the OCD Santa Fe Office with copies provided to the OCD Aztec District Office.

Please be advised that OCD approval does not relieve Conoco of liability if contamination exists which is beyond the scope of the work plan or if the activities fail to adequately remediate or determine the extent of contamination related to Conoco's activities. In addition, OCD approval does not relieve Conoco of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Denny Foust, OCD Aztec Office

P 667 242 274

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PS Form **3800**, June 1990

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Bill Olson

From: Frank Chavez
Date sent: Wednesday, June 07, 1995 9:32AM
To: Bill Olson
Subject: Registered: Frank Chavez

Your message
To: Frank Chavez
Subject: Conoco Shepherd & Kelsey #1
Date: Friday, June 02, 1995 10:29AM
was accessed on
Date: Wednesday, June 07, 1995 9:32AM

Bill Olson

From: Bill Olson
To: Frank Chavez
Cc: Denny Foust
Subject: Conoco Shepherd & Kelsey #1
Date: Friday, June 02, 1995 10:29AM
Priority: High

Below is a draft approval letter for Conoco's recent ground water remediation plan for the Shepherd & Kelsey #1 well site. Please provide me with any comments by 10:30 am on 6/6/95. Thanks!

Bill Olson

From: Denny Foust
Date sent: Friday, June 02, 1995 10:27AM
To: Bill Olson
Subject: Registered: Denny Foust

Your message
To: Denny Foust
Subject: Conoco Shepherd & Kelsey #1
Date: Friday, June 02, 1995 10:29AM
was accessed on
Date: Friday, June 02, 1995 10:27AM

Bill Olson

From: Denny Foust
To: Bill Olson
Subject: RE: Conoco Shepherd & Kelsey #1
Date: Friday, June 02, 1995 10:39AM

BILL, ITEM #3 ARE WE SETTING NEW PRECEDENTS IN REQUIRING PAH AND CATION TESTING ON AN ONGOING BASIS RATHER THAN ONE TIME WITH FOLLOW UPS FOR POSITIVE RESULTS? ITEM #5 IF BOTH SANTA FE AND DISTRICT OFFICES ARE TO BE NOTIFIED SHOULD WE SAY SO?--DGF

From: Bill Olson
To: Frank Chavez
Cc: Denny Foust
Subject: Conoco Shepherd & Kelsey #1
Date: Friday, June 02, 1995 10:29AM
Priority: High

Below is a draft approval letter for Conoco's recent ground water remediation plan for the Shepherd & Kelsey #1 well site. Please provide me with any comments by 10:30 am on 6/6/95. Thanks!

Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

April 17, 1995

Mr. William C. Olsen
Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 3088
Santa Fe, NM 87504

Dear Mr. Olson:

GROUNDWATER TREATMENT PLAN, SHEPHERD & KELSEY 1, S29-29N-11W (L)

Enclosed is the Bio Air Sparging Remediation Project Plan for this site which we have begun installation of in accordance with our previous submission and your approval. We have incorporated the revised sparging well design into the plan in Section 6. Should you have any questions, please call Mr. Mark Kratzer, Environmental Coordinator in this office, at (915) 686-5492.

Yours very truly,

Judy A. McLemore

Judy A. McLemore
Sr. Environmental Coordinator

cc: Mr. Denny Foust
NM Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

John Coy (w/o enclosure)

Conoco Transmission

Date

From

Employee

Ext.

City, State, Country

Room No.

Acct. No.

To

Name: Bill Olson

Phone No.

Department: NMOCD

Room No.

City, State, Country: Santa Fe

No. of Pages: 1 + Cover.

Note

1. Your originals must have good contrast (dark detail on light background).
2. Legible.
3. ½-inch margin on all sides of sheet.
4. Number all pages.

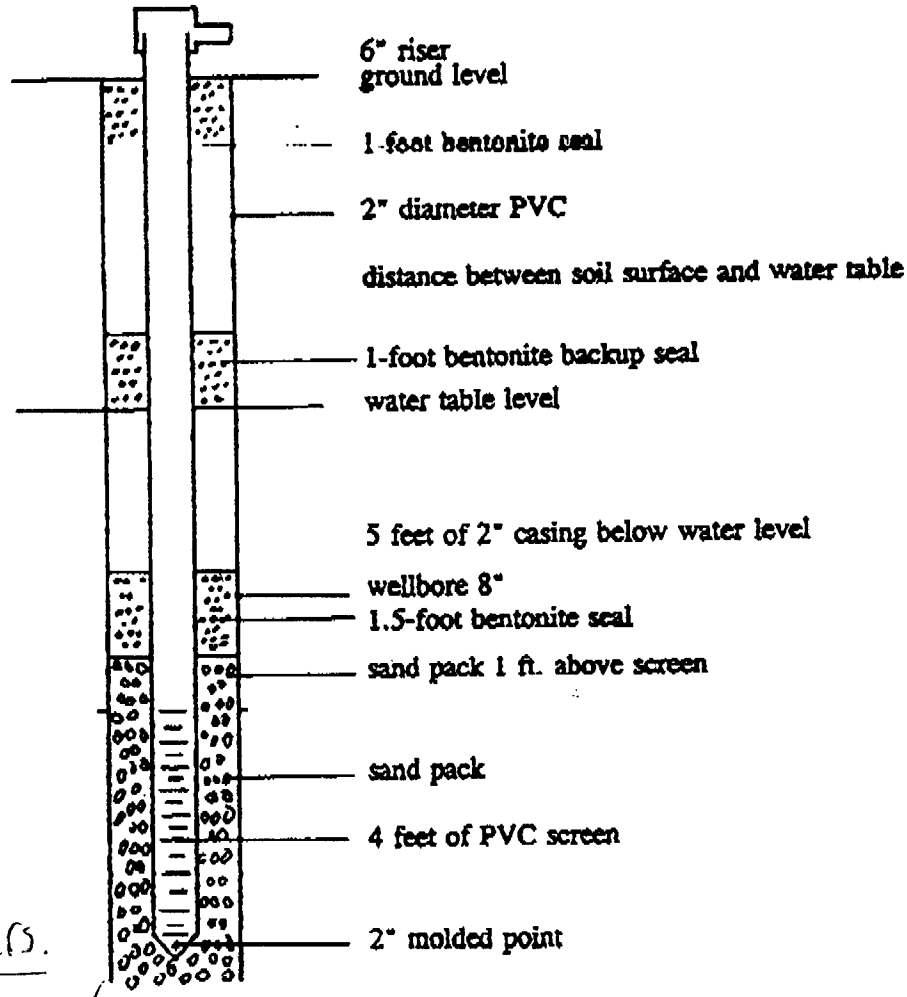
Special Instructions

Bill, alternate well completion proposal for the Shepherd & Kelsey & Salmon. We would like to discuss this with you

Thanks.
Buddy

11-11 PB, 10-86

Air Sparging Well Design for HS 8" Augar, Shepard and Kelsey, April 5, 1995



4/10/95 0900 hrs.
Verbally approved to Judy McLemore with condition that bentonite be added to the fill in the interval between the surface plug and the water table plug
Bill Olson.

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
2040 S. PACHECO
SANTA FE, NEW MEXICO 87505
(505) 827-7131

April 5, 1995

CERTIFIED MAIL
RETURN RECEIPT NO. P-667-242-240

Ms. Judy A. McLemore
Conoco, Inc.
10 Desta Drive, Suite 100W
Midland, Texas 79705-4500

RE: GROUND WATER REMEDIATION PLAN
SHEPHERD & KELSEY #1 WELL SITE

Dear Ms. McLemore:

The New Mexico Oil Conservation Division (OCD) has completed a review of Conoco's March 24, 1995 "GROUNDWATER TREATMENT PROGRAMS, SHEPHERD & KELSEY 1 - SECTION 29-29N-11W, UNIT L, SALMON #1 - SECTION 30-29N-11W UNIT P". This document requests approval to install at the Shepherd & Kelsey #1 site the same "BIO AIR SPARGING SYSTEM" Conoco proposed on March 2, 1995 as a technique for remediation of contaminated ground water at Conoco's Salmon #1 site.

The above referenced remediation system installation plan is approved with the following conditions:

1. The air sparging wells will be constructed such that the annulus between the lower and upper bentonite plugs is filled with a concrete grout containing 3-5% bentonite.

2. Conoco will submit to the OCD for approval, by April 28, 1995, a plan for determining the extent of ground water contamination and monitoring the ground water quality at the site.

3. Conoco will notify the OCD at least one week in advance of all scheduled major activities such that the OCD has the opportunity to witness the events and or split samples.

4. All original documents submitted for approval will be submitted to the OCD Santa Fe Office with copies provided to the OCD Aztec District Office.

Please be advised that OCD approval does not **relieve Conoco of liability** if contamination exists which is **beyond the scope of the work plan or if the activities fail to adequately remediate** contamination related to **Conoco's activities.** In addition, OCD approval does not relieve Conoco of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

xc: Denny Foust, OCD Aztec Office

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Bill Olson

From: Bill Olson
To: Frank Chavez
Cc: Denny Foust
Subject: Conoco Shepherd & Kelsey #1 Remediation Plan
Date: Tuesday, April 04, 1995 1:37PM
Priority: High

Attached you will find a draft approval letter for Conoco's recent ground water remediation plan for the Shepherd & Kelsey #1 well site. Please provide me with any comments by 1:30 pm on 4/6/95. Thanks!

<<File Attachment: REMEDY1.APR>>

Bill Olson

From: Frank Chavez
Date sent: Tuesday, April 04, 1995 3:41PM
To: Bill Olson
Subject: Registered: Frank Chavez

Your message
To: Frank Chavez
Subject: Conoco Shepherd & Kelsey #1 Remediation Plan
Date: Tuesday, April 04, 1995 1:37PM
was accessed on
Date: Tuesday, April 04, 1995 3:41PM

Bill Olson

From: Denny Foust
Date sent: Tuesday, April 04, 1995 3:55PM
To: Bill Olson
Subject: Registered: Denny Foust

Your message
To: Denny Foust
Subject: Conoco Shepherd & Kelsey #1 Remediation Plan
Date: Tuesday, April 04, 1995 1:37PM
was accessed on
Date: Tuesday, April 04, 1995 3:55PM

Bill Olson

From: Denny Foust
To: Bill Olson
Subject: CONOCO SHPHERD AND kELSEY #1
Date: Wednesday, April 05, 1995 7:24AM
Priority: High

Bill Olson, check your dates, this is not August 1993.

Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

March 24, 1995

Mr. William C. Olsen
Environmental Burearu
New Mexico Oil Conservation Division
Post Office Box 3088
Santa Fe, NM 87504

Dear Mr. Olson:

GROUNDWATER TREATMENT PROGRAMS, SHEPHERD & KELSEY 1 - SECTION 29-29N-11W, UNIT L, SALMON #1 - SECTION 30-29N-11W, UNIT P

Conoco submitted a proposed groundwater treatment plan for the Salmon #1 to your office on March 2, 1995. Our plans have been to utilize the same treatment method for both the Salmon and Shepherd and Kelsey sites. In order to do this cost efficiently, we plan to treat the sites sequentially with the Salmon being the first site treated.

However, due to the estimated treatment time for both sites and their locations, we have made the decision that treatment should begin with the Shepherd and Kelsey and then proceed to the Salmon site.

We are completing the treatment plan for the Shepherd and Kelsey and we anticipate being able to submit it to you by the first week in April. However, the Shepherd and Kelsey treatment plan will in essence mirror the Salmon treatment plan in content with variations being in depth, number of and placement of wells and treatment times.

In order to take full advantage of the work window and be able to treat both sites this year, we plan to begin installing the treatment system on the Shepherd and Kelsey, the week of April 10. These plans are contingent on receiving approval from the OCC to initiate the work.

We request approval to begin installation of a Bio Air Sparging System on the Shepherd and Kelsey at your earliest convenience.

In the future, the treatment of these sites and the pit closure program will be under the oversight of Mr. Mark Kratzer of this office. Please direct any questions to Mark at (915) 686-5492.

Yours very truly,

Judy A. McLemore

Judy A. McLemore
Environmental Coordinator

cc: John Coy - Farmington
Denny Foust - NMOCD - Aztec

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

DRUG FREE

BRUCE KING
GOVERNOR

ANITA LOCKWOOD
CABINET SECRETARY

August 25, 1994

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STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

CERTIFIED MAIL
RETURN RECEIPT NO. P-111-334-162

Ms. Judy A. McLemore
Environmental Coordinator
Conoco, Inc.
10 Desta Drive, Suite 100W
Midland, Texas 79705-4500

RE: TEMPORARY DISCHARGE AUTHORIZATION
CONOCO SHEPHERD & KELSEY #1 GROUND WATER REMEDIATION

Dear Ms. McLemore:

The New Mexico Oil Conservation Division (OCD) has reviewed Conoco's August 17, 1994, "SHEPHERD & KELSEY #1, SITE REMEDIATION PLAN AMENDMENT REQUEST". This document requests permission to temporarily pump contaminated ground water and add nutrients before recirculating the effluent to the ground water at Conoco's Shepherd & Kelsey #1 well site.

Pursuant to New Mexico Water Quality Control Commission (WQCC) Regulation 3-106.B. you are hearby authorized to discharge without an approved discharge plan until December 23, 1994 with the following conditions:

1. Conoco will provide the OCD with a report on the ground water remedial activities by December 23, 1994. The report will include:

   a. A map showing the locations of all monitoring wells and the direction of the hydraulic gradient.

   b. The results of all water quality sampling related to the ground remediation actions.

2. Conoco will notify the OCD at least 24 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples.

3. If Conoco plans to continue operation of this system after December 23, 1994, Conoco will submit a WQCC discharge plan application to the OCD for approval.

4. All original documents will be submitted to the OCD Santa Fe Office, and copies will be provided to the OCD Aztec Office.

Please be advised that OCD authorization does not relieve you of liability should your operation result in actual or additional pollution of surface waters, ground waters or the environment. In addition, this authorization does not relieve you of responsibility for compliance with any other federal, state or local laws and/or regulations.

If you have any questions please, contact William Olson of my staff at (505)827-5885.

Sincerely,

William J. LeMay
Director

xc: OCD Aztec District Office

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Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

August 17, 1994

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

Dear Mr. Olsen:

SHEPHERD & KELSEY #1, SITE REMEDIATION PLAN AMENDMENT REQUEST

Conoco requests NMOCD authorization to amend the existing remediation plan for this site to allow circulation of the water and addition of nutrients to the water in the trenches.

We propose to circulate the water using a suction pump, moving the water through PVC slotted line which runs the length of the trench and back into the trench over a plastic liner placed on the side(s) of the trench. (see attached diagram)

Liquid nutrients will be added directly to the trench water in an amount not to exceed 3 ppm nitrogen in the form of potassium nitrate twice weekly for a maximum of two weeks. Overall, we do not anticipate addition of the nutrients more than four times during the time the pit is opened. Prior to closure, we will sample the water in the pit and analyze for nitrate to demonstrate levels are acceptable.

The circulation of water will add oxygen to the water when the trench is open and along with periodic addition of nutrients will create conditions in the water for the natural microbial population to begin remediation of the groundwater.

As we are in the process of remediating the soil at this site currently and an existing trench is open, we would appreciate a quick response to our proposal. This would allow us to begin circulating the water in the existing trench.

Yours very truly,

Judy A. McLemore

Judy A. McLemore
Environmental Coordinator

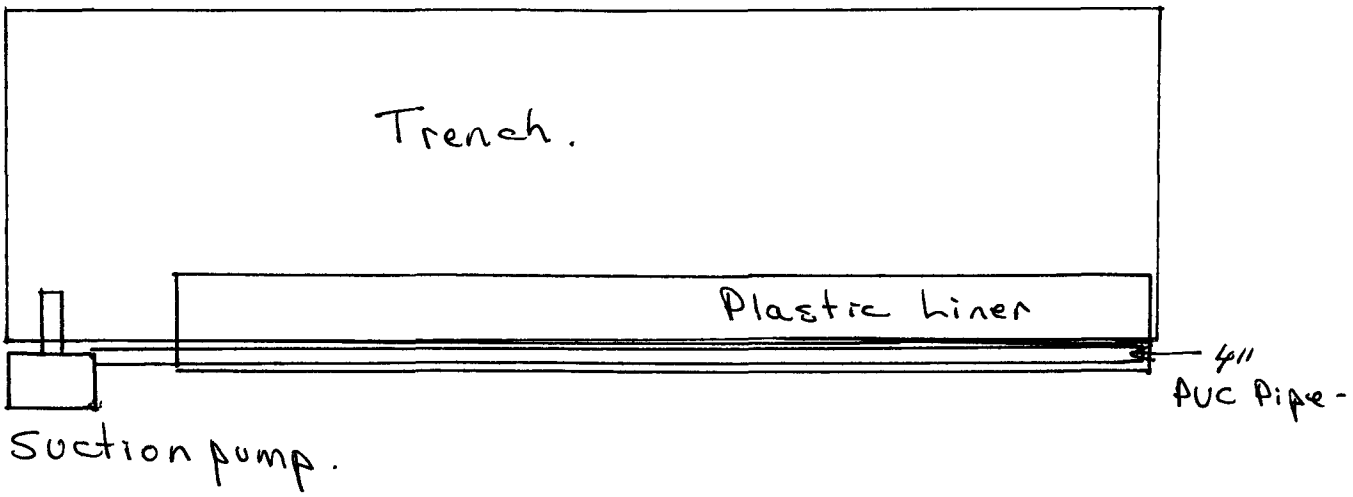
cc: Dan McCoy, John Coy, Greg Vick - Farmington

Mr. Frank Chavez
District Supervisor
NM Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

SHEPHERD + Kelsey #1

Remediation Plan Amendment.

Water Circulation System



State of New Mexico
ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT
Santa Fe, New Mexico 87505

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

MEMORANDUM OF MEETING OR CONVERSATION

☑ Telephone ☐ Personal	Time 1410	Date 7/5/94

Originating Party	Other Parties
Judy McLemore - Conoco	Bill Olson - Envir. Bureau

Subject

Shepherd Kelsey 1 Well Site

Discussion

Conoco requested permission to dispose of water contaminated with E+P exempt wastes to be taken to either Basin Disposal or Simco for disposal.
Water was generated as part of site remediation plan approved by OCD on 5/23/94

Conclusions or Agreements

Gave verbal permission

Distribution

file
Denny Foust - OCD Aztec

Signed Bill Olson

Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

March 15, 1994

RECEIVED
MAR 22 1994
OIL CONSERVATION DIV.
SANTA FE

Mr. William C. Olson
Environmental Bureau
New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, NM 87504

Dear Mr. Olson:

SAN JUAN BASIN PIT CLOSURE ANNUAL REPORT

This letter will provide the New Mexico OCD with the following information:

SECTION	INFORMATION PROVIDED
A	SUMMARY OF 1993 CLOSURE WORK
B	DETAIL RECORDS ON 1993 PIT CLOSURES
C	GROUNDWATER ASSESSMENT SUMMARY, REPORT AND 1994 PLAN OF ACTION
D	1994 WORK PLAN WITH PIT LIST
E	RESULTS OF CONOCO'S IN-SITU BIOREMEDIATION DEMONSTRATION PROJECT

With this letter, Conoco requests your approval of our proposed work plan for the two sites with groundwater contamination.

Any questions may be directed to Judy McLemore (915) 686-6559.

Yours very truly,

Judy A. McLemore

for R. D. Kiker
SHEAR Director

cc: Frank Chavez - Aztec NMOCD

John Coy/Dan McCoy - Farmington

Midland Division
Exploration Production

Conoco Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705-4500
(915) 686-5400

May 14, 1994

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

Dear Mr. Olsen:

SAN JUAN BASIN GROUNDWATER SAMPLING RESULTS

Attached you will find a spreadsheet which summarizes the groundwater sampling performed at the Shepherd & Kelsey and the Salmon Line Drip Pit locations. If you will recall, we summarized the groundwater testing results from the tests run in the summer of 1993 in our annual report submitted to you on March 15, 1994. We also included our plan to sample the wells at these two locations in the early spring and to provide the results to you thereafter. The sampling was performed on March 28, using the same sampling procedure as noted in the Groundwater Assessment Report.

SHEPHERD & KELSEY

Both the upgradient wells show non detect for BTEX from the second sampling. If you will remember, Conoco trenched the pit last fall which allowed aeration of the water and removal of the hydrocarbon contaminated soil from the top of the groundwater. We suspect this may have influenced the change in the upgradient wells BTEX results.

The downgradient well at this location continues to demonstrate BTEX in concentrations in excess of the NM Groundwater standards. We do see some reduction in the BTEX but the TEX constituents have increased.

Conoco will proceed with the remediation plan as submitted in the our annual report upon concurrence by the NMOCD. This plan is to trench the location thus eliminating the source of the contamination while concurrently allowing the exposed groundwater to aerate.

SALMON LINE DRIP PIT

Again, the upgradient wells at this location are non-detect with the exception of xylenes. Although xylenes do show in Upgradient

Well 1, the concentration is well below the groundwater standard. The contents of this pit were excavated in the fall of 1993 and removed to the Salmon 1E where they were landfarmed.

Downgradient Well 2 samples all show non detect for BTEX. This gives a clear indication the lateral extent of the contamination is between the first and second downgradient wells. Downgradient well #1 continues to show BTEX concentrations. Levels have decreased significantly for all constituents of BTEX, on the order of 40-45%. This would indicate there has been significant progress achieved by removal of the source of contamination, or pit contents, last fall.

Remediation Plan. We are reviewing options for remediation of groundwater at this site. Because of the location of this pit (not on a large battery pad site), we are exploring non-intrusive methods for remediating the groundwater and anticipate providing a remediation plan for your approval by the end of June.

Please direct any questions to me at (915) 686-6559.

Yours very truly,

Judy A. McLemore

Judy A. McLemore
Environmental Coordinator

cc: RDK
Dan McCoy - Farmington
John Coy - Farmington

Mr. Frank Chavez
District Supervisor
NM Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

CONOCO INC.

26-Apr-94

San Juan Basin

Groundwater Analytical Results

	Benzene	Toluene	Ethyl Benzene	m,p Xylene	o- Xylene	Total Xylenes
New Mexico Groundwater Standards	0.01	0.75	0.75			0.62
Shepherd & Kelsey Dehydrator Pit						
Upgradient Well 1						
8-93	0.084	0.048	0.023	0.079	0.065	0.252
3-28-94	ND	ND	ND	ND	ND	ND
Upgradient Well 2						
8-93	<.003	0.045	0.076	<.003	<.003	<.009
3-28-94	ND	ND	ND	ND	ND	ND
Downgradient Well 1						
8-93	0.160	1.600	0.530	4.900	1.300	6.200
3-28-94	0.075	3.530	0.987	9.900	5.140	15.040
Salmon Line Drip Pit						
Upgradient Well 1						
8-93	0.098	0.052	0.097	0.085	0.025	0.110
3-28-94	ND	ND	ND	0.000	0.003	0.003
Upgradient Well 2						
8-93	<.003	<.003	<.003	<.006	<.003	<.009
3-28-94	ND	ND	ND	ND	ND	ND
Downgradient Well 1						
8-93	8.300	12.000	<.3	2.310	0.660	2.970
3-28-94	4.710	6.350	0.072	1.140	0.595	1.735
Downgradient Well 2						
8-93	0.100	<.003	<.003	<.006	<.003	<.009
3-28-94	ND	ND	ND	ND	ND	ND

ALL RESULTS STATED IN MG/L

GROUNDWATER ASSESSMENT FOR THREE PRODUCTION TANK BATTERIES
SAN JUAN BASIN PRODUCTION AREA
MIDLAND DIVISION
CONOCO, INC.

Submitted to:

William C. Olson
Hydrogeologist
Environmental Bureau
New Mexico Oil Conservation Division

Prepared for:

Judy McLemore
Environmental Coordinator
Midland Division
Conoco, Inc.
10 Desta Drive, Suite 100W
Midland, TX 79705

Prepared by:

John P. Hancock
Senior Environmental Engineer
Environmental Services Division
Conoco, Inc.
Ponca City, OK

September 30, 1993

Table of Contents

List of Tables

List of Figures

A. Introduction

In closing impoundments on state and fee lands identified in Conoco's San Juan Basin Pit Closure Plan using procedures described in guidelines issued by the New Mexico Energy, Minerals and Resources Oil Conservation Division Environmental Bureau (NMOCD), preliminary site assessments were performed. When using the ranking criteria of the guidelines, three impoundments required further assessment of oil and gas production operation impact upon localized groundwater. These further assessments were conducted by Conoco's Environmental Services Division (EvSD) with laboratory analysis performed by EvSD's compliance laboratory using EPA protocol analysis. Assessments were performed on impoundments at the following sites located in San Juan County New Mexico.

- Nye Com #1E Tank Drip Pit
- Salmon #1 Line Drip Pit
- Shepard and Kelsey #1 Dehydrator Pit

These assessments were performed on August 24, 25 and 26, 1993 by Conoco EvSD personnel Joel Wilson and Michael Boor.

B. Assessment Plan

The assessment for each site was to be performed by installing three small diameter monitoring wells at each site. One well was to be installed hydrologically downgradient from the surface impoundment with two wells installed upgradient. Each well was to be sampled using appropriate sampling methods and protocols for the following parameters.

- BTEX
- PAH (semivolatiles)
- Specific Conductance
- pH
- Temperature
- TDS

All samples were to be field screened for volatile organic compounds (field headspace analysis) using an Organic Vapor Meter (OVM). If the reading for any well was greater than 100 ppm, another well would be installed approximately 100 feet downgradient and sampled.

Following well installation a survey of the site was to be performed to horizontally locate the wells and to determine the hydraulic gradient.

Please refer to Appendix A for the complete workplan.

C. Well Installation and Sampling

All wells were installed to a depth of about three feet below the water table using a power auger or hand auger as needed. A 0.010" slotted screened PVC pipe was installed at a depth of about three feet below the water table to about three feet above the water table. Unscreened PVC casing was installed to the surface above the screened pipe. A one foot bentonite seal was placed at the surface to prevent surface water from entering the well bore. Colorado Environmental Spec 30 sand was used as the completion material to fill the annulus from the well total depth to the surface bentonite seal. After all materials were installed in each well, each bentonite seal was hydrated. All augering equipment was cleaned after the installation of each well. Construction logs for each well are detailed in Appendix B. Photographs of each well installation are included in Appendix C.

C.1. Nye Com #1E

Three wells were installed at the Nye Com #1E.

Please refer to Figure 1 and Appendices B and D for the site plot-plan, hydraulic gradient calculations and well construction logs.

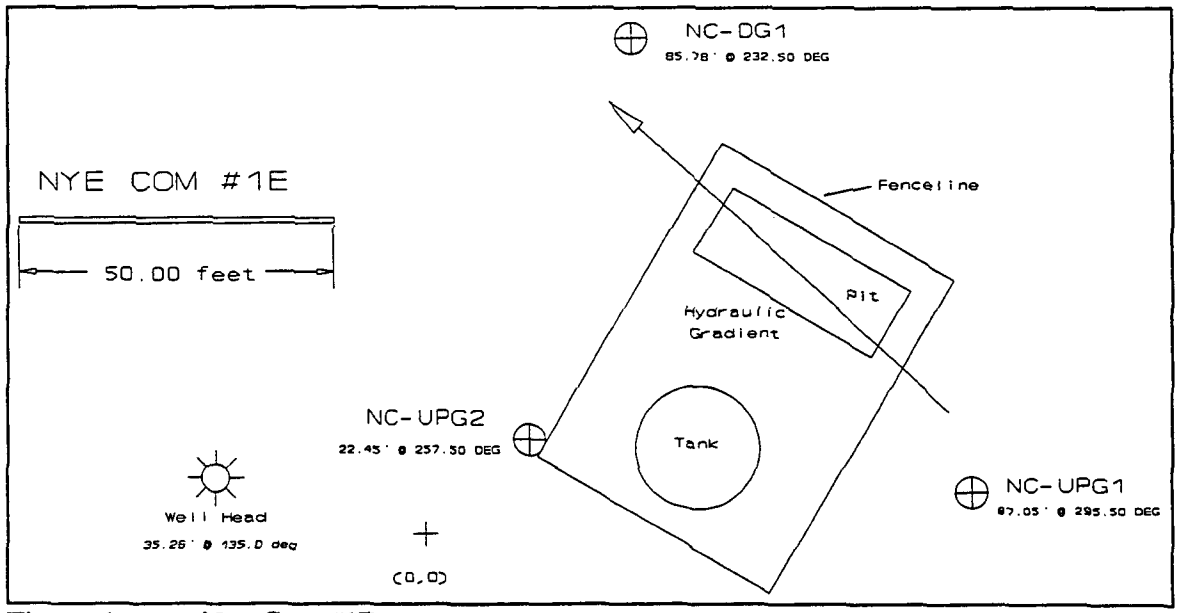


Figure 1 *Nye Com #1E*

The following table lists the surveyed water level data of this site.

Table 1 Survey Data - Nye Com #1E

Well	Water Level BTOC (feet)	Well Total Depth (feet)	Riser Height above ground (inches)	Elevation of TOC (feet)	Elevation of water table (feet)
NC-UPG1	-5.74	9.87	17	-3.57	-9.31
NC-UPG2	-6.22	9.88	16	-3.96	-10.18
NC-DG1	-6.53	11.60	34	-4.16	-10.69

Note: Elevation datum is height of surveying instrument.
BTOC = Below top of casing.

The hydraulic gradient at this site is 0.015 $^{feet}/_{foot}$.

The following table lists the field gathered data for this site.

Table 2 Field Data - Nye Com #1E

		NC-UPG1	NC-UPG2	NC-DG1
Temperature	(°C)	18.1	20.2	16.2
pH		7.25	7.06	7.00
Specific Conductance	(mmhos/cm)	6390	1660	3680
Total Dissolved Solids	(mg/l)	3190	8330	1838
OVM Reading	(ppm)	ND	ND	ND

Note: Total Dissolved Solids is calculated from the Specific Conductance Measurement.
ND - Not detected.

C.2. Salmon #1

Four wells were installed at this site.

Please refer to the following figure and Appendices B and D for the site plot-plan, hydraulic gradient calculations and well construction logs.

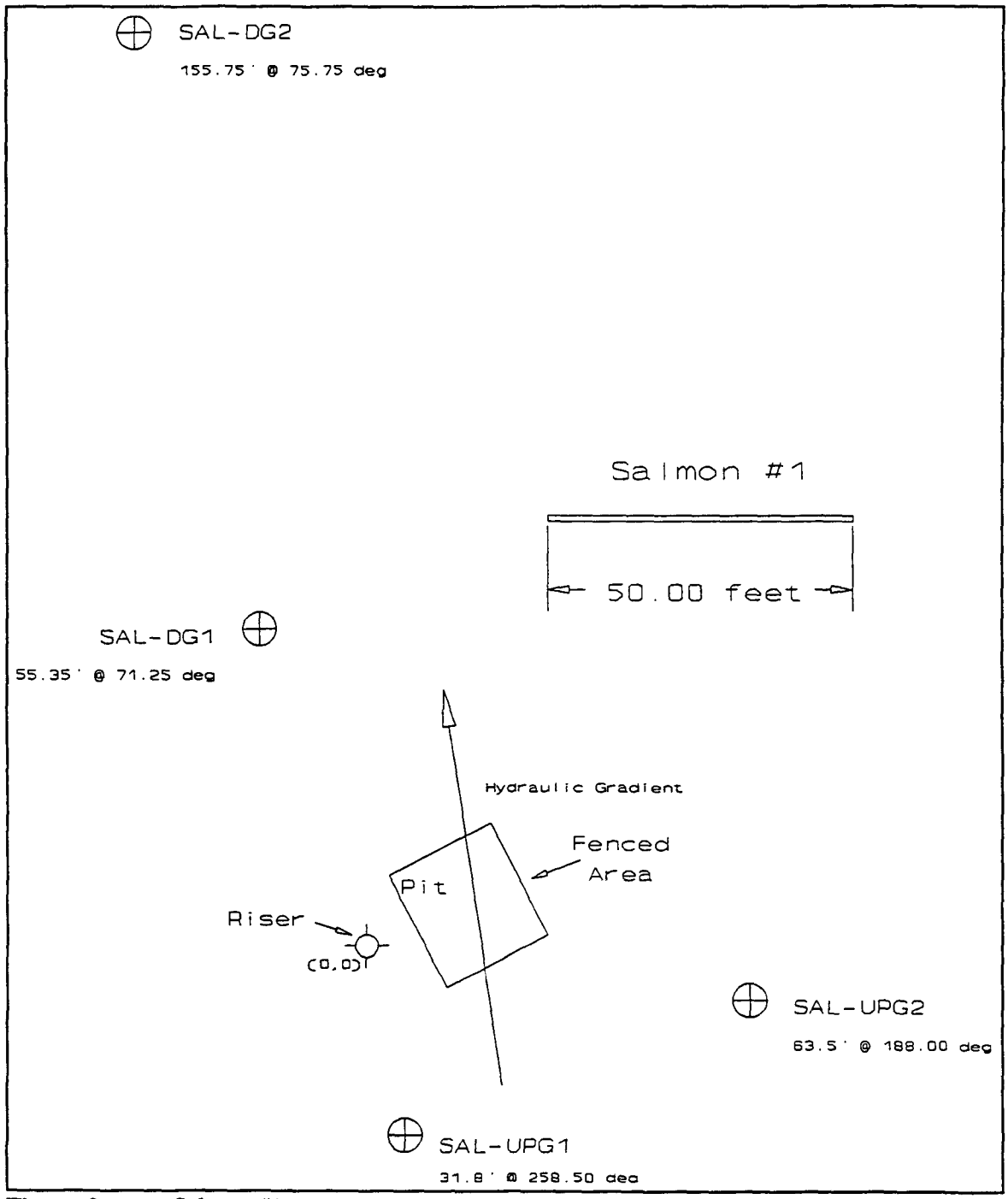


Figure 2 *Salmon #1*

The OVM reading for well SAL-DG1 was above 100 ppm indicating that another well should be installed farther downgradient. Well SAL-DG2 was installed approximately 100 feet

downgradient from well SAL-DG1. The OVM reading for well SAL-DG2 was less than 100 ppm and an additional downgradient well was not installed.

The following table lists the survey data of this site.

Table 3 Survey Data - Salmon #1

Well	Water Level BTOC (feet)	Well Total Depth (feet)	Riser Height above ground (inches)	Elevation of TOC (feet)	Elevation of water table (feet)
SAL-UPG1	-8.65	10.88	9	-3.98	-12.63
SAL-UPG2	-9.11	11.95	14	-3.63	-12.74
SAL-DG1	-2.62	7.67	6	-10.73	-13.35
SAL-DG2	-5.21	9.34	10	-9.45	-14.66

Note: Elevation datum is height of surveying instrument.
BTOC = Below top of casing.

The hydraulic gradient at this site is 0.009 $^{feet}/_{foot}$.

The following table lists the field gathered data for this site.

Table 4 Field Data - Salmon #1

		SA-UPG1	SA-UPG2	SA-DG1	SA-DG2
Temperature	(°C)	20.1	19.2	20.9	20.4
pH		7.48	7.63	7.84	7.56
Specific Conductance	(mmhos/cm)	1490	1620	1440	1860
Total Dissolved Solids	(mg/l)	7700	824	723	932
OVM Reading	(ppm)	77	ND	172	ND

Note: Total Dissolved Solids is calculated from the Specific Conductance Measurement.
ND- Not detected.

C.3. Shepard and Kelsey #1

Three wells were installed at this site. Please refer to the following figure and Appendices B and D for the site plot-plan, hydraulic gradient calculations and well construction logs.

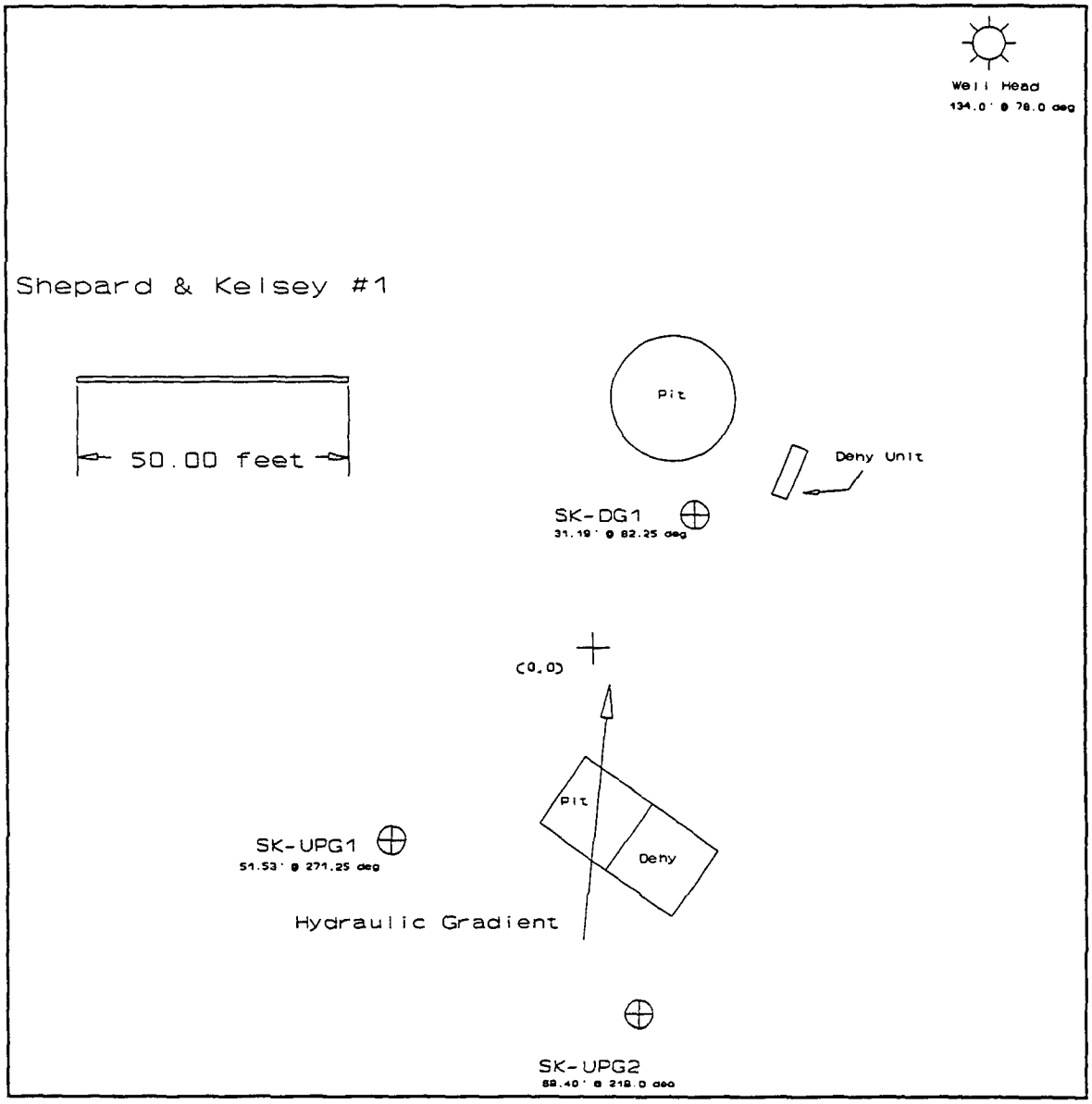


Figure 3 Shepard and Kelsey #1

The following table lists the survey data for this site.

Table 5 Survey Data - Shepard and Kelsey #1

Well	Water Level BTOC (feet)	Well Total Depth (feet)	Riser Height above Ground (inches)	Elevation of TOC (feet)	Elevation of water table (feet)
SK-UPG1	-6.20	10.10	5.5	-3.58	-9.78
SK-UPG2	-5.41	10.10	7.5	-4.05	-9.46
SK-DG1	-6.35	9.05	15.0	-4.38	-10.73

Note: Elevation datum = height of surveying instrument.
BTOC = Below top of casing.

The hydraulic gradient at this site is 0.013 $^{feet}/_{foot}$.

The following table lists the field gathered data for this site.

Table 6 Field Data - Shepard and Kelsey #1

		SK-UPG1	SK-UPG2	SK-DG1
Temperature	(°C)	18.0	23.3	20.7
pH		7.46	7.53	7.53
Specific Conductance	(mmhos/cm)	2110	2290	1960
Total Dissolved Solids	(mg/l)	1098	1162	978
OVM Reading	(ppm)	ND	ND	16.6

Note: Total Dissolved Solids is calculated from the Specific Conductance Measurement.
ND- Not detected.

D. Sample Protocol

All samples were taken after at least ten well volumes of water were purged from each well. The Polynuclear Aromatic Hydrocarbon (PAH or Semi-volatile) samples were taken using a peristaltic pump. All other samples were taken using a stainless steel bailer. All samples were collected, labeled, preserved, and shipped according to EPA guidelines and accompanied by a Chain-of-Custody form. Sampling equipment was washed and triple-rinsed with deionized water between samples. Chain-of-Custody forms are included in Appendix E.

E. Analytical Data

The following table should be used as a reference when referring to the laboratory analytical reports contained in the Analytical Reports Appendix.

Table 7 Sample Cross Reference

Chain-of-Custody Sample ID	Sample Name	Lab ID	Date Sampled
NC-DG1	SJN-NC-DG1	P308088-03	8/26/93
NC-UPG1	SJN-NC-UPG1	P308088-01	8/26/93
NC-UPG2	SJN-NC-UPG2	P308088-02	8/26/93
SAL-DG1	SJN-SAL-DG1	P308088-09	8/25/93
SAL-DG2	SJN-SAL-DG2	P308088-10	8/26/93
SAL-UPG1	SJN-SAL-UPG1	P308088-07	8/25/93
SAL-UPG2	SJN-SAL-UPG2	P308088-08	8/25/93
SK-DG1	SJN-SK-DG1	P308088-06	8/25/93
SK-UPG1	SJN-SK-UPG1	P308088-05	8/25/93
SK-UPG2	SJN-SK-UPG2	P308088-04	8/25/93
TRIP BLANK	SJN-TRIP BLANK	P308088-11	8/19/93

Notes: "NC" refers to Nye Com #1E
"SAL" refers to Salmon #1
"SK" refers to Shepard and Kelsey #1

The following table lists the laboratory results for BTEX and TDS.

Table 8 Laboratory Results - BTEX and TDS

Sample #	Benzene mg/l	Toluene mg/l	Eth-Benzene mg/l	p-Xylene mg/l	m-Xylene mg/l	o-Xylene mg/l	Total Xylenes mg/l	TDS mg/l
NC-UPG1	<.003	<.003	<.003	<.003	<.003	<.003	<.009	6496
NC-UPG2	<.003	<.003	<.003	<.003	<.003	<.003	<.009	1330
NC-DG1	<.003	<.003	<.003	<.003	<.003	<.003	<.009	2915
SK-UPG1	.084	.048	.023	.012	.067	.065	.252	1500
SK-UPG2	<.003	.045	.076	<.003	<.003	<.003	<.009	1828
SK-DG1	.160	1.600	.530	1.300	3.600	1.300	6.200	1288
SAL-UPG1	.098	.052	.097	.024	.061	.025	.110	1044
SAL-UPG2	<.003	<.003	<.003	<.003	<.003	<.003	<.009	1340
SAL-DG1	8.300	12.000	<.300	.610	1.700	.660	2.970	1116
SAL-DG2	.100	<.003	<.003	<.003	<.003	<.003	<.009	1344
TRIP BLANK	<.003	<.003	<.003	<.003	<.003	<.003	<.009	<3

Notes: "UPG" designates an upgradient well.
"DG" designates a downgradient well.
BTEX by EPA Method 8020 with preparation Method 5030.
TDS by EPA Method 160.1.
mg/l is equivalent to parts per million.
Total Xylenes is the sum of the concentrations of o-, m- and p-xylene.

All QA/QC analyte spikes and surrogate recoveries were within method specifications for the above analyses.

The following table lists the results of the laboratory analyses of Polynuclear Aromatic Hydrocarbons (PAHs).

Table 9 Laboratory Results - Polynuclear Aromatic Hydrocarbons (PAHs)

Analyte mg/l	NC-DG1	SAL-DG1	SK-DG1
2-Methylnapthalene	<.020	<0.010	<0.010
3-Methylcholanthrene	<.020	<0.010	<0.010
7,12-Dimethlybenz(a)anthracene	<.020	<0.010	<0.010
Acenaphthene	<.020	<0.010	<0.010
Acenaphthylene	<.020	<0.010	<0.010
Anthracene	<.020	<0.010	<0.010
Benzo(a)anthracene	<.020	<0.010	<0.010
Benzo(a)pyrene	<.020	<0.010	<0.010
Benzo(b)fluoranthene	<.020	<0.010	<0.010
Benzo(g,h,i)perylene	<.020	<0.010	<0.010
Benzo(k)fluoranthene	<.020	<0.010	<0.010
Chrysene	<.020	<0.010	<0.010
Dibenz(a,h)anthracene	<.020	<0.010	<0.010
Dibenz(a,j)acridine	<.020	<0.010	<0.010
Fluoranthene	<.020	<0.010	<0.010
Fluorene	<.020	<0.010	<0.010
Indeno (1,2,3-cd) pyrene	<.020	<0.010	<0.010
Naphthalene	<.020	<0.010	<0.010
Phenanthrene	<.020	<0.010	<0.010
Pyrene	<.020	<0.010	<0.010

Note: Samples were extracted using EPA method 3520 and analyzed using Method 8270.

Please note that terphenyl-d14 surrogate recoveries for the samples from wells SAL-DG1 and SK-DG1 were low. The samples were re-extracted and re-analyzed with no changes noted for the re-analysis. This indicates that a matrix interference is present. Please refer to the Analytical Results Appendix for detailed analysis data.

F. Summary

F.1. Nye Com #1E

Well NC-UPG1 was placed upgradient of the surface impoundment and well NC-DG1 was placed downgradient. No impact upon the groundwater by BTEX or PAHs was found at this location.

F.2. Salmon #1

Wells SAL-UPG1 and SAL-DG1 were about 20° from the hydraulic gradient line running directly through the surface impoundment. Well SAL-DG2 was placed downgradient. SAL-UPG2 showed no evidence of groundwater impact. Groundwater samples from well SAL-DG1 contained 8.300 and 12.000 mg/l of benzene and toluene respectively and contained 2.970 mg/l of total xylene. SAL-DG2 samples contained 0.100 mg/l of benzene. This indicates that the extent of the benzene plume is beyond the extreme downgradient well, but at a very low level.

No PAHs were found to be present at this site.

F.3. Shepard and Kelsey #1

Well SK-UPG2 was placed upgradient of the surface impoundment and well SK-DG1 was placed downgradient. SK-DG1 samples contained 0.160 and 1.600 mg/l benzene and toluene, respectively. Total xylenes for samples from well SK-DG1 at this site were 6.200 mg/l.

No PAHs were found to be present at this site.

Appendix A
Workplan

SAN JUAN BASIN
GROUNDWATER INVESTIGATION
WORKPLAN

INTRODUCTION

This workplan outlines the field and analytical procedures to assess groundwater quality at three pits in the San Juan Basin area. The following are the pits slated for investigation and subsequent closure:

NYC Com 1E -- Tank Drip Pit (TDP)
Salom 1 -- Line Drip Pit (LDP)
Shepard & Kelsey 1 -- Dehydrator Pit (DHP)

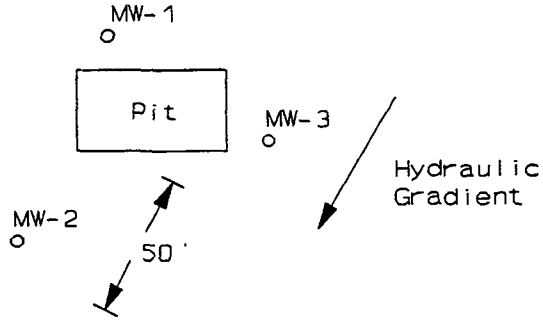
As part of the closure plan, a site assessment was conducted in early June 1993. The results of this investigation include further groundwater quality assessment around the three pits mentioned above. This workplan will describe the methodologies for sampling and analysis of the local groundwater near the pits. Basically, the work will follow the NMOCD Unlined *Surface Impoundment Closure Guidelines* Sec. III.2.c (Ground Water Sampling).

FIELD WORK

The field work will be conducted by Conoco Environmental Support personnel.

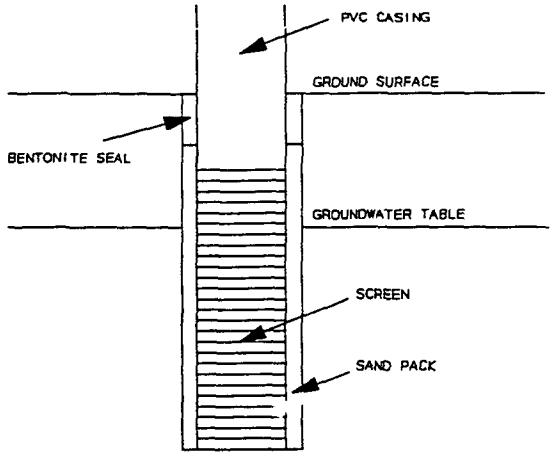
Temporary Monitor Well Installation

Three small diameter PVC monitoring wells will be installed adjacent to each impoundment. One of these will be located hydrologically down-gradient at a distance of not more than 50 feet from the pit boundary. The other two wells will be installed up-gradient near the pit boundary. The following diagram better describes the layout:



Each well will be installed by hand or power augering a 3- or 4-inch hole to a depth of approximately 3 feet below the water table. A clean one-inch-diameter PVC slotted screen will be placed to a depth of approximately 2-3 feet above the water table. The screen will be connected to a blank one-inch PVC casing.

The remaining annulus will be sand packed with clean sand with a bentonite clay seal near the top. The following illustrates the well construction:



TEMPORARY MONITOR WELL

Certain field conditions may require an alternate method for installing the monitor wells. In this case, a hollow steel rod will be driven to the desired depth. The one-inch PVC well casing and screen will then be inserted inside the steel rod and left in place while retracting the steel rods. The resulting annular space will be sand packed with an upper bentonite clay seal.

SAMPLING AND ANALYSIS

Prior to sampling, each well will be developed by pumping at least ten well volumes and monitoring pH to determine stabilization.

A clean teflon or stainless steel bailer will be used to collect samples for the following analysis:

8020	BTEX	2 ml - 40 ml
8270	PAH (Semivolatiles)	2 L - 1 L
--	TDS	125 mL
--	Specific Conductance	Field
--	pH	Field
--	Temp	Field

A peristaltic pump may be used to collect the larger volume samples. The BTEX sample will be collected with a bailer. Samples for PAHs will be collected only from down-gradient wells.

All samples will be collected, labelled, preserved, and shipped according to EPA guidelines and protocols. A Chain-of-Custody form will accompany each shipment. Sampling equipment will be triple-rinsed using deionized water.

PLUME DELINEATION

All samples will be screened (field headspace) for volatile organics using an Organic Vapor Meter (OVM) calibrated to isobutylene. Locations of samples with OVM readings greater than 100 ppm will be extended approximately 100 feet down-gradient and reassessed by installing another temporary monitor well and subsequent sampling.

SURVEYING

All monitor well locating will be surveyed to log both horizontal and vertical positions of the well casing. A fixed point will be used to reference the location of each well and to provide an elevation benchmark.

Water levels will be measured using a conductivity sounding probe and referenced to the top of the casing. This data may allow a more accurate determination of the local hydraulic gradient.

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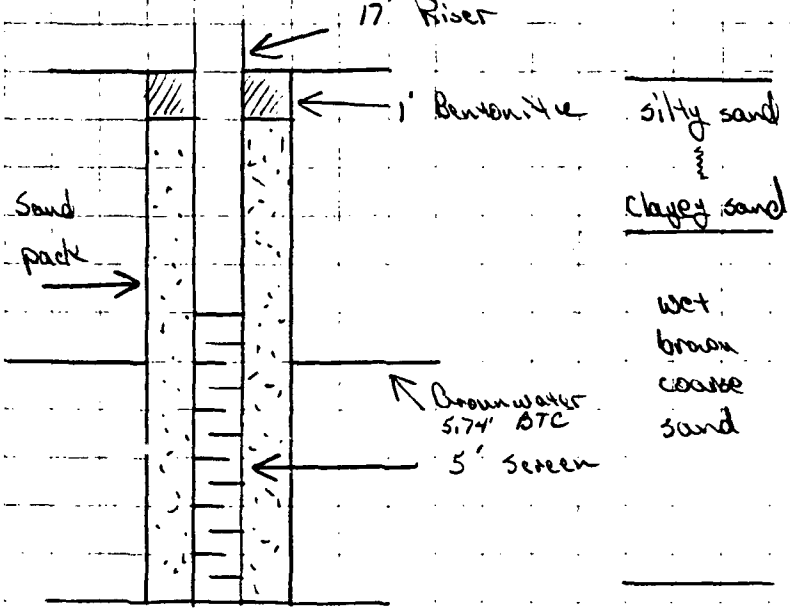
Appendix B
Well Construction Logs
Site Plot Plans

NC-UPG1

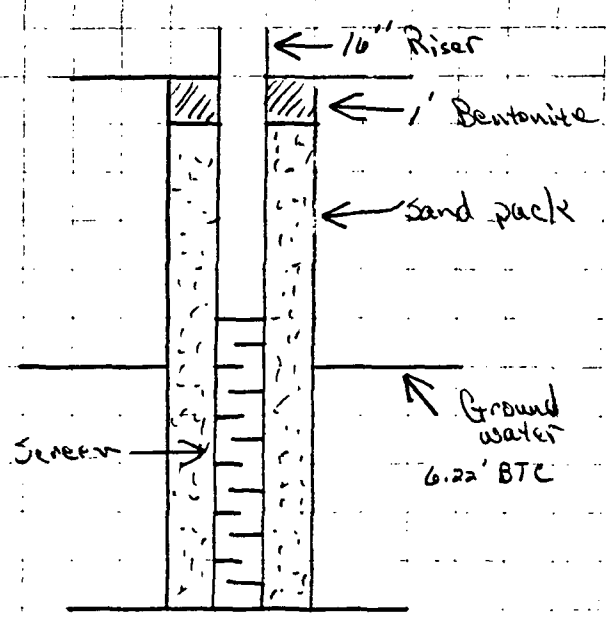


T.D. = 9.80' BTC

Material = 1" PVC w/ .010" slotted screen

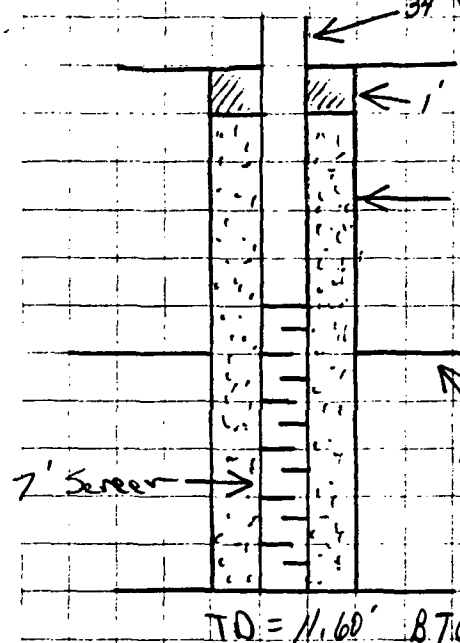
Sand pack = Co. Env. Spec 20 sand

NC-UPG2



TD = 9.88' BTC

NC-DG1



TD = 11.60' BTC

Field Data

	NC-UPG1	NC-UPG2	NC-DG-1	
Temp	18.1	20.2	16.2	°C
pH	7.25	7.06	7.00	
S.C.	6390	1660	3680	mS/cm
TDS	3,19	0,833	1,838	g/L
OVM	ND	ND	ND	ppm

Made By J.P. Hancock
Checked By
Date 9-10-93
Page 1 of 4

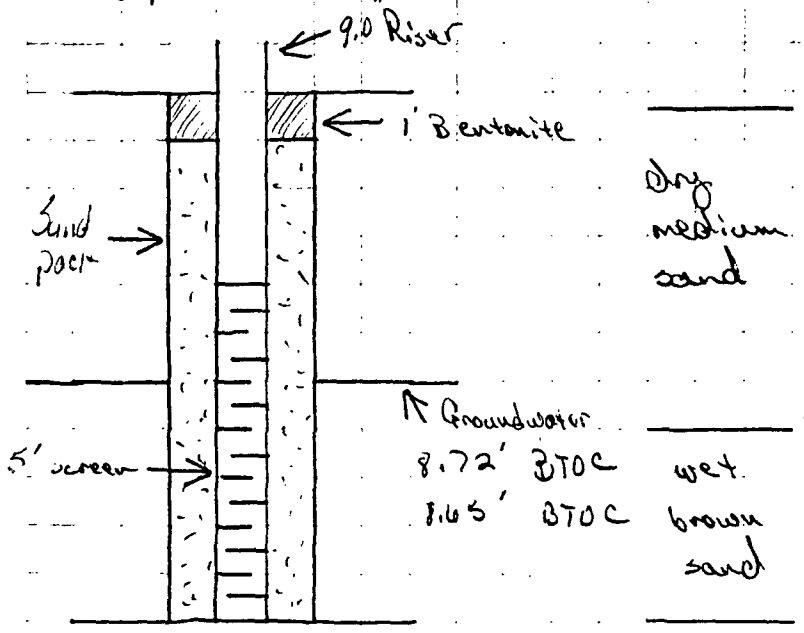
Conoco Inc.
Calculation Sheet

Title San Juan GW
NyE Co #1E

Job No.
Field San Juan
State N.M.

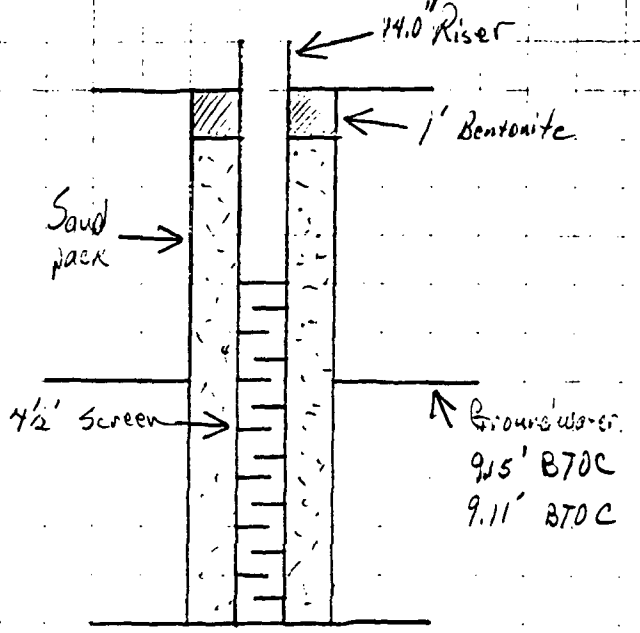
13-231-PB, 7

SAH-UPG1



TD = 10.88'

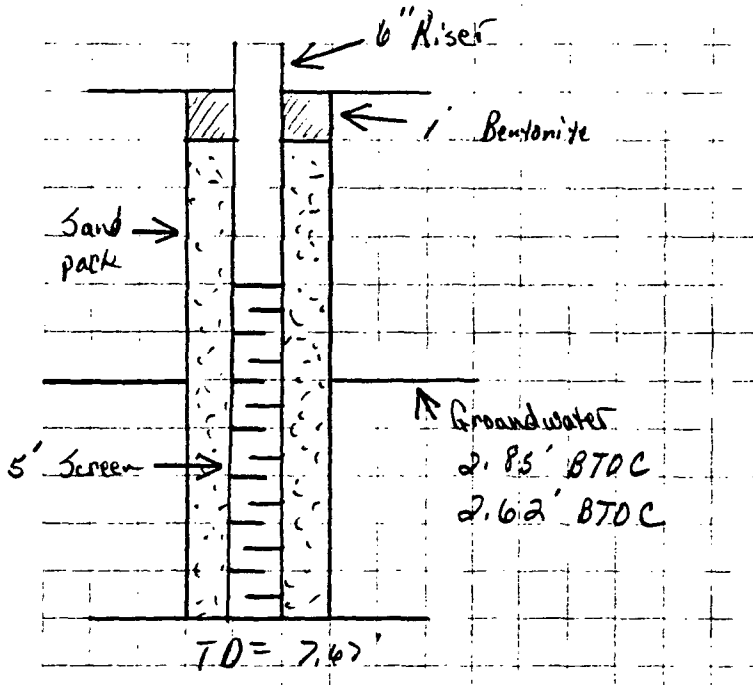
SAH-UPG2



TD = 11.95'

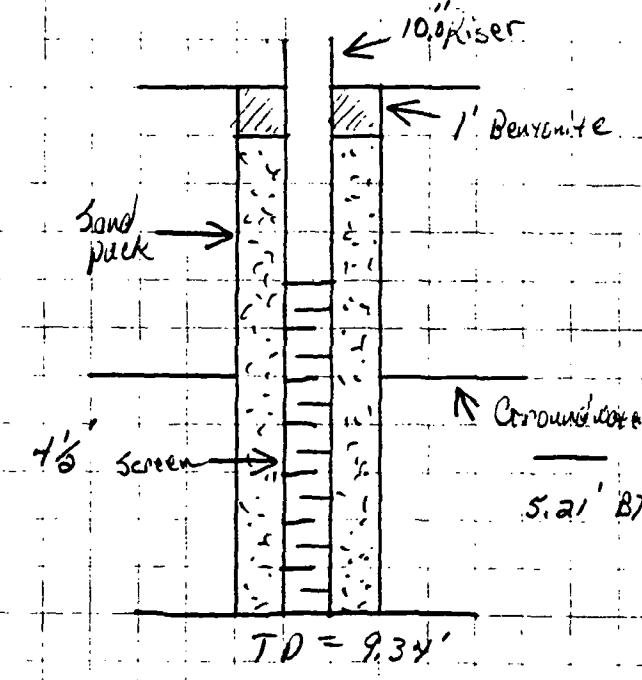
Material = 1" PVC w/ .010" slotted screen
Sand pack = C. Env. Spec. 30 sand

SAH-DG1



TD = 7.40'

SAH-DG2



TD = 9.34'

13-231-PB

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Date 9-10-93
Page 2 of 4

Conoco Inc.
Calculation Sheet

Title San Juan 6'N
Salmon #1

Job No.
Field San Juan
State NM

Salmon # 1

Field Data

	SAL-UPG1	SAL-UPG2	SAL-DG1	SAL-DG-2	Units
Temp	20.1	19.2	20.9	20.4	°C
pH	7.48	7.63	7.84	7.56	
S.C.	1490	1620	1440	1860	mS/cm
TDS	0.770	0.824	0.723	0.932	g/L
OVM	77	ND	172	ND	ppm

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Date 9-10-93
Page 3 of 4

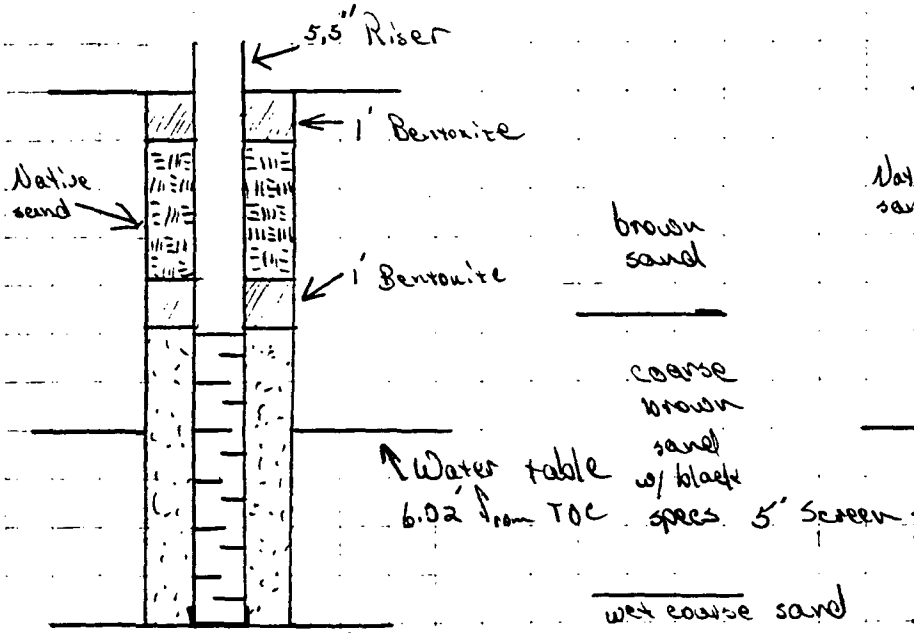
Conoco Inc.
Calculation Sheet

Title San Juan GW
Salmon #1

Job No.
Field San Juan
State NM

13-231-PB

SK-UPG1

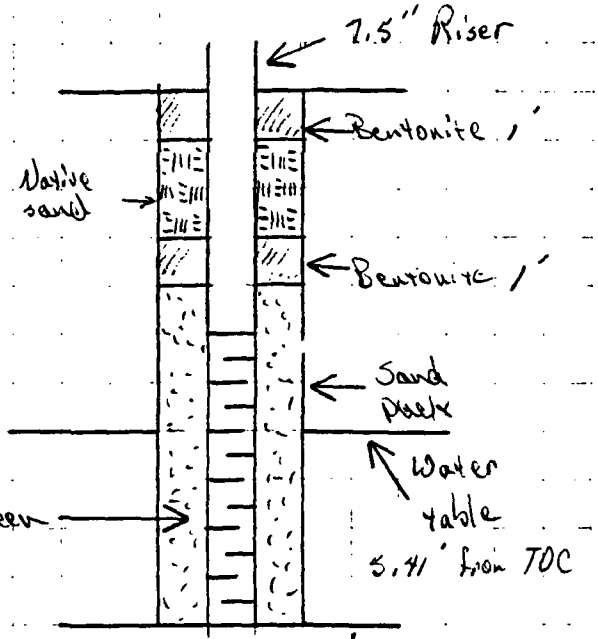


T.D. = 10.10' BTC

Material = 1" PVC w/ .010" slotted screen

Sand pack = Colorado Env. Spec 30 sand

SK-UPG2

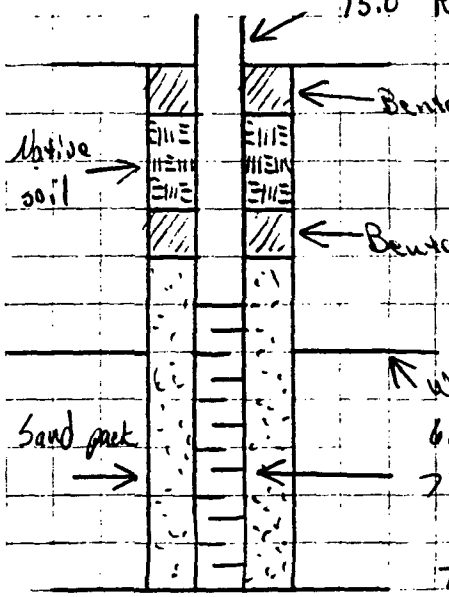


TD = 10.10' BTC

Screen length = 5'

Material = 1" PVC w/ .010" slotted screen

SK-DG1



TD = 9.05' BTC

Field Data

	SK-UPG1	SK-UPG2	SK-DG1	Units
Temp	19.0	23.3	20.7	°C
pH	7.46	7.63	7.53	
S.C.	2110	2290	1960	mS/cm
TDS	1.098	1.162	.978	g/L
DUM	ND	ND	16.6	ppm

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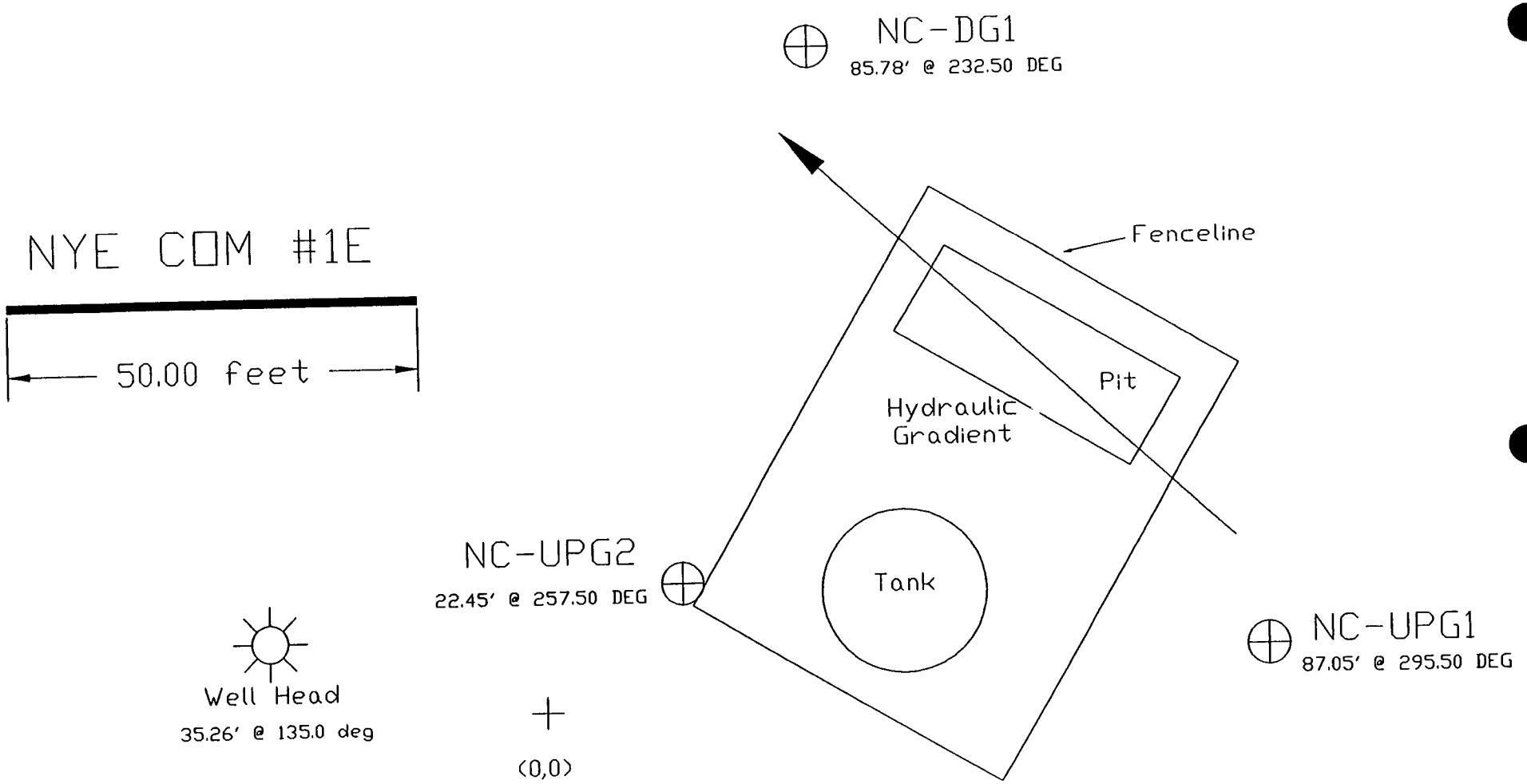
Checked By
Date 9-10-93
Page 4 of 4

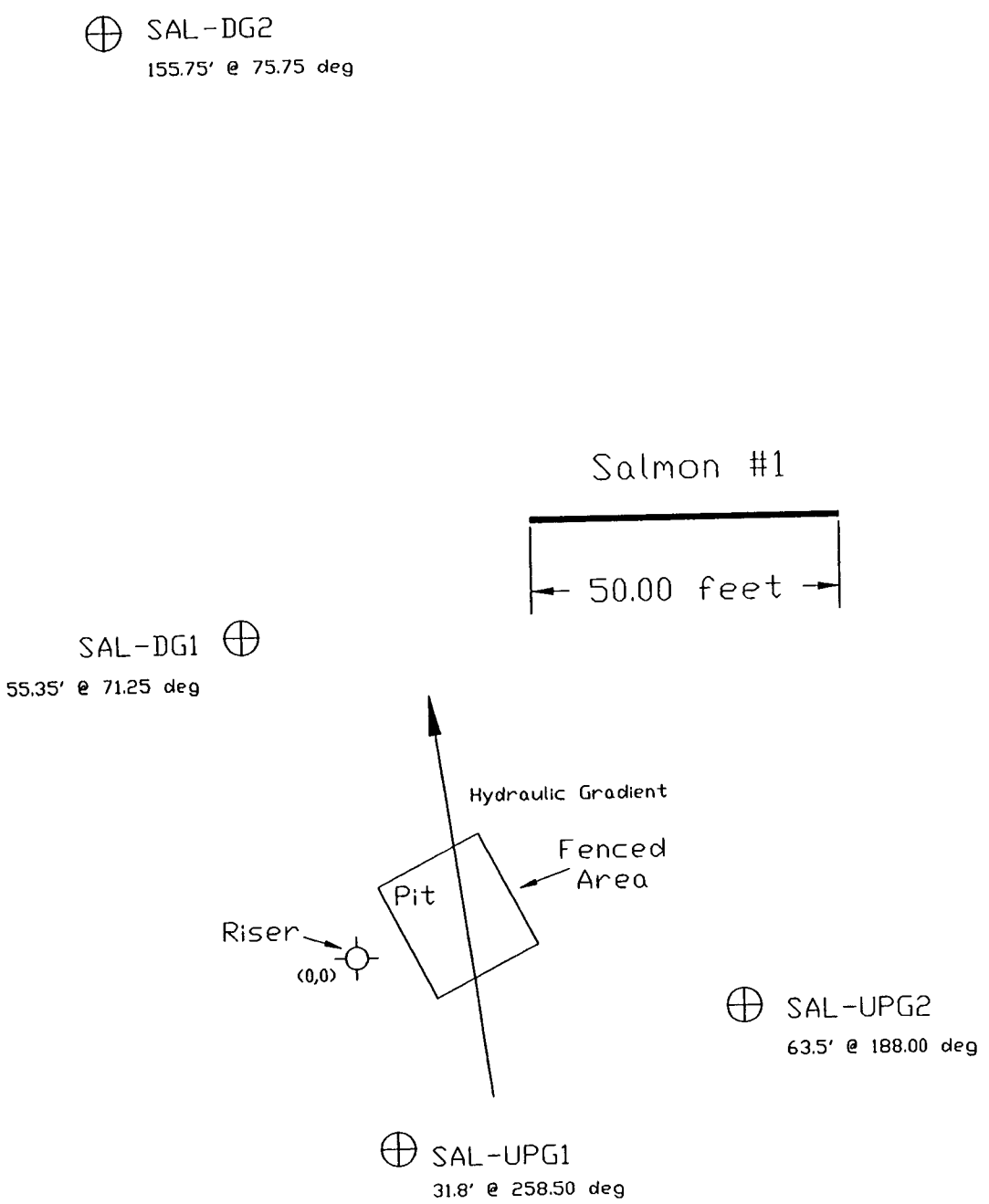
Conoco Inc.
Calculation Sheet

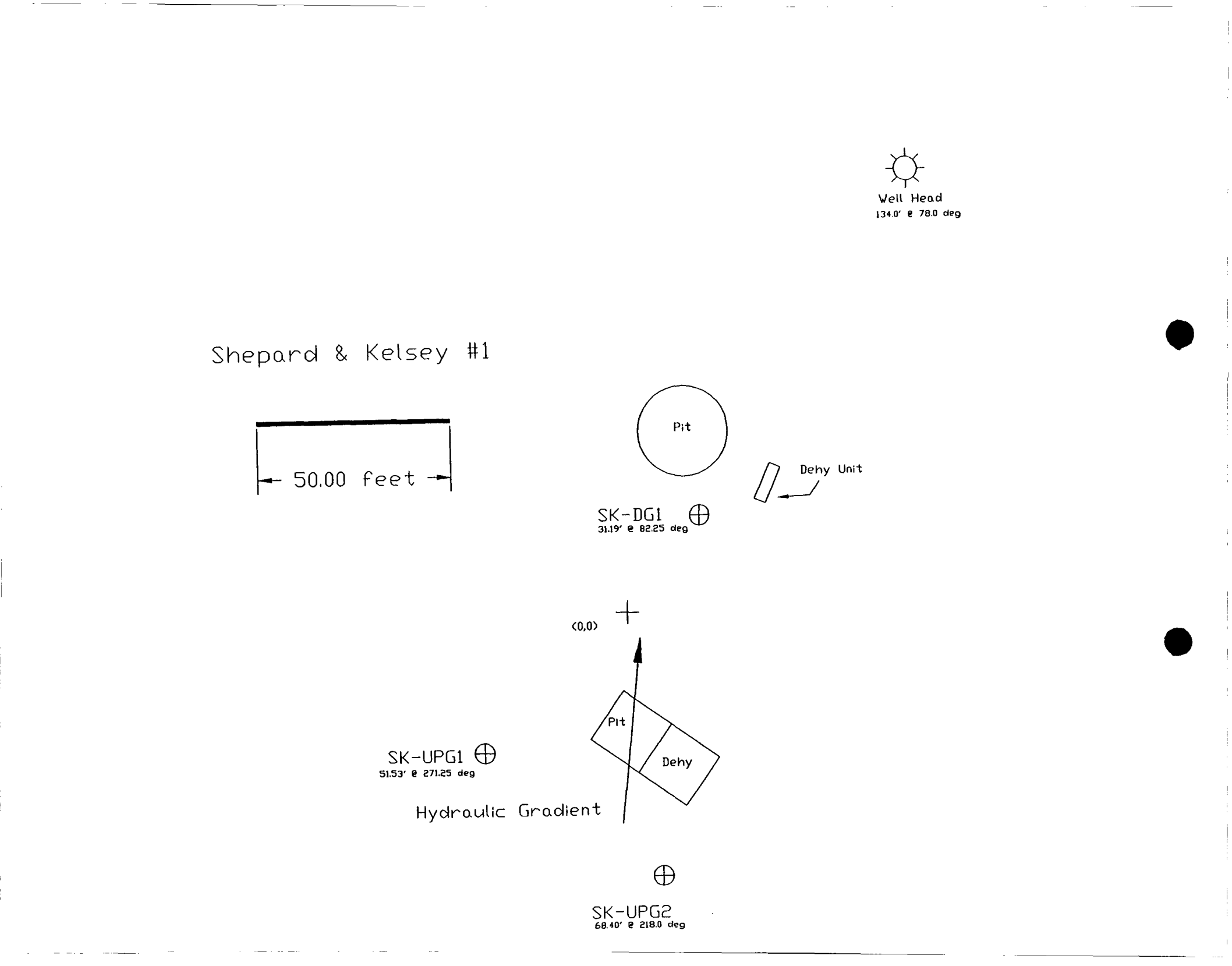
Title San Juan GW
Shepard & Kelsey #1

Job No.
Field San Juan
State N.M.

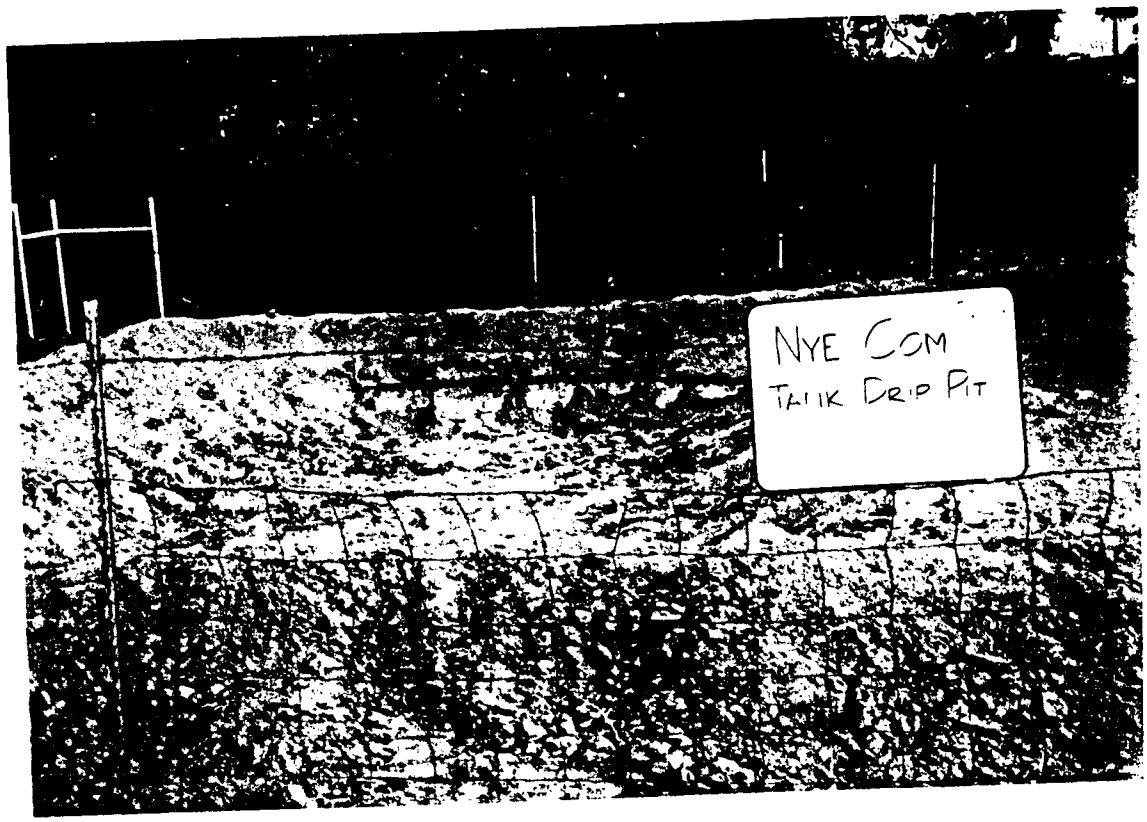
13-231-PB


NC-DG1
85.78' @ 232.50 DEG
NYE COM #1E
50.00 feet
Fenceline
Pit
Hydraulic
Gradient
NC-UPG2
22.45' @ 257.50 DEG
Tank
NC-UPG1
87.05' @ 295.50 DEG
Well Head
35.26' @ 135.0 deg
(0,0)


SAL-DG2
155.75' @ 75.75 deg
Salmon #1
50.00 feet
SAL-DG1
55.35' @ 71.25 deg
Hydraulic Gradient
Fenced
Area
Pit
Riser
(0,0)
SAL-UPG2
63.5' @ 188.00 deg
SAL-UPG1
31.8' @ 258.50 deg


Well Head
134.0' @ 78.0 deg
Shepard & Kelsey #1
50.00 feet
Pit
Dehy Unit
SK-DG1
31.19' @ 82.25 deg
(0,0)
Pit
Dehy
SK-UPG1
51.53' @ 271.25 deg
Hydraulic Gradient
SK-UPG2
68.40' @ 218.0 deg

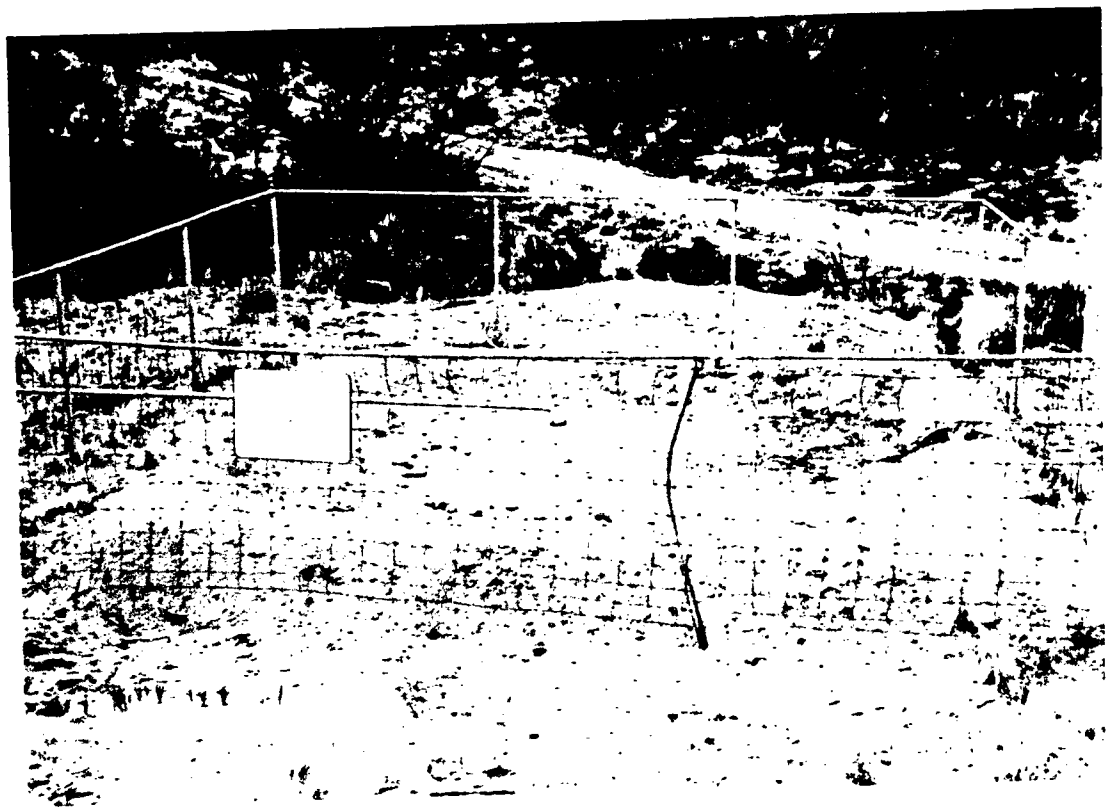
Appendix C
Photographs


NYE COM
TANK DRIP PIT

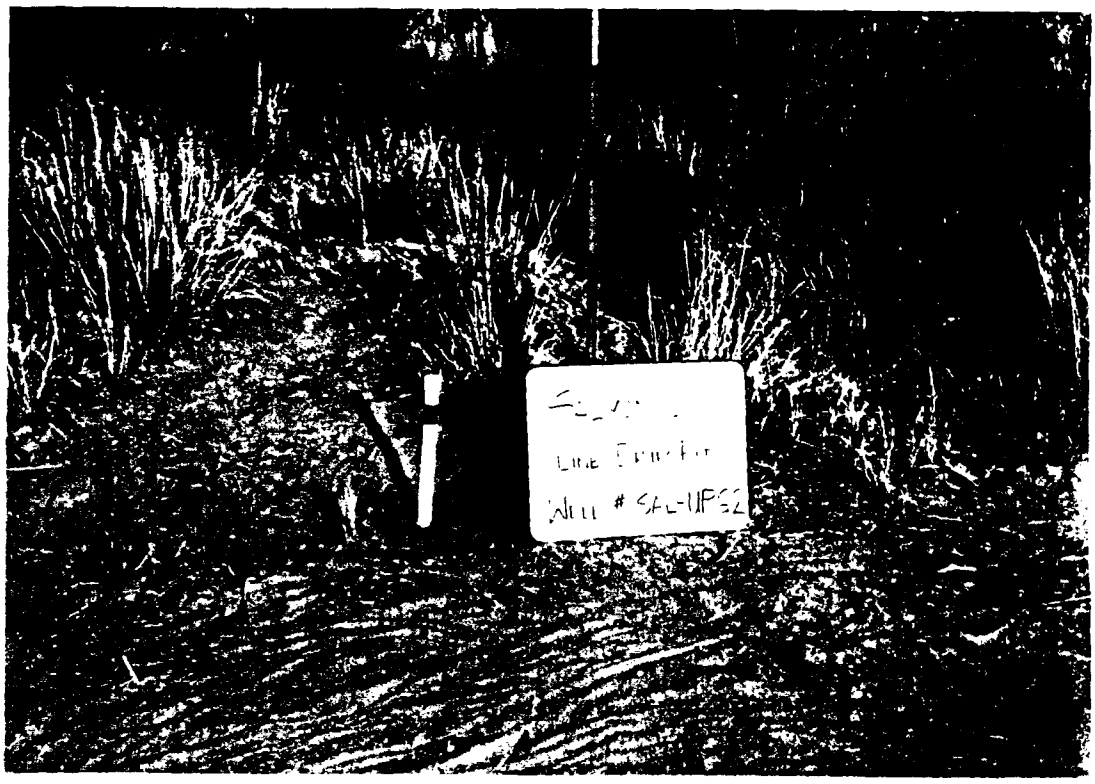

NYE COM
WELL # NC-[illegible]


NYE COM
TANK DRIP PIT
WELL # NC-UPG1

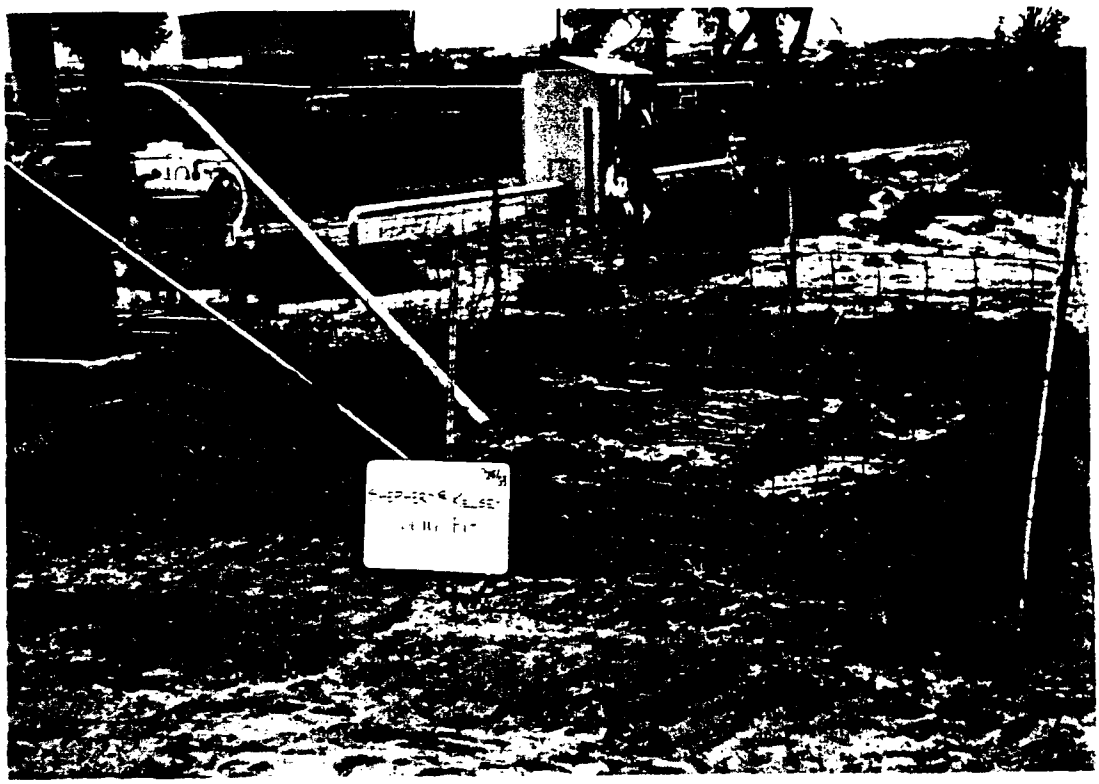

NYE COM
WELL # NC-UPG2

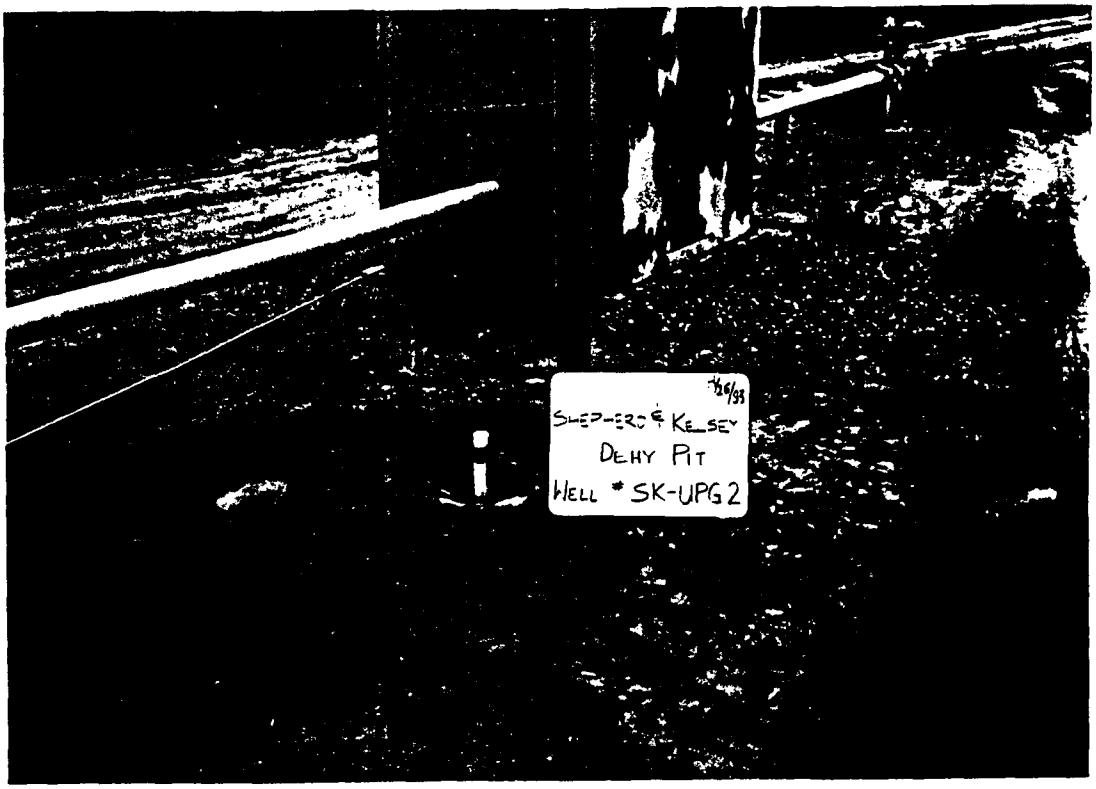



WELL # SAL-D5




3/26/93
SHEPHERD & KELSEY
DEHY PIT
WELL # SK-DG1




1/26/93
SHEPHERD & KELSEY
DEHY PIT
WELL # SK-UPG 2


1/26/93
SHEPHERD & KELSEY
DEHY PIT
WELL # SK-UPG 1

Appendix D
Hydraulic Gradient Calculations

A= 85 88 $\frac{85}{88} \cdot 10 = 9.66$ 20, 30, 40, 50, 60, 70, 80
19.32, 28.98, 38.64, 48.30, 57.95, 67.61, 77.27

B= 79 51 $\frac{79}{51} \cdot 12 = 3.10$ 12 22 32 42 52 62 72
18.59 34.08 49.57 65.06

C= 109 139 $\frac{109}{139} \cdot 10 = 7.84$ 20 30 40 50 60 70 80 90 100 110 120 130 140
15.68 23.53 31.37 39.21 47.05 ~~54.89~~ 64.74 72.67 80.74 88.81 96.89 104.96
59.89 62.73 70.58 78.84 86.26 94.10 101.94 109.78

Gradient

$\frac{59.3}{50'} = \frac{38.9}{X}$ $\frac{.5}{32.80} = .015 \frac{ft}{ft}$

$X = 32.80$

NYE COM #1E

50.00 feet

$\frac{50'}{55.9} = \frac{X}{38.75}$

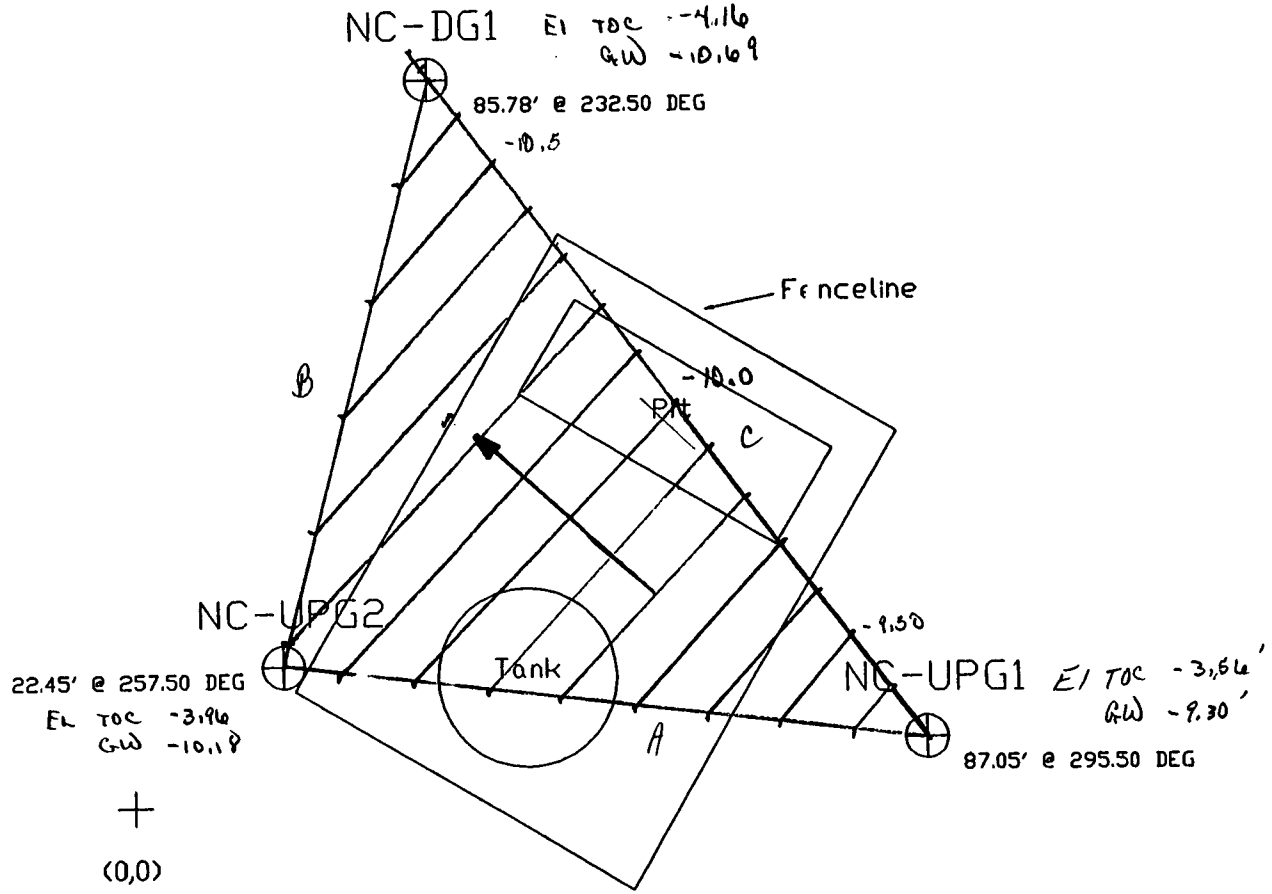
$X = 34.67'$

Gradient =

$\frac{.50'}{34.67'} = .014 \frac{ft}{ft}$

Well Head
35.26' @ 135.0 deg
EL. 0' TOCF

(0,0)



NYE.DWG

El -9.45' TOC
WL -5.21' FTOC
-14.66'

	Length	Elev. @ 100				
A =	77	72	$\frac{7}{72}\cdot 77 = 7.5$	$\frac{23}{72}\cdot 77 = 28.9$	$\frac{47}{72}\cdot 77 = 50.3$	
			$\frac{17}{72}\cdot 77 = 18.2$	$\frac{37}{72}\cdot 77 = 39.6$	$\frac{67}{72}\cdot 77 = 71.7$	
B =	89	61	$\frac{8}{61}\cdot 89 = 8.8$	$\frac{24}{61}\cdot 89 = 37.9$	$\frac{46}{61}\cdot 89 = 67.1$	
			$\frac{16}{61}\cdot 89 = 23.3$	$\frac{36}{61}\cdot 89 = 52.5$	$\frac{56}{61}\cdot 89 = 81.7$	
C =	54	11	$\frac{7}{11}\cdot 54 = 34.4$			

⊕ SAL-DG2
155.75' @ 75.75 deg

$\frac{31}{30} = \frac{44.2}{50'}$

$X = 35.07'$

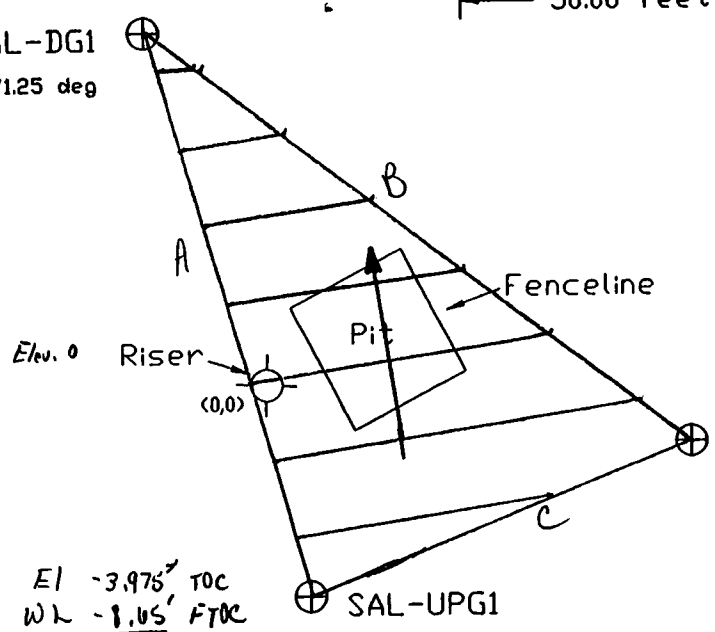
$\frac{30'}{35.07} = .009$ ft/ft

El -10.73' TOC
WL -2.02' FTOC
-13.35

SAL-DG1
55.35' @ 71.25 deg

Salmon #1

50.00 feet



SAL-UPG2
63.5' @ 188.00 deg

El -3.625' TOC
WL -9.11' FTOC
-12.74

El -3.975' TOC
WL -8.65' FTOC
-12.63

SAL-UPG1
31.8' @ 258.50 deg

SALMON.DWG

Gradient

$\frac{42.6}{50'} = \frac{31.5}{X}$

$X = 37.32'$

$\frac{.50'}{37.32'} = .013\ \frac{ft}{ft}$

Well Head
134.0' @ 78.0 deg
Elv. 0.0 TOC F

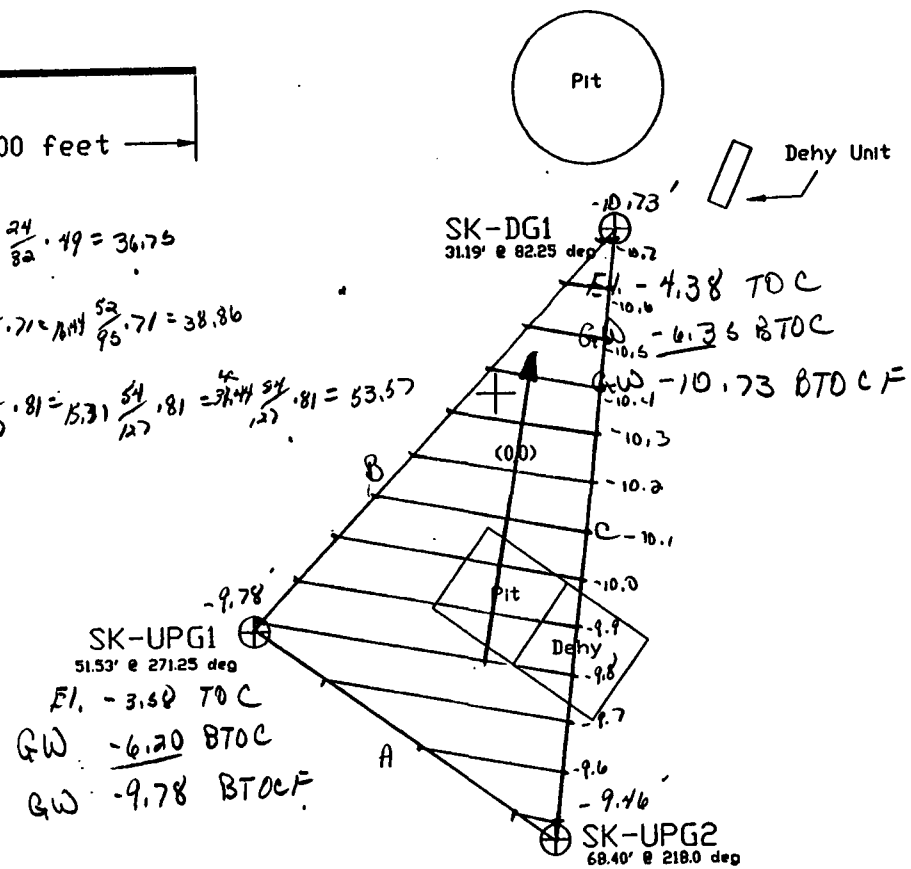
Shepard & Kelsey #1

50.00 feet

A= 49 78-46 = 32 $\frac{4}{32} \cdot 49 = 6.13$ $\frac{11}{32} \cdot 49 = 21.41$ $\frac{24}{32} \cdot 49 = 36.75$

B=71 $\frac{10.73}{9.78}$ $\frac{.16}{}$ 95 $\frac{2}{95} \cdot 71 = 1.49$ $\frac{12}{95} \cdot 71 = 9.17$ $\frac{22}{95} \cdot 71 = 16.44$ $\frac{52}{95} \cdot 71 = 38.86$

C=81 127 $\frac{4}{127} \cdot 81 = 2.55$ $\frac{14}{127} \cdot 81 = 8.93$ $\frac{24}{127} \cdot 81 = 15.31$ $\frac{54}{127} \cdot 81 = 34.44$ $\frac{57}{127} \cdot 81 = 53.57$



El. -4.38 TOC
GW -6.36 BTOC
GW -10.73 BTOC F

El. -3.58 TOC
GW -6.20 BTOC
GW -9.78 BTOC F

El. -4.05 TOC
GW -5.41 BTOC
GW -9.46 BTOC F

Appendix E
Chain-of-Custody Forms

CONOCO

Environmental Sample Chain of Custody and Log
Research and Engineering

N 22209

Project Number

Type or Print Data

Facility Name	Telephone Number	Transporter Name	Telephone Number
NYE COM 1E LEASE	(NOI NUMBER	M.J. BOOR	( ) X-6646
Facility Address		**Transporter Address**	
SAN JUAN BASIN, NM. OFF HWY 64		FYSD	
Facility Supervisor		**Method of Shipping**	
JOHN COY, CONOCO EPNA, ETN 827-5813		HAND DELIVER	
Process Producing Sample	**Special Shipping Instructions**		
TEMP. WELLS			
Employee(s) Sampling	**Remarks**		
JF WILSON & MJ BOOR			
Other Employee(s) Handling			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	No.	Analysis Req. ▶ Preservative	BTEX	TDS	PNA's 8270
NC-UPG1	8/26/93	0905	WATER	80 ml	40ml VOA	2	YES, ACID	X		
NC-UPG1		0905		500 ml	DK-GL	1	NO		X	
NC-UPG2		0920		80 ml	40ml VOA	2	YES, ACID	X		
NC-UPG2		0920		500ml	DK-GL	1	NO		X	
NC-DG1		0935		80ml	40ml VOA	2	YES, ACID	X		
NC-DG1		0935		500ml	DK GL	1	NO		X	
NC-DG1		0935		2L	1L DK GL	2	NO			X

Signatures

	Date/Time		Date/Time	
Bottles Relinquished by G. English by JFW	8/20/93 1330	Bottles Received by Joel F. Wilson	8/25/93 0800	Condition of Samples Upon Arrival at Final Destination
Relinquished by Joel F. Wilson	8/26/93 2235	Received by J. Mike Boor	8-25-93 2235	GOOD
Relinquished by Mike Boor	8-30-93 08:20	Received by	8/30/93 0420	Signature Date 9/13/93
Relinquished by	Date/Time	Received by	Date/Time	Temp. of Samples on Arrival (Temp. sensitive analysis only)
Relinquished by	Date/Time	Received by	Date/Time	4°C
Relinquished by	Date/Time	Received by	Date/Time	Signature Date 9/13/93

Conoco

Environmental Sample Chain of Custody and Log
Research and Engineering

2211

Project Number

Type or Print Data

Facility Name: SALMON 1 PROD. LEASE	Telephone Number: (NO) NUMBER	Transporter Name: M.J. BOOR	Telephone Number: ( ) X-6646
Facility Address: SAN JUAN BASIN, NM OFF HWY 64		Transporter Address: EVED	
Facility Supervisor: JOHN COY, CONOCO EPNA, ETN 827-5813		Method of Shipping: HAND DELIVER	
Process Producing Sample: LINE DRIP PIT FROM GAS WELL	Special Shipping Instructions		
Employee(s) Sampling: J.F. WILSON & M.J. BOOR	Remarks		
Other Employee(s) Handling			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	No.	Analysis Req. ▶ Preservative	BTEX	TDS	PNA's 8270
SAL-UPG1	8/25/93	1540	WATER	80ml	40ml VOA	2	YES, ACID	X		
SAL-UPG1		1540		500ml	DK-GL	1	NO		X	
SAL-UPG2		1600		80ml	40ml VOA	2	YES, ACID	X		
SAL-UPG2		1600		500ml	DK-GL	1	NO		X	
SAL-DG1		1640		80ml	40ml VOA	2	YES, ACID	X		
SAL-DG1		1640		500ml	DK-GL	1	NO		X	
SAL-DG1	↓	1640	↓	1L	DK-GL	2	NO			X
SAL-DG2	8/26/93	1445	WATER	80ml	40ml VOA	2	YES, ACID	X		
SAL-DG2	8/26/93	1445	↓	500ml	DK-GL	1	NO		X	

Signatures

	Date/Time		Date/Time	
Bottles Relinquished by: G. Englekirk by JFW	8/20/93 1330	Bottles Received by: J.F. Wilson	8/25/93 0800	Condition of Samples Upon Arrival at Final Destination: Good
Relinquished by: J.F. Wilson	8/26/93 2235	Received by: M.J. Boor	8-26-93 2235	
Relinquished by: M.J. Boor	8-30-93 08:20	Received by	8/30/93 0820	Signature / Date: 8/30/93
Relinquished by	Date/Time	Received by	Date/Time	Temp. of Samples on Arrival (Temp. sensitive analysis only)
Relinquished by	Date/Time	Received by	Date/Time	
Relinquished by	Date/Time	Received by	Date/Time	Signature / Date

Environmental Sample Chain of Custody Log

Research and Engineering

2cc76

Project Number

Type or Print Data

Facility Name: SHEPARD & KELSEY LEASE	Telephone Number: (NO NUMBER	Transporter Name: M. J. BOOR	Telephone Number: ( ) X-6646
Facility Address: MAGNUM ROAD, BLOOMINGTON, NM		Transporter Address: EYSD	
Facility Supervisor: JOHN COY, CONOCO EPNA, ETN827-5813		Method of Shipping: HAND DELIVER	
Process Producing Sample: TEMP. WELLS	Special Shipping Instructions:		
Employee(s) Sampling: WILSON, JF & BOOR, MJ	Remarks:		
Other Employee(s) Handling:			

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	No.	Analysis Req. ▶ Preservative	BTEX	TDS	PNA's 8270
SK-UPG2	8/25/93	0915	WATER	80 ml	40ml VOA	2	Yes, ACID	X		
SK-UPG2	8/25/93	0915	"	500 ml	GL-DK	1	NO		X	
SK-UPG1	8/25/93	0930	"	80 ml	40ml VOA	2	YES, ACID	X		
SK-UPG1	8/25/93	0930	"	500ml	GL-DK	1	NO		X	
SK-DG1	8/25/93	1100	"	80ml	40ml VOA	2	Yes, ACID	X		
SK-DG1	8/25/93	1100	"	500ml	DK-GL	1	NO		X	
SK-DG1	8/25/93	1100	"	2L	DK-GL	2	NO			X

Signatures

	Bottles Relinquished by	Date/Time	Bottles Received by	Date/Time
1	G. Engelking by JFW	8/26/93 1330		8/25/93 0800
2		8/26/93 2235		8-26-93 2235
3		8-30-93 08:20		8-31-93 0820
4				
5				

Condition of Samples Upon Arrival at Final Destination

Signature: Date:

Temp. of Samples on Arrival (Temp. sensitive analysis only)

4°C

Signature: Date: 9/13/93

Appendix F
Analytical Reports

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-NC-DG1
Sample Name: SJN-NC-DG1
Date Sampled: August 26, 1993
Lab Sample ID: P308088-03 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	1	2915		10	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	< 3		3	UG/L	Sep 3, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 3, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
TOLUENE	1	< 3		3	UG/L	Sep 3, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	83.0	Sep 3, 1993

Method Number: 8270 Prep Method: 3520

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
2-METHYLNAPHTHALENE	2	< 20		20	UG/L	Sep 10, 1993
3-METHYLCHOLANTHRENE	2	< 20		20	UG/L	Sep 10, 1993
7,12-DIMETHYLBENZ(A)ANTHRACENE	2	< 20		20	UG/L	Sep 10, 1993
ACENAPHTHENE	2	< 20		20	UG/L	Sep 10, 1993
ACENAPHTHYLENE	2	< 20		20	UG/L	Sep 10, 1993
ANTHRACENE	2	< 20		20	UG/L	Sep 10, 1993
BENZO(A)ANTHRACENE	2	< 20		20	UG/L	Sep 10, 1993
BENZO(A)PYRENE	2	< 20		20	UG/L	Sep 10, 1993
BENZO(B)FLUORANTHENE	2	< 20		20	UG/L	Sep 10, 1993
BENZO(G,H,I)PERYLENE	2	< 20		20	UG/L	Sep 10, 1993
BENZO(K)FLUORANTHENE	2	< 20		20	UG/L	Sep 10, 1993
CHRYSENE	2	< 20		20	UG/L	Sep 10, 1993
DIBENZ(A,H)ANTHRACENE	2	< 20		20	UG/L	Sep 10, 1993
DIBENZ(A,J)ACRIDINE	2	< 20		20	UG/L	Sep 10, 1993
FLUORANTHENE	2	< 20		20	UG/L	Sep 10, 1993
FLUORENE	2	< 20		20	UG/L	Sep 10, 1993
INDENO(1,2,3-CD)PYRENE	2	< 20		20	UG/L	Sep 10, 1993
NAPHTHALENE	2	< 20		20	UG/L	Sep 10, 1993
PHENANTHRENE	2	< 20		20	UG/L	Sep 10, 1993
PYRENE	2	< 20		20	UG/L	Sep 10, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2-FLUOROBIPHENYL	2	71.0	Sep 10, 1993
NITROBENZENE-D5	2	71.0	Sep 10, 1993
TERPHENYL-D14	2	63.0	Sep 10, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-NC-UPG1
Sample Name: SJN-NC-UPG1
Date Sampled: August 26, 1993
Lab Sample ID: P308088-01 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	1	6496		10	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	< 3		3	UG/L	Sep 3, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 3, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
TOLUENE	1	< 3		3	UG/L	Sep 3, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	90.0	Sep 3, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-NC-UPG2
Sample Name: SJN-NC-UPG2
Date Sampled: August 26, 1993
Lab Sample ID: P308088-02 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	4	1330		40	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	< 3		3	UG/L	Sep 3, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 3, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
TOLUENE	1	< 3		3	UG/L	Sep 3, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	87.0	Sep 3, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-SAL-DG2
Sample Name: SJN-SAL-DG2
Date Sampled: August 26, 1993
Lab Sample ID: P308088-10 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	4	1444		40	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	100		3	UG/L	Sep 7, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 7, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
TOLUENE	1	< 3		3	UG/L	Sep 7, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	80.0	Sep 7, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-SAL-UPG2
Sample Name: SJN-SAL-UPG2
Date Sampled: August 25, 1993
Lab Sample ID: P308088-08 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	4	1340		40	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	< 3		3	UG/L	Sep 3, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 3, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 3, 1993
TOLUENE	1	< 3		3	UG/L	Sep 3, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	83.0	Sep 3, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-SK-DG1
Sample Name: SJN-SK-DG1
Date Sampled: August 25, 1993
Lab Sample ID: P308088-06 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	4	1288		40	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	20	160		60	UG/L	Sep 3, 1993
ETHYLBENZENE	20	530		60	UG/L	Sep 3, 1993
M-XYLENE	20	3600		60	UG/L	Sep 3, 1993
O-XYLENE	20	1300		60	UG/L	Sep 3, 1993
P-XYLENE	20	1300		60	UG/L	Sep 3, 1993
TOLUENE	20	1600		60	UG/L	Sep 3, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	20	115.0	Sep 3, 1993

Method Number: 8270 Prep Method: 3520

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
2-METHYLNAPHTHALENE	1	< 10		10	UG/L	Sep 10, 1993
3-METHYLCHOLANTHRENE	1	< 10		10	UG/L	Sep 10, 1993
7,12-DIMETHYLBENZ(A)ANTHRACENE	1	< 10		10	UG/L	Sep 10, 1993
ACENAPHTHENE	1	< 10		10	UG/L	Sep 10, 1993
ACENAPHTHYLENE	1	< 10		10	UG/L	Sep 10, 1993
ANTHRACENE	1	< 10		10	UG/L	Sep 10, 1993
BENZO(A)ANTHRACENE	1	< 10		10	UG/L	Sep 10, 1993
BENZO(A)PYRENE	1	< 10		10	UG/L	Sep 10, 1993
BENZO(B)FLUORANTHENE	1	< 10		10	UG/L	Sep 10, 1993
BENZO(G,H,I)PERYLENE	1	< 10		10	UG/L	Sep 10, 1993
BENZO(K)FLUORANTHENE	1	< 10		10	UG/L	Sep 10, 1993
CHRYSENE	1	< 10		10	UG/L	Sep 10, 1993
DIBENZ(A,H)ANTHRACENE	1	< 10		10	UG/L	Sep 10, 1993
DIBENZ(A,J)ACRIDINE	1	< 10		10	UG/L	Sep 10, 1993
FLUORANTHENE	1	< 10		10	UG/L	Sep 10, 1993
FLUORENE	1	< 10		10	UG/L	Sep 10, 1993
INDENO(1,2,3-CD)PYRENE	1	< 10		10	UG/L	Sep 10, 1993
NAPHTHALENE	1	< 10		10	UG/L	Sep 10, 1993
PHENANTHRENE	1	< 10		10	UG/L	Sep 10, 1993
PYRENE	1	< 10		10	UG/L	Sep 10, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
2-FLUOROBIPHENYL	1	66.0	Sep 10, 1993
NITROBENZENE-D5	1	78.0	Sep 10, 1993
TERPHENYL-D14	1	20.0	Sep 10, 1993

Comments:

8270: SURROGATE RECOVERY FOR TERPHENYL-D14 WAS LOW. THE SAMPLE WAS RE-ANALYZED WITH NO CHANGES NOTED. THE SAMPLE WAS THEN RE-EXTRACTED AND REANALYZED EVEN THOUGH HOLD TIMES HAD EXPIRED. NO CHANGES WERE NOTED ON THE RE-EXTRACT.

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-SK-UPG2
Sample Name: SJN-SK-UPG2
Date Sampled: August 25, 1993
Lab Sample ID: P308088-04 Analysis Lab: PONCA CITY

Method Number: 160_1

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
TOTAL DISSOLVED SOLIDS	4	1500		40	MG/L	Sep 1, 1993

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	8.4		3	UG/L	Sep 3, 1993
ETHYLBENZENE	1	23		3	UG/L	Sep 3, 1993
M-XYLENE	1	6.7		3	UG/L	Sep 3, 1993
O-XYLENE	1	6.5		3	UG/L	Sep 3, 1993
P-XYLENE	1	12		3	UG/L	Sep 3, 1993
TOLUENE	1	4.8		3	UG/L	Sep 3, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE
Sample Source: SJN-TRIP BLNK
Sample Name: SJN-TRIP BLNK
Date Sampled: August 19, 1993
Lab Sample ID: P308088-11 Analysis Lab: PONCA CITY

Method Number: 8020 Prep Method: 5030

Analyte/Parameter	Dilution	Result	MDL	PQL	Unit	Date Analyzed
BENZENE	1	< 3		3	UG/L	Sep 7, 1993
ETHYLBENZENE	1	< 3		3	UG/L	Sep 7, 1993
M-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
O-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
P-XYLENE	1	< 3		3	UG/L	Sep 7, 1993
TOLUENE	1	< 3		3	UG/L	Sep 7, 1993

Surrogates:

Analyte/Parameter	Dilution	RPR	Date Analyzed
TRIFLUOROTOLUENE	1	90.0	Sep 7, 1993

Location: SAN JUAN
Project Name: SAN JUAN BASIN CLOSURE

Analyte/Parameter	Result	Unit	MDL	PQL	Method No.	Analyzed	Sample Name
TOTAL DISSOLVED SOLIDS	2915	MG/L		10	160_1	93-09-01	SJN-NC-DG1
TOTAL DISSOLVED SOLIDS	6496	MG/L		10	160_1	93-09-01	SJN-NC-UPG1
TOTAL DISSOLVED SOLIDS	1330	MG/L		40	160_1	93-09-01	SJN-NC-UPG2
TOTAL DISSOLVED SOLIDS	1116	MG/L		40	160_1	93-09-01	SJN-SAL-DG1
BENZENE	8300	UG/L		300	8020	93-09-08	SJN-SAL-DG1
M-XYLENE	1700	UG/L		300	8020	93-09-08	SJN-SAL-DG1
O-XYLENE	660	UG/L		300	8020	93-09-08	SJN-SAL-DG1
P-XYLENE	610	UG/L		300	8020	93-09-08	SJN-SAL-DG1
TOLUENE	12000	UG/L		300	8020	93-09-08	SJN-SAL-DG1
TOTAL DISSOLVED SOLIDS	1444	MG/L		40	160_1	93-09-01	SJN-SAL-DG2
BENZENE	100	UG/L		3	8020	93-09-07	SJN-SAL-DG2
TOTAL DISSOLVED SOLIDS	1044	MG/L		40	160_1	93-09-01	SJN-SAL-UPG1
BENZENE	98	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
ETHYLBENZENE	9.7	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
M-XYLENE	61	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
O-XYLENE	25	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
P-XYLENE	24	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
TOLUENE	52	UG/L		3	8020	93-09-03	SJN-SAL-UPG1
TOTAL DISSOLVED SOLIDS	1340	MG/L		40	160_1	93-09-01	SJN-SAL-UPG2
TOTAL DISSOLVED SOLIDS	1288	MG/L		40	160_1	93-09-01	SJN-SK-DG1
BENZENE	160	UG/L		60	8020	93-09-03	SJN-SK-DG1
ETHYLBENZENE	530	UG/L		60	8020	93-09-03	SJN-SK-DG1
M-XYLENE	3600	UG/L		60	8020	93-09-03	SJN-SK-DG1
O-XYLENE	1300	UG/L		60	8020	93-09-03	SJN-SK-DG1
P-XYLENE	1300	UG/L		60	8020	93-09-03	SJN-SK-DG1
TOLUENE	1600	UG/L		60	8020	93-09-03	SJN-SK-DG1
TOTAL DISSOLVED SOLIDS	1828	MG/L		40	160_1	93-09-01	SJN-SK-UPG1
ETHYLBENZENE	7.6	UG/L		3	8020	93-09-03	SJN-SK-UPG1
TOLUENE	4.5	UG/L		3	8020	93-09-03	SJN-SK-UPG1
TOTAL DISSOLVED SOLIDS	1500	MG/L		40	160_1	93-09-01	SJN-SK-UPG2
BENZENE	8.4	UG/L		3	8020	93-09-03	SJN-SK-UPG2
ETHYLBENZENE	23	UG/L		3	8020	93-09-03	SJN-SK-UPG2
M-XYLENE	6.7	UG/L		3	8020	93-09-03	SJN-SK-UPG2
O-XYLENE	6.5	UG/L		3	8020	93-09-03	SJN-SK-UPG2
P-XYLENE	12	UG/L		3	8020	93-09-03	SJN-SK-UPG2
TOLUENE	4.8	UG/L		3	8020	93-09-03	SJN-SK-UPG2

SJN-NC-DG1
Lab Sample ID: P308088-03 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01 PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
BENZENE	98.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	P308088-01 PONCA CITY
M-XYLENE	98.0	P308088-01 PONCA CITY
O-XYLENE	98.0	P308088-01 PONCA CITY
P-XYLENE	98.0	P308088-01 PONCA CITY
TOLUENE	98.0	P308088-01 PONCA CITY
Surrogates:		
TRIFLUOROTOLUENE	90.0	P308088-01 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BENZENE	98.0	0.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01 PONCA CITY
M-XYLENE	98.0	0.0	P308088-01 PONCA CITY
O-XYLENE	98.0	0.0	P308088-01 PONCA CITY
P-XYLENE	98.0	0.0	P308088-01 PONCA CITY
TOLUENE	98.0	0.0	P308088-01 PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	0.0	P308088-01 PONCA CITY

Method Number: 8270 Prep Method: 3520
Batch Start Date: 10-SEP-93 Instrument: HP1 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
2-METHYLNAPHTHALENE	92.0	P308088-03 PONCA CITY
3-METHYLCHOLANTHRENE	89.0	P308088-03 PONCA CITY
7,12-DIMETHYLBENZ(A)ANTHRACENE	34.0	P308088-03 PONCA CITY
ACENAPHTHENE	93.0	P308088-03 PONCA CITY
ACENAPHTHYLENE	94.0	P308088-03 PONCA CITY
ANTHRACENE	89.0	P308088-03 PONCA CITY
BENZO(A)ANTHRACENE	104.0	P308088-03 PONCA CITY
BENZO(A)PYRENE	104.0	P308088-03 PONCA CITY
BENZO(B)FLUORANTHENE	98.0	P308088-03 PONCA CITY
BENZO(G,H,I)PERYLENE	127.0	P308088-03 PONCA CITY
BENZO(K)FLUORANTHENE	104.0	P308088-03 PONCA CITY
CHRYSENE	105.0	P308088-03 PONCA CITY
DIBENZ(A,H)ANTHRACENE	120.0	P308088-03 PONCA CITY
DIBENZ(A,J)ACRIDINE	122.0	P308088-03 PONCA CITY
FLUORANTHENE	100.0	P308088-03 PONCA CITY

SJN-NC-DG1
Lab Sample ID: P308088-03 Analysis Lab: PONCA CITY

Analyte/Parameter	RPR	Lab Sample ID
FLUORENE	96.0	P308088-03 PONCA CITY
INDENO(1,2,3-CD)PYRENE	122.0	P308088-03 PONCA CITY
NAPHTHALENE	91.0	P308088-03 PONCA CITY
PHENANTHRENE	96.0	P308088-03 PONCA CITY
PYRENE	101.0	P308088-03 PONCA CITY
Surrogates:		
2-FLUOROBIPHENYL	76.0	P308088-03 PONCA CITY
NITROBENZENE-D5	76.0	P308088-03 PONCA CITY
TERPHENYL-D14	71.0	P308088-03 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2-METHYLNAPHTHALENE	100.0	8.0	P308088-03 PONCA CITY
3-METHYLCHOLANTHRENE	91.0	3.0	P308088-03 PONCA CITY
7,12-DIMETHYLBENZ(A)ANTHRACENE	27.0	21.0	P308088-03 PONCA CITY
ACENAPHTHENE	98.0	5.0	P308088-03 PONCA CITY
ACENAPHTHYLENE	100.0	7.0	P308088-03 PONCA CITY
ANTHRACENE	92.0	3.0	P308088-03 PONCA CITY
BENZO(A)ANTHRACENE	109.0	4.0	P308088-03 PONCA CITY
BENZO(A)PYRENE	109.0	5.0	P308088-03 PONCA CITY
BENZO(B)FLUORANTHENE	107.0	9.0	P308088-03 PONCA CITY
BENZO(G,H,I)PERYLENE	116.0	9.0	P308088-03 PONCA CITY
BENZO(K)FLUORANTHENE	110.0	6.0	P308088-03 PONCA CITY
CHRYSENE	110.0	4.0	P308088-03 PONCA CITY
DIBENZ(A,H)ANTHRACENE	114.0	5.0	P308088-03 PONCA CITY
DIBENZ(A,J)ACRIDINE	116.0	5.0	P308088-03 PONCA CITY
FLUORANTHENE	102.0	2.0	P308088-03 PONCA CITY
FLUORENE	99.0	3.0	P308088-03 PONCA CITY
INDENO(1,2,3-CD)PYRENE	113.0	8.0	P308088-03 PONCA CITY
NAPHTHALENE	102.0	11.0	P308088-03 PONCA CITY
PHENANTHRENE	100.0	4.0	P308088-03 PONCA CITY
PYRENE	110.0	8.0	P308088-03 PONCA CITY
Surrogates:			
2-FLUOROBIPHENYL	81.0		P308088-03 PONCA CITY
NITROBENZENE-D5	88.0		P308088-03 PONCA CITY
TERPHENYL-D14	75.0		P308088-03 PONCA CITY

SJN-NC-UPG1
Lab Sample ID: P308088-01 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

SJN-NC-UPG2
Lab Sample ID: P308088-02 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

SJN-SAL-DG1
Lab Sample ID: P308088-09 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

Method Number: 8270 Prep Method: 3520
Batch Start Date: 10-SEP-93 Instrument: HP1 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
2-METHYLNAPHTHALENE	92.0	P308088-03	PONCA CITY
3-METHYLCHOLANTHRENE	89.0	P308088-03	PONCA CITY
7,12-DIMETHYLBENZ(A)ANTHRACENE	34.0	P308088-03	PONCA CITY
ACENAPHTHENE	93.0	P308088-03	PONCA CITY
ACENAPHTHYLENE	94.0	P308088-03	PONCA CITY
ANTHRACENE	89.0	P308088-03	PONCA CITY
BENZO(A)ANTHRACENE	104.0	P308088-03	PONCA CITY
BENZO(A)PYRENE	104.0	P308088-03	PONCA CITY
BENZO(B)FLUORANTHENE	98.0	P308088-03	PONCA CITY
BENZO(G,H,I)PERYLENE	127.0	P308088-03	PONCA CITY
BENZO(K)FLUORANTHENE	104.0	P308088-03	PONCA CITY
CHRYSENE	105.0	P308088-03	PONCA CITY
DIBENZ(A,H)ANTHRACENE	120.0	P308088-03	PONCA CITY
DIBENZ(A,J)ACRIDINE	122.0	P308088-03	PONCA CITY
FLUORANTHENE	100.0	P308088-03	PONCA CITY

SJN-SAL-DG1
Lab Sample ID: P308088-09 Analysis Lab: PONCA CITY

Analyte/Parameter	RPR	Lab Sample ID
FLUORENE	96.0	P308088-03 PONCA CITY
INDENO(1,2,3-CD)PYRENE	122.0	P308088-03 PONCA CITY
NAPHTHALENE	91.0	P308088-03 PONCA CITY
PHENANTHRENE	96.0	P308088-03 PONCA CITY
PYRENE	101.0	P308088-03 PONCA CITY
Surrogates:		
2-FLUOROBIPHENYL	76.0	P308088-03 PONCA CITY
NITROBENZENE-D5	76.0	P308088-03 PONCA CITY
TERPHENYL-D14	71.0	P308088-03 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
2-METHYLNAPHTHALENE	100.0	8.0	P308088-03 PONCA CITY
3-METHYLCHOLANTHRENE	91.0	3.0	P308088-03 PONCA CITY
7,12-DIMETHYLBEN[illegible]A)ANTHRACENE	27.0	21.0	P308088-03 PONCA CITY
ACENAPHTHENE	98.0	5.0	P308088-03 PONCA CITY
ACENAPHTHYLENE	100.0	7.0	P308088-03 PONCA CITY
ANTHRACENE	92.0	3.0	P308088-03 PONCA CITY
BENZO(A)ANTHRACENE	109.0	4.0	P308088-03 PONCA CITY
BENZO(A)PYRENE	109.0	5.0	P308088-03 PONCA CITY
BENZO(B)FLUORANTHENE	107.0	9.0	P308088-03 PONCA CITY
BENZO(G,H,I)PERYLENE	116.0	9.0	P308088-03 PONCA CITY
BENZO(K)FLUORANTHENE	110.0	6.0	P308088-03 PONCA CITY
CHRYSENE	110.0	4.0	P308088-03 PONCA CITY
DIBENZ(A,H)ANTHRACENE	114.0	5.0	P308088-03 PONCA CITY
DIBENZ(A,J)ACRIDINE	116.0	5.0	P308088-03 PONCA CITY
FLUORANTHENE	102.0	2.0	P308088-03 PONCA CITY
FLUORENE	99.0	3.0	P308088-03 PONCA CITY
INDENO(1,2,3-CD)PYRENE	113.0	8.0	P308088-03 PONCA CITY
NAPHTHALENE	102.0	11.0	P308088-03 PONCA CITY
PHENANTHRENE	100.0	4.0	P308088-03 PONCA CITY
PYRENE	110.0	8.0	P308088-03 PONCA CITY
Surrogates:			
2-FLUOROBIPHENYL	81.0		P308088-03 PONCA CITY
NITROBENZENE-D5	88.0		P308088-03 PONCA CITY
TERPHENYL-D14	75.0		P308088-03 PONCA CITY

SJN-SAL-DG2
Lab Sample ID: P308088-10 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

SJN-SAL-UPG1
Lab Sample ID: P308088-07 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

SJN-SAL-UPG2
Lab Sample ID: P308088-08 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID	
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01	PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY

SJN-SK-DG1
Lab Sample ID: P308088-06 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01 PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
BENZENE	98.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	P308088-01 PONCA CITY
M-XYLENE	98.0	P308088-01 PONCA CITY
O-XYLENE	98.0	P308088-01 PONCA CITY
P-XYLENE	98.0	P308088-01 PONCA CITY
TOLUENE	98.0	P308088-01 PONCA CITY
Surrogates:		
TRIFLUOROTOLUENE	90.0	P308088-01 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BENZENE	98.0	0.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01 PONCA CITY
M-XYLENE	98.0	0.0	P308088-01 PONCA CITY
O-XYLENE	98.0	0.0	P308088-01 PONCA CITY
P-XYLENE	98.0	0.0	P308088-01 PONCA CITY
TOLUENE	98.0	0.0	P308088-01 PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	0.0	P308088-01 PONCA CITY

Method Number: 8270 Prep Method: 3520
Batch Start Date: 10-SEP-93 Instrument: HP1 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
2-METHYLNAPHTHALENE	92.0	P308088-03 PONCA CITY
3-METHYLCHOLANTHRENE	89.0	P308088-03 PONCA CITY
7,12-DIMETHYLBENZ(A)ANTHRACENE	34.0	P308088-03 PONCA CITY
ACENAPHTHENE	93.0	P308088-03 PONCA CITY
ACENAPHTHYLENE	94.0	P308088-03 PONCA CITY
ANTHRACENE	89.0	P308088-03 PONCA CITY
BENZO(A)ANTHRACENE	104.0	P308088-03 PONCA CITY
BENZO(A)PYRENE	104.0	P308088-03 PONCA CITY
BENZO(B)FLUORANTHENE	98.0	P308088-03 PONCA CITY
BENZO(G,H,I)PERYLENE	127.0	P308088-03 PONCA CITY
BENZO(K)FLUORANTHENE	104.0	P308088-03 PONCA CITY
CHRYSENE	105.0	P308088-03 PONCA CITY
DIBENZ(A,H)ANTHRACENE	120.0	P308088-03 PONCA CITY
DIBENZ(A,J)ACRIDINE	122.0	P308088-03 PONCA CITY
FLUORANTHENE	100.0	P308088-03 PONCA CITY

SJN-SK-DG1
Lab Sample ID: P308088-06 Analysis Lab: PONCA CITY

Analyte/Parameter	RPR	Lab Sample ID	
FLUORENE	96.0	P308088-03	PONCA CITY
INDENO(1,2,3-CD)PYRENE	122.0	P308088-03	PONCA CITY
NAPHTHALENE	91.0	P308088-03	PONCA CITY
PHENANTHRENE	96.0	P308088-03	PONCA CITY
PYRENE	101.0	P308088-03	PONCA CITY
Surrogates:			
2-FLUOROBIPHENYL	76.0	P308088-03	PONCA CITY
NITROBENZENE-D5	76.0	P308088-03	PONCA CITY
TERPHENYL-D14	71.0	P308088-03	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
2-METHYLNAPHTHALENE	100.0	8.0	P308088-03	PONCA CITY
3-METHYLCHOLANTHRENE	91.0	3.0	P308088-03	PONCA CITY
7,12-DIMETHYLBENZ(A)ANTHRACENE	27.0	21.0	P308088-03	PONCA CITY
ACENAPHTHENE	98.0	5.0	P308088-03	PONCA CITY
ACENAPHTHYLENE	100.0	7.0	P308088-03	PONCA CITY
ANTHRACENE	92.0	3.0	P308088-03	PONCA CITY
BENZO(A)ANTHRACENE	109.0	4.0	P308088-03	PONCA CITY
BENZO(A)PYRENE	109.0	5.0	P308088-03	PONCA CITY
BENZO(B)FLUORANTHENE	107.0	9.0	P308088-03	PONCA CITY
BENZO(G,H,I)PERYLENE	116.0	9.0	P308088-03	PONCA CITY
BENZO(K)FLUORANTHENE	110.0	6.0	P308088-03	PONCA CITY
CHRYSENE	110.0	4.0	P308088-03	PONCA CITY
DIBENZ(A,H)ANTHRACENE	114.0	5.0	P308088-03	PONCA CITY
DIBENZ(A,J)ACRIDINE	116.0	5.0	P308088-03	PONCA CITY
FLUORANTHENE	102.0	2.0	P308088-03	PONCA CITY
FLUORENE	99.0	3.0	P308088-03	PONCA CITY
INDENO(1,2,3-CD)PYRENE	113.0	8.0	P308088-03	PONCA CITY
NAPHTHALENE	102.0	11.0	P308088-03	PONCA CITY
PHENANTHRENE	100.0	4.0	P308088-03	PONCA CITY
PYRENE	110.0	8.0	P308088-03	PONCA CITY
Surrogates:				
2-FLUOROBIPHENYL	81.0		P308088-03	PONCA CITY
NITROBENZENE-D5	88.0		P308088-03	PONCA CITY
TERPHENYL-D14	75.0		P308088-03	PONCA CITY

SJN-SK-UPG1
Lab Sample ID: P308088-05 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01 PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
BENZENE	98.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	P308088-01 PONCA CITY
M-XYLENE	98.0	P308088-01 PONCA CITY
O-XYLENE	98.0	P308088-01 PONCA CITY
P-XYLENE	98.0	P308088-01 PONCA CITY
TOLUENE	98.0	P308088-01 PONCA CITY
Surrogates:		
TRIFLUOROTOLUENE	90.0	P308088-01 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BENZENE	98.0	0.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01 PONCA CITY
M-XYLENE	98.0	0.0	P308088-01 PONCA CITY
O-XYLENE	98.0	0.0	P308088-01 PONCA CITY
P-XYLENE	98.0	0.0	P308088-01 PONCA CITY
TOLUENE	98.0	0.0	P308088-01 PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	0.0	P308088-01 PONCA CITY

SJN-SK-UPG2
Lab Sample ID: P308088-04 Analysis Lab: PONCA CITY

Method Number: 160_1
Batch Start Date: 01-SEP-93 Instrument: BAXTER DK-43 Batch Number: 1

Replicate:

Analyte/Parameter	Result	Unit	RPD	Lab Sample ID
TOTAL DISSOLVED SOLIDS	6656	MG/L	2.4	P308088-01 PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID
BENZENE	98.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	P308088-01 PONCA CITY
M-XYLENE	98.0	P308088-01 PONCA CITY
O-XYLENE	98.0	P308088-01 PONCA CITY
P-XYLENE	98.0	P308088-01 PONCA CITY
TOLUENE	98.0	P308088-01 PONCA CITY
Surrogates:		
TRIFLUOROTOLUENE	90.0	P308088-01 PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID
BENZENE	98.0	0.0	P308088-01 PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01 PONCA CITY
M-XYLENE	98.0	0.0	P308088-01 PONCA CITY
O-XYLENE	98.0	0.0	P308088-01 PONCA CITY
P-XYLENE	98.0	0.0	P308088-01 PONCA CITY
TOLUENE	98.0	0.0	P308088-01 PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	0.0	P308088-01 PONCA CITY

SJN-TRIP BLNK
Lab Sample ID: P308088-11 Analysis Lab: PONCA CITY

Method Number: 8020 Prep Method: 5030
Batch Start Date: 03-SEP-93 Instrument: HPGC5 Batch Number: 1

Spike:

Analyte/Parameter	RPR	Lab Sample ID	
BENZENE	98.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	P308088-01	PONCA CITY
M-XYLENE	98.0	P308088-01	PONCA CITY
O-XYLENE	98.0	P308088-01	PONCA CITY
P-XYLENE	98.0	P308088-01	PONCA CITY
TOLUENE	98.0	P308088-01	PONCA CITY
Surrogates:			
TRIFLUOROTOLUENE	90.0	P308088-01	PONCA CITY

Spike Duplicate:

Analyte/Parameter	RPR	RPD	Lab Sample ID	
BENZENE	98.0	0.0	P308088-01	PONCA CITY
ETHYLBENZENE	98.0	0.0	P308088-01	PONCA CITY
M-XYLENE	98.0	0.0	P308088-01	PONCA CITY
O-XYLENE	98.0	0.0	P308088-01	PONCA CITY
P-XYLENE	98.0	0.0	P308088-01	PONCA CITY
TOLUENE	98.0	0.0	P308088-01	PONCA CITY
Surrogates:				
TRIFLUOROTOLUENE	90.0	0.0	P308088-01	PONCA CITY