B-29-30N-13W

5847 San Felipe Suite 3600
Houston, Texas 77057
Telephone: (713) 780-5000
Fax (713) 780-5273
Telex 9108813603

March 11, 1991

State of New Mexico
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504-2088

BHP Petroleum
(Americas) Inc

Attention: Mr. David Catanach

RE: Administrative Amendment Request
Order No. SWD - 225
Gallegos Canyon Unit #306 (SWD)
NE¼ , SE¼ , Sec. 19, T29N, R12W
San Juan County, New Mexico

RECEIVED
MAR 1 8 1991
OIL CON. DIV.
DIST. 3

Dear Mr. Catanach:

BHP Petroleum respectfully requests that the above referenced Order be administratively amended to allow disposal of water produced from the Fruitland Coal formation along with the Pictured Cliffs produced water into the Mesaverde formation.

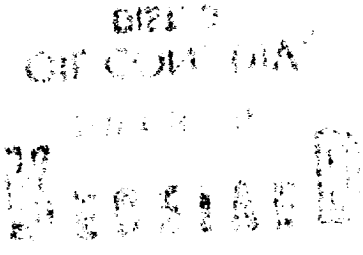
I recently discussed with you over the phone my written request of February 28, 1991, concerning BHP Petroleum's desire to increase the perforation density in the subject well. I appreciated your verbal approval to do the requested work conditioned by reducing the surface injection pressure back to 600 psi.

It now has come to my attention that the subject well is the closest salt water disposal well to some of our recently completed Fruitland Coal wells.

I've enclosed several water analyses representative of the water produced from our coal wells. I've also enclosed representative analysis of the water from the Mesaverde formation.

As you will notice the quality of the water produced from both the Pictured Cliffs and Fruitland Coal formations are quite similar.

Your earliest review and response would be greatly appreciated.



Please don't hesitate to call me at (713) 780-5448, if you have any questions or need any additional information.

Sincerely,

Melissa Forbes

for Chuck Williams
Administrator, Field Services
Inland Business Unit

CW:rm

Enclosures - Water analyses

cc: Ernie Busch, NMOCD in Aztec, NM.
Well file

API WATER ANALYSIS REPORT FORM

Laboratory No. 25-910226-4B

Company	Sample No.	Date Sampled
BHP PETROLEUM		

Field	Legal Description	County or Parish	State
	Sec. 25, T29N, R13W	SAN JUAN	NM

Lease or Unit	Well	Depth	Formation	Water, B/D
	GCU 393		FRUITLAND COAL	

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	25035	1088.5
Calcium, Ca	224	18.4
Magnesium, Mg	262	21.6
Barium, Ba		

ANIONS		
Chloride, Cl	39586	1117
Sulfate, So_4		
Carbonate, CO_3		
Bicarbonate, HCO_3	702	11.5

Total Dissolved Solids (calc.) 65809

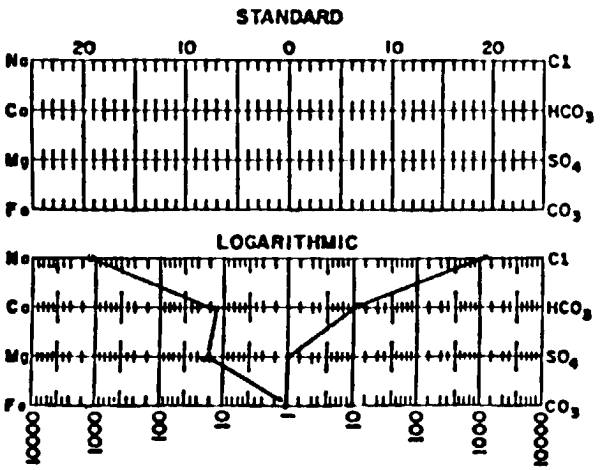
Iron, Fe (total)

Sulfide, as H_2S

OTHER PROPERTIES

pH	6.51
Specific Gravity, 60/60 F.	1.042
Resistivity (ohm-meters) 68° F.	2.129

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS:

Date Received	Preserved	Date Analyzed	Analyzed By
2-6-91		2-8-91	MKL

TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311

API WATER ANALYSIS REPORT FORM

Laboratory No.

Company BHP		Sample No. 2		Date Sampled
Field	Legal Description Sec 20 T29N R12W		County or Parish SJ	State NM
Lease or Unit Gallegos Canyon	Well #381	Depth	Formation Fr. Coal	Water, B/D
Type of Water (Produced, Supply, etc.)		Sampling Point Production Unit		Sampled By J.C. Harris

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	14,730	640
Calcium, Ca	421	21.0
Magnesium, Mg	183	15.0
Barium, Ba		

ANIONS		
Chloride, Cl	24,430	660
Sulfate, So_4	0	0
Carbonate, CO_3	0	0
Bicarbonate, HCO_3	1010	16.5

Total Dissolved Solids (calc.) 40,770

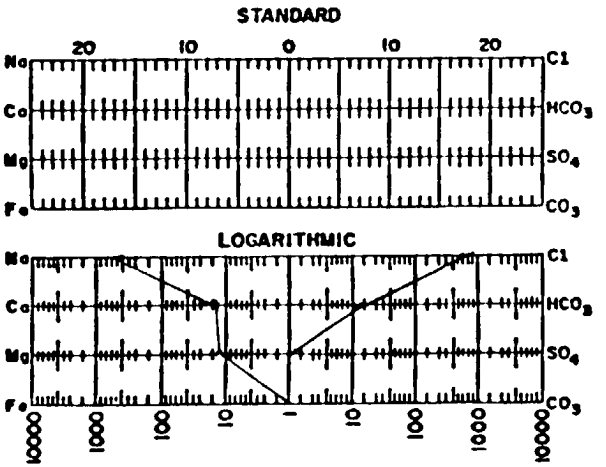
Iron, Fe (total)

Sulfide, as H_2S 0

OTHER PROPERTIES

pH	7.55
Specific Gravity, 60/60 F.	1.0307
Resistivity (ohm-meters) 72° F.	0.200

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS:

Date Received	Preserved	Date Analyzed	Analyzed By
7/31/90		8/1/90	BT

TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311

2503-3068

API WATER ANALYSIS REPORT FORM

TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311

Laboratory No.

Company: BHP		Sample No.	Date Sampled: 5/24	
Field	Legal Description	County or Parish	State	
Lease or Unit	Well: CCW 385	Depth	Formation: Ft Coal	Water, B/D
Type of Water (Produced, Supply, etc.)	Sampling Point: Prod. Unit		Sampled By	

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	15641	683.0
Calcium, Ca	321	16.0
Magnesium, Mg	170	14.0
Barium, Ba		

ANIONS		
Chloride, Cl	24673	695.0
Sulfate, So_4	0	0
Carbonate, CO_3	0	0
Bicarbonate, HCO_3	1098	18.0

Total Dissolved Solids (calc.): 31,900

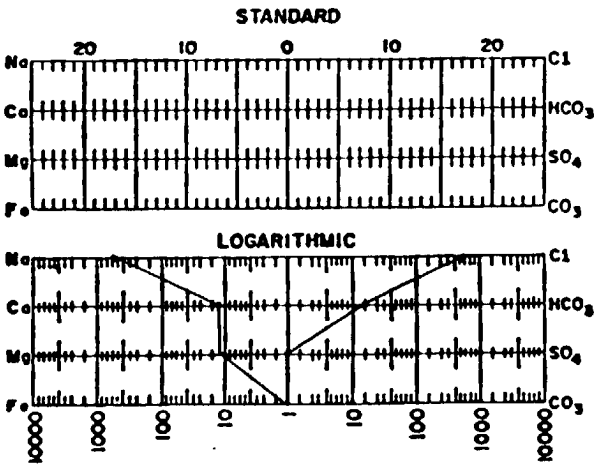
Iron, Fe (total):

Sulfide, as H_2S:

OTHER PROPERTIES

pH	7.45
Specific Gravity, 60/60 F.	1.016
Resistivity (ohm-meters) 77° F.	.28

WATER PATTERNS — me/l



REMARKS & RECOMMENDATIONS:

Date Received	Preserved	Date Analyzed	Analyzed By
		5/29/90	Jacque Wehrt

API WATER ANALYSIS REPORT FORM

Laboratory No. 25-910111-2C

Company	Sample No.	Date Sampled
BHP PETROLEUM		1-9-91

Field	Legal Description	County or Parish	State
	NE/NE S13-T29N-R13W	SAN JUAN	NM

Lease or Unit	Well	Depth	Formation	Water, B/D
	GCU 386		FRUITLAND	

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By

TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	12896	560.7
Calcium, Ca	637	31.8
Magnesium, Mg	207	17
Barium, Ba		

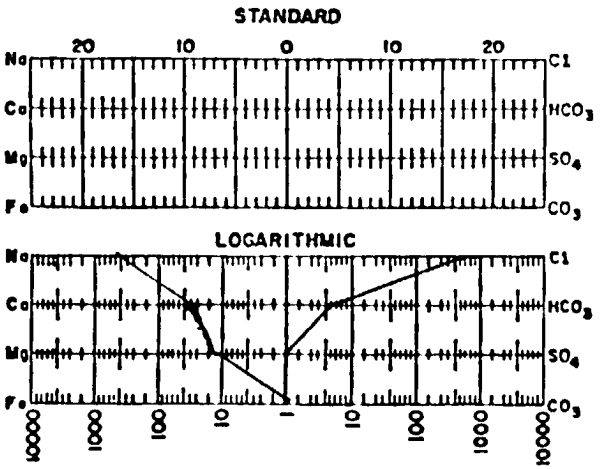
ANIONS		
Chloride, Cl	21412	604
Sulfate, So_4		ND
Carbonate, CO_3		
Bicarbonate, HCO_3	336	5.5

Total Dissolved Solids (calc.)	35488
Iron, Fe (total)	
Sulfide, as H_2S	

OTHER PROPERTIES

pH	6.63
Specific Gravity, 60/60 F.	1.032
Resistivity (ohm-meters) 64° F.	0.19

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS:

Date Received	Preserved	Date Analyzed	Analyzed By
1-11-91		1-14-91	MKL

CL1-12A (REV. 1964) Exhibit B

RECEIVED
AUG 22 1980
RMD CASPER

CHEMICAL & GEOLOGICAL LABORATORIES

P. O. Box 2794
Casper, Wyoming

WATER ANALYSIS REPORT

OPERATOR Energy Reserves Group, Inc.
WELL NO. Well No. 288
FIELD Kutz-PC
COUNTY San Juan
STATE New Mexico

DATE 8-19-80 LAB NO. 34974-2
LOCATION
FORMATION Pictured Cliffs
INTERVAL
SAMPLE FROM Separator (7-30-80)

REMARKS & CONCLUSIONS:

Cations	mg/l	meq/l	Anions	mg/l	meq/l
Sodium	16284	708.35	Sulfate	0	0.00
Potassium	80	2.05	Chloride	27000	761.40
Lithium	-	-	Carbonate	0	0.00
Calcium	659	32.88	Bicarbonate	525	8.60
Magnesium	325	26.72	Hydroxide	-	-
Iron	present		Hydrogen sulfide	-	-
Total Cations		770.00	Total Anions		770.00

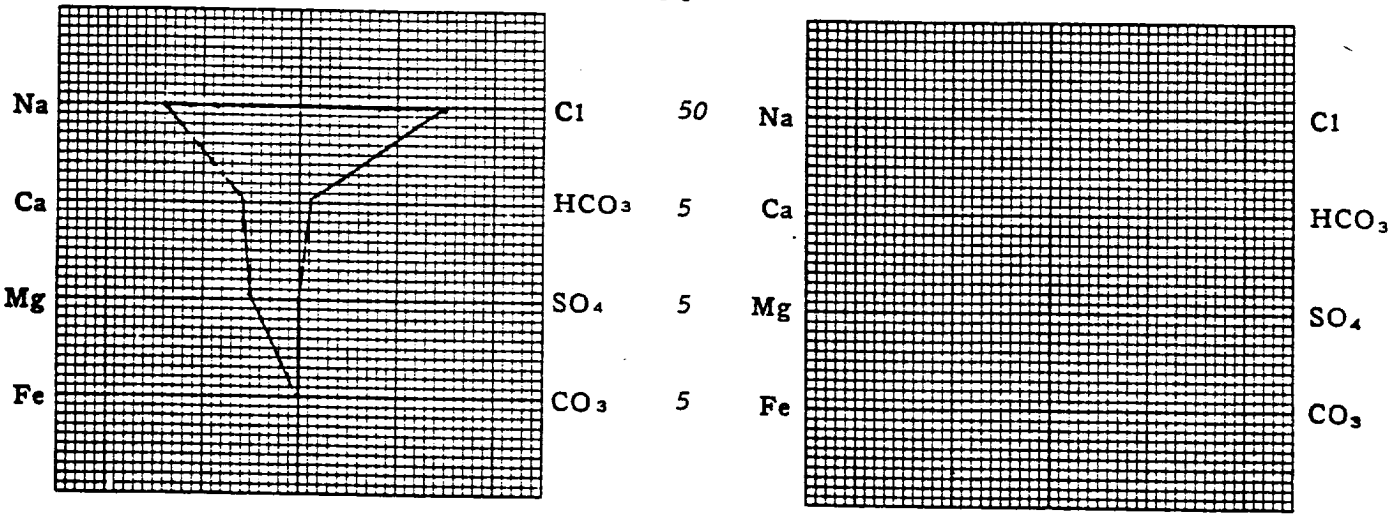
Total dissolved solids, mg/l 44606
NaCl equivalent, mg/l 44782
Observed pH 6.7

Specific resistance @ 68°F.:
Observed 0.164 ohm-meters
Calculated 0.155 ohm-meters

WATER ANALYSIS PATTERN

Sample above described

Scale
MEQ per Unit



(Na value in above graphs includes Na, K, and Li)
NOTE: Mg/l=Milligrams per liter Meq/l= Milligram equivalents per liter
Sodium chloride equivalent=by Dunlap & Hawthorne calculation from components

API WATER ANALYSIS REPORT FORM

Laboratory No. 25-910214-4A

Company	Sample No.	Date Sampled
B.H.P. Petroleum		2-8-91

Field	Legal Description	County or Parish	State
	NE/4, SE/4 Sec 7, T28N, R11W		

Lease or Unit	Well	Depth	Formation	Water, B/D
	G.C.U. 516		Picture Cliff	

Type of Water (Produced, Supply, etc.)	Sampling Point	Sampled By
PSI: 200# Temp: 58°F		

TECH, Inc.
333 East Main
Farmington
New Mexico
87401
505/327-3311

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	15,338	668
Calcium, Ca	1137	56.72
Magnesium, Mg	331	27.28
Barium, Ba		

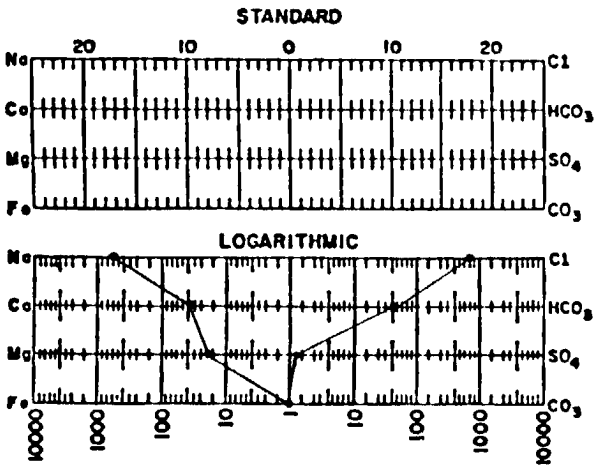
ANIONS		
Chloride, Cl	26410	745
Sulfate, So_4	14	0.3
Carbonate, CO_3		
Bicarbonate, HCO_3	428	7.02

Total Dissolved Solids (calc.)	43658
Iron, Fe (total)	
Sulfide, as H_2S	

OTHER PROPERTIES

pH	6.9
Specific Gravity, 60/60 F.	1.0344
Resistivity (ohm-meters) 71.6 F.	0.17

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS:

Date Received		Date Analyzed	Analyzed By
2-14-91		2-14-91	M.A.

BAROID DIVISION
N L Industries, Inc.
P.O. Box 1675 Houston, Texas 77001

WATER ANALYSIS TEST REPORT

BAROID TREATING CHEMICALS

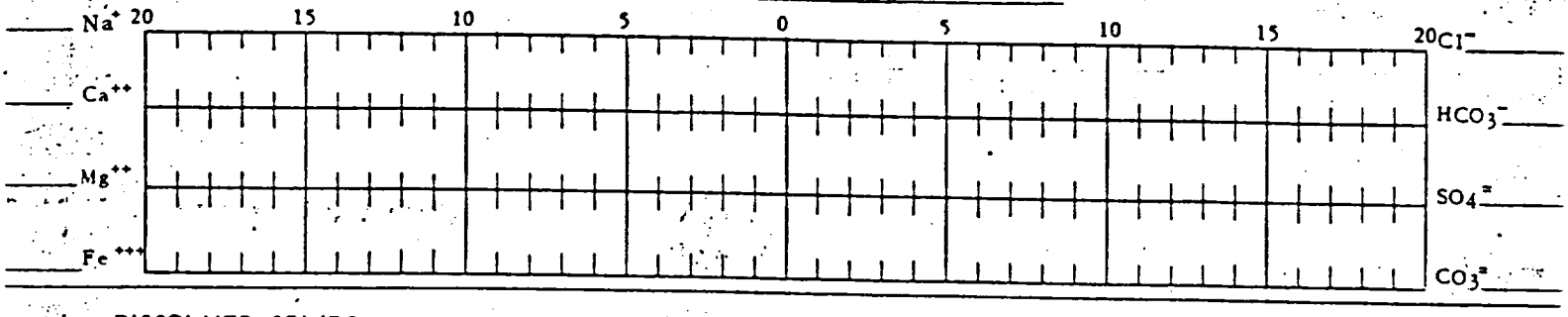
Exhibit D

RECEIVED JUN 20 1977

COMPANY: Energy Reserves			SHEET NUMBER / DATE: 6-10-77
FIELD: Basin Dakota		COUNTY OR PARISH: San Juan	STATE: N. Mexico
LEASE OR UNIT: King Gas Com.	WELL(S) NAME OR NO.: #1	WATER SOURCE (FORMATION): Mesaverde - Cliffhouse	
DEPTH, FT. / BHT, F / SAMPLE SOURCE / TEMP, F		WATER, BBL/DAY / OIL, BBL/DAY / GAS, MMCF/DAY	
TYPE OF OIL	API GRAVITY: °	TYPE OF WATER: ☒ PRODUCED WATER ☐ INJECTION WATER OTHER	

WATER ANALYSIS PATTERN

(NUMBER BESIDE ION SYMBOL INDICATES me/l * SCALE UNIT)



DISSOLVED SOLIDS

CATIONS	me/l	mg/l*
Total Hardness		
Sodium, Na^+ (calc.)		
Calcium, Ca^{++}	2	40
Magnesium, Mg^{++}	6	73
Iron (Total), Fe^{+++}		1.9
ANIONS		
Chloride, Cl^-		10,600
Sulfate, $SO_4^=$		90
Carbonate, $CO_3^=$		1,200
Bicarbonate, HCO_3^-	232	14,152
Hydroxyl, OH^-		-0-
Sulfide, $S^=$		
Phosphate-Meta, PO_3^-		
Phosphate-Ortho, $PO_4^=$		

DISSOLVED GASES

Hydrogen Sulfide, H_2S		mg/l *
Carbon Dioxide, CO_2		mg/l *
Oxygen, O_2		mg/l *

PHYSICAL PROPERTIES

pH	8.4	
Eh (Redox Potential)		MV
Specific Gravity		
Turbidity, JTU Units		
Total Dissolved Solids (Calc.)		mg/l *
Stability Index @ F		
@ F		
$CaSO_4$ Solubility @ F		mg/l *
@ F		mg/l *
Max. $CaSO_4$ Possible (Calc.)		mg/l *
Max. $BaSO_4$ Possible (Calc.)		mg/l *
Residual Hydrocarbons		ppm(Vol/Vo

SUSPENDED SOLIDS (QUALITATIVE)

Iron Sulfide ☐ Iron Oxide ☐ Calcium Carbonate ☐ Acid Insoluble ☐

REMARKS AND RECOMMENDATIONS:

* NOTE: me/l and mg/l are commonly used interchangeably for epm and ppm respectively. Where epm and ppm are used, corrections should be made for specific gravity.

BTC ENGINEER: Max Woolery	DIST. NO.	ADDRESS: Farmington, NM	325-9701	HOME PHONE
TESTED: Woolery	DATE: 6-10-77	DISTRIBUTION: ☐ CUSTOMER ☐ BTC ENGINEER OR ☐ BTC LAB ☐ AREA OR ☐ DISTRICT OFFICE ☐ BTC SALES SUPERVISOR		