F 30-045-25923 3-15-84

F. Loc. 800/N; 1730/E Elev. 5749 GL Spd. 9-4-84 Comp. ____ TD 4166 PB ____

Casing S. 8 5/8 @ 231 w 271 Cu. ft. Sx. Int. ____ @ ____ W ____ Sx. Cu. ft. Pr. 5 1/2 @ 4698 W ____ Sx. T. ____ @ ____

Csg. Perf. Prod. Stim. perf 4036

T R A N S Gas

Grav. ____ 1st Del. Gas

I.P. ____ BO/D MCF/D After ____ Hrs. SICP ____ PSI After ____ Days GOR ____ 1st Del. Oil

TOPS		NiID X	Well Log	TEST DATA						
				Schd.	PC	Q	PW	PD	D	Ref.No.
Ojo Alamo		C-103 ✓✓✓	Plat X							
Kirtland		C-104	Electric Log ✓✓✓							
Fruitland		1 1/2 °	C-122							
Pictured Cliffs		Dltr	Dfa							
Chacra		Datr	Dac							
Cliff House		Sud-								
Menefee										
Point Lookout										
Mancos										
Gallup										
ıorn										
Dakota										
Entrada										
		Acres 160								

P

Fulcher Kutz PC Co. SJ S 34 T 30N R 12W U B Oper. Southland Roayalty Co Lse. McGrath No. 4

BURLINGTON RESOURCES

SAN JUAN DIVISION

December 11, 1996

Certified Mail Z-382-118-202

William J. LeMay
New Mexico Oil Conservation Division
Energy, Minerals, and Natural Resources Dept.
2040 S. Pacheco
Santa Fe, New Mexico 87504

Re: Ground Water Discharge Plan
Class I Injection Well Request
McGrath No. 4 Injection Well

Dear Mr. LeMay:

Burlington Resources Oil & Gas Company (formerly Meridian Oil) is providing your department with the original and one copy of a proposed Ground Water Discharge Plan for the above referenced facility. The plan includes a request to convert the existing Class II injection well located at the facility to a Class I non-hazardous injection well. This will allow Burlington the flexibility of disposing of its own non-exempt, non-hazardous waste (i.e. contaminated rainwater, engine washwater, etc.) generated from Burlington owned facilities. You will find enclosed with the plan a filing fee check in the amount of fifty dollars.

Please note in the distribution, one copy of the Plan has been sent to Denny Foust at the NMOCD office in Aztec, New Mexico.

Burlington Resources would like to meet with the NMOCD to discuss specifics of this project once you have had time to become familiar with the application. We will be contacting your staff in the near future to arrange this meeting. If you have any questions concerning this request, please contact me at 326-9841.

Area of review 1/2 mile.

Sincerely,

Keith M. Boedecker

Keith M. Boedecker
Sr. Staff Environmental Representative

RECEIVED
DEC 13 1996
OIL CON. DIV.
DIST. 3

Enclosed: Discharge Plan (Original and 1 Copies)
Filing Fee (Check No. 252600)

cc: Keith Baker - BR w/o attachments
Johnny Ellis - BR w/ attachments
Kevin Midkiff - BR w/ attachments
Denny Foust - Aztec Office (one plan copy)

File - McGrath No. 4: Discharge Plan - Permit Application

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MCGRATH CLASS I INJECTION WELL
GROUNDWATER DISCHARGE PLAN

December 6, 1996

Prepared by:

Burlington Resources Oil & Gas Company
San Juan Division
Farmington, New Mexico

TABLE OF CONTENTS

McGRATH CLASS I INJECTION WELL
GROUNDWATER DISCHARGE PLAN

1. TYPE OF OPERATION

The McGrath Disposal Well (McGrath) is a fluids injection well which receives liquid oil field wastes from production and compression operations. Tanker trucks unload the oilfield liquids into an oil/water separator. In the separator the fluid undergoes a process of gravity separation. Separated oil is transferred into an aboveground storage tank to await transportation off site for sale. Water separated from the oil is transferred to aboveground storage tanks to await injection below the ground into the Mesa Verde - Point Lookout formation.

2. OPERATOR AND TECHNICAL REPRESENTATIVE

A. Operator

Name: Burlington Resources	**Address: P.O. Box 4289**
City: Farmington	**State: New Mexico**
Zip: 87499-4289	**Phone: 505-326-9700**

B. Technical Representative

Name: Craig A. Bock	**Address: P.O. Box 4289**
City: Farmington	**State: New Mexico**
Zip: 87499-4289	**Phone: 505-326-9537**

3. FACILITY LOCATION

Township: T 30N	**Range: R 12W**	**Quarter/Quarter: NW/NE** **Section: 34**	**County: San Juan**

4. LANDOWNERS

Name: City of Albuquerque	**Address: P.O. Drawer 28**
c/o Price Family Limited Partnership	**State: New Mexico**
City: Farmington	**Phone: Unknown**
Zip: 87499	

5. FACILITY DES IPTION

McGrath is a disposal well facility which receives oilfield liquids. Fluid is received from transport trucks through a 4 inch manifold system. The liquid is directed to an open top heated tank where initial oil/water separation occurs. Oil is skimmed and directed to one oil sales tank. Water removed from initial separation is sent to one of six water settling tanks also for further oil/water separation. Oil removed from the settling tanks is sent to the oil sales tank. Water is removed from the settling tanks and directed through filters which remove solids down to 1 micron before injection. The water is then sent to one of six water holding tanks where it is held until being injected utilizing two pumps. Basic sediments from tank bottoms are removed from all tanks and directed to one open top sediment tank.

The facility is physically located on top of Crouch Mesa. The entire facility was constructed on a pad of approximately 2.6 acres in size. The attached Figure 1 is an area map showing the physical location of McGrath.

6. MATERIALS STORED OR USED AT THE FACILITY

McGrath stores and injects large amounts of oil field fluids. The following table provides a listing of the equipment used for storage and types of fluids stored:

Tank Number	Capacity	Product	Construction Material	Configuration
Tank #1	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #2	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #3	210 Barrel	Produced Water & Oil	Steel	Aboveground
Tank #4	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #5	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #6	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #7	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #8	500 Barrel	Oil	Steel	Aboveground
Tank #9	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #10	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #11	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #12	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #13	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Tank #14	500 Barrel	Produced Water/Wastewater	Steel	Aboveground
Open Top Tank #15	450 Barrel	Basic Sediment	Steel	Aboveground
Open Top Tank #16	800 Barrel	Produced Water & Oil	Steel	Aboveground
Open Top Tank #17	18 Barrel	Produced Water/Wastewater	Fiberglass	Aboveground
Open Top Tank #18	50 Barrel	Produced Water/Wastewater	Fiberglass	Aboveground
Open Top Tank #19	18 Barrel	Produced Water & Oil	Fiberglass	Aboveground

The attached Figure 2 illustrates the overall facility lay-out. Each tank is identified in Figure 2 as listed above.

7. SOURCES AND QUANTITIES OF EFFLUENT AND WASTE SOLIDS GENERATED AT THE FACILITY

A. Waste Stream Data

Waste Stream	Source of Waste	Approx. Volume/Month	Type/Volume of Additives	Collection System/Storage
Produced Water	Oil & Gas Wells/ Compressor Stations	75,000 bbls	None	Tanks/Injection
Wastewater (Precipitation, Washwater & Plant wastewater)	Oil & Gas Wells/ Compressor Stations/ Val Verde Treating Plant	Precipitation 50 bbls Washwater 100 bbls Plant Wastewater 3750 bbls	None	Tanks/Injection
Sock Type Filters	Filter House	8 Yards	None	Container/Bin
Leaks/Precipitation	Pump Engines	Intermittent	EG, Oil, Water	Open Top Tank
Used Oil	Pump Engines	10 Gallons	None	Vendor
Oil Filters	Pump Engines	5 Filter Elements	None	Vendor
Basic Sediment	Sediment Tank	250 bbls	None	Open Top Tank
General Refuse	Office Building	Less Than 1 yard	None	Container/Bin

B. Quality Characteristics

No process or waste streams are intentionally discharged to the ground surface. All waste streams are collected and their disposition is described in Section 8.

Produced Water - The produced water is generated from oil & gas wells across the San Juan Basin owned by Burlington Resources. A grab sample was obtained and a typical API analysis was conducted. Results of the analysis are provided in Exhibit No. 3; Attachment No. 4.

Wastewater - This waste is generated at oil & gas wells, compressor stations and Burlington's Val Verde treating plant. The wastewater stream consists of rainwater runoff, engine washwater and plant wastewater generated from rejuvinating the deionizing beds at the Val Verde plant. These waste streams have been grab sampled at various compressor stations and the Val Verde plant and analyzed to demonstrate that they are non-hazardous. The analyses are attached to this section as Exhibit No. 1.

Basic Sediment - This waste is generated from tank bottoms located at the facility. It consists of oily sediment generated in the separation process. This waste stream has been grab sampled and analyzed to demonstrate that it is non-hazardous. The analysis is attached to this section as Exhibit No. 1.

C. Commingled Waste Streams

McGrath receives and generates multiple types of waste streams. These waste streams include produced water, rainwater, washwater and plant wastewater received from oil & gas wells, compressor stations and Val Verde plant. These waste streams are commingled both at production sites and compressor stations and at the McGrath facility. Individual wastes streams that are commingled have been sampled and analyzed to demonstrate they are non-hazardous. These analyses are provided in Exhibit No.1.

8. DESCRIPTION CURRENT LIQUID AND SOLID WASTE COLLECTION, STORAGE AND DISPOSAL PROCEDURES

A. Summary Information

The facility waste stream collection, storage and disposal methods are summarized below:

Waste Stream	Source of Waste	Collection System/Storage	Disposal Procedures
Produced Water	Oil & Gas Wells/ Compressor Stations	Transport Off-loading/Tanks	On-site Injection
Wastewater (Precipitation, Washwater & Plant Wastewater)	Oil & Gas Wells/ Compressor Stations/ Val Verde Treating Plant	Transport Off-loading/Tanks	On-site Injection
Sock Type Filters	Filter House	Container/Bin	Off-site Disposal
On-site Leaks	Pump Engines	Open Top Tank	On-site Injection
Used Oil	Pump Engines	Tanks	Off-site Recycling
Oil Filters	Pump Engines	Container/Bin	Off-site Disposal
Basic Sediment	Sediment Tank	Open Top Tank	Off-site Disposal
General Refuse	Office Building	Container/Bin	Off-site Disposal

B. Collection and Storage Systems

Waste stream and process stream flow for major equipment at the McGrath is shown in Figure 3. Belowground pipes carry process fluids as well as waste fluids. Figure 3 illustrates those lines that are above and belowground. Mechanical integrity testing is performed as the lines are installed and on an as needed basis (during modifications or repairs). The size and construction material of the on-site collection equipment is described in the table in Section 6.

McGrath incorporates a tertiary containment system. An earthen berm surrounds the entire facility. The capacity of the bermed area exceeds the required NMOCD criteria of one and one third times the capacity of the largest tank.

C. Existing Effluent and Solids Disposal

1. On-Site Facilities

The facility currently utilizes a permitted Class II injection well. The well was issued permit Order R-7370 by the OCD on October 11, 1983. A copy of the permit is provided in Exhibit No. 2. Burlington Resources proposes to change the status of the well to a Class I non-hazardous injection well. This will allow for the disposal of non-exempt oilfield wastes such as precipitation, washwater and Val Verde plant waste water. Specific details of the injection well are provided in Exhibit No. 3, including proposed modifications to conduct necessary wellwork to meet Class I requirements. The following waste streams are disposed on-site:

Waste Stream	On-site Storage	Final Disposition
Produced Water	Tank	On-site Injection
Wastewater (Precipitation, Washwater & Plant Wastewater)	Tank	On-site Injection
On-site Leaks	Tank	On-site Injection

2. Off-Site Facilities

The following table provides information about the storage and disposal of waste streams exiting the facility.

Exiting Stream	On-site Storage	Shipping Agent	Final Disposition	Receiving Facility
Sock Type Filters	Bin	Waste Management C/R 3100 Aztec, NM	Landfill	Waste Management C/R 3100 Aztec, NM Profile # 24997.
Crude Oil	Tank	Giant Refining	Refinery	Giant Refinery Bloomfield, NM
Used Oil	Tank	Pumps and Services 603 S. Carlton Ave. Farmington, NM	Recycled	Pumps and Services 603 S. Carlton Ave. Farmington, NM
Used Oil Filters	Bin	Pumps and Services 603 S. Carlton Ave. Farmington, NM	Recycle/landfill	Pumps and Services 603 S. Carlton Ave. Farmington, NM
Basic Sediment	Open Top Tank	San Juan Basin Transport Companies	Landfarm	Tierra Environmental 420 Cr. 3100 Aztec, NM 87410
General Refuse	Bin	Burlington Resources	Landfill	Waste Management C/R 3100 Aztec, NM

9. PROPOSED MODIFICATIONS

All storage, transfer, and containment systems meet the criteria described in "Guidelines for the Preparation of Groundwater Discharge Plans at Natural Gas Plants, Refineries, Compressors and Crude Oil Pump Stations" (NMOCD 12/95). The only proposed modification at this time includes conducting necessary work as outlined in Exhibit No. 3 to convert the existing Class II injection well to a Class I non-hazardous injection well.

10. INSPECTION, MAINTENANCE AND REPORTING

A. Leak Detection/Site Visits

There are no sumps, buried pits or buried tanks at this facility. Therefore, there is no equipment where leak detection is required.

As described in Section 8.B of this plan, all aboveground storage tanks are surrounded with an earthen containment berm that more than exceeds NMOCD's requirement of one and one third times the capacity of the largest tank.

McGrath is manned daily from 7:00 a.m. to 5:00 p.m. However, the facility operates 24 hours per day, 365 days per year. Burlington and contract personnel frequently visit the site to perform maintenance, inspect the equipment and ensure proper operation of the station.

B. Precipitation/Runoff

Any on-site precipitation is captured by the berm surrounding the facility. Due to the semi-arid climate, the precipitation is allowed to evaporate.

11. SPILL/LEAK PREVENTION AND REPORTING PROCEDURES

A. Spill/Leak Potential

Potential sources of spills or leaks at this facility may include the following:

- Tank overflow or rupture
- Rupture of process pipelines
- Truck unloading/loading operations

Prevention of accidental releases from these sources is a priority of Burlington. Spill prevention is achieved through proper operating procedures and by an active equipment inspection and maintenance program. Spill detection is accomplished by routine visual inspection of facility equipment and monitoring of process instrumentation by Burlington or contract personnel.

B. Spill/Leak Clean Up

General spill clean up procedures may involve recovery of as much free liquid as possible, and minor earthwork to prevent migration. Recovered fluids would be transported off-site for recycling or disposal. Clean up procedures will follow NMOCD's "Guidelines For Remediation of Leaks, Spills, and Releases" (August 13, 1993).

C. Spill/Leak Reporting

Should a release of materials occur, Burlington will notify the NMOCD in accordance with the provisions described in NMOCD Rule and Regulation No.116 and WQCC Section 1203.

D. Injection Well Shut-in Procedures

Transport shipments of fluids to be processed and injected are only accepted during daylight hours between 7:00 a.m. and 3.30 p.m. Monday through Friday. Scheduled shipments are stopped when anticipated injection shut-in occurs, thus preventing potential unauthorized discharges. Should an emergency occur which causes the well to shut-in, then transport shipments are stopped until well is inspected and brought back on-line. Extended shut-in periods would require waste shipments to be disposed at commercial facilities.

12. SITE CHARAC . .RISTICS

A. Hydrologic Features

1. **Surface Water:** The Animas River is located approximately three quarters of a mile to the north of the McGrath facility.

2. **Domestic Water Sources:** Data collected from the State Engineer's Office showed that there are four groundwater wells within 1/2 mile of the facility.

3. **Springs:** There are no known springs within 1 mile of the facility.

4. **Groundwater:** The Nacimiento formation occurs at the surface in the area of McGrath. Aquifer waters in the Nacimiento Formation have an average specific conductance of 1,500 micromhoms (New Mexico Bureau of Mines, Hydrologic Report 6, 1983). Water samples collected from three groundwater wells within area of McGrath have average Total Dissolved Solids (TDS) of 1100 mg/l (Exhibit No. 3; Attachment No.7)

   Groundwater under the facility is estimated to be greater than 200 feet (New Mexico Bureau of Mines, Hydrologic Report 6, 1983).

B. Geologic Description

The Nacamiento Formation is characterized as predominantly mudstone with medium to course grained sandstone beds (New Mexico Bureau of Mines, Hydrologic Report 6, 1983). The formation beneath the facility is approximately 450 feet thick (Exhibit No. 3; Attachment No. 7).

C. Flood Protection

Flood protection is not incorporated into the design of McGrath because it is situated about 270 feet above the nearby Animas River. There are no other nearby water bodies that would pose a flood danger to the facility.

13. ADDITIONAL INFORMATION

As stated previously, this facility does not intentionally discharge or dispose of any waste on-site. Containment and leak detection devices have been installed and are periodically inspected to insure proper operation. As a result, Burlington has demonstrated that approval of this plan will not result in concentrations in excess of the standards of Section 3-103 or the presence of any toxic pollutant at any place of withdrawal of water for present or reasonably foreseeable future use.

A. Reporting Commitment

Should a release occur at this facility, Burlington Resources will conduct required reporting under NMOCD Rule 116 and WQCC Section 1203.

B. Existing Permit

A copy of the existing OCD injection permit (Order R-7370) for this facility is provided in Exhibit No. 2.

C. Injection well Conversion Information

Necessary information concerning the reclassification from a Class II well to a Class I non-hazardous injection well is provided in Exhibit No. 3.

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

SUSPECTED HAZARDOUS & SOLID WASTE ANALYSIS

Client:	Philip Environmental	Project #:	96036
Sample ID:	102496-01	Date Reported:	10-25-96
Lab ID#:	A713	Date Sampled:	10-24-96
Sample Matrix:	Sludge	Date Received:	10-24-96
Preservative:	Cool	Date Analyzed:	10-25-96
Condition:	Cool & Intact	Chain of Custody:	4987

Parameter	Result
IGNITABILITY:	**Did not ignite upon direct contact with flame.**
CORROSIVITY:	**7.32**
REACTIVITY:	**Did not react violently with water, strong base (10N Sodium Hydroxide), or strong acid (6N Hydrochloric acid).**

RCRA Hazardous Waste Criteria

Parameter	Hazardous Waste Criterion
IGNITABILITY:	Sample ignition upon direct contact with flame indicates hazardous waste status.
CORROSIVITY:	pH less than or equal to 2.0 or pH greater than or equal to 12.5 indicates hazardous waste status.
REACTIVITY:	Violent reaction with water, strong base (10N Sodium Hydroxide), or strong acid (6N Hydrocholoric Acid) indicates hazardous waste status.
Reference:	40 CFR part 261 Subpart C sections 261.21 - 261.23. July 1, 1992.
Comments:	**McGrath 4 bwD.**

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHODS 8010/8020
AROMATIC / HALOGENATED
VOLATILE ORGANICS

Client:	Philip Environmental	Project #:	96036
Sample ID:	102496-01	Date Reported:	10-29-96
Laboratory Number:	A713	Date Sampled:	10-24-96
Chain of Custody:	4987	Date Received:	10-24-96
Sample Matrix:	Sludge	Date Extracted:	10-25-96
Preservative:	Cool	Date Analyzed:	10-28-96
Condition:	Cool & Intact	Analysis Requested:	TCLP

Parameter	Concentration (mg/L)	Detection Limit (mg/L)	Regulatory Limits (mg/L)
Vinyl Chloride	ND	0.0004	0.2
1,1-Dichloroethene	0.0071	0.0002	0.7
2-Butanone (MEK)	ND	0.0003	200
Chloroform	ND	0.0001	6.0
Carbon Tetrachloride	ND	0.0001	0.5
Benzene	ND	0.0002	0.5
1,2-Dichloroethane	ND	0.0001	0.5
Trichloroethene	ND	0.0003	0.5
Tetrachloroethene	0.0057	0.0005	0.7
Chlorobenzene	0.0205	0.0003	100
1,4-Dichlorobenzene	0.0509	0.0002	7.5

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria	Parameter	Percent Recovery
	Trifluorotoluene	104%
	Bromofluorobenzene	96%

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, July 1992.
Method 5030, Purge-and-Trap, SW-846, USEPA, July 1992.
Method 8010, Halogenated Volatile Organic. SW-846, USEPA, Sept. 1994.
Method 8020, Aromatic Volatile Organics, SW-846, USEPA. Sept. 1994.

Note: Regulatory Limits based on 40 CFR part 261 Subpart C section 261.24, July 1, 1992.

Comments: **McGrath 4 bwD.**

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8040
PHENOLS

Client:	Philip Environmental	Project #:	96036
Sample ID:	102496-01	Date Reported:	10-29-96
Laboratory Number:	A713	Date Sampled:	10-24-96
Chain of Custody:	4987	Date Received:	10-24-96
Sample Matrix:	Sludge	Date Extracted:	10-25-96
Preservative:	Cool	Date Analyzed:	10-28-96
Condition:	Cool & Intact	Analysis Requested:	TCLP

Parameter	Concentration (mg/L)	Detection Limit (mg/L)	Regulatory Limit (mg/L)
o-Cresol	ND	0.020	200
p,m-Cresol	ND	0.040	200
2,4,6-Trichlorophenol	ND	0.020	2.0
2,4,5-Trichlorophenol	ND	0.020	400
Pentachlorophenol	0.079	0.020	100

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	2-Fluorophenol	96%
	2,4,6-Tribromophenol	98%

References: Method 1311, Toxicity Characteristic Leaching Procedure Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 3510, Separatory Funnel Liquid-Liquid Extraction. Test Methods for Evaluating Solid Waste, SW-846, USEPA, July 1992.

Method 8040, Phenols, Test Methods for Evaluating Solid Waste. SW-846, USEPA. Sept. 198

Note: Regulatory Limits based on 40 CFR part 261 subpart C section 261.24, July 1. 1992.

Comments: **McGrath 4 bwD.**

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA Method 8090
Nitroaromatics and Cyclic Ketones
TCLP Base/Neutral Organics

Client:	Philip Environmental	Project #:	96036
Sample ID:	102496-01	Date Reported:	10-28-96
Laboratory Number:	A713	Date Sampled:	10-24-96
Chain of Custody:	4987	Date Received:	10-24-96
Sample Matrix:	Sludge	Date Extracted:	10-25-96
Preservative:	Cool	Date Analyzed:	10-28-96
Condition:	Cool and Intact	Analysis Requested:	TCLP

Parameter	Concentration (mg/L)	Det. Limit (mg/L)	Regulatory Limit (mg/L)
Pyridine	**ND**	**0.020**	**5.0**
Hexachloroethane	**0.088**	**0.020**	**3.0**
Nitrobenzene	**ND**	**0.020**	**2.0**
Hexachlorobutadiene	**ND**	**0.020**	**0.5**
2,4-Dinitrotoluene	**0.087**	**0.020**	**0.13**
HexachloroBenzene	**ND**	**0.020**	**0.13**

ND - Parameter not detected at the stated detection limit.

QA/QC Acceptance Criteria	Parameter	Percent Recovery
	2-fluorobiphenyl	**99%**

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, July 1992.
Method 3510, Separatory Funnel Liquid-Liquid Extraction, SW-846, USEPA, July 1992.
Method 8090, Nitroaromatics and Cyclic Ketones, SW-846, USEPA, Sept. 1986.

Note: Regulatory Limits based on 40 CFR part 261 Subpart C section 261.24, July 1, 1992.

Comments: **McGrath 4 bwD.**

Analyst

Review

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

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 1311
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
TRACE METAL ANALYSIS

Client:	Philip Environmental	Project #:	96036
Sample ID:	102496-01	Date Reported:	10-29-96
Laboratory Number:	A713	Date Sampled:	10-24-96
Chain of Custody:	4987	Date Received:	10-24-96
Sample Matrix:	Sludge	Date Analyzed:	10-29-96
Preservative:	Cool	Date Extracted:	10-25-96
Condition:	Cool & Intact	Analysis Needed:	TCLP metals

Parameter	Concentration (mg/L)	Det. Limit (mg/L)	Regulatory Level (mg/L)
Arsenic	**0.036**	**0.001**	**5.00**
Barium	**18.2**	**0.01**	**100**
Cadmium	**0.001**	**0.001**	**1.00**
Chromium	**ND**	**0.001**	**5.00**
Lead	**0.003**	**0.001**	**5.00**
Mercury	**ND**	**0.001**	**0.200**
Selenium	**ND**	**0.001**	**1.00**
Silver	**ND**	**0.001**	**5.0**

ND - Parameter not detected at the stated detection limit.

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, July 1992.

Methods 3010, 3020, Acid Digestion of Aqueous Samples and Extracts for Total Metals, SW-846, USEPA, July 1992.

Methods 7060, 7080, 7131, 7191, 7470, 7421, 7740, 7761 Analysis of Metals by GFAA and Cold Vapor Techniques, SW-846, USEPA.

Note: Regulatory Limits based on 40 CFR part 261 subpart C section 261.24, July 1, 1992.

Comments: **McGrath 4 bwD.**

Analyst

Review

EXHIBIT NO. 2

OCD Order R-7370

Class II Permit

STATE OF NEW MEY
ENERGY AND MINERALS DI RTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING
CALLED BY THE OIL CONSERVATION
DIVISION FOR THE PURPOSE OF
CONSIDERING:

CASE NO. 7949
Order No. R-7370

APPLICATION OF SOUTHLAND ROYALTY
COMPANY FOR SALT WATER DISPOSAL,
SAN JUAN COUNTY, NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on August 31, 1983, at Santa Fe, New Mexico, before Examiner Michael E. Stogner.

NOW, on this 11th day of October, 1983, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Southland Royalty Company, is the owner and operator of the McGrath Well No. 4, to be located 800 feet from the North line and 1730 feet from the East line of Section 34, Township 30 North, Range 12 West, NMPM, San Juan County, New Mexico.

(3) That the applicant proposes to utilize said well to dispose of produced salt water into the Point Lookout formation, with injection into the perforated interval from approximately 4,225 feet to 4,300 feet.

(4) That the injection should be accomplished through 2 3/8-inch plastic lined tubing installed in a packer set at approximately 4,200 feet; that the casing-tubing annulus should be filled with an inert fluid; and that a pressure gauge or approved leak detection device should be attached to the annulus in order to determine leakage in the casing, tubing, or packer.

(5) That the injection well or system should be equipped with a pressure limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 850 psi.

(6) That the Director of the Division should be authorized to administratively approve an increase in the injection pressure upon a proper showing by the operator that such higher pressure will not result in migration of the injected waters from the Point Lookout formation.

(7) That the operator should notify the supervisor of the Aztec district office of the Division of the date and time of the installation of disposal equipment so that the same may be inspected.

(8) That the operator should take all steps necessary to ensure that the injected water enters only the proposed injection interval and is not permitted to escape to other formations or onto the surface.

(9) That approval of the subject application will prevent the drilling of unnecessary wells and otherwise prevent waste and protect correlative rights.

IT IS THEREFORE ORDERED:

(1) That the applicant, Southland Royalty Company, is hereby authorized to utilize its McGrath Well No. 4 to be located 800 feet from the North line and 1730 feet from the East line of Section 34, Township 30 North, Range 12 West, NMPM, San Juan County, New Mexico, to dispose of produced salt water into the Point Lookout formation, injection to be accomplished through 2 3/8-inch tubing installed in a packer set at approximately 4,200 feet, with injection into the perforated interval from approximately 4,225 feet to 4,300 feet;

PROVIDED HOWEVER, that the tubing shall be plastic-lined; that the casing-tubing annulus shall be filled with an inert fluid; and that a pressure gauge shall be attached to the annulus or the annulus shall be equipped with an approved leak detection device in order to determine leakage in the casing, tubing, or packer.

(2) That the injection well or system shall be equipped with a pressure limiting switch or other acceptable device which will limit the wellhead pressure on the injection well to no more than 850 psi.

(3) That the Director of the Division may authorize an increase in injection pressure upon a proper showing by the operator of said well that such higher pressure will not result in migration of the injected fluid from the Point Lookout formation.

(4) That the operator shall notify the supervisor of the Aztec district office of the Division of the date and time of the installation of disposal equipment so that the same may be inspected.

(5) That the operator shall immediately notify the supervisor of the Division's Aztec district office of the failure of the tubing, casing, or packer, in said well or the leakage of water from or around said well and shall take such steps as may be timely and necessary to correct such failure or leakage.

(6) That the applicant shall submit monthly reports of its disposal operations in accordance with Rules 701 through 708 and 1120 of the Division Rules and Regulations.

(7) That jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY,
Director

S E A L

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

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(505) 827-5800

September 4, 1986

Meridian Oil Inc.
P. O. Box 4289
Farmington, New Mexico

Attn: Doug Harris

Re: Injection Pressure Increase
McGrath No. 4 Well
Section 34, T-30N, R-12W,
San Juan County, New Mexico

Dear Sir:

Reference is made to your request of August 26, 1986 to increase the surface injection pressure on your McGrath No. 4 SWD Well. This request is based on a step rate test conducted on the well on August 25, 1986. The results of the test have been reviewed by my staff and we feel an increase in injection pressure on this well is justified at this time.

You are therefore authorized to increase your surface injection pressure on the following well:

Well & Location	Maximum Injection Surface Pressure
McGrath No. 4 800 FNL & 1730 FEL Unit B, Sec. 34, T-30N, R-12W San Juan County, New Mexico	2370 PSIG

The Division Director may rescind this injection pressure increase if it becomes apparent that the injected water is not being confined to the injection zone or it is endangering any fresh water aquifers.

Sincerely,

R. L. STAMETS
Director

xc: OCD Aztec
D. Catanach
Donna McDonald

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Report Generated:
December 2, 1996 14:43

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: BURLINGTON RESOURCES OIL &GAS
3535 E. 30TH STREET
FARMINGTON, NM 87401

ATTN: KEITH BOEDECKER

WORKORDER # : 9611252
WORK ID : MCGRATH CONVERSION
CLIENT CODE : BURL01
DATE RECEIVED : 11/27/96

Lab ID: 9611252-01A
Sample ID: NO.1 REGEN WATER

Collected: 11/27/96 11:30:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
pH/EPA 150.1 pH	6.6	pH Units	0.10	1.0	11/29/96	WPH445

Fred L. Shore, Ph.D.
VP of Laboratory Operations

WORKORDER COMMENTS

DATE : **12/02/96**
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND	= Analyte "not detected" in analysis at the sample specific detection limit.
D_F	= Sample "dilution factor"
NT	= Analyte "not tested" per client request.
B	= Analyte was also detected in laboratory method QC blank.
E	= Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT	= The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

*** Analytical results reported pertain only to the samples provided ***
*** for analysis and may not represent actual field conditions. ***
***
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REPORT COMMENTS

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REVISED
KTB 11/27/96

Report Generated:
November 27, 1996 16:27

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT BURLINGTON RESOURCES OIL &GASWORKORDER # : 9610240
TO: 3535 E. 30TH STREET WORK ID : MCGRATH CONVERSION
FARMINGTON, NM 87401 CLIENT CODE : BURL01
DATE RECEIVED : 10/30/96

ATTN: KEITH BOEDECKER

Lab ID: 9610240-01A
Sample ID: NO.1 REGEN WATER

Collected: 10/29/96 11:30:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	<0.5	% (Percent)				
TCLP (ICP) DIG/1311/3005	10/31/96	N/A				
TCLP EXTRACTION/TCLP 1311	10/30/96	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	ND	mg/L	0.40	10	11/06/96	M9692,M9699
Barium, Ba	ND	mg/L	0.50	1.0	11/06/96	M9692,M9699
Cadmium, Cd	ND	mg/L	0.0050	1.0	11/06/96	M9692,M9699
Chromium, Cr	0.31	mg/L	0.020	1.0	11/06/96	M9692,M9699
Lead, Pb	ND	mg/L	0.050	1.0	11/06/96	M9692,M9699
Mercury, Hg	ND	mg/L	0.0020	10	11/06/96	M9692,M9699
Selenium, Se	ND	mg/L	0.050	1.0	11/06/96	M9692,M9699
Silver, Ag	ND	mg/L	0.040	1.0	11/06/96	M9692,M9699
TCLP(CVAA)Hg XT/SW846 7471	11/05/96	N/A				

Lab ID: 9610240-01B
Sample ID: NO.1 REGEN WATER

Collected: 10/29/96 11:30:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP SV/METHOD 1311/8270B						
1,4-Dichlorobenzene	ND	mg/L	0.0010	14	11/22/96	TSVOA176
2-Methylphenol / O-Cresol	ND	mg/L	0.0010	14	11/22/96	TSVOA176
3/4-Methylphenol / M/P-Cresol	ND	mg/L	0.0010	14	11/22/96	TSVOA176
Hexachloroethane	ND	mg/L	0.0010	14	11/22/96	TSVOA176
Nitrobenzene	ND	mg/L	0.0010	14	11/22/96	TSVOA176
Hexachlorobutadiene	ND	mg/L	0.0010	14	11/22/96	TSVOA176
2,4,6-Trichlorophenol	ND	mg/L	0.010	14	11/22/96	TSVOA176
2,4,5-Trichlorophenol	ND	mg/L	0.010	14	11/22/96	TSVOA176
2,4-Dinitrotoluene	ND	mg/L	0.010	14	11/22/96	TSVOA176
Hexachlorobenzene	ND	mg/L	0.0010	14	11/22/96	TSVOA176
Pentachlorophenol	ND	mg/L	0.020	14	11/22/96	TSVOA176
Pyridine	NDE*	mg/L	0.010	14	11/22/96	TSVOA176
TCLP SVOA XT/1311/3520	11/08/96	N/A				

Lab ID: 9610240-01C
Sample ID: NO.1 REGEN WATER

Collected: 10/29/96 11:30:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP ZHE / TCLP 1311	11/07/96	N/A				
ZHE/VOA/METHOD 1311/8240B						
Vinyl Chloride	ND	mg/L	0.0050	1.0	11/07/96	TVOA267
1,1-Dichloroethene	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
Chloroform	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
1,2-Dichloroethane	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
2-Butanone (MEK)	0.058	mg/L	0.0050	1.0	11/07/96	TVOA267
Carbon Tetrachloride	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
Trichloroethene	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
Benzene	0.0075	mg/L	0.0010	1.0	11/07/96	TVOA267
Tetrachloroethene	ND	mg/L	0.0010	1.0	11/07/96	TVOA267
Chlorobenzene	ND	mg/L	0.0010	1.0	11/07/96	TVOA267

Lab ID: 9610240-01D
Sample ID: NO.1 REGEN WATER

Collected: 10/29/96 11:30:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
CORROS(NACE)/SW846 1110						
Corrosivity (NACE)	ND	mm/yr	6.0	1.0	11/07/96	WNACE33
FLASH POINT/SW846 1010						
Flash Point	>60	Deg Centigrade	20	1.0	11/11/96	WFLASH195
pH/EPA 150.1						
pH	7.9E*	pH Units	0.10	1.0	11/27/96	WPH443
REACTIVITY/SW846 7-3						
Sulfide	NON-REACT	mg/Kg of Waste	500	1.0	11/22/96	W9682/W9683
Cyanide	NON-REACT	mg/Kg of Waste	250	1.0	11/22/96	W9682/W9683

for Fred L. Shore, Ph.D.
VP of Laboratory Operations

WORKORDER COMMENTS

DATE : **11/27/96**
WORKORDER: **9610240**

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND	= Analyte "not detected" in analysis at the sample specific detection limit.
D_F	= Sample "dilution factor"
NT	= Analyte "not tested" per client request.
B	= Analyte was also detected in laboratory method QC blank.
E	= Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT	= The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

*Please Note: The pyridine result associated with the TCLP semi-volatile is reported as estimated (E) due to the asssociated QA/QC samples demonstrating variable recoveries. The bias may affect the reported result or detecton limit minimally, or as much as 100 % of AAL's detection limit. Therefore, this should be considered when evaluating the sample data for pyridine. The sample data could not be verified due the sample's hold time expiring.

*Please Note: The pH was analyzed out of hold time per client request and is reported as estimated.

62-20
311

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400384

DATE	AMOUNT
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Everett D DeBois

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CONTROL NO.	REFERENCE INVOICE	REFERENCE DATE	PAID ON BEHALF OF	DUE VENDOR
420699134	RFC	961126	MOI	50.00
			TOTAL	50.00

VENDOR NO. 400384 CHECK NO. 252600

14. CERTIFICATION

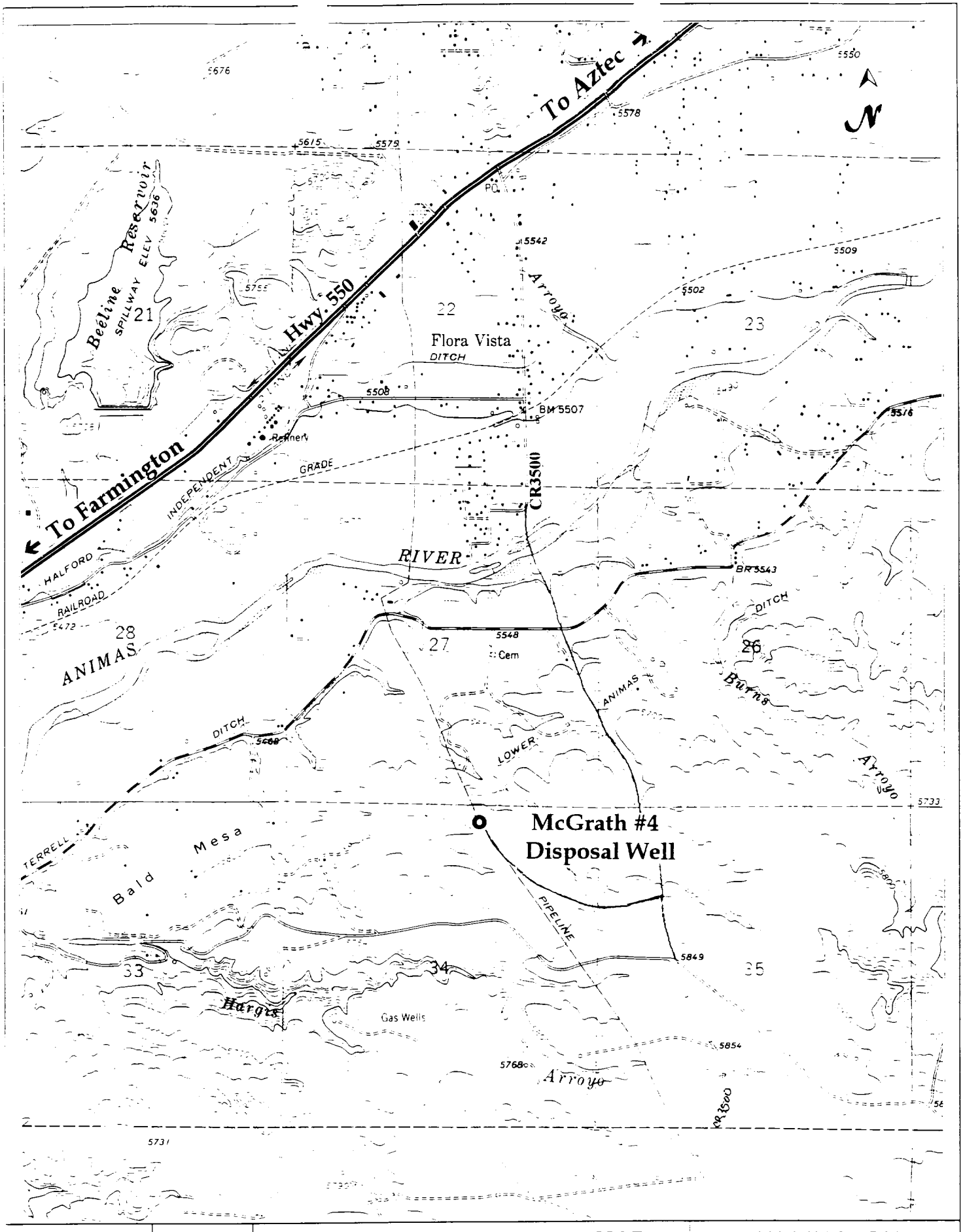
"I hereby certify that I am familiar with the information contained in and submitted with this discharge plan, and that such information is true, accurate, and complete to the best of my knowledge and belief."

Name: Keith Baker Title: Environmental and Safety Manager

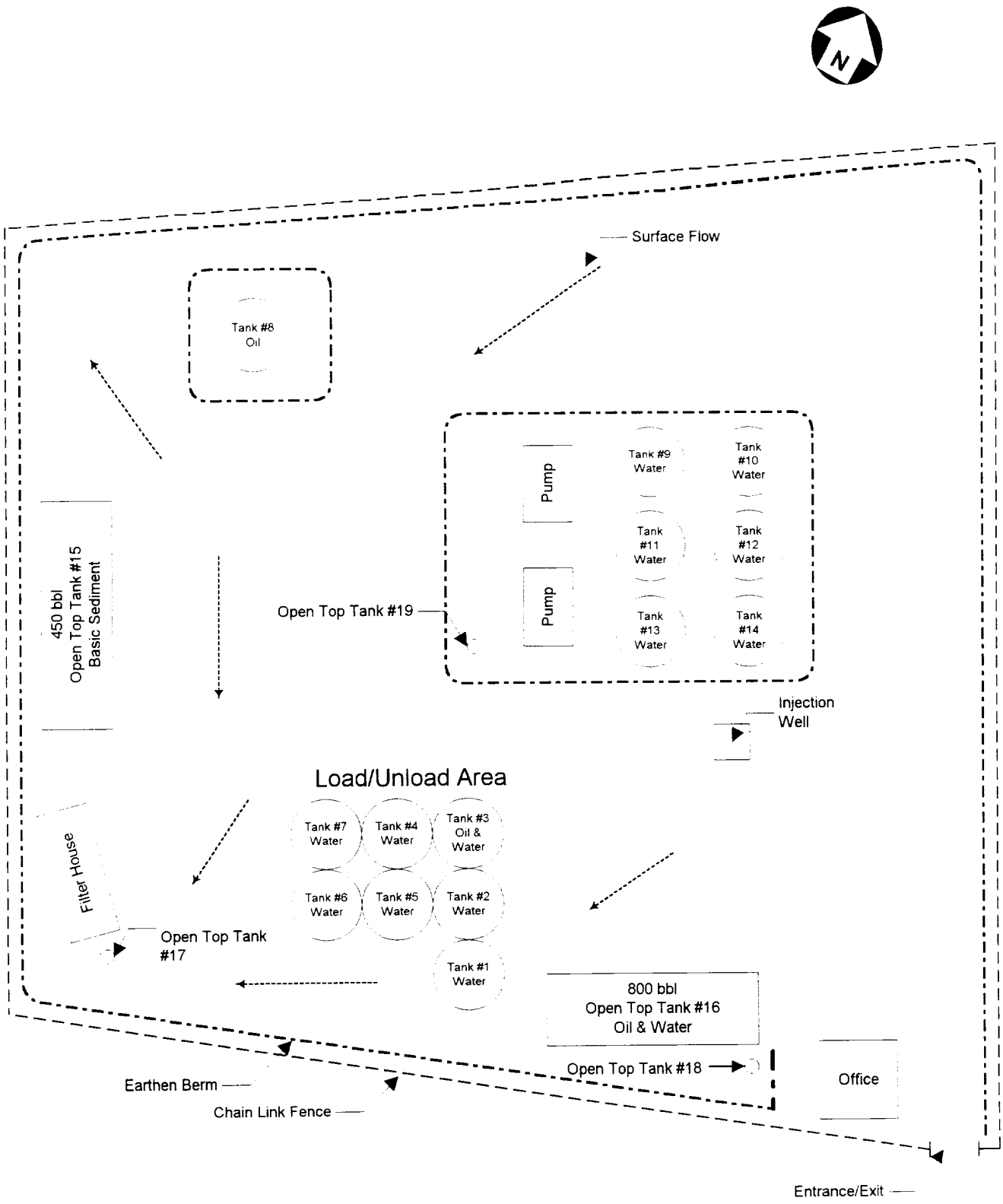
Signature: Keith Baker Date: 12-5-96

Name: James B. Fraser Title: Production Manager

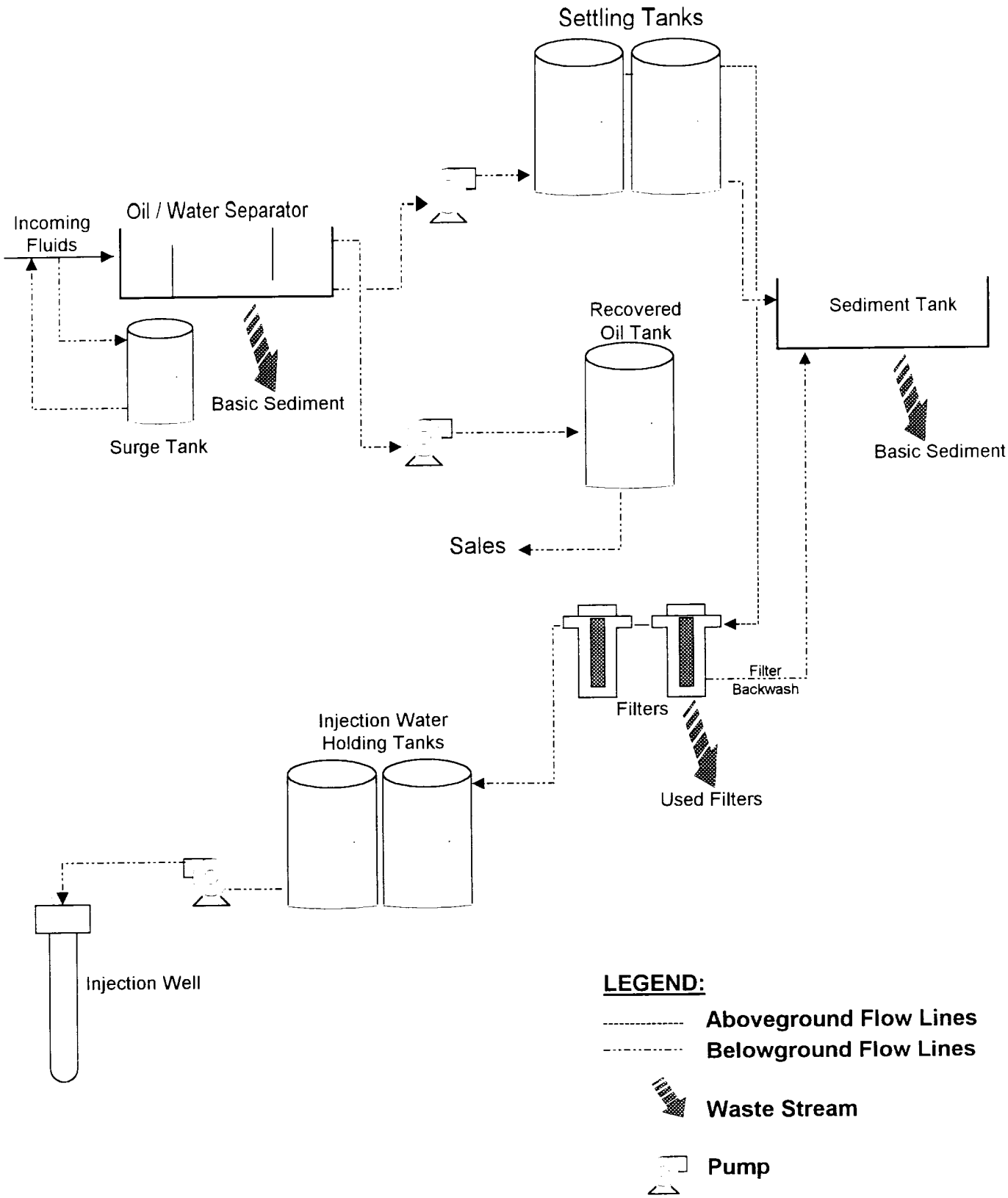
Signature: James B Fraser Date: 12-11-96



Date:	12/3/96	**FIGURE 1: FACILITY AREA MAP** **McGrath Disposal Well**	***BURLINGTON RESOURCES*** ***San Juan Division***
Originated By:	CAB		
USGS 7.5 Minute Series		USGS Quadrangle Name: Flora Vista, N. Mex.	



Date:	11/20/96	**FIGURE 2: FACILITY LAY-OUT** **McGrath Disposal Well**	***BURLINGTON RESOURCES*** ***San Juan Division***
Originated By:	CAB		
		Discharge Plan	



Date:	11/20/96	FIGURE 3: FLOW SCHEMATIC McGrath Disposal Well	BURLINGTON RESOURCES San Juan Division
Originated By:	CAB		
		Discharge Plan	

EXHIBIT NO. 1

Precipitation, Washwater, Plant Wastewater & Basic Sediment

Laboratory Analyses

Non-Hazardous Demonstration

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Report Generated:
October 25, 1996 14:31

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT BURLINGTN RESOURCES OIL & GASWORKORDER # : 9610059
TO: 3535 E. 30TH STREET WORK ID : MCGRATH CONVERSION
FARMINGTON, NM 87401 CLIENT CODE : BURL01
DATE RECEIVED : 10/08/96

ATTN: KEITH BOEDECKER

Lab ID: 9610059-01A
Sample ID: NO. 1 RAINWATER

Collected: 10/04/96 15:40:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	N/A	% (Percent)				
TCLP (ICP) DIG/1311/3005	10/11/96	N/A				
TCLP BARIUM(FAA)/1311/7080						
Barium, Ba	ND	mg/L	0.50	1.0	10/16/96	M9627
TCLP EXTRACTION/TCLP 1311	10/09/96	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	ND	mg/L	0.40	1.0	10/15/96	M9627,M9629
Barium, Ba	NT	mg/L	0.50	1.0	10/15/96	M9627,M9629
Cadmium, Cd	ND	mg/L	0.0050	1.0	10/15/96	M9627,M9629
Chromium, Cr	1.57	mg/L	0.020	1.0	10/15/96	M9627,M9629
Lead, Pb	ND	mg/L	0.050	1.0	10/15/96	M9627,M9629
Mercury, Hg	ND	mg/L	0.0020	1.0	10/11/96	M9627,M9629
Selenium, Se	ND	mg/L	0.050	1.0	10/15/96	M9627,M9629
Silver, Ag	ND	mg/L	0.040	1.0	10/15/96	M9627,M9629
TCLP(CVAA)Hg XT/SW846 7471	10/11/96	N/A				

Lab ID: 9610059-01B
Sample ID: NO. 1 RAINWATER

Collected: 10/04/96 15:40:00
Matrix: LIQUID

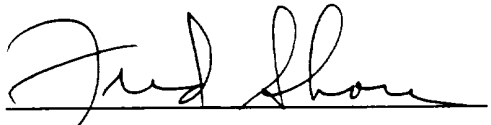
TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP SV/METHOD 1311/8270B						
1,4-Dichlorobenzene	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
2-Methylphenol / O-Cresol	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
3/4-Methylphenol / M/P-Cresol	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
Hexachloroethane	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
Nitrobenzene	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
Hexachlorobutadiene	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
2,4,6-Trichlorophenol	ND	mg/L	0.010	9.3	10/18/96	TSVOA174
2,4,5-Trichlorophenol	ND	mg/L	0.010	9.3	10/18/96	TSVOA174
2,4-Dinitrotoluene	ND	mg/L	0.010	9.3	10/18/96	TSVOA174
Hexachlorobenzene	ND	mg/L	0.0010	9.3	10/18/96	TSVOA174
Pentachlorophenol	ND	mg/L	0.020	9.3	10/18/96	TSVOA174
Pyridine	ND	mg/L	0.010	9.3	10/18/96	TSVOA174
TCLP SVOA XT/1311/3520	10/16/96	N/A				

Lab ID: 9610059-01C
Sample ID: NO. 1 RAINWATER
Collected: 10/04/96 15:40:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
FLASH POINT/SW846 1010						
Flash Point	>60	Deg Centigrade	20	1.0	10/18/96	WFLASH191
pH/EPA 150.1						
pH	9.3	pH Units	0.10	1.0	10/21/96	WPH435
REACTIVITY/SW846 7-3						
Sulfide	NON-REACT	mg/Kg of Waste	500	1.0	10/17/96	W9629
Cyanide	NON-REACT	mg/Kg of Waste	250	1.0	10/17/96	W9629

Lab ID: 9610059-01D
Sample ID: NO. 1 RAINWATER
Collected: 10/04/96 15:40:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP ZHE / TCLP 1311	10/16/96	N/A				
ZHE/VOA/METHOD 1311/8240B						
Vinyl Chloride	ND ✓	mg/L	0.0050	1.0	10/21/96	TVOA264
1,1-Dichloroethene	0.0026 ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
Chloroform	ND ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
1,2-Dichloroethane	ND ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
2-Butanone (MEK)	0.018 ✓	mg/L	0.0050	1.0	10/21/96	TVOA264
Carbon Tetrachloride	ND ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
Trichloroethene	ND ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
Benzene	0.0038 ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
Tetrachloroethene	0.017 ✓	mg/L	0.0010	1.0	10/21/96	TVOA264
Chlorobenzene	ND ✓	mg/L	0.0010	1.0	10/21/96	TVOA264



Fred L. Shore, Ph.D.
VP of Laboratory Operations

WORKORDER COMMENTS

DATE : **10/25/96**
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND =	Analyte "not detected" in analysis at the sample specific detection limit.
D_F =	Sample "dilution factor"
NT =	Analyte "not tested" per client request.
B =	Analyte was also detected in laboratory method QC blank.
E =	Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT =	The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

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Report Generated:
November 8, 1996 10:58

CERTIFICATE OF ANALYSIS
RESULTS BY SAMPLE

SENT TO: BURLINGTON RESOURCES OIL &GAS
3535 E. 30TH STREET
FARMINGTON, NM 87401

WORKORDER # : 9610158
WORK ID : MCGRATH CONVERSION
CLIENT CODE : BURL01
DATE RECEIVED : 10/18/96

ATTN: KEITH BOEDECKER

Lab ID: 9610158-01A
Sample ID: NO. 1 WASHWATER

Collected: 10/16/96 14:10:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
% SOLIDS(TCLP XT)EPA 160.3	<0.5	% (Percent)				
TCLP (ICP) DIG/1311/3005	10/25/96	N/A				
TCLP BARIUM(FAA)/1311/7080						
Barium, Ba	ND	mg/L	0.50	1.0	10/28/96	M9670
TCLP EXTRACTION/TCLP 1311	10/21/96	N/A				
TCLP METALS/1311/SW8466010						
Arsenic, As	ND	mg/L	0.40	1.0	10/26/96	M9670,M9687
Barium, Ba	NT	mg/L	0.50			M9670,M9687
Cadmium, Cd	ND	mg/L	0.0050	1.0	10/26/96	M9670,M9687
Chromium, Cr	0.02	mg/L	0.020	1.0	10/26/96	M9670,M9687
Lead, Pb	ND	mg/L	0.050	1.0	10/26/96	M9670,M9687
Mercury, Hg	ND	mg/L	0.0020	1.0	10/31/96	M9670,M9687
Selenium, Se	ND	mg/L	0.050	1.0	10/26/96	M9670,M9687
Silver, Ag	ND	mg/L	0.040	1.0	10/26/96	M9670,M9687
TCLP(CVAA)Hg XT/SW846 7471	10/29/96	N/A				

Lab ID: 9610158-01B
Sample ID: NO. 1 WASHWATER

Collected: 10/16/96 14:10:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP SV/METHOD 1311/8270B						
1,4-Dichlorobenzene	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
2-Methylphenol / O-Cresol	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
3/4-Methylphenol / M/P-Cresol	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
Hexachloroethane	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
Nitrobenzene	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
Hexachlorobutadiene	ND	mg/L	0.010	9.2	10/30/96	TSVOA175
2,4,6-Trichlorophenol	ND	mg/L	0.010	9.2	10/30/96	TSVOA175
2,4,5-Trichlorophenol	ND	mg/L	0.010	9.2	10/30/96	TSVOA175
2,4-Dinitrotoluene	ND	mg/L	0.0010	9.2	10/30/96	TSVOA175
Hexachlorobenzene	ND	mg/L	0.020	9.2	10/30/96	TSVOA175
Pentachlorophenol	ND	mg/L	0.010	9.2	10/30/96	TSVOA175
Pyridine	ND	mg/L				
TCLP SVOA XT/1311/3520	10/29/96	N/A				

Lab ID: 9610158-01C
Sample ID: NO. 1 WASHWATER

Collected: 10/16/96 14:10:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
TCLP ZHE / TCLP 1311	10/28/96	N/A				
ZHE/VOA/METHOD 1311/8240B						
Vinyl Chloride	ND'	mg/L	0.0050	1.0	10/29/96	TVOA265
1,1-Dichloroethene	ND'	mg/L	0.0010	1.0	10/29/96	TVOA265
Chloroform	0.0032'	mg/L	0.0010	1.0	10/29/96	TVOA265
1,2-Dichloroethane	ND'	mg/L	0.0010	1.0	10/29/96	TVOA265
2-Butanone (MEK)	0.010'	mg/L	0.0050	1.0	10/29/96	TVOA265
Carbon Tetrachloride	ND'	mg/L	0.0010	1.0	10/29/96	TVOA265
Trichloroethene	ND'	mg/L	0.0010	1.0	10/29/96	TVOA265
Benzene	0.0013'	mg/L	0.0010	1.0	10/29/96	TVOA265
Tetrachloroethene	0.012'	mg/L	0.0010	1.0	10/29/96	TVOA265
Chlorobenzene	ND'	mg/L	0.0010	1.0	10/29/96	TVOA265

Lab ID: 9610158-01D
Sample ID: NO. 1 WASHWATER

Collected: 10/16/96 14:10:00
Matrix: LIQUID

TEST / METHOD	RESULT	UNITS	LIMIT	D_F	DATE ANAL	BATCH_ID
FLASH POINT/SW846 1010						
Flash Point	>60	Deg Centigrade	20	1.0	10/18/96	WFLASH191
pH/EPA 150.1						
pH	6.8	pH Units	0.10	1.0	10/21/96	WPH435
REACTIVITY/SW846 7-3						
Sulfide	NON-REACT	mg/Kg of Waste	500	1.0	10/24/96	W9642
Cyanide	NON-REACT	mg/Kg of Waste	250	1.0	11/04/96	W9642

Fred L. Shore, Ph.D.
VP of Laboratory Operations

WORKORDER COMMENTS

DATE : **11/08/96**
WORKORDER:

DEFINITIONS/DATA QUALIFIERS

The following are definitions, abbreviations, and data qualifiers which may have been utilized in your report:

ND =	Analyte "not detected" in analysis at the sample specific detection limit.
D_F =	Sample "dilution factor"
NT =	Analyte "not tested" per client request.
B =	Analyte was also detected in laboratory method QC blank.
E =	Analyte concentration (result) is an estimated value or exceeds analysis calibration range.
LIMIT =	The minimum amount of the analyte that AAL can detect utilizing the specified analysis.

Please Note: Multiply the "Limit" value (AAL's Detection Limit) by Dilution Factor (D_F) to obtain the sample specific Detection Limit.

REPORT COMMENTS

EXHIBIT NO. 3

Injection Well Information

for

Converting Well to Class I Non-Hazardous

Exhibit No. 3

Injection Well Information

The following information is provided as Burlington Resources proposal to convert the existing Class II injection well to a Class I Non-hazardous injection well. Some information is provided in the Exhibit No. 3 attachments and some information is referenced as having been previously submitted with the original injection well application. The information provided in this Exhibit is the same information requested in OCD form C-108.

I. **Purpose:** Convert Class II injection well to a Class I Non-hazardous injection well

II. **Operator:** Burlington Resources Oil & Gas Company
P.O. Box 4289
Farmington, NM 87499-4289

Contact: Kevin Midkiff
Sr. Operations Engineer
(505) 326-9807

III. **Well Data:** **SEE ATTACHMENT NO. 1**: Information includes:

1. Lease name; well no.; location by section, township, range and footage within section.
2. Casing string used with its size, setting depth, sacks of cement used, hole size, top of cement, and how such top was determined.
3. A description of tubing to be used including its size, lining material, and setting depth.
4. The name, model, and setting depth of the packer used or a description of any other seal system or assembly used.
5. The name of the injection formation
6. The injection interval and perforation depth
7. Original purpose of the well.
8. Depths of other perforated intervals and detail on the sacks of cement or bridge plugs used to seal off such perforations.
9. Depth to and name of next higher and next lower oil or gas zone in the area of the well.

IV. **This application request is an expansion of an existing injection well.** The original permit is OCD R-7370 and is provided in Exhibit No. 2.

V. **Well Area of Review: SEE ATTACHMENT NO. 2**: Information includes:

A map that identifies all wells and leases within two miles of the proposed injection well with a one-half mile radius circle drawn around the proposed injection well.

VI. **Wells of record within the area of review: SEE ATTACHMENT NO. 3**: Information includes:

A tabulation of data on each well within the area of review which penetrate the proposed injection zone. Data includes description of each well's type, construction, date drilled, location, depth and record of completion.

VII. **Data on proposed operation: SEE ATTACHMENT NO. 4**: Information includes:

1. Proposed average and maximum daily rate and volume of fluids to be injected.
2. Open or Closed System.
3. Average and maximum injection pressures.
4. Sources and appropriate analysis of injection fluid and compatibility with the receiving formation.
5. Chemical analysis of disposal zone formation water.

VIII. **Geological Data: SEE ATTACHMENT NO. 5**: Information includes:

Appropriate geological data on the injection zone including appropriate lithologic detail, geological name, thickness and depth. The geologic name, and depth to bottom of all underground sources of drinking water overlying the proposed injection zone and well as any such sources known to be immediately underlying the injection interval.

IX. **Proposed Stimulation Program: SEE ATTACHMENT NO. 6**

X. **Appropriate logging and test data on the well: PREVIOUSLY SUBMITTED**

XI. **Chemical analysis of fresh water: SEE ATTACHMENT NO. 7**: Information was previously submitted in original application.

XII. **Affirmative Geological & Engineering Statement: SEE ATTACHMENT NO. 8**

ATTACHMENT NO. 1

Injection Well Data

(Item No. III on Form C-108)

PERTINENT DATA SHEET
CURRENT CONDITION 11/25/96

WELLNAME: McGrath #4 SWD

DP NUMBER: 46321
PROP. NUMBER:

WELL TYPE: Flora Vista Mesaverde

ELEVATION: KB 5761'
GL 5749'

LOCATION: 800' FNL, 1730' FEL
Unit B, Sec. 34, T30N, R12W
San Juan County, NM
Long./Lat.:108.081940 - 36.774170

INITIAL POTENTIAL: Test

INITIAL SITP: Psig
LAST AVAILABLE SITP: - Psig

OWNERSHIP:
GWI: 100.0000%
NRI: 87.5000%
SJBT: 62.6250%

DRILLING:
SPUD DATE: 9/4/84
COMPLETED: 10/16/84
TOTAL DEPTH: 4700'
PBTD: 4653'

CASING RECORD:

HOLE SIZE	SIZE	WEIGHT	GRADE	DEPTH	EQUIP.	CEMENT	TOC
12-1/4"	8-5/8"	23#	K55	231'	Casing	230 sxs	Circ to Surface
7-5/8"	5-1/2"	15.5#	K55	4698'	Casing DV tool @ 2139' Sqz. DV tool w.100 sxs.	Stage 1: 230 sxs Stage 2: 360 sxs * Perf 2 holes @ 554', Sqz. 3 times . w/275 sxs. TOC now @ 375' (CBL) (Ratty cmt. to 336')	3565' (CBL) *560' (CBL)
	2-3/8"	6.5#	J55	4236'	Tubing - plastic lined 140 jts, 4223'		
	Baker Model R-3 Packer at 4236'						

FORMATION TOPS:

Nacimiento	Surface
Ojo Alamo	410'
Fruitland Coal	1520'
Pictured Cliffs	1885'
Cliffhouse	3485'
Menefee	3610'
Point Lookout	4310'

This well was originally drilled to evaluate the Pictured Cliffs and the Cliff House Mesa Verde with the itention of completing the well as an SWD if those zones were non-comercial.

LOGGING:

PERFORATIONS 4274'-4374' - 204 holes (Mesa Verde - Point Lookout)

STIMULATION:

10/84:	Breakdown with 77000 gal. 15% MCA acid.
8/86	Frac w/102,000# sand, 127,000 gal. water.
6/85:	Pump 750 gal. 1% HCl down tubing.

WORKOVER HISTORY:

8/86	Acidize with 2000 gal. 15% MCA, frac w/102,000# 20/40 sand, 127,000 gal. water. Resqueeze DV tool w/30 sxs cement.
8/87:	Acidize with 500 gal. 15% HCl

PRODUCTION HISTORY:

	Commenced injection on 2/13/85
9/86	Maximum injection pressure increased to 2370 psi.
12/92	Ran injection survey
11/96	Injection rate = 2300 BWD at 1650 psi

PIPELINE:

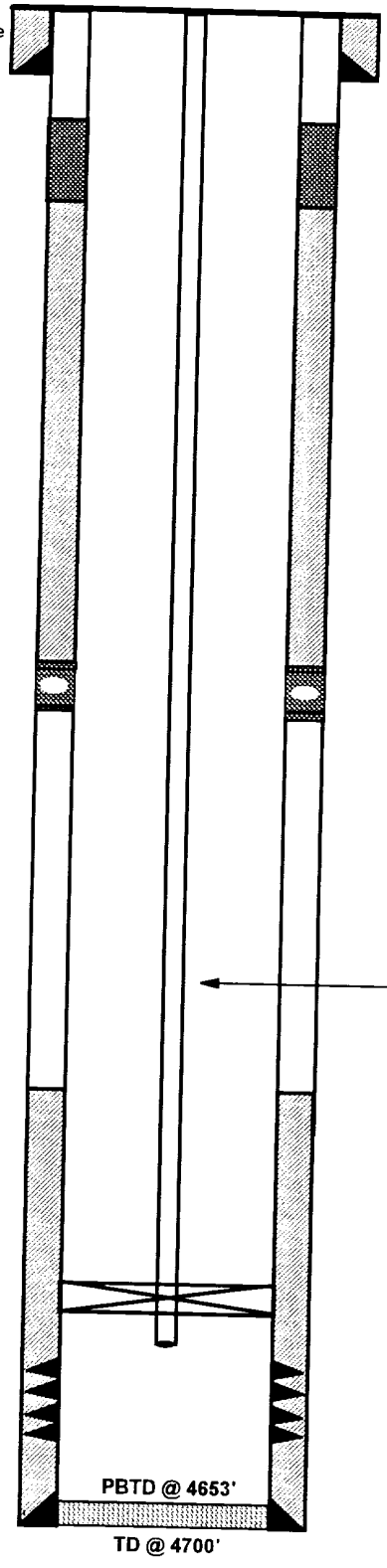
McGrath SWD #4
Current 11/25/96

Flora Vista Mesaverde

DPNO: 46321

Spud: 09-04-84
Completed: 10-16-84
Elev. GL: 5749'
KB: 5761'

Unit B, Sec. 34, T30N, R12W
800' FNL, 1730' FEL, San Juan County, NM
Longitude / Latitude: 108.081940 - 36.774170



12-1/4" Hole
Nacimiento @ Surface
Ojo Alamo @ 410'
Fruitland Coal @ 1520'
Pictured Cliffs @ 1885'
Cliff House @ 3485'
Menefee @ 3610'
Point Lookout @ 4310'
7-5/8" Hole
PBTD @ 4653'
TD @ 4700'

8-5/8", 23#, K55 csg. set @ 231'
Cmt. w/230 sx. Circ. to surface.

Original: TOC @ 560' (CBL)
Perf 2 holes @ 554'. Squeeze
3 times for a total of 275 sx.
TOC now @ 375' (CBL).

DV tool @ 2139'.
Squeeze DV tool w/100 sx.

8/86 - Resqueeze DV tool w/30 sx.

2-7/8", 6.5#, J55. Plastic lined tbg.
(140 jts., 4223') set @ 4236'

TOC @ 3565' (CBL)

Baker Model R-3 Double Grip packer set @ 4236'

Perfs @ 4274' - 4374' - 204 holes (MV - Point Lookout)
8/86: Frac'd w/102,000# sd and 127,000 gal. water

5-1/2", 15.5#, K55 csg. set @ 4698'
Stage collar @ 2139'.
Stage 1 - 230 sx cmt.
Stage 2 - 360 sx cmt.

BURLINGTON RESOURCES

Memorandum

Production Operations

To: NMOCD

From: Kevin Midkiff

Date: December 5, 1996

Subject McGrath #4 SWD
SWD Upgrade - Squeeze Cement Procedure
Sec. 34, T30N, R12W, SJC, NM

The procedure included with our Discharge Plan to convert the McGrath No. 4 SWD to a Class I disposal well includes a squeeze procedure to bring cement back to surface. This will involve perforating the well at 330' and circulating cement out the bradenhead. This squeeze job will provide cement coverage across any near surface fresh water aquifers.

As per my telephone conversation with Mark Ashley (NMOCD) on 12/5/96, we do not plan to squeeze cement the interval from 3565' to 2139' (refer to attached wellbore diagram). This interval does not currently have cement behind the 5-1/2" casing. Cementing this interval would require at least one and possibly several "suicide" type squeeze procedures. I believe that perforating the 5-1/2" casing for squeeze purposes would decrease the wellbore integrity over a period of years. There are no fresh water aquifers across this interval that could potentially be contaminated by any casing leak. Furthermore, the Lewis Shale and the Mesa Verde (Cliffhouse) formations which are across this void interval are non-productive in the vicinity of the McGrath No. 4 SWD.

If you have any questions regarding our conversion procedure, please feel free to contact me at (505)-326-9807.

Kevin L. Midkiff
Sr. Operations Engineer

CLASS I DISPOSAL CONVERSION PROCEDURE
Procedure A - Upper Squeeze

McGrath #4 SWD
DPNO: 46321
800' FNL, 1730' FEL
Sec. 34, T30N, R12W, San Juan County, NM

Project Summary: The purpose of this project is to convert the McGrath #4 SWD to a Class I disposal well. To accomplish this we must squeeze cement the 5-1/2" casing to provide a continuous cement sheath from surface to the DV tool at 2139'. We will also use this workover opportunity to acidize the perforations to treat for any scale buildup.

1. Flow well back to relieve pressure. Set 2 flowback tanks.

2. MIRU daylight PU. ND wellhead, NU BOP. POOH with IPC tubing and packer. The Baker Model R-3 Double Grip packer releases with straight pick up. Replace any corroded joints. Deliver 4700' of 2-7/8" 6.5# N80 workstring. PU workstring and RIH with casing scraper on workstring to PBTD at 4653'. POOH.

3. MIRU wireline company. Set CIBP in 5-1/2" casing at 4000'. Pressure tests casing to 500 psi.

4. Perforate squeeze holes at 330'. Open bradenhead and establish circulation through squeeze perfs. Set cement retainer at 270' and establish circulation through holes and out bradenhead valve. Squeeze through retainer with approximately 75 sxs of Class B cement with 2% Calcium Chloride (1.36 cf/sk, 14.7 ppg) Cement volume is estimated, pump until cement circulates out bradenhead. Have 300 sxs on location in case formation takes cement. Close bradenhead and squeeze to 500 psi. Sting out of retainer and POOH.

5. RIH with 4-3/4" bit and drill out retainer and cement. Pressure test casing to 500 psi and resqueeze as necessary.

6. Drill out CIBP at 4000' and chase to bottom, POOH.

7. RIH with Howco Selective Injection Packer (SIP), ball type circulating valve, and workstring to 4374'. RU stimulation company and acidize the Point Lookout perfs from 4374' to 4274' with 30 gallons per ft. (3000 gal. total) of 15% PAD acid. Pump acid while puling the SIP across the perfs. The 15% PAD has the following composition: 10% Xylene, 90% 15% HCl, 10 gal/M FE-1A (acetic acid), 50 lbs/M FE-2 (citric acid), 10 gal/M WS-36 (surfactant).

Injection Rate:	1 BPM
Anticipated Pressure:	1700 psi

   RDMO stimulation company. RIH to about 4400' Drop ball to open circulation valve and swab back acid. POOH with tubing laying down workstring.

8. RIH with plastic coated wireline re-entry guide, stainless steel Baker 2.25" R nipple, 1 - 8' plastic coated 2-7/8" joint, Baker Model 45A4 Big Bore Lok-Set packer (plastic coated), 2.25" Model L-16 stainless steel on-off seal connector, and 2-7/8" plastic coated injection tubing. Set packer at 4236'. Pressure test packer (annulus) to 500 psi. Sting off of on/off tool and load annulus with packer fluid (2% KCl water with 10 gal/M gal Champion Cortron R-2264 chemical). Sting onto on/off tool and pressure test annulus (on/off tool) to 500 psi. ND BOP, NU wellhead. RDMO PU. Turn to injection.

Approve: Kevin L. Midkiff 12/5/96
Operations Engineer

Approve: W. J. [illegible] 12/5
Drilling Superintendent

Concur: R. E. Munert 12/5/96
Production Superintendent

Contacts:	Operations Engineer	Kevin Midkiff	326-9807 (Office) 564-1653 (Pager)
	Production Foreman	Johnny Ellis	326-9822 (Office) 327-8144 (Pager)

PERTINENT DATA SHEET
PROPOSED CONDITION AFTER CLASS I CONVE[illegible]ON

WELLNAME: McGrath #4 SWD

DP NUMBER: 46321
PROP. NUMBER:

WELL TYPE: Flora Vista Mesaverde

ELEVATION: KB 5761'
GL 5749'

LOCATION: 800' FNL, 1730' FEL
Unit B, Sec. 34, T30N, R12W
San Juan County, NM
Long./Lat.:108.081940 - 36.774170

INITIAL POTENTIAL: Test

INITIAL SITP: Psig
LAST AVAILABLE SITP: - Psig

OWNERSHIP:
GWI: 100.0000%
NRI: 87.5000%
SJBT: 62.6250%

DRILLING:
SPUD DATE: 9/4/84
COMPLETED: 10/16/84
TOTAL DEPTH: 4700'
PBTD: 4653'

CASING RECORD:

HOLE SIZE	SIZE	WEIGHT	GRADE	DEPTH	EQUIP.	CEMENT	TOC
12-1/4"	8-5/8"	23#	K55	231'	Casing	230 sxs	Circ to Surface
7-5/8"	5-1/2"	15.5#	K55	4698'	Casing DV tool @ 2139' Sqz. DV tool w.100 sxs.	Stage 1: 230 sxs Stage 2: 360 sxs * Perf 2 holes @ 554', Sqz. 3 times w/275 sxs. TOC now @ 375' (CBL) (Ratty cmt. to 336')	3565' (CBL) *560' (CBL)

For Conversion - Squeeze cement so that TOC = Surface

2-3/8"	6.5#	J55	4236'	Tubing - plastic lined 140 jts, 4223'	

Baker Plastic Coated Lok-Set Packer with On/Off Tool at 4236'

FORMATION TOPS:

Nacimiento	Surface
Ojo Alamo	410'
Fruitland Coal	1520'
Pictured Cliffs	1885'
Cliffhouse	3485'
Menefee	3610'
Point Lookout	4310'

This well was originally drilled to evaluate the Pictured Cliffs and the Cliff House Mesa Verde with the itention of completing the well as an SWD if those zones were non-comercial.

LOGGING:

PERFORATIONS 4274'-4374' - 204 holes (Mesa Verde - Point Lookout)

STIMULATION:
10/84: Breakdown with 77000 gal. 15% MCA acid.
8/86 Frac w/102,000# sand, 127,000 gal. water.
6/85: Pump 750 gal. 1% HCl down tubing.

WORKOVER HISTORY:
8/86 Acidize with 2000 gal. 15% MCA, frac w/102,000# 20/40 sand, 127,000 gal. water. Resqueeze DV tool w/30 sxs cement.
8/87: Acidize with 500 gal. 15% HCl

PRODUCTION HISTORY:
Commenced injection on 2/13/85
9/86 Maximum injection pressure increased to 2370 psi.
12/92 Ran injection survey
11/96 Injection rate = 2300 BWD at 1650 psi

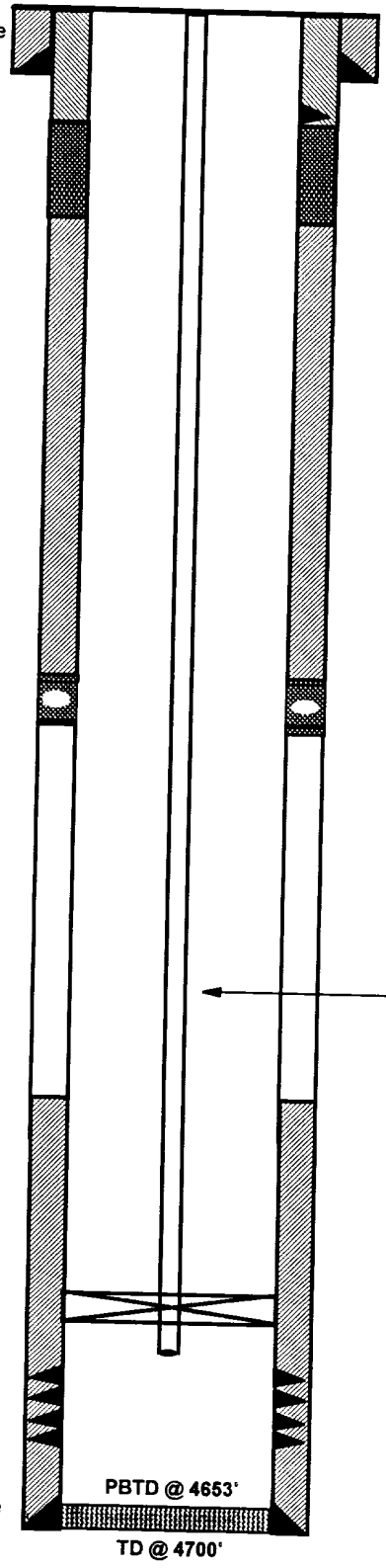
PIPELINE:

McGrath SWD #4
Proposed Condition After Class I Conversion

Flora Vista Mesaverde
DPNO: 46321

Spud: 09-04-84
Completed : 10-16-84
Elev. GL: 5749'
KB: 5761'

Unit B, Sec. 34, T30N, R12W
800' FNL, 1730' FEL, San Juan County, NM
Longitude / Latitude: 108.081940 - 36.774170



12-1/4" Hole
Nacimiento @ Surface
Ojo Alamo @ 410'
Fruitland Coal @ 1520'
Pictured Cliffs @ 1885'
Cliff House @ 3485'
Menefee @ 3610'
Point Lookout @ 4310'
7-5/8" Hole
PBTD @ 4653'
TD @ 4700'

8-5/8", 23#, K55 csg. set @ 231'
Cmt. w/230 sx. Circ. to surface.
Squeeze Holes at 330'
Squeeze with 75 sx
Original: TOC @ 560' (CBL)
Perf 2 holes @ 554'. Squeeze
3 times for a total of 275 sx.
TOC now @ 375' (CBL).

DV tool @ 2139'.
Squeeze DV tool w/100 sx.
8/86 - Resqueeze DV tool w/30 sx.

2-7/8", 6.5#, J55, Plastic lined tbg.
(140 jts., 4223') set @ 4236'

TOC @ 3565' (CBL)

Baker Plastic Coated Lok-Set packer with On/Off tool set at 4236'

Perfs @ 4274' - 4374' - 204 holes (MV - Point Lookout)
8/86: Frac'd w/102,000# sd and 127,000 gal. water

5-1/2", 15.5#, K55 csg. set @ 4698'
Stage collar @ 2139'.
Stage 1 - 230 sx cmt.
Stage 2 - 360 sx cmt.

PERFORATING BLUEJET INC. LOGGING

CEMENT BOND LOG

Computer Laser

FILING NO.

COMPANY SOUTHLAND ROYALTY

WELL McGRATH #4

FIELD FLORA VISTA MESA VERDE

COUNTY SAN JUAN STATE N.M.

LOCATION 800' FNL & 1730' FEL

SEC. 34 TWP. 30N RGE. 12W

OTHER SERVICES

Permanent Datum GROUND LEVEL Elev. 5749'
Log Measured From K.B. 12 Ft. Above Perm. Datum
Drilling Measured From KELLY BUSHING

ELEV. KB 5761'
DF 5760'
GL 5749'

DATE	9/28/84		
RUN NO.	ONE		
TYPE LOG	CBL-VDL-AT-DCL-SIGN		
DEPTH – DRILLER	4700'		
DEPTH – LOGGER	2850'		
Bottom Logged Interval	2200'	600'	
Top Logged Interval	1950'	350'	
TYPE FLUID IN HOLE	WATER		
SALINTY, PPM CL.			
DENSITY			
LEVEL	FULL		
MAX. REC. TEMP. DEG. F.			
OPERATING RIG TIME	2 HOURS		
RECORDED BY	T. ATENCIO & P. SCHULTE		
WITNESSED BY	MR. LINGO		

RUN	BORE – HOLE RECORD			CASING RECORD			
				8 5/8	24	SURF	231'
				5 1/2	15.5	SURF	4698'

CEMENTING DATA		SURFACE STRING	PRODUCTION STRING	LINER
DATE CEMENTED				
CEMENT VOLUME		230 SX	510 SX	
CEMENT TYPE				
ADDITION	%			
RETARDER	%			
SLURRY WT.	LOSS SLURRY WATER			

Service Order No. 7117 | C.C.L. Memory Distance 12.5

GAMMA RAY
COUNTS PER SECOND
FIRST SWEEP 60
SECOND SWEEP 100
Casing Collars
N LOG
DEPTH AND MINUTE MARKERS

AMPLITUDE		
0	AMPLITUDE (m.V.)	50
0	AMPLITUDE (m.V.)	10
	AMPLIFIED (X5)	

TRAVEL TIME		
1200	ΔT TOTAL JJ SEC.	200
300	ΔT TOTAL JJ SEC.	200
	AMPLIFIED (X10)	

WAVE TRAIN DISPLAY

200 (MICROSECONDS) TIME INCREASES → 1200

CASING BONDING CODE

← 100 - 90%
← 90 - 70%
← 70 - 0 %

FULL WAVE SIGNATURE

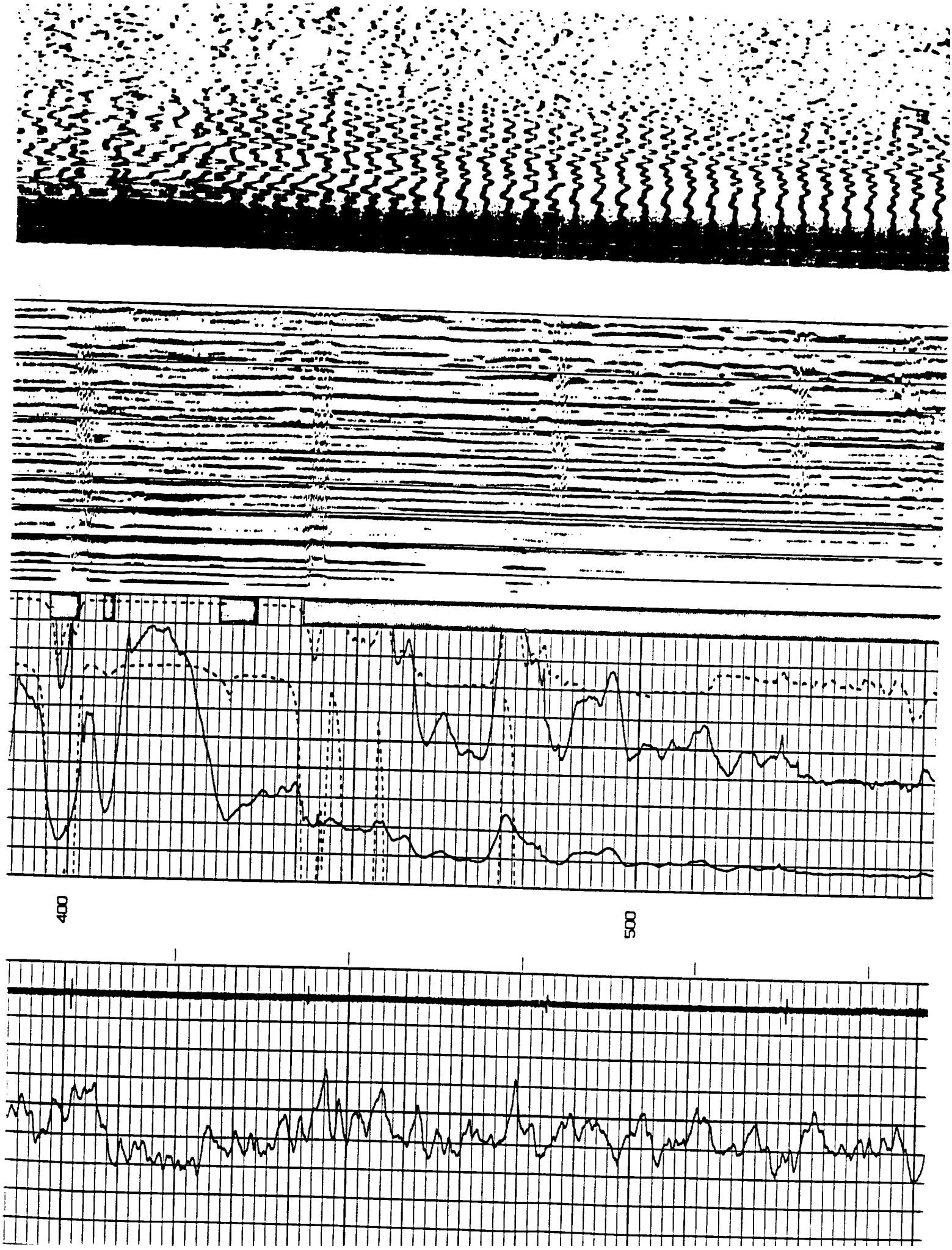
HALF WAVE SIGNATURE

TIME INCREASES →
0 MICROSECONDS 1000

san juan repro Form 329-1

300

400


400
500

III. B)

1. The injection zone is the Point Lookout member of the Mesa Verde Sandstone.
2. The injection interval is through perforations at 4274' to 4374'.
3. The McGrath No. 4 SWD was originally drilled to test the commercial viability of the Pictured Cliffs and the Cliffhouse Mesa Verde. The alternative purpose for the well was as a salt water disposal. The Pictured Cliffs and the Cliffhouse intervals had insufficient shows to justify completion, so the well was completed as a disposal well in the Point Lookout Mesa Verde.
4. No other intervals were perforated in the wellbore.
5. The next higher oil or gas zone in the area is the Pictured Cliffs at 1885'. The next lower oil or gas zone in the area is the Dakota formation at 6396'.

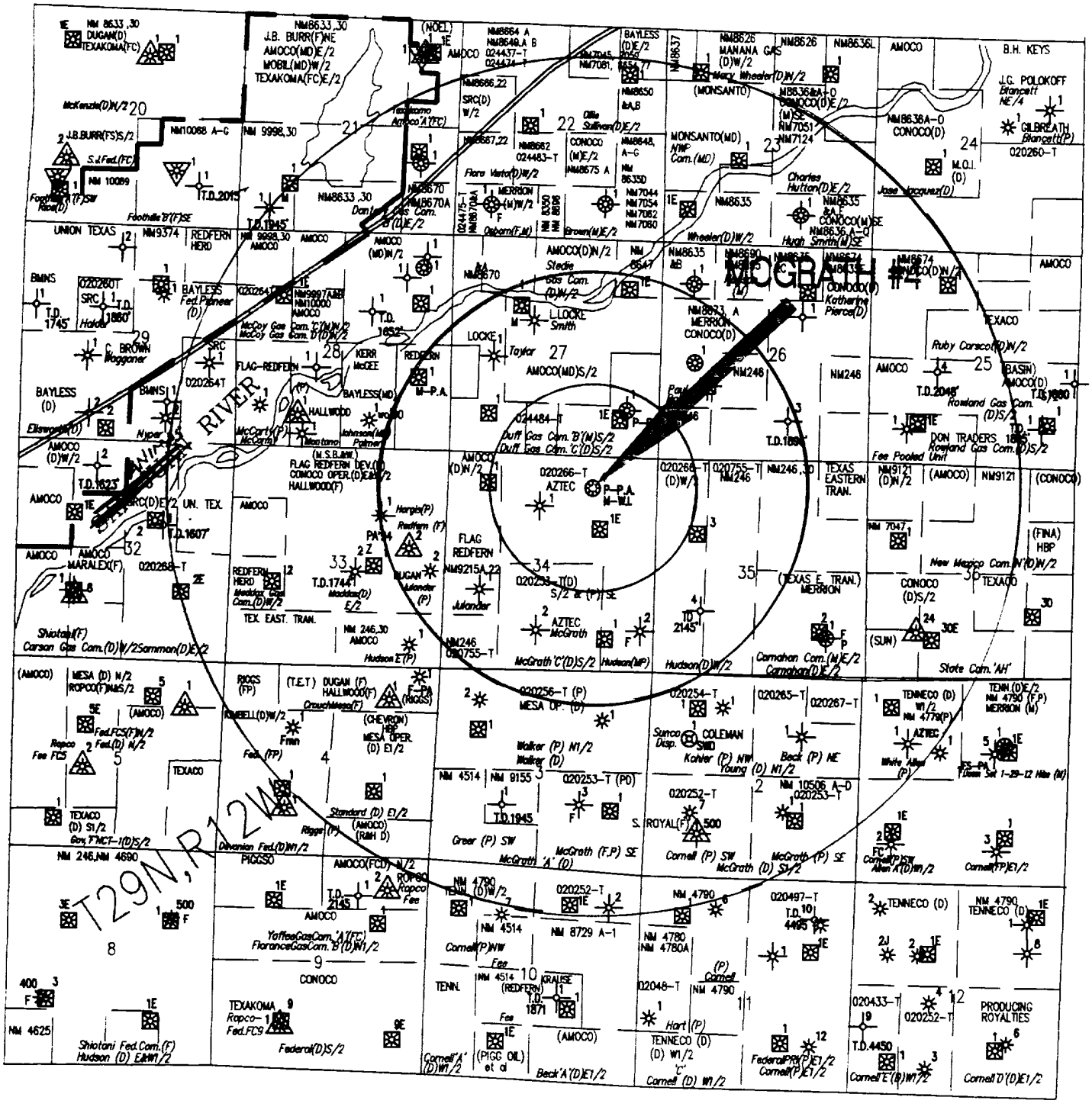
ATTACHMENT NO. 2

Lease Map

(Item No. V on Form C-108)

MCGRATH #4

SEC. 34-30N-12W



ATTACHMENT NO. 3

Wells Within Area of Review

(Item No. VI on Form C-108)

PERTINENT DATA SHEET
10/21/96

WELLNAME: Duff Gas Com C #1E	**OPERATOR:** Amoco Production Company
WELL TYPE: Dakota	**ELEVATION:** GL
LOCATION: 1100' FSL, 1030' FEL Sec. 27, T30N, R12W San Juan County, NM	**INITIAL POTENTIAL:** Test **INITIAL SICP:** Psi
OWNERSHIP: GWI: NRI: SJBT:	**DRILLING:** SPUD DATE: 9/20/84 COMPLETED: 10/22/84 TOTAL DEPTH: 6500' PBTD: 6450'

CASING RECORD:

HOLE SIZE	SIZE	WEIGHT	GRADE	DEPTH	EQUIP.	CEMENT	TOC
9-7/8"	8-5/8"	24#	K55	323'	Casing	420 cf. Class B, 2% CaCl.	Circ. to surface.
7-7/8"	4-1/2"	10.5#	K55	6500'	Casing DV tool @ 3185'	1st Stage: 1121 cf 'B' cmt. 2nd Stage: 1116 cf 'B' cmt.	3185' Surface
	2-3/8"			6344'	Tubing		

FORMATION TOPS:

Ojo Alamo
Kirtland
Fruitland Coal
Pictured Cliffs
Lewis
Cliffhouse
Point Lookout
Mancos
Gallup
Greenhorn
Graneros
Dakota

LOGGING:

PERFORATIONS
Dakota 6249'-6262', 6328'-6357', 6394'-6423' (2 SPF)
Reperf 6249'-6262', 6328'-6357' (2 SPF)

STIMULATION: Frac w/28,400 gal. 70Q foam and 12,000# 20/40 sand.
Re-frac w/58,000 gal. 70Q foam, 108,000# 20/40 sand.

WORKOVER HISTORY: 7/93 Perf @ 335'. Squeeze bradenhead w/100 sxs. Drilled out.

PRODUCTION HISTORY: Gas Oil

RESERVE INFORMATION: Gas Oil

PIPELINE:

PERTINENT DATA SHEET
10/21/96

[redacted]

WELLNAME: Duff Gas Com #1E	**OPERATOR:** Amoco Production Company
WELL TYPE: Dakota	**ELEVATION:** GL
LOCATION: 1770' FNL, 1480' FEL Sec. 34, T30N, R12W San Juan County, NM	**INITIAL POTENTIAL:** Test **INITIAL SICP:** Psi
OWNERSHIP: GWI: NRI: SJBT:	**DRILLING:** SPUD DATE: 11/20/84 COMPLETED: 1/7/85 TOTAL DEPTH: 6609' PBTD: 6604'

CASING RECORD:

HOLE SIZE	SIZE	WEIGHT	GRADE	DEPTH	EQUIP.	CEMENT	TOC
12-1/4"	8-5/8"	24#	K55	316'	Casing	295 cf 'B' cmt.	Circ. to surface.
7-7/8"	4-1/2"	10.5#	K55	6609'	Casing DV tool @ 3377'	1st Stage: 1032 cf 'B' 50/50 Poz w/118 cf 'B' Neat cmt. 2nd Stage: 1881 cf 'B' 65/35 Poz	3377' Surface
	2-3/8"			6575'	Tubing		

FORMATION TOPS:

Ojo Alamo	Point Lookout
Kirtland	Mancos
Fruitland Coal	Gallup
Pictured Cliffs	Greenhorn
Lewis	Graneros
Cliffhouse	Dakota

LOGGING:

PERFORATIONS
Dakota 6558'-6576' - 4 SPF
Reperf 6396'-6410', 6420'-6424', 6476'-6508', 6516'-6520' (2 SPF)

STIMULATION:
Frac w/20,000 gal. 30# gel. and 25,000# 20/40 sand.
Frac w/70,000 gal. 70Q foam and 90,000# 20/40 sand.

WORKOVER HISTORY:

PRODUCTION HISTORY: Gas Oil

RESERVE INFORMATION: Gas Oil

PIPELINE:

PERTINENT DATA SHEET
10/21/96

WELLNAME: Duff Gas Com #1	**OPERATOR:** Amoco Production Company
WELL TYPE: Dakota	**ELEVATION:** GL
LOCATION: 790' FNL, 1015' FWL Sec. 34, T30N, R12W San Juan County, NM	**INITIAL POTENTIAL:** Test **INITIAL SICP:** Psi
OWNERSHIP: **GWI:** **NRI:** **SJBT:**	**DRILLING:** **SPUD DATE:** 1/30/62 **COMPLETED:** 3/7/62 **TOTAL DEPTH:** 6425' **PBTD:** 6320'

CASING RECORD:

HOLE SIZE	SIZE	WEIGHT	GRADE	DEPTH	EQUIP.	CEMENT	TOC
12-1/4"	8-5/8"	32.7#		354'	Casing	250 sxs 'B' cmt.	Circ. to surface.
7-7/8"	4-1/2"	10.5#		6425'	Casing DV tool @ 1994'	1st Stage: 600 sxs Incor 4% gel 1-1/2# Tuff Plug, followed by 100 sxs Neat 2nd Stage: 500 sxs Incor 4% gel	2276' (Calc) Surface
	2-3/8"			6286'	Tubing		

FORMATION TOPS:

Ojo Alamo	Point Lookout
Kirtland	Mancos
Fruitland Coal	Gallup
Pictured Cliffs	Greenhorn
Lewis	Graneros
Cliffhouse	Dakota

LOGGING:

PERFORATIONS
Dakota 6275'-6281', 6313'-6319' (6 SPF)
Re-perf 6203'-6212', 6219'-6225' (2 SPF)

STIMULATION:
Original Acidize w/1000 gal. 7-1/2% MCA. Frac w/70,800 gal. 20# gel and 60,000# sand @ 31 BPM.
Refrac Breakdown w/2% KCl. Frac w/27,783 gal. and 52,000# 20/40 sand.

WORKOVER HISTORY:
9/24/81: Set RBP @ 6250'. Perf 6203'-6212', 6219'-6225' (2 SPF). Breakdown w/2% KCl. Frac w/27,783 gal. and 52,000# 20/40 sand. Cleanout and pull RBP. Tubing set @ 6286'. PBTD @ 6320'.

PRODUCTION HISTORY: Gas Oil

RESERVE INFORMATION: Gas Oil

PIPELINE:

ATTACHMENT NO. 4

Proposed Operations

(Item No. VII on Form C-108)

VII. Proposed Operations

1. The proposed average daily injection volume: 2,500 Bbl
   The proposed maximum daily injection volume: 5,000 Bbl

2. This is a closed system.

3. The proposed average injection pressure: 1,650 psig
   The approved maximum injection pressure: 2,370 psig

4. The injection water analysis is attached.

5. The formation water analysis is attached.

Saturation Index Calculations

Champion Technologies, Inc.
(Based on the Tomson-Oddo Model)

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 5 & 6
Date	10/31/96

Water Analysis (mg/L)

Calcium	321
Magnesium	49
Barium	0
Strontium	0
Sodium*	13076
Bicarbonate Alkalinity	1,110
Sulfate	3,020
Chloride	18,000

* - Calculated Value

Appended Data

H2S	51 mg/L
Iron	1 mg/L
C02	180 mg/L

Physical Properties

Ionic Strength*	0.63
pH†	6.30
Temperature	85°F
Pressure	100 psia

* - Calculated Value † - Known/Specified Value

Calcite Calculation Information

Calculation Method	*Value*
pH	6.30
Bicarbonate Alkalinity Correction(s)	*Value*
None Used	---

SI & PTB Results

Scale Type	*SI*	*PTB*
Calcite (Calcium Carbonate)	-0.83	N/A
Gypsum (Calcium Sulfate)	-0.83	N/A
Hemihydrate (Calcium Sulfate)	-0.76	N/A
Anhydrite (Calcium Sulfate)	-1.08	N/A
Barite (Barium Sulfate)	N/A	N/A
Celestite (Strontium Sulfate)	N/A	N/A

2 B&B

Ranged Data

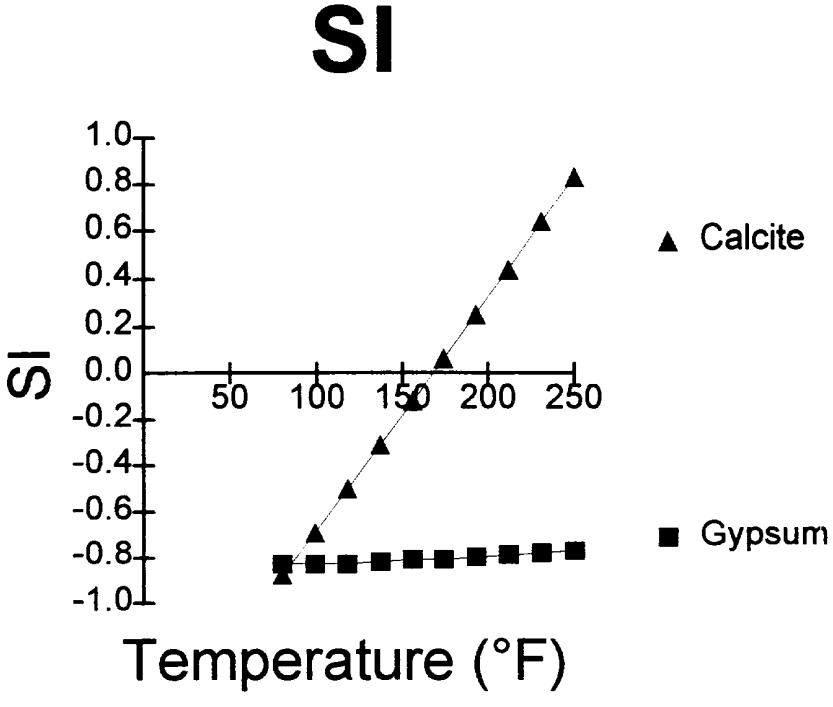
Champion Technologies, Inc.

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 5 & 6
Date	10/31/96

SI Results

Temperature (°F)	*Calcite*	*Gypsum*
80	-0.88	-0.83
99	-0.69	-0.83
118	-0.50	-0.83
137	-0.31	-0.82
156	-0.12	-0.81
174	0.06	-0.81
193	0.25	-0.80
212	0.44	-0.79
231	0.64	-0.78
250	0.83	-0.77



Saturation Index Calculations

Champion Technologies, Inc.
(Based on the Tomson-Oddo Model)

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tank #2
Date	10/31/96

Water Analysis (mg/L)

Calcium	321
Magnesium	292
Barium	0
Strontium	0
Sodium*	9236
Bicarbonate Alkalinity	458
Sulfate	3,245
Chloride	13,000

* - Calculated Value

Appended Data

H2S	68 mg/L
Iron	2 mg/L
C02	190 mg/L

Physical Properties

Ionic Strength*	0.50
pH†	5.30
Temperature	85°F
Pressure	100 psia

* - Calculated Value † - Known/Specified Value

Calcite Calculation Information

Calculation Method	*Value*
pH	5.30
Bicarbonate Alkalinity Correction(s)	*Value*
None Used	---

SI & PTB Results

Scale Type	*SI*	*PTB*
Calcite (Calcium Carbonate)	-2.11	N/A
Gypsum (Calcium Sulfate)	-0.78	N/A
Hemihydrate (Calcium Sulfate)	-0.69	N/A
Anhydrite (Calcium Sulfate)	-1.04	N/A
Barite (Barium Sulfate)	N/A	N/A
Celestite (Strontium Sulfate)	N/A	N/A

Ranged Data

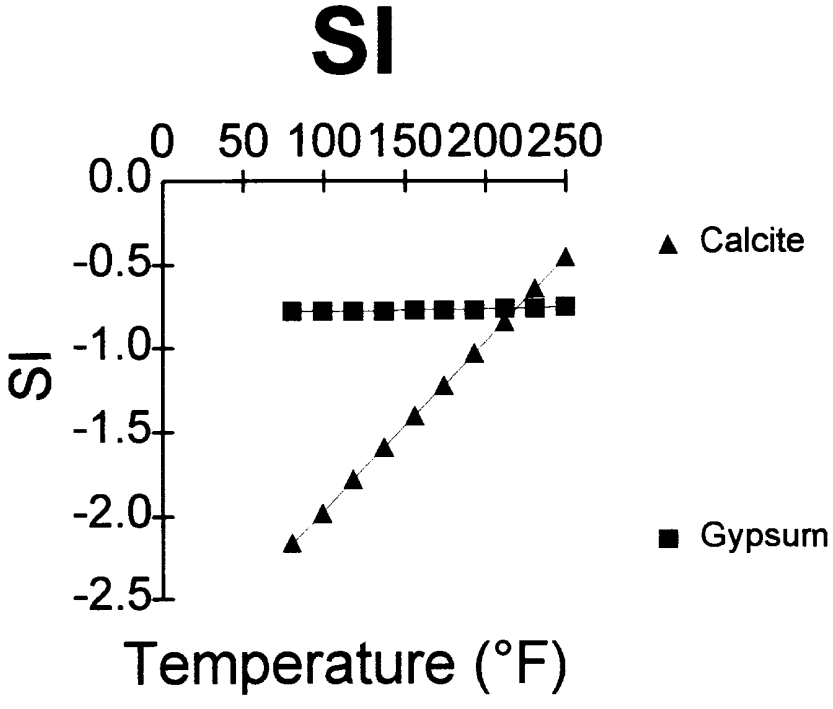
Champion Technologies, Inc.

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tank #2
Date	10/31/96

SI Results

Temperature (°F)	*Calcite*	*Gypsum*
80	-2.16	-0.78
99	-1.98	-0.78
118	-1.78	-0.78
137	-1.59	-0.78
156	-1.40	-0.77
174	-1.22	-0.77
193	-1.03	-0.77
212	-0.84	-0.76
231	-0.64	-0.76
250	-0.45	-0.75



Saturation Index Calculations

Champion Technologies, Inc.

(Based on the Tomson-Oddo Model)

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 7 & 8
Date	10/31/96

Water Analysis (mg/L)

Calcium	321
Magnesium	194
Barium	0
Strontium	0
Sodium*	9144
Bicarbonate Alkalinity	3,782
Sulfate	49
Chloride	13,000

* - Calculated Value

Appended Data

H2S	393 mg/L
Iron	1 mg/L
C02	180 mg/L

Physical Properties

Ionic Strength*	0.45
pH†	6.90
Temperature	85°F
Pressure	100 psia

* - Calculated Value † - Known/Specified Value

Calcite Calculation Information

Calculation Method	*Value*
pH	6.90
Bicarbonate Alkalinity Correction(s)	*Value*
None Used	---

SI & PTB Results

Scale Type	*SI*	*PTB*
Calcite (Calcium Carbonate)	0.45	164.5
Gypsum (Calcium Sulfate)	-2.51	N/A
Hemihydrate (Calcium Sulfate)	-2.41	N/A
Anhydrite (Calcium Sulfate)	-2.77	N/A
Barite (Barium Sulfate)	N/A	N/A
Celestite (Strontium Sulfate)	N/A	N/A

Ranged Data

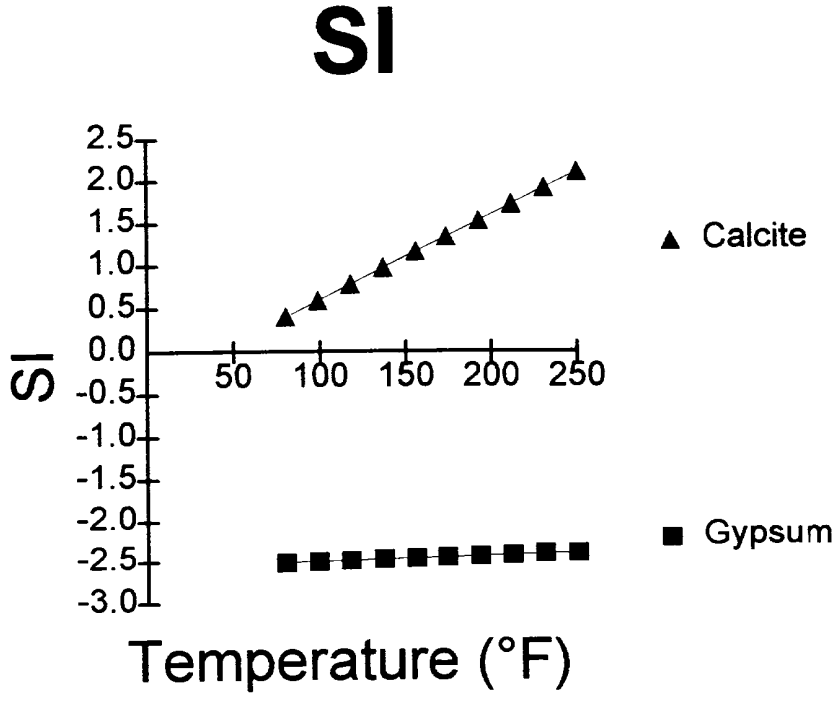
Champion Technologies, Inc.

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 7 & 8
Date	10/31/96

SI Results

Temperature (°F)	*Calcite*	*Gypsum*
80	0.40	-2.51
99	0.59	-2.50
118	0.78	-2.49
137	0.97	-2.47
156	1.16	-2.46
174	1.34	-2.45
193	1.53	-2.43
212	1.73	-2.42
231	1.92	-2.40
250	2.11	-2.39



Saturation Index Calculations

Champion Technologies, Inc.
(Based on the Tomson-Oddo Model)

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 3 & 4
Date	10/31/96

Water Analysis (mg/L)

Calcium	80
Magnesium	97
Barium	0
Strontium	0
Sodium*	7475
Bicarbonate Alkalinity	2,196
Sulfate	3,625
Chloride	8,000

* - Calculated Value

Appended Data

H2S	9 mg/L
Iron	8 mg/L
C02	300 mg/L

Physical Properties

Ionic Strength*	0.38
pH†	6.80
Temperature	85°F
Pressure	100 psia

* - Calculated Value † - Known/Specified Value

Calcite Calculation Information

Calculation Method	*Value*
pH	6.80
Bicarbonate Alkalinity Correction(s)	*Value*
None Used	---

SI & PTB Results

Scale Type	*SI*	*PTB*
Calcite (Calcium Carbonate)	-0.42	N/A
Gypsum (Calcium Sulfate)	-1.28	N/A
Hemihydrate (Calcium Sulfate)	-1.17	N/A
Anhydrite (Calcium Sulfate)	-1.55	N/A
Barite (Barium Sulfate)	N/A	N/A
Celestite (Strontium Sulfate)	N/A	N/A

Ranged Data

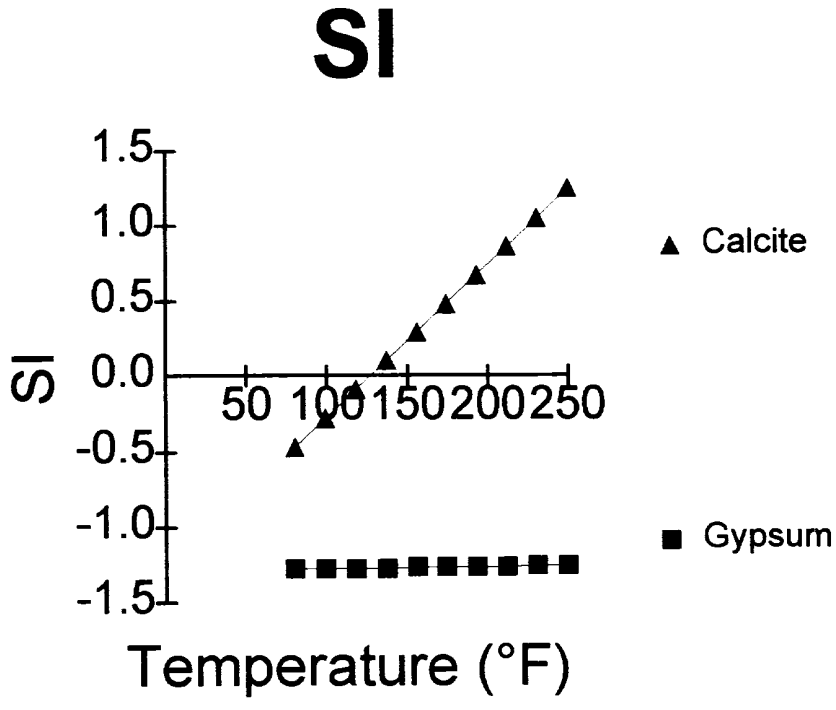
Champion Technologies, Inc.

Site Information

Company	Burlington Resources
Field	McGrath SWD
Point	Tanks 3 & 4
Date	10/31/96

SI Results

Temperature (°F)	*Calcite*	*Gypsum*
80	-0.47	-1.28
99	-0.28	-1.28
118	-0.09	-1.28
137	0.10	-1.28
156	0.29	-1.27
174	0.48	-1.27
193	0.67	-1.27
212	0.86	-1.27
231	1.05	-1.26
250	1.25	-1.26



"Exhibit H"

ANALYSIS NO. ST-76

API FORM 45.1

FIELD RECEIPT NO. ___

API WATER ANALYSIS REPORT FORM

Company: Coleman Oil & Gas		Sample No.: 2		Date Sampled: 02-25-92
Field	Legal Description: Sec 2 T29N R8W		County or Parish: San Juan	State: NM
Lease or Unit: Sunco Disposal	Well: #1	Depth: 4-	Formation: M.V. (Pt. Lookout)	Water, B/D:
Type of Water (Produced, Supply, etc.): Produced	Sampling Point: Pit			Sampled By:

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	7451	323.94
Calcium, Ca	168	8.40
Magnesium, Mg	39	3.20
Barium, Ba	—	—
Potassium, K	720	18.41

ANIONS		
Chloride, Cl	11879	335.10
Sulfate, SO_4	185	3.85
Carbonate, CO_3	0	0
Bicarbonate, HCO_3	915	15.00
Hydroxide, OH	0	0

OTHER PROPERTIES

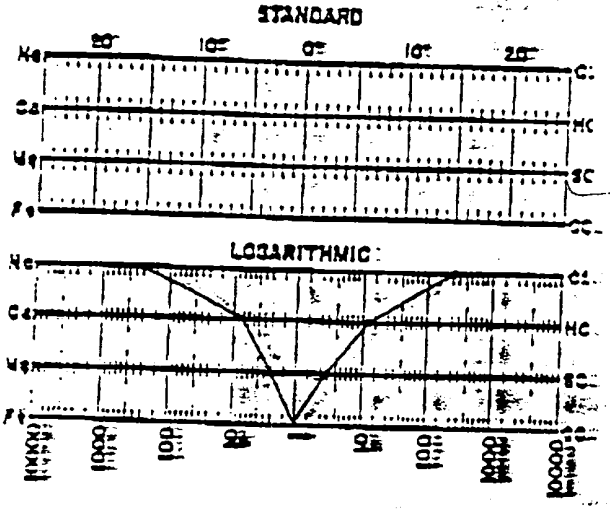
pH	7.01
Specific Gravity, 60/60 F.	1.013
Resistivity (ohm-meters) 78 F.	.35
Total Hardness	580

Total Dissolved Solids (calc.) 21357

Fe, Fe (total) 25 ppm

Sulfide as H_2S neg

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS:

ANALYST: Lee

PLEASE REFER ANY QUESTIONS TO:

WESTERN CO. OF NORTH AMERICA
FARMINGTON, N.M.
MIKE AULT-District Engineer
(505) 327-6222

FARMINGTON DIS "Exhibit I"

LABORATORY WATER

To: Southland Royalty

Attn: Doug Harris

Box 570

Farmington, N.M. 87499

Date 9/12/84

4255 - 4377

Submitted by Doug Harris Date Rec.

Well No. McGrath #4 Depth 4255' - 4377' Formation Point Lookout

County. Field Source DST #2 4255' - 4377'

	Top Recovery	Bottom Recovery	Sample Chamber
Resistivity	3.16@ 65°F	.97@ 71°F	.68 @ 68°F
Specific Gravity			
pH	8.47	7.53	7.86
Calcium (Ca)	55	210	210 *MPL
Magnesium (Mg)	NT	NT	35
Chlorides (Cl)	2900	6950	6900
Sulfates (SO_4)			
Bicarbonates (HCO_3)	320	705	670
Soluble Iron (Fe)	NT	NT	NT

Remarks:

*Milligrams per liter

Respectfully submitted,

Analyst:

HALLIBURTON COMPANY

By

NOTICE

ATTACHMENT NO. 5

Geologic Data

(Item No. VIII on Form C-108)

The following description was submitted with the original disposal application on June 21, 1983:

A sample log run on the J. Hudson #3, NW 35-30-12, indicates the Point Lookout in this area consists of sandstone-shale sequences typical of the Point Lookout. The shales are described as greenish gray, silty, soft to medium soft. The sandstones are predominately green to gray green colored, coarse large grained to conglomeratic quartz. The lowermost sandstones change to white to amber coarse grained, quartz. Some traces of coal were mentioned, but are probably remnants from the Menefee section.

There is a structural rise across section 34 from the NE to the SW of 10' which is typical of the slope into the central basin. There is no surface or subsurface evidence of faulting in the vicinity of this well.

Recent logs on Dakota infill wells in the area indicate porosity value ranges of 8% to 12%. The average for this site will be in the 9 to 10% range.

Average thickness of the proposed injection intervals within the Point Lookout is estimated as 68'. This interval is found in the depth range of 4000' -4400' in offset wells. A correlation cross-section for the proposed site is attached.

The only overlying sources of drinking water are the Nacimiento strata exposed at the surface. The Ojo Alamo is present at 456' to 595'. It is proposed to set surface casing through this interval for positive protection even though it contains non-potable water.

ATTACHMENT NO. 6

Proposed Stimulation

(Item No. IX on Form C-108)

During the Class I conversion process, BR plans to acidize the injection interval with 3,000 gallons of 15% hydrochloric acid.

ATTACHMENT NO. 7

Fresh Water Analysis

(Item No. XI on Form C-108)

The attached analysis was submitted with the original permit application on June 21, 1983.

ATTACHMENT #7

The following water analysis were obtained from domestic water wel's in the area on June 6, 1983.

Well Owner	Location	Depth	TDS	H_2S	Na	Cu	Mg	Fe	K	Cl	HCO_3	SO_4	CO_3	OH
Dave Thomas	NE-33-30-12	40'	789	neg	44	117	41	<.05	1.04	19.6	286	280	<1	<.5
Randy Burson	SE-27-30-12	68'	859	neg	59.8	115	41	<.05	1.27	33.1	411	198	<1	<.5
R. D. Carter	SE-27-30-12	72'	1592	neg	27.6	370	44	<.05	1.6	22.4	165	961	<1	<.5

All values reported are mg/l.

ATTACHMENT NO. 8

Statement

(Item No. XII on Form C-108)

I hereby certify that I have examined available geologic and engineering data and can find no evidence of open faults or any other hydrological connection between the disposal zone and any underground source of drinking water.

Kevin L. Midkiff
Sr. Operations Engineer

Nov. 25, 1996
Date