

Compatibility Analysis of the

Proposed Injection Fluid and San Andres Formation Water

707 North Leech

P.O.Box 1499

Hobbs, New Mexico 88240

Company : CONOCO, INC

Date : 06-13-1990

Sample 1: Compatability Report - Warren McKee Unit #24

	Sample 1	Sample 2	Sample 3
Specific Gravity:	1.047	1.051	1.044
Total Dissolved Solids:	66467	72011	60922
pH:	7.00	7.00	7.00
IONIC STRENGTH:	1.319	1.429	1.210

CATIONS:		me/liter	mg/liter	me/liter	mg/liter	me/liter	mg/liter
Calcium	(Ca ⁺²)	200	4000	216	4320	184	3620
Magnesium	(Mg ⁺²)	97.9	1190	109	1320	86.7	1050
Sodium	(Na ⁺¹)	856	19700	928	21300	784	18000
Iron (total)	(Fe ⁺²)	1.52	42.5	1.12	31.3	1.92	53.8
Barium	(Ba ⁺²)	0.075	5.15	0.112	7.72	0.037	2.58
Manganese	(Mn ⁺²)	26.6	730	39.9	1100	13.3	365

ANIONS:		me/liter	mg/liter	me/liter	mg/liter	me/liter	mg/liter
Bicarbonate	(HCO ₃ ⁻¹)	11.6	708	11.1	677	12.1	738
Carbonate	(CO ₃ ⁻²)	0	0	0	0	0	0
Hydroxide	(OH ⁻¹)	0	0	0	0	0	0
Sulfate	(SO ₄ ⁻²)	31.0	1490	23.8	1140	38.2	1830
Chloride	(Cl ⁻¹)	1110	39400	1220	43200	1000	15600

DISSOLVED GASES

Carbon Dioxide	(CO ₂)	0	0	0
Hydrogen Sulfide	(H ₂ S)	0	0	0
Oxygen	(O ₂)	0	0	0

SCALING INDEX (positive value indicates scale)

Temperature	Calcium Carbonate	Calcium Sulfate	Calcium Carbonate	Calcium Sulfate	Calcium Carbonate	Calcium Sulfate
86°F 30°C	0.77	-11	0.77	-16	0.78	-5.7

Sample 1 = 50% (sample date 5/18/90) 50% (sample date 4/3/72)

Sample 2 = 75% (sample date 5/18/90) 25% (sample date 4/2/72)

Sample 3 = 100%

EXHIBIT 12-A

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION

EXHIBIT NO. 12-A

CASE NO. 9971

Submitted by Conoco Inc.

Hearing Date 6-27-90

STATEMENT OF WATER COMPATIBILITY



Home Office 707 N. Leech, P.O. Box 1499 / Hobbs, NM 88240 / Ph. 505/393-7751, TWX 910/986-0010

June 19, 1990

Mr. Paul Adams
Conoco, Inc.
10 Desta Drive West
Midland, TX 79705

Dear Mr. Adams:

We have evaluated water samples from the Warren Unit McKee #24 SWD and the San Andres formation. We find no compatibility problems with commingling these waters.

If you have any questions or require further information, please contact us.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Bill Steiner', is written over the typed name.

Bill Steiner
Product Manager

BS/sr

cc: Jay Brown
Joe Hay

EXHIBIT 12-B

BEFORE EXAMINER CATANACH
OIL CONSERVATION DIVISION

EXHIBIT NO. 12-B
CASE NO. 9971
Submitted by Conoco Inc.
Hearing Date 6-27-90