NM - 60

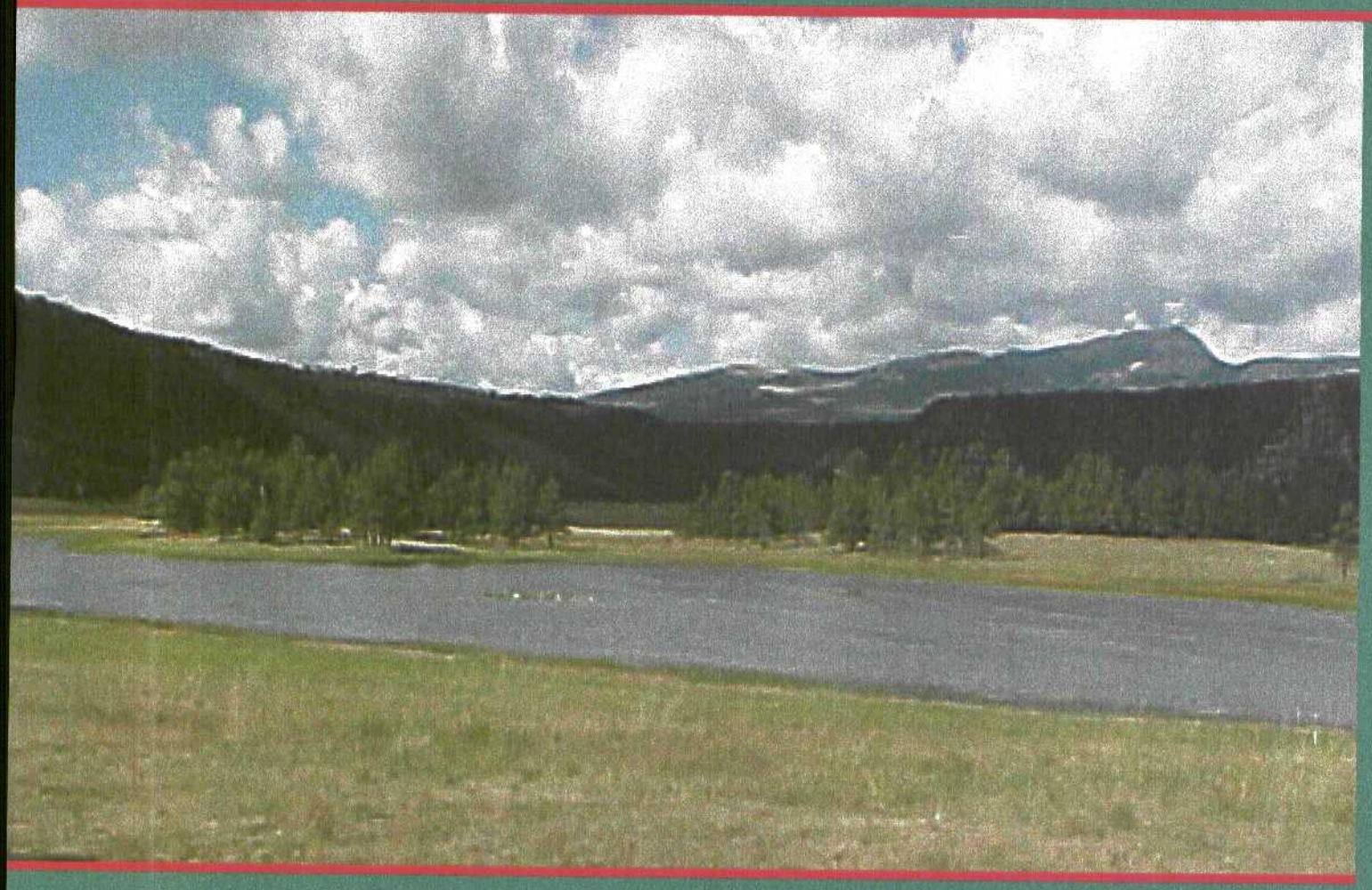
GENERAL CORRESPONDENCE

YEAR(S):

2000-

Raton Basin CBM Project
Block D Produced Water Management Program Site Tour

September 27, 2000



El Paso Energy Raton
Colfax County, New Mexico

R.T. Hicks Consultants, Ltd.

4665 Indian School NE, Suite 106, Albuquerque, NM 87110

Presentation of Working Hypotheses and Discussion

1. Injection will manage all produced water until June 2001
2. Injection will manage high TDS produced water after June 2001
3. "Small" discharges to small lakes in summer and fall will have no negative impact
4. "Large" discharges to East Bremmer Lake will produce no negative impact
5. Overflow of produced water to Middle Bremmer Lake requires careful management
6. Westernmost gas wells (proposed in 2001) will produce higher quality water than existing wells
7. Discharge of westernmost gas wells into West Bremmer Lake will improve ecosystem
8. Produced water quality of the westernmost wells will improve over time
9. Produced water management system can enhance ecosystem of Van Bremmer Canyon
10. The ecosystem of Marys Lake will be improved by the proposed produced water management system
11. Treatment to reduce produced water TDS is cost-effective for certain wells/areas
12. Complete restoration of the produced water management system is built into the design
13. Upon completion of construction in June 2001, the produced water management system will be embraced by Vermejo Park and approved by NMOCD.
14. After one year of operation, the system will be nominated for a national environmental award.

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Raton Basin CBM Project
Block D Produced Water Management Program
NMOCD Field Trip Agenda

8:00-8:45 **Office Briefing**

- Overview of Project
- Existing Production in Block D
- 2001 Proposed Expansion
- Future Expansion
- Water Produced at Present
- Future Water Production

8:45-9:45 **Drive to Block D**

- If you have the NMGS Vermejo Park Guidebook (1976), see Day 2 Road Log
- Set odometer to zero at office, with luck we will cross the railroad tracks at 1.2 miles
- Copy of Road Log attached - look for descriptions of upper Raton Formation and lower Poison Canyon Formation. These are the units exposed at the surface in much of the Block D area
- 17.8 miles - in 1976 a cattle guard marked the transition zone between the Raton and Poison Canyon Formation
- 31.3 miles - If time permits on our way back, we will walk/ride from 31.3 to 32.1 in order to examine the Poison Canyon/Raton Formation Transition Zone
- Changes in road geometry since 1976 makes the remainder of the log difficult. Note mile 42.8 is Vermejo Park Headquarters - the lunch stop for the 1976 trip, and our lunch stop as well.
- We turn left at mile 49.0, traveling up Rock Creek to Castle Valley Park. Here we pick up the Road Log for Day 3, Part V at Bubbling Spring (mile 4.5 of Part V). This is our first stop.

10:00 **Stop 1: Bubbling Spring**

- Part V Road Log, mile 4.5 tells the story
- Proposed surface water sampling point
- We will sample downstream from here in early October
- We will sample upstream from here in early October
- These three sampling points may provide a model for our produced water management system: a mixture of coal bed water and near-surface groundwater that creates a benefit and causes minimal degradation

10:30 **Stop 2: Injection Well and Well D-11**

- Injection well handles all produced water from existing wells in Block D
- Proposed sampling point for commingled produced water
- Proposed sampling point for Well D-11 produced water
- Brief discussion of existing produced water management system

11:00 **Stop 3: Well D-18**

- Proposed sampling point for produced water from Well D-18
- View of Dry Lake - deflation basin
- Sandstone bench (D-18 pad and below), underlain by mudstone and clayey sandstone
- Mudstone probably underlies lake bed
- Candidate for habitat enhancement through produced water management

11:45 **Stop 4 : Van Bremmer Canyon Windmill**

- Groundwater and surface water sampling point (October field program)
- Typical landscape of this creek that drains Van Bremmer Park
- Possible monitoring point for proposed produced water management system

12:15 **Stop 5: East Bremmer Lake**

- Proposed surface water sampling point
- Candidate for habitat enhancement through produced water management
- Center "crater" probably due to excavation during past droughts

12:30 **Stop 6: Middle Bremmer Lake**

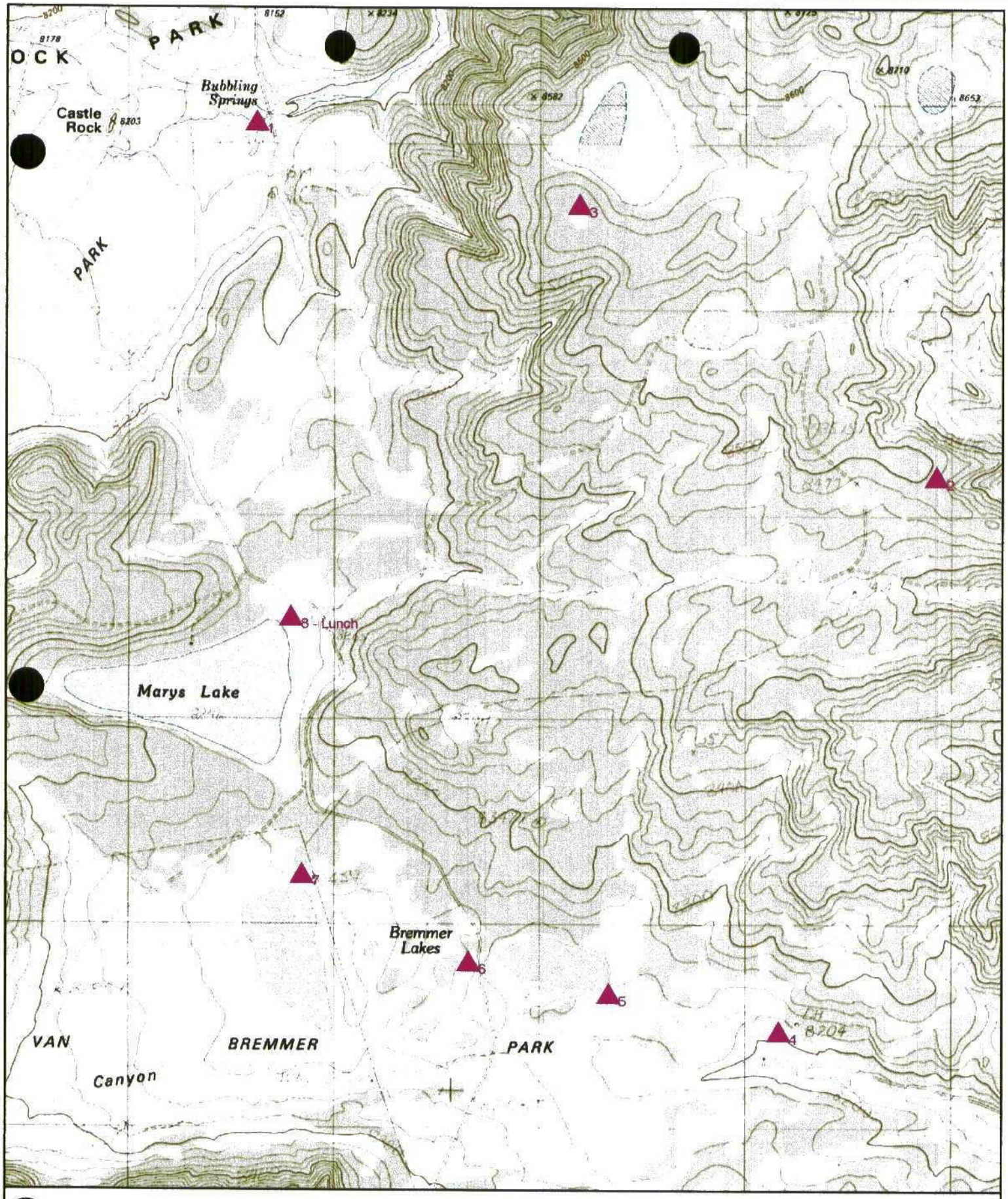
- Candidate for habitat enhancement through produced water management
- Produced water could enter here from East Bremmer Lake
- Surface water sampling point (October field program)

12:45 **Stop 7: West Bremmer Lake**

- Surface water sampling point (October field program)
- We have not resolved the role (if any) of this lake in produced water management program

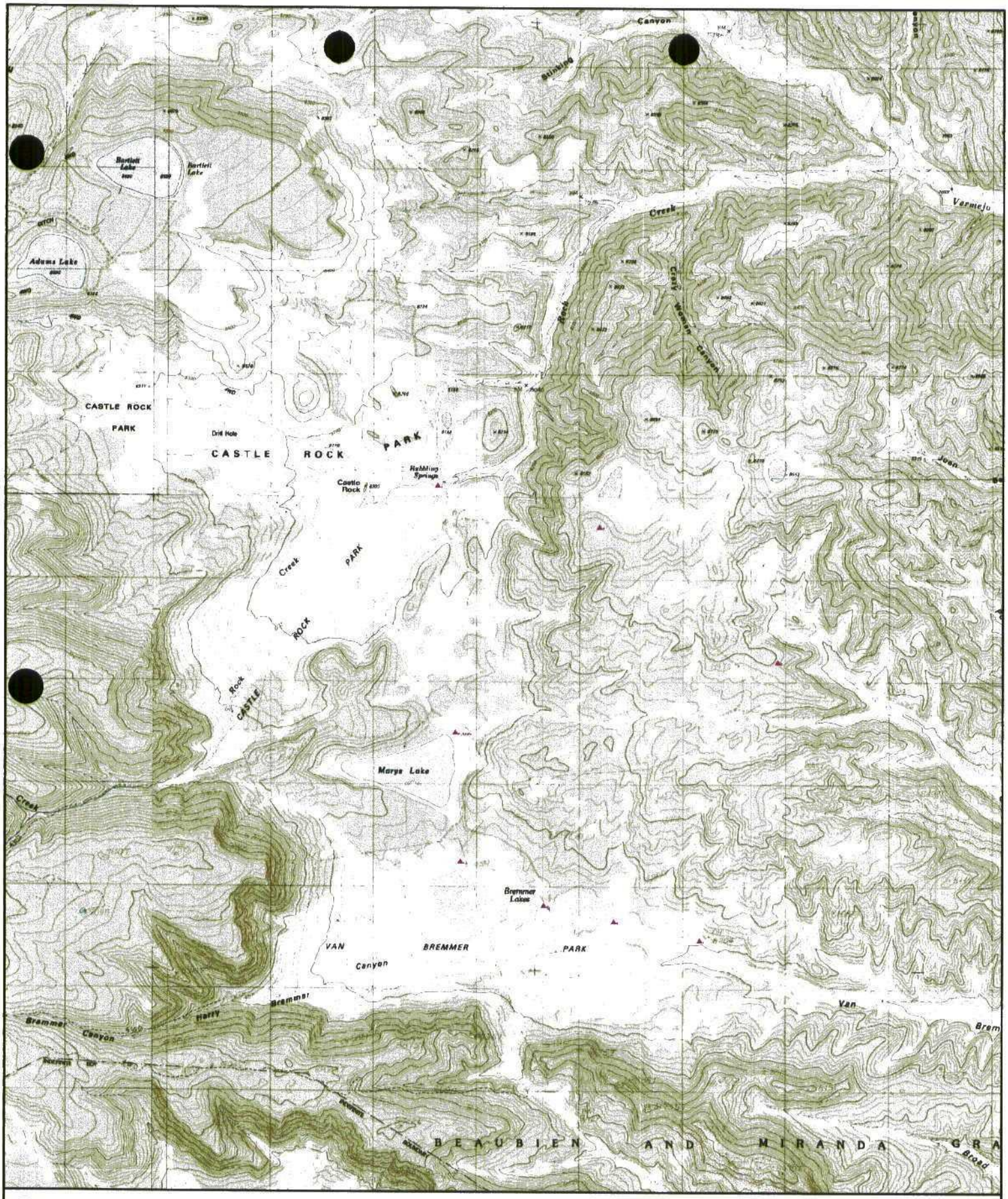
1:00 **Stop 8: Marys Lake and Lunch**

- Part V Road Log, mile 6.3 tells the story
- A sensitive, non-drilling area
- Proposed surface water sampling point for comparison with the Bremmer Lakes (during October sampling program)



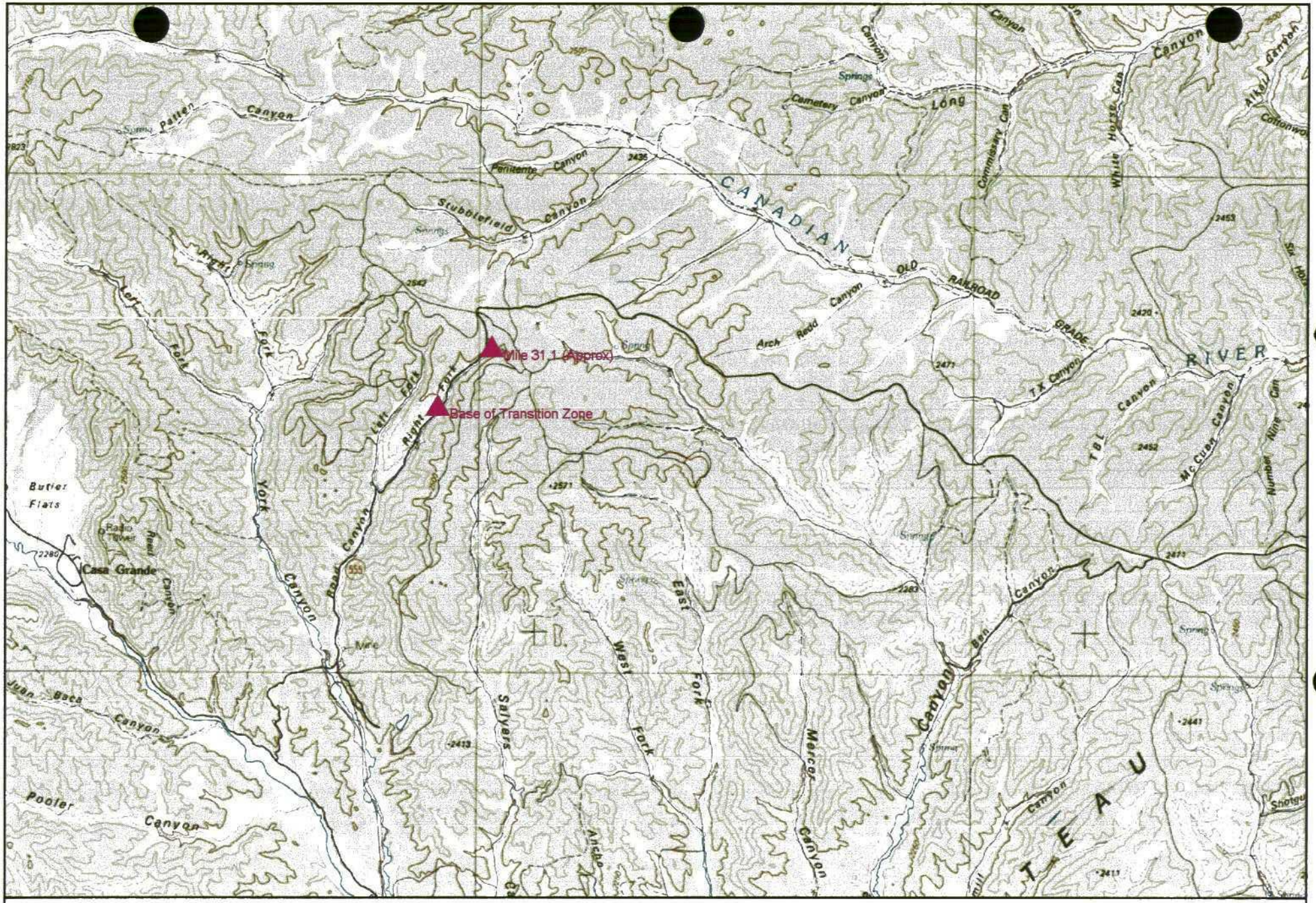
Name: VAN BREMMER PARK
Date: 9/26/2000
Scale: 1 inch equals 2000 feet

Location: 036° 51' 17.8" N 105° 04' 49.8" W
Caption: Field Trip Stops



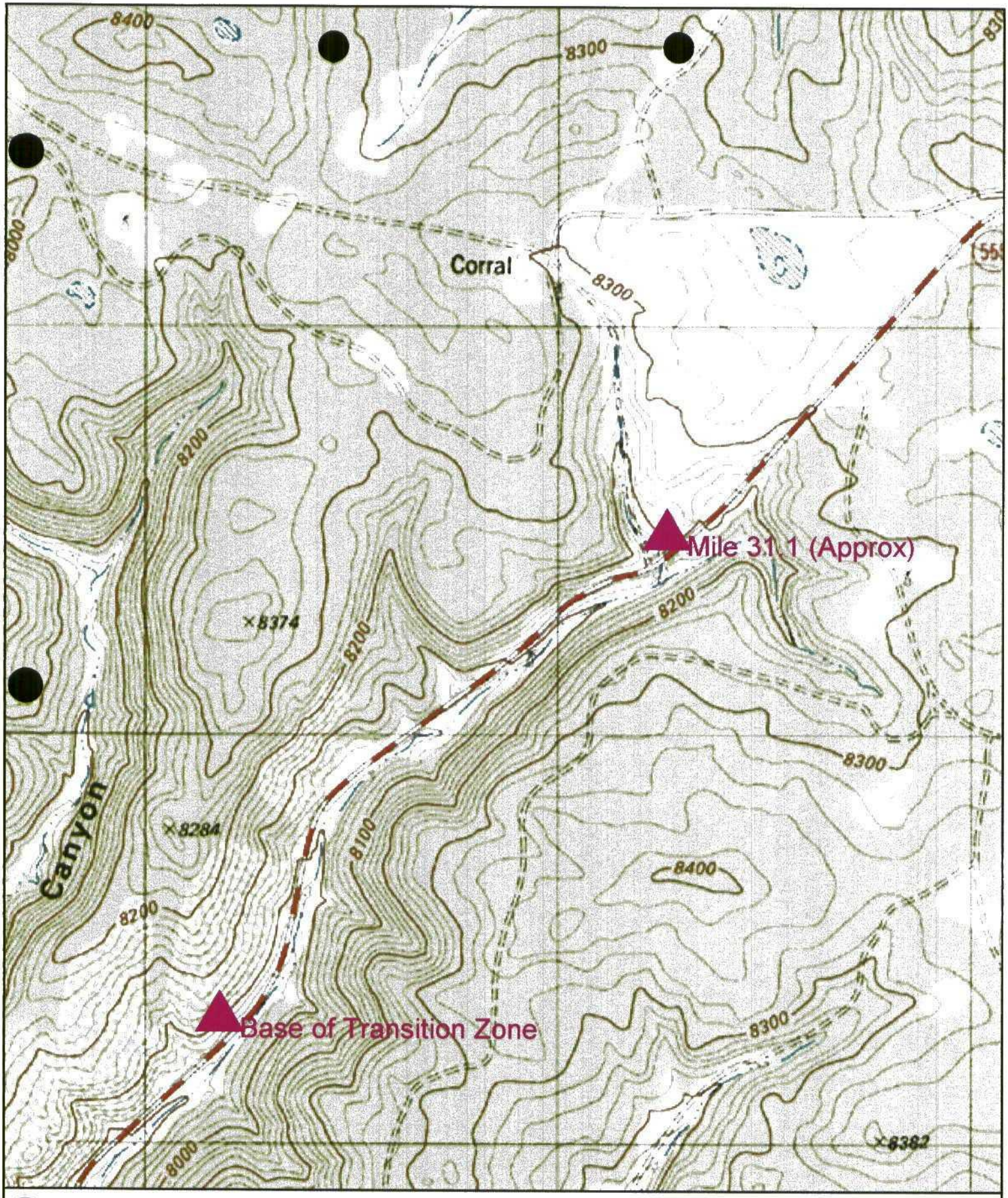
Name: VERMEJO PARK
Date: 9/26/2000
Scale: 1 inch equals 4000 feet

Location: 036° 51' 56.9" N 105° 05' 12.5" W
Caption: Block D and Surrounding Area



Name: RATON
Date: 9/26/2000
Scale: 1 inch equals 1.578 miles

Location: 036° 54' 27.3" N 104° 50' 51.9" W
Caption: Topography of Road Log Near Poison Canyon/Raton Formation Transition Zone



Name: CASA GRANDE
Date: 9/26/2000
Scale: 1 inch equals 1000 feet

Location: 036° 55' 29.2" N 104° 53' 21.1" W
Caption: Poison Canyon /Raton Formation Transition Zone

SECOND DAY

ROAD LOG FROM RATON TO UNDERWOOD LAKES THROUGH THE RATON COAL FIELD VIA THE YORK CANYON MINE, VERMEJO PARK AND GOLD CREEK

CHARLES L. PILLMORE

WITH A DISCUSSION OF TIMBER TYPES AND SITE FACTORS

CRAIG O. LAURIE

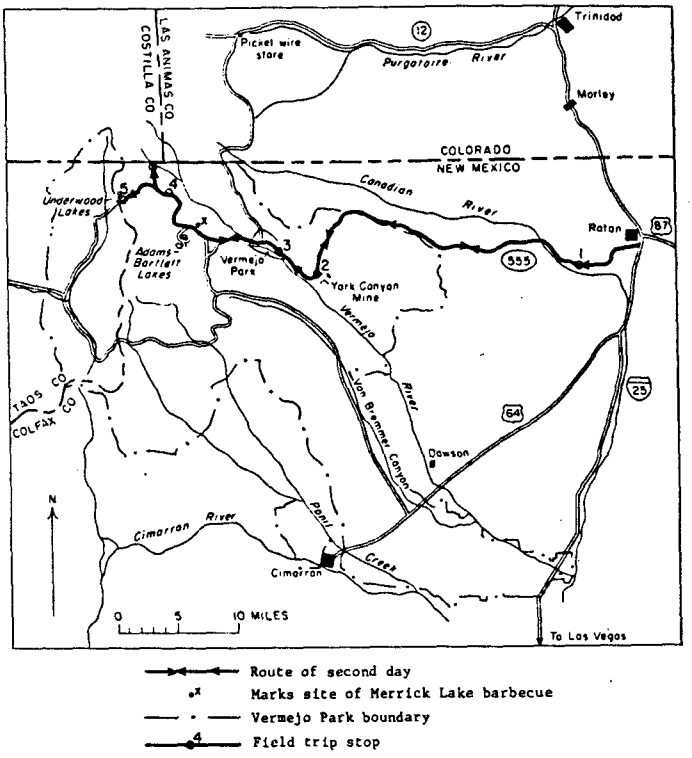
FRIDAY, OCTOBER 1, 1976

ASSEMBLY POINT: La Mesa Race Track frontage road.

DEPARTURE TIME: 8:00 A.M.

DISTANCE: 65.4 miles

NUMBER OF STOPS: 5



Today's route proceeds on the York Canyon mine road, N.M. 555, from Raton through the Tertiary coal-bearing rocks of the Raton coal field to Vermejo Park, into an overturned section of the Mesozoic, and finally to the Tertiary volcanics of the Underwood volcanic field. Beginning in the nearly flat-lying Pierre Sh., the route proceeds up the Canadian River and along Potato Canyon, formed by sandstone beds of the Raton and Trinidad Fms. Several coal beds of the Vermejo and Raton Fms. are exposed. The road crests on rocks of the Poison Canyon Fm. (mile 19) that form the Park Plateau surface. For 12 miles the route follows the divide between the Canadian River and Vermejo River, providing spectacular vistas of the Cimarron and Culebra Ranges of the Sangre de Cristo Mountains. Leaving the ridge, we enter Vermejo Park lands and proceed down Road Canyon to the York Canyon mine, where Kaiser Steel officials will discuss the mining and reclamation operations.

From York Canyon mine, we continue on to the Vermejo River (mile 39) and through the Vermejo gate. Vermejo Park is closed to the public; the entry gate is manned at all times and advance permission is required to enter. The next stop is in Vermejo Park at Casa Grande, the headquarters of Pennzoil's Vermejo Park Ranch. Lunch will be provided and we will have an opportunity to visit the grounds and study the Trinidad Ss., which is well exposed around the rim of the Park. Following lunch, we continue across Vermejo Park, a dissected broad Tertiary anticline, through the western part of the coal field to Gold Creek (mile 57.8); a stop will be made to study the overturned marine Cretaceous section.

At this point, we will split into three groups: (1) A group interested in marine Cretaceous stratigraphy can

remain at Gold Creek to inspect the Niobrara, Carlile, Greenhorn and Graneros formations. A short distance up the road and through The Wall, the lower part of the Mesozoic section can be examined. (2) A second group interested in Mesozoic stratigraphy should take trucks and follow the supplementary road log beginning at mile 59.6 to the Ricardo Creek section; there a vertical section of rocks from the Sangre de Cristo Fm. through the lower part of the Morrison Fm. can be inspected. A small tributary to Ricardo Creek cuts this section normal to the strike and the rocks are well exposed. (3) A third group continues on the main route of the trip, through overturned sandstone of the Sangre de Cristo Fm., crosses the sheared and broken zone adjacent to a major thrust fault, traverses a very large landslide mass on the east flank of the divide and stops near the Taos-Colfax county line on Costilla Pass; this group will look at mid-Tertiary volcanic rocks at Underwood Lakes. Weather, time, and road conditions permitting, a short side trip (necessitating 4-wheel drive vehicles) will be attempted to the mesa above Underwood Lakes, where the welded tuff forms a bare ridge crest.

The whole group will reconvene at Merrick Lake for the final activity of the day, a cowboy barbecue prepared by Vermejo Ranch. The return to Raton after the barbecue will be the same route by which we entered Vermejo Park.

This second-day road log includes general descriptions of the timber types along our main route and of site conditions that determine the timber types of an area. *The timber type road log will be in italics and will be integrated with the geologic road log, but mileage intervals will be only approximate because the changes in timber type are gradual.*

The Vermejo Park Second Day road log route contains interesting timber types that are widely recognized associations of tree species, varying in diversity from monocultural (Aspen, Ponderosa Pine) to "catch-all" (Mixed Conifer) (see Martin, this Guidebook). A type is subdivided into stands: groups of trees characterized by diameter, height and species. The following list includes many of the trees commonly seen at Vermejo Park:

Ponderosa Pine—*Pinus ponderosa*	Aspen—*Populus tremuloides*
Rocky Mountain Juniper—*Juniperus scopularum*	Willow—*Salix* spp.
Piñon Pine—*Pinus edulis*	Cottonwood—*Populus angustifolia*
Douglas Fir—*Pseudotsuga menziesii*	Engelmann Spruce—*Picea engelmannii*
White Fir—*Abies concolor*	Bristlecone Pine—*Pinus aristata*

The timber type of an area is determined by a set of site-influencing factors, which together create the area's environment for tree growth. Basic site-influencing factors are amount of moisture, aspect, temperature and soil type; altitude has an indirect effect by influencing each of these critical factors. The importance of geology as a site-influencing factor becomes apparent along the route.

In Vermejo Park, where conditions for the growth of many species are marginal, the effect of a small change in site can produce dramatic timber-type contrasts. About one-half the precipitation in Vermejo Park comes from snow, which is generally retained longest on north and east aspects, producing a more moist site and eventually contributing to a change in soil type. A different set of timber types grows on the cooler more moist north and east slopes than on the warmer, drier south and west aspects. Soil type itself is also critical: the depth, porosity and permeability of the soil on a site determine how much water can be absorbed and held and how many trees of what vigor can be supported. Some tree species are very sensitive to one or more site-influencing factors, making them less adaptable. White Fir, for example, is extremely sensitive to site temperature and generally will flourish only in a well-shaded cool spot, whereas Spruce is a hardy tree adaptable to a wide range of temperatures.

Using these concepts, a timber type can be defined as a group of timber species that flourishes under similar site conditions. Timber types encountered along the field trip route will be described according to species composition and the environment. Riparian species, those living on the bank of a river or a lake, will not be mentioned as a type, but will be identified.

0.0 Leave entrance to La Mesa Park. Turn right on access road (adjacent to highway). Note sign "Vermejo Park Hdq. 40 miles." To the south is a grand view of the Raton volcanic field in the southeast quarter of the panorama. Ahead is Eagletail Mountain, a broad shield volcano, about 10 miles south of Raton. At 9:00 are high mesas with attendant basaltic caps; the high basalt-covered mesa is Johnson Mesa; Hunter Mesa extends out as a tongue from Johnson Mesa; and Maloche Mesa is the small outlier, which is detached from the main flow. At the foot of the mesas, erosional surfaces (Levings, 1951) are visible: the highest, the San Miguel surface, is restricted to a small remnant on the southwest flank of Johnson Mesa; below the San Miguel is the more extensive Beshoar surface, which extends out from the mesa flanks; and below that, the Barilla surface, the most extensive (Pillmore and Scott,

this Guidebook). As seen readily from the road, outcrops below the basalt are quite scarce due to landslides.

0.2

0.2 Turn right on N.M. 555 at sign to York Canyon.

0.1

0.3 Entrance to new Raton Hospital to left. La Mesa Racetrack on right. At 12:00, the canyon walls of the Canadian River are formed by Raton Fm. underlain by a thin sequence of coal-bearing rocks of the Vermejo Fm., which is in turn underlain by the light-gray cliffs of the Trinidad Ss. The gray slopes below the Trinidad are Pierre Sh. Far across the valley at the foot of the slopes, the entrance to Dillon Canyon can be seen at 2:00. At this entrance, but not visible from this road, dump and coke ovens of the old Gardiner, Blossburg No. 4 and Brilliant No. 1 mines (Fig. 2.2) are located near the abandoned town of Gardiner. The old Blossburg No. 4 was operated from 1882 to 1898.

0.2

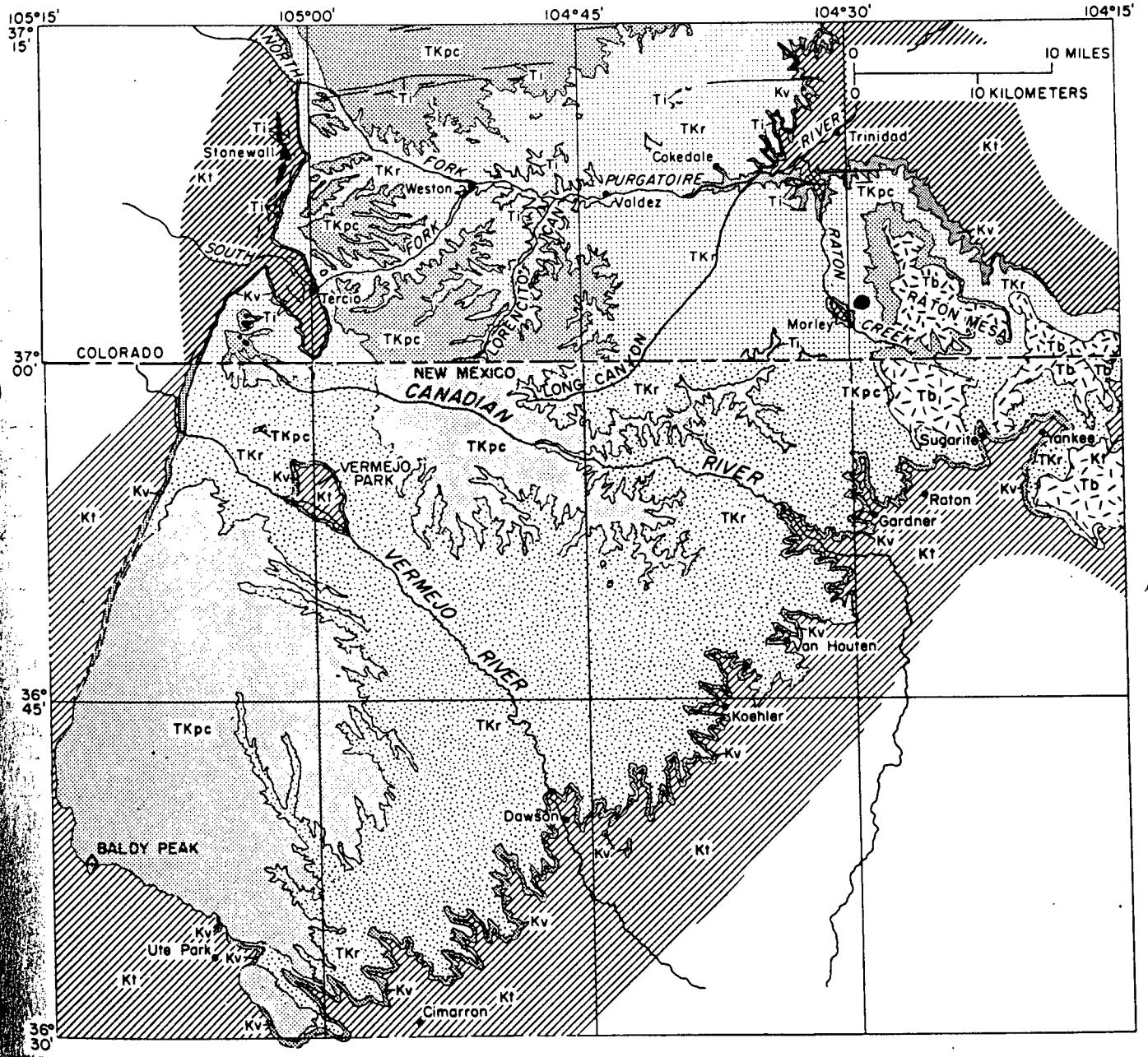


Figure 2.1. Generalized geologic map of Raton and Trinidad coal fields. Kt, Trinidad Sandstone and older rocks; Kv, Vermejo Formation; TKr, Raton Formation; TKpc, Poison Canyon Formation; Tb, basalt laval flows; Ti, Tertiary dikes and sills. Modified from Johnson (1969).

Table 1. Generalized stratigraphic section of rocks in the Raton coal field
[Position of Cretaceous-Tertiary Boundary from Pillmore, 1969]

AGE		FORMATION	GENERAL DESCRIPTION	APPROXIMATE THICKNESS (ft) (m)
TERTIARY	PALEOCENE	POISON CANYON FORMATION	Sandstone, coarse to conglomeratic, beds 5 ft (1.5 m) to more than 50 ft (15 m) thick, interbeds of soft yellow-weathering clayey sandstone; thickens to west at expense of underlying rocks.	500+ (150+)
		RATON FORMATION	Sandstone, very fine grained to fine grained, with interbeds of claystone, siltstone, and coal; commercial coal beds in upper part. Lower few feet conglomeratic; intertongues with Poison Canyon to the west. Generally sharp erosional contact with underlying Vermejo Formation.	0-2,000 (0-610)
CRETACEOUS	LATE CRETACEOUS	VERMEJO FORMATION	Sandstone, very fine grained to medium grained, interbedded with mudstone, carbonaceous shale, and coal; extensive thick coals top and bottom.	0- 380 (0-115)
		TRINIDAD SANDSTONE	Sandstone, very fine grained to medium grained; contains casts of Ophiomorpha sp.	0- 130 (0- 40)
		PIERRE SHALE	Black shale, limestone concretions, silty in upper part; grades up to sandstone.	2,500+ (760+)
		NIOBRARA FORMATION	Limestone and calcareous shale; consists of the Smoky Hill and Fort Hays Limestone Members.	500+ (150+)
		CARLILE FORMATION	Black shale, gray calcareous shale, and calcarenite; consists of the upper black shale unit, and Juana Lopez, Blue Hill Shale, and Fairport Members.	250 (76)
		GREENHORN FORMATION	Limestone and calcareous shale. Consists of the Bridge Creek Limestone Member and the Hartland and Lincoln Members.	130 (39)
		GRANEROS SHALE	Black shale and shaly limestone.	110 (33)
	EARLY CRETACEOUS	DAKOTA SANDSTONE	Quartzitic sandstone.	145 (44)
		PURGATOIRE FORMATION	Dark-gray silty shale of the Glencairn Shale Member equivalent and conglomeratic sandstones, about 50 ft (15 m) thick, that consist of granules and pebbles of pink and gray chert as large as 1 in. (2.5 cm) in diameter.	70 (21)
JURASSIC	LATE JURASSIC	MORRISON AND RALSTON CREEK(?) FORMATIONS	Red and green claystone, limestone, and sandstone with gypsiferous siltstone and claystone containing jasper.	200- 300 (60- 90)
		ENTRADA SANDSTONE	Fine-grained sandstone; chert granules at base.	70- 95 (21- 30)
TRIASSIC	LATE TRIASSIC	JOHNSON GAP AND CHINLE FORMATIONS	Beds of limestone pebble conglomerate, siltstone, and sandstone of the Johnson Gap in upper two-thirds of unit. Red to grayish-purple siltstones and sandstones; white conglomeratic sandstone of the Chinle in lower part.	190 (58)
PENNSYLVANIAN-PERMIAN		SANGRE DE CRISTO FORMATION	Red and gray conglomerate and sandstone.	1,000+ (305+)
PRECAMBRIAN			Gneiss, schist, quartzite, and granite.	

0.5 Road turns southwest.

From approximately mile 0 to 5, the Juniper-Sage timber type, composed mainly of Rocky Mountain Juniper, Sage and Piñon Pine (Fig. 2.3) is dominant. This type is transitional between high rangeland and lower mountain types. Usually found in foothill areas, it occurs on very warm, dry sites with shallow soils. All species in this type are well adapted to a near-desert environment, having extensive, shallow root systems to better utilize the limited amount of moisture.

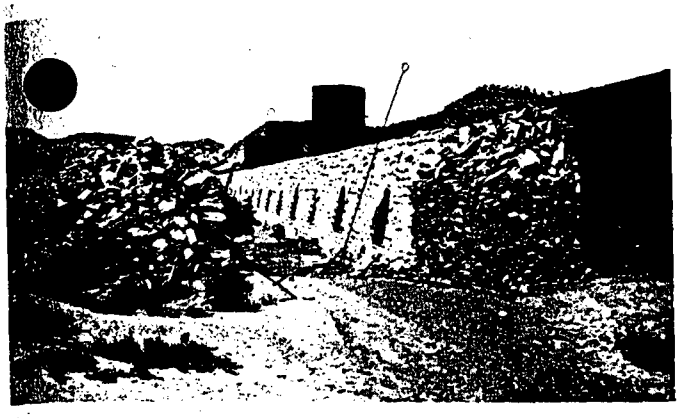


Figure 2.2. Coke ovens at Gardiner. Photograph by W. T. Lee, early 1900's.

0.1

0.6 Entrance to Raton Flying Service airport. Across the broad valley at 12:00, the Beshoar pediment characterized by pine trees and Barilla pediments are well exhibited. Other lower terrace remnants are present along the south side of the Canadian River valley.

0.2

0.8 Road turns back west.

0.4

1.2 Railroad crossing. Gravel pits on left, just above and behind the crossing. Bridge over Dillon Creek. Remnant of Barilla surface at 3:00.

0.3

1.5 At 9:00, Eagletail Mountain on skyline.

0.9

2.4 Junction with alternate road into Raton. Veer left and continue on York Canyon mine road. To right, landslide deposits overlie Pierre Sh.

0.4

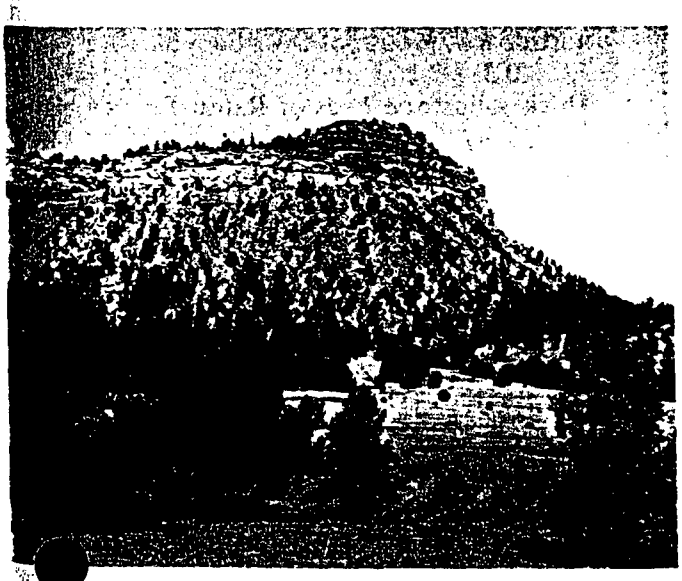


Figure 2.3. Cliffs formed by Trinidad Ss., overlain by coal-bearing Vermejo Formation. Pierre Shale forms the slope below. Juniper-Sage timber type; Piñon Pine at right and Rocky Mountain Juniper at left.

2.8 **STOP 1; ORIENTATION.** Turn left off road. Landslide deposits occur at the base of the slope and consist mostly of sandstone from overlying formations; porous soil supports the growth of Piñon Pine and Rocky Mountain Juniper. To the east, Johnson, Hunter and Maloche Mesas and their accompanying landslide deposits are visible. To the southeast, the Raton volcanic field and associated cones and flows are clearly visible (Fig. 2.4).

Eagletail Mountain is at about 8:00 on the southern horizon. The Barilla and Beshoar pediments are clearly seen from here, along with the lower terrace surfaces of the Canadian River. The high remnant on the right (Fig. 2.4) is probably equivalent to Levings' (1951) San Miguel pediment, but it has not been field checked. To the southeast, basalt flows appear to rest on a surface that conforms to the Barilla surface. It is apparent that some major eruptions during the late stages of the volcanic activity flowed onto the Barilla or related surfaces. On the ridge crest, at 3:00, coal beds in the Vermejo Fm. are underlain by light-colored sandstones of the Trinidad. The Vermejo is thin (45 ft, Lee, 1923), and the Raton coal bed is about 20 ft above the top of the Trinidad. Lee described the section as follows:

Section of rocks measured on north wall of the Canadian River canyon near easternmost point on ridge (Lee, 1923, pl. 2, p. 13, section 207).

	Thickness in Feet
Raton Formation:	
Sandstone	20
Coal	1
Mudstone	20
Coal	.5
Carbonaceous shale	10
Coal (Sugarite zone?)	3
Carbonaceous shale	40
Intrusive igneous rock	8
Coal	1
Carbonaceous shale	15
Conglomerate	10
Unconformity	
Vermejo Formation:	
Coal	.3
Mudstone	2.1
Coal	3.6
Sandstone	15
Coal	3.8
Mudstone	20
Trinidad Sandstone:	
Sandstone	100±

1.0

3.8 Two small covered hills to left are remnants of the Barilla surface. Small remnant of same surface is at 2:00. Exposure of Pierre-Trinidad

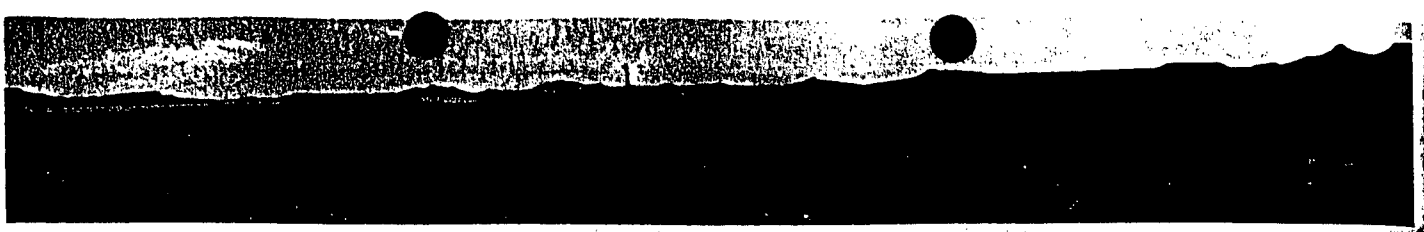


Figure 2.4. Panorama to south and east from Stop 1, showing pediments and lava flows and volcanoes of the Raton volcanic field.

transition zone and overlying Trinidad is at 3:00.

0.8

4.6 To south across canyon are dissected fan and terrace deposits.

1.1

5.7 Roadcut exposes Trinidad Ss. and upper part of Pierre Sh. To left is mouth of Coal Canyon, one of the major tributaries of the Canadian River. Thick sandstone beds of lower part of Raton Fm. form ledges on upper slopes of ridges on left.

From mile 5 to 10, Piñon-Juniper timber, dominated by Piñon Pine, Rocky Mountain Juniper and Ponderosa Pine is prevalent. Sites in this interval have generally low moisture, shallow soils and high temperatures. Where the temperature is lower and there is a little more moisture, scattered Ponderosa Pine is seen. On the left side of the road, some of the north slopes display a Ponderosa Pine-Douglas Fir type.

1.7

7.4 Gravel pits on left; gravel is mostly locally derived sandstone of Trinidad and Raton Fms. Gravelly alluvium in flood-plain deposits of the Canadian River has been used extensively by Kaiser Steel Corp. for mine road. To right of road is a toreva-block or rotational landslide of Trinidad Ss. in the shale.

0.4

7.8 Roadcut exposes transition zone of Pierre Sh. At the top of the exposure, thin, very fine-grained sandstone beds are interbedded with silty shale of the Pierre. Blocks and pieces of Trinidad Ss. form landslide deposits that cover the slopes along the road.

0.1

7.9 Roadcut into transition zone shows sandstone beds increasing in number and thickness upward. Trinidad Ss. immediately above roadcut.

0.2

8.1 Fence; mine-road gate was formerly here.

0.4

8.5 Junction with small road to right. Trinidad Ss. directly above road on right.

0.2

8.7 Road crosses Canadian River. Trinidad Ss. in streambank and at 12:00.

0.2

8.9 Road again crosses river. Recent excavation has cut out loop in the road. Note thin coal in sandstone at 3:00.

0.2

9.1 Hairpin curve in road. Exposure of Trinidad and Vermejo Fms. in streamcut on south side of stream. Blocks of sandstone on slope at 12:00 are from thick sandstone beds in lower part of Raton Fm.

0.3

9.4 On south side of canyon, just before road crosses stream, contact between Trinidad and Vermejo is well exposed.

0.1

9.5 Cross Canadian River, near top of Trinidad.

0.2

9.7 From curve, ranch buildings visible at 12:00. On north side of canyon, good exposure of coal and carbonaceous beds of Vermejo Fm. (Bohor and Pillmore, this Guidebook, for description). Position of base of Raton Fm. is uncertain.

0.3

10.0 Gravel pits on left; Holocene alluvium on north bank. Mouth of Deer Canyon.

0.3

10.3 Thick sandstone beds of Raton Fm. on right.

0.3

10.6 Road crosses Potato Creek. Thick sandstone beds of lower part of Raton Fm. on right. Sills similar to those in Figure 2.5 intrude sandstone near base of the Raton.

From mile 10 to 19, the Ponderosa Pine-Piñon Pine timber type, composed of Ponderosa Pine, Piñon Pine, Rocky Mountain Juniper and Gambel Oak is abundant on the right side of the road and on most of the left side. In a few areas the left side of the road accommodates a Ponderosa-Douglas Fir type, due to steep, cool north slopes. A few Aspen are present near the stream.

2.4

13.0 Roadcut in dark mudstone and sandstone interbedded with thin beds of carbonaceous shale and coal of the Raton Fm. For the next

Figure 2.5 Sheets of intrusive rock in sandstone in Cottonwood Canyon, about 5 miles southeast of mile 10.6. Photograph by W. T. Lee, early 1900's.

0.5 mile, road proceeds through lower part of the Raton Fm.

0.4

13.4 Junction with old, abandoned logging road. Tin Pan coal in bulldozer cut. The coal zone is 7.5 ft thick and contains 74 in. of coal. A tonstein occurs as a 2 in. thick parting about in the middle of the coal (Bohor and Pillmore, this Guidebook for measured coal section, Fig. 10).

0.6

0 Sandstone outcrop on south bank of stream, apparently formed by slumping or sandstone-foundering (Fig. 2.6).

0.5

14.5 Bulldozer scrape on right side of road exposes Potato Canyon coal bed.

0.3

14.8 Junction of Potato Canyon with one of its major tributaries. Road veers right and continues up Potato Canyon. Coal bed exposed in scar on south side of canyon.

0.2

15.0 Prospect entry into Potato Canyon coal bed (Fig. 2.7). The mine extends only a few tens of feet. Seventy-four inches of coal occur in a 6.5 ft zone (see Bohor and Pillmore, this Guidebook, for measured section).

0.4

15.4 Junction with No. 8 Canyon. Thin coal bed exposed in roadcut. Landslide and slope-wash deposits are common for the next mile.

1.1

16.5 Junction with old logging road to right. In roadcut at 12:00, an 8-10 in. thick coal bed crops out in a sequence of mudstone and siltstone beds.

0.2

16.7 Landslide deposits (Fig. 2.8). A 22 in. thick coal bed is exposed near top of cut. The coal contains three thin tonsteins (Bohor and Pillmore, this Guidebook).

0.6

17.3 Grayish-red and orange colors begin to appear, marking beginning of Raton-Poison Canyon transition zone. Thin carbonaceous streaks are present in roadcut.

0.5

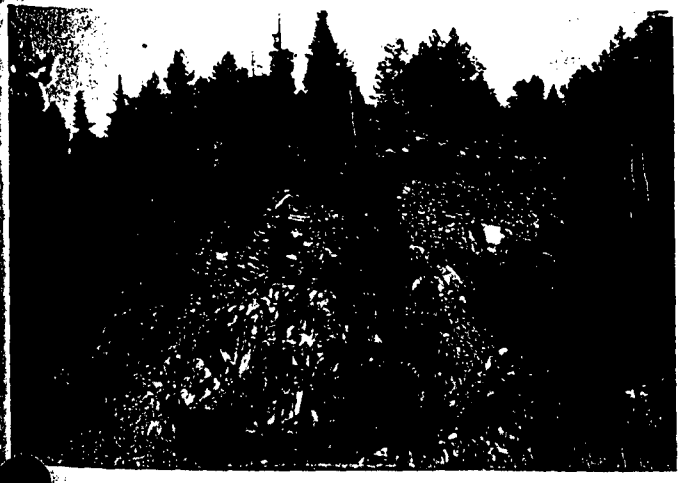
17.8 Cattle guard. Transition zone between Raton and Poison Canyon Fms. Grayish-orange to yellowish-gray weathering clayey sandstone interbedded with irregular lenses and beds of fine-grained sandstone. Coarsens upward to very coarse-grained and granule sandstone sized grains.

0.8

18.6 Thick sandstone beds in Poison Canyon Fm.

0.4

19.0 Turnoff to Armstrong Fire Lookout Tower on left.



ure 2.6. Unusual sedimentary features exhibited by sandstone body in Raton Formation, Potato Canyon. Photograph by H. L. James.

Figure 2.7. Prospect entry into Potato Canyon coal bed.

Figure 2.8. Landslides near mile 15.4 have caused constant road-maintenance problems.

0.9

19.9 Road to left goes to Koehler by way of Crow Canyon. At 12:00, Purgatory Peak (elev. 13,676 ft) in Colorado.

0.2

20.1 Road to left enters Vermejo Ranch by way of Sawmill Canyon (locked gate). For the next 11 miles, the road continues along the drainage divide between the Canadian and Vermejo Rivers. The entire crest of the divide is underlain by the Poison Canyon Fm. (Fig. 2.9). The fences on the left separate Kaiser Steel Corp. property from the Vermejo Ranch.

From about miles 19 to 31, the Ponderosa Pine timber type (Ponderosa Pine, Piñon Pine, Rocky Mountain Juniper, Gambel Oak and Douglas Fir) is common. The open character of the type (little or no brush) is caused by frequent fires in the area. Brush encroachment will probably increase, because of intensified forest fire prevention practices that permit fewer fires. As a result, deadwood will build up in the area, producing increasingly hazardous conditions for fires that "crown out," destroying mature trees.

Figure 2.9. Outcrops of arkosic sandstone of the Poison Canyon Formation. Standard poodle shows scale.

1.0

21.1 Panoramic view over western part of the Raton coal field centered at about 2:00. West and East Spanish Peaks are visible over the tree-covered horizon. Looking to the left, the Colorado part of the Sangre de Cristo Mountains can be seen, including Purgatory and other peaks over 13,000 ft (Fig. 2.10) in elevation. Purgatory Peak is at 12:00. To the left, the headwater area of the Vermejo River is visible, and farther to the left, at 10:00, the next highest point on the ridge is Little Costilla Peak (elev. 12,584 ft). At 9:30, Copper Mountain and Baldy Peak, which are in Philmont Scout Ranch area, can be seen. Ahead, the tree-covered rolling hills constitute the western part of the Raton coal field; they are mostly underlain by rocks of the Poison Canyon and upper Raton Fms. Vermejo Park (not visible) lies to the left at 11:00. To the left, lying just beneath the Poison Canyon, is the Chimney Divide coal zone, which contains coal beds 2-4 ft thick underlying only 50-100 ft of cover on long fingerlike ridges. The rocks exposed here and for some distance along the road are representative of the Poison Canyon Fm., arkosic sandstone that ranges from very fine-grained to very coarse-grained with streaks and seams of granule sandstone and conglomerate. Many of the beds weather grayish-orange to pink, in part due to the potassium feldspar content. Interbeds of clayey sandstone or sandy claystone form grayish-orange to yellowish-gray slopes. The sandstone layers are irregularly bedded and are mostly discontinuous lenses.

0.5

21.6 Drill site on right.

2.7

24.3 Drill site on right.

0.4

24.7 In the distance at 3:00, view of Bartlett Mesa and Fishers Peak.

0.6

25.3 Drill site on right. Ghost town of Catskill is about 2 miles north (Fig. 2.11).

4.6

29.9 Little Costilla Peak at 12:00.

0.8

30.7 Undrained depression of probable eolian origin on left. During the 1965-66 drought, pits were

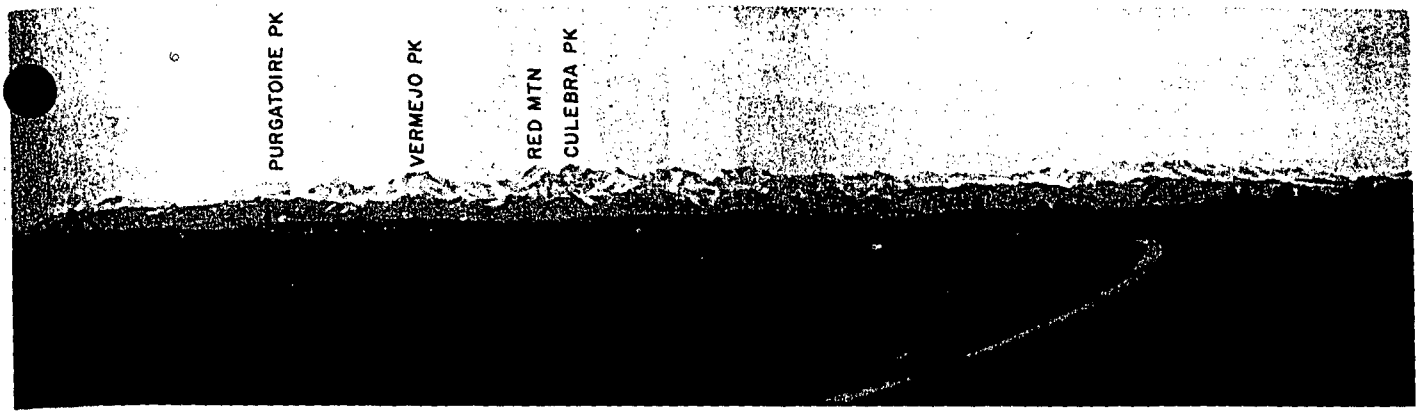


Figure 2.10. Panoramic view showing Culebra Range of the Sangre de Cristo Mountains. The peaks labeled are all in Colorado and range from 13,676 (Purgatoire) to 14,047 (Culebra) ft in elevation. Photograph by H. L. James.

dug in several natural basins such as this to capture water for cattle.

0.4

31.1 Cattle guard; enter Vermejo Ranch. Corrals on right and road to Chimney Divide and Caliente Canyon on left. About 2 miles southeast the most recent wildcat oil well in the area was drilled to 6,335 ft T.D. in 1973-74 (American Fuels Corp. No. 10 NMB). The Fort Hays Mbr. of the Niobrara Fm. was the oldest unit penetrated.

0.2

31.3 Beginning of transition zone between Raton and Poison Canyon Fms.

From mile 31 to 35, Ponderosa Pine-Piñon Pine (not a discrete type here) (Ponderosa Pine, Piñon Pine, Rocky Mountain Juniper, Gambel. Oak) is present. This section of the route represents a transition between the Ponderosa Pine type on the ridge and the Piñon-Juniper type further down the canyon near the mine.

0.8

32.1 Approximate base of transition zone.

The following section, measured through the transition zone between the Poison Canyon and Raton Fms., is included to show the difficulty in positioning the contact. In areas where lithologies are not significantly different, the contact is placed above the highest coal or carbonaceous zone and beneath the lowest persistent bed of arkosic granule sandstone:

Section starts near property gate at head of Road Canyon and continues nearly 1.5 miles down the road to the Chimney Divide coal bed, offsetting on roadcuts and along sandstone ledges.

igure 2.11. Beehive charcoal kilns near Catskill, Canadian iver canyon, New Mexico.

	Thickness in Feet
Poison Canyon Formation:	
8. Sandstone and sandy claystone. Sandstone is medium-grained to granule, occurs as lenses and pods, forms discontinuous ledges, weathers yellowish-gray to reddish or grayish-orange, and is interbedded with mudstone. Sandy claystone forms slopes between and intertongues with sandstone beds, weathers to dusky yellow or yellowish-orange. Ledge-forming sandy zones roughly 25 ft thick alternating with softer slope-forming mudstone and sandy claystone zones about the same thickness	125
Transition zone:	
7. Clayey sandstone and mudstone intertonguing and interbedded with lenses and pods of sandstone. Mudstone weathers yellowish-gray to dusky yellow as in unit 8. Toward base of unit, color is mostly gray and silty claystone predominates; some carbonaceous fragments near base. Sandstone is fine-grained to very coarse-grained, with some discontinuous pods and stringers of granule-sized sandstone throughout. Sandstone beds are very lenticular, less than 20 ft long. At 50 and 100 ft above base of unit zones of sandstone lenses form ledges in slope. Some dark purplish-red, iron oxide-cemented concretions 0.5-1 ft in diameter	160
6. Sandstone, fine- to coarse-grained, yellowish-gray; weathers yellowish-gray to grayish-orange, micaceous, carbonaceous, lenticular, calcareous cement; forms a minor ledge in roadcut	2

	Thickness In Feet
Raton Formation:	
5. Shale, carbonaceous to coaly; thin seams and stringers of coal	4
4. Mudstone and clayey sandstone. Weathered dusky yellowish to yellowish-orange, with stains of red and brown; contains carbonaceous fragments. Grades upward into unit 5. Offset 250 yds to south on top of unit 3	6
3. Sandstone, coarse-grained to granule, arkosic, mostly quartz and feldspar, calcareous cement, gray to yellowish-gray, carbonaceous. Upper part finer grained. Erosional contact at base, fluting trends S. 30 E. to S. 60 E.	9
2. Clayey sandstone and mudstone. Lenticular, fine-grained sandstone beds as thick as 3 ft in lower part. Clayey sandstone and mudstone weathers grayish-yellow to grayish-orange; structureless; forms dipping slope. Yellowish-gray to grayish-orange sandstone, carbonaceous, calcareous in part	27
1. Chimney Divide coal bed (see Bohor & Pillmore, this Guidebook for detailed section of this bed)	6

0.5

32.6 Chimney Divide coal bed in roadcut.

0.7

33.3 Holocene alluvium dissected and gullied.

0.6

33.9 Stock pond and dam on left. Ridge crest at 10:30 underlain by 4 ft thick Chimney Divide coal in 4.5 ft zone.

0.7

34.6 Stock pond. Bulldozer scrape on east side permits view of Raton sequence of channel sandstone resting on irregular surface cut into mudstone below.

0.5

35.1 Excavation on left at 9:00. Air intake for northernmost workings of York Canyon mine. Note irregular nature of sandstone that crops out to south.

0.4

35.5 Approximate northern limit of outcrop of York Canyon coal bed.

0.2

35.7 Outcrop to left, at 9:00, is probably discovery point of York Canyon coal bed (Fig. 2.12), as it is one of the rare outcrops (12 ft thick). To the right, about 25 yds south of the outcrop, is a slumped burned exposure in which the coal does not crop out; this reddish mass of debris is typical of the York Canyon coal bed. It is commonly covered with talus and slope debris from an overlying resistant sandstone. Where the coal has burned on the outcrop, it is reduced to ash, leaving a void filled with overlying rocks. Adjacent to the road to the right and straight ahead, rounded slopes are strip mined areas reclaimed by Kaiser Steel Corp.

Figure 2.12. Outcrop of York Canyon coal bed in Road Canyon. Photograph by H. L. James.

The York Canyon bed, 9-12 ft thick beneath the point of this ridge, was completely mined; reclamation is nearly completed and planting began this year. Surface mining is continuing to the west. Overlying the York Canyon coal is a continuous tabular sandstone that forms a resistant caprock in most places underground. Naturally, in surface mining, this caprock creates problems when it breaks in large blocks.

0.3

36.0 Prospect entries and vent fan for York Canyon coal mine. The York Canyon coal bed is exposed beneath the tabular sandstone at the Prospect entry site and in the midslope of the ridge on the east side of the canyon (Fig 2.13). The coal (11 ft thick) has a parting 1 ft thick located about 18 in. from the top. At the right limit of the exposed coal, it is

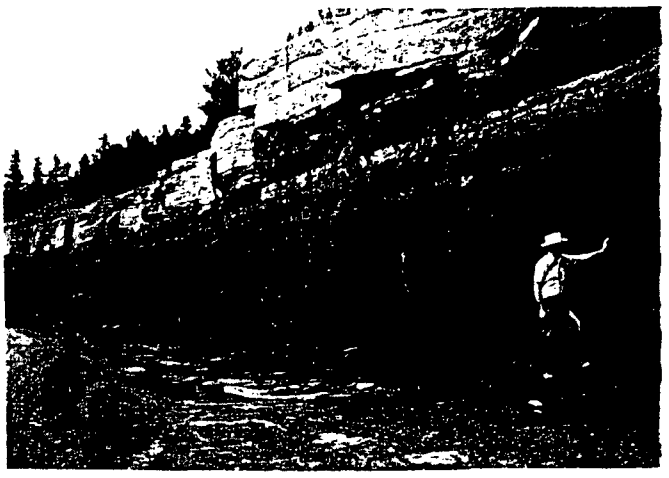
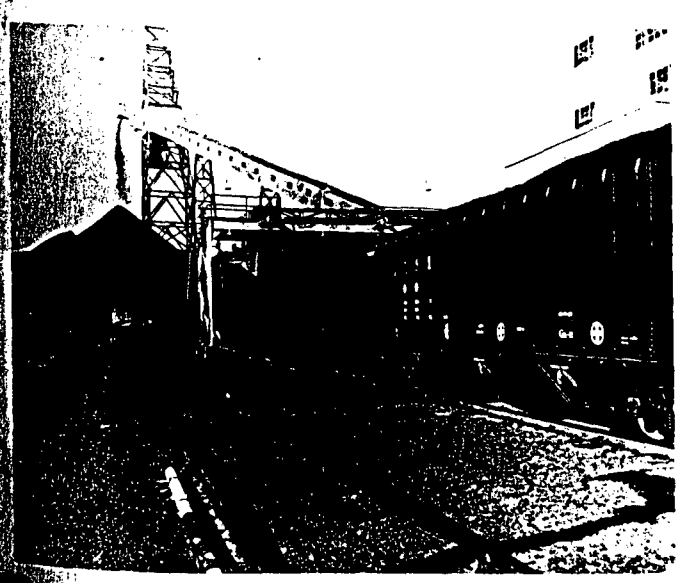


Figure 2.13. The York Canyon coal bed overlain by a nearly continuous tabular sandstone at the prospect entry. Photograph by H. L. James.

Figure 2.14. Fault offsetting York Canyon coal bed at prospect entry, about 0.5 mile north of York Canyon mine. Fault displaces roadbed about 50 ft. Photograph by H. L. James.

abruptly cut out beneath a fault that dips 30°-40° to the south (Fig. 2.14). This fault separates the coal bed about 50 ft and continues to the southeast. The fault was not observed during mining on the west side of the canyon; apparently it swings north and ends up the canyon. The York Canyon coal bed was originally opened by Kaiser Steel to deliver coal for a test plant at the Fontana Steel plant in Fontana, California in 1964. A road was built, and the coal was trucked through Crow Canyon about 40 miles to the Koehler wash plant; it was washed and shipped from there to Fontana by rail. The test was successful and plans were made to open the main entries of the York Canyon mine, nearly a mile to the south. The preparation plant at York Canyon was completed in 1966 and the mine was opened that same year (Figs. 2.15 and 2.16). The wash plant is especially designed to recycle the water used in washing coal. Powdered magnetite from Kaiser's Eagle Mountain operation is used as a heavy-media agent in the plant. Availability of water is a principal concern; it is pumped from the Vermejo River to supplement the meager surface and subsurface flow in York Canyon.



ure 2.15. Preparation plant and coal pile at York Canyon ine. Cars are loaded as they pass non-stop beneath the coal ile.

Figure 2.16. A new cinder cone in York Canyon? No—only the coal pile at York Canyon mine.

0.2

36.2 Road junction. Turn right to Vermejo Park.

From about mile 35 to 46 Piñon-Juniper (Piñon Pine, Rocky Mountain Juniper, Ponderosa Pine) is conspicuous (Fig. 2.24). Sites in this interval have generally low moisture, shallow rocky soils and high temperatures. Where the temperature is lower and the moisture a little higher, scattered Ponderosa Pine is seen. The Piñon-Juniper type has traditionally been considered worthless; the timber has no market and the foliage of Junipers contains an inhibitant to grass encroachment. Millions of dollars have been spent developing a means to eradicate the type in order to utilize the land for grazing, but most ideas proved economically unfeasible. Because of the need for alternative sources of petroleum byproducts, the possibility of using extracts from Juniper is being investigated.

0.1

36.3 **STOP 2; YORK CANYON MINE.** Near this point we will visit the surface mining and reclamation activities of Kaiser Steel Corp. (Fig. 2.17).

Figure 2.17. Spoil piles and reclamation at York Canyon surface mine. A new 42-yd dragline is being assembled across valley.

0.1

36.4 Junction with main coal-haulage road. Reset speedometers here to compensate for distance driven off road at mine stop. CAUTION—Coal trucks cross the road from nearby surface mines. The Upper York Canyon mine was opened July 10, 1976, about 6 miles northwest of here in the Left Fork of York Canyon. A section through part of Raton Formation is included to show relationships of coal beds. The section begins 950 ft above base of the Raton Fm. and was measured up the road from the bottom of the canyon to the mine entry.

	Thickness in Feet
Raton Formation:	
13. Mudstone, siltstone and very fine-grained sandstone:	
Mudstone	3-5
Sandstone	0-6
Mudstone	6-8
Sandstone	12+
Total sequence	~25
12. Coal—upper Left Fork. Joints appear to match cleat at N. 53° W., butt N. 40° E. Fractures at N. 20° E., N. 40°-45° E. and N. 25°-35° W. Lower 10 in. of coal is crunchy and brittle. Nine-inch carbonaceous shale 10 in. above base. Two inch discontinuous parting 9 in. below top	8.83
11. Sandstone very fine-grained to medium-grained, yellowish-gray; weathers yellowish-gray to grayish-orange; noncalcareous, hard. Forms thick ledge, prominent but does not crop out consistently. Joints N. 30°-40° W. Intertongues with siltstone laterally. Upper part is light gray, fine-grained sandstone containing carbonaceous streaks and seams, irregular coaly bodies and pods, dark yellowish-brown on joint surface	3.33
10. Shale, gray, bottom 6 in. carbonaceous	2+
9. Coal, blocky, breaks in rhomboids. Cleat N. 52° W., butt N. 15° E.	1.08
8. Shale, coaly and shaly bone	.75
7. Coal, cleat N. 54° W., joints N. 40° W., N. 40° E.	1.17
6. Shale, carbonaceous; lower 2 in. contains coal streaks. Grades up to mudstone and sandstone. Joints N. 40° E. Middle part mostly very fine-grained sandstone; weathers yellowish-gray. Upper part dark gray claystone. Carbonaceous in upper 6 in., coaly in top 3 in.	20
5. Coal, fractured, hard, vitric. Cleat N. 45°-50° W., joint N. 40° E.	1.08
4. Mudstone, nodular weathering, medium gray, carbonaceous; weathers grayish-orange and brown on fracture surface, with 2 in. carbonaceous shale at base. Six inch carbonaceous shale 5 ft above base. Joints N. 40° W. Upper 2-3 ft claystone	8.5
3. Coal—lower Left Fork. Hard, vitric, conchoidal fracture. Cleat N. 55° W., butt N. 30° E. Twenty-three inches above base is light gray-weathering 1 in. tonstein	3.58
2. Shale, carbonaceous	.58
1. Mudstone and siltstone, carbonaceous, weather grayish-orange to grayish-yellow and brown; contain plant fragments and impressions	1+

0.3

36.7 Roadcut exposes York Canyon coal bed on right.

0.3

37.0 Crest of ridge between York and Vermejo Canyons. Thin coal bed in roadcut. In gully immediately ahead, the York Canyon coal bed consists of upper and lower coal beds separated by a 12 ft parting that thickens (to 35 ft) rapidly to the west.

0.1

37.1 Approximate position of York Canyon coal bed. No outcrops at this location.

0.4

37.5 Stock pond at 9:00.

1.4

38.9 Coal exposed in roadcut on right.

0.1

39.0 Vermejo Ranch entry gate (locked), permission required to enter.

0.2

39.2 Junction with Vermejo River road. Adobe ruin across valley.

0.1

39.3 Gravel pit into river terrace. Gravel, used for graveling road to mine, is composed of a wide variety of rock types; the most resistant are rhyolite from Ash Mountain and quartzite pebbles and cobbles from various sedimentary units. Crops are cultivated for stock feed on soils developed in alluvium along the Vermejo River floodplain and at Vermejo Park.

0.7

40.0 Folded beds of the Vermejo Park Anticline become apparent. Road to Juan de Vaca canyon to the left. Approximately 0.5 mile up No. 1 canyon to the right, a coal bed crops out that appears correlative with the upper Left Fork bed. This coal bed also contains tonsteins (see Bohor and Pillmore, this Guidebook, for description of coal section).

0.2

40.2 Left Fork (No. 1) coal zone exposed in the roadcut, dipping 10° E. This coal zone is the lowest coal of significant thickness in the Raton Fm. in the western part of the Raton coal field. The coal can be seen on the south (left) side of the canyon near a lone pine tree. About 1 mile up Juan de Vaca canyon, at the last known exposure of this bed, the zone measured 4.75 ft thick and contained nearly 4 ft of coal.

0.1

40.3 Terrace gravel.

1.0

41.3 Mouth of Reed canyon on right. Base of Raton Fm. crosses road. Ledge on both sides of road is formed by conglomerate, the basal unit of the Raton Fm. The covered slope ahead is underlain by the coal-bearing Vermejo Fm. East entrance to Vermejo Park. Vermejo Park is a broad dissected anticline that plunges southeast (Fig. 2.18).

0.1

41.4 Vermejo coal bed at 3:00; proposed pit 60 ft beneath top of the Vermejo Formation.

0.3

41.7 Two to three foot thick sill of intermediate composition intrudes lower part of Vermejo Fm. in the interval occupied by the Raton coal bed.

Figure 2.18. Aerial view to north of Vermejo Park. Spanish Peaks in background.

0.1

41.8 At 9:00, the Trinidad crops out across the river. An excellent suite of trace fossils at this exposure.

0.2

42.0 Top of Trinidad Ss. at 3:00, about 60 yd north of road. Outcrop of Raton coal bed, coked by the intrusive, lies above the Trinidad.

0.1

42.1 Approximate base of transition zone between Pierre Sh. and Trinidad Ss. Up gully to right is a nearly complete section of the Trinidad, which contains the best examples that we have observed in the area of the trace fossil *Diplocraterion* (Pillmore and Maberry, this Guidebook).

0.1

42.2 Pond to right. For the next 0.5 mile, Pierre Sh. is overlain by a large landslide.

0.5

42.7 Cattle guard and junction with narrow ranch road to left.

0.1

42.8 **STOP 3; LUNCH.** Entrance to Vermejo Park guest area, Park Headquarters and Bartlett mansion (Fig. 2.19).

0.1

42.9 Bartlett mansion gate (Fig. 2.20). On point at 2:00 is a pavilion on Trinidad Ss. Here the upper part of the Pierre and most of the Trinidad are well exposed (Fig. 2.21). The tree-covered slope above the Trinidad cliffs is the Vermejo Fm., and the sandstone cliffs at the top of the ridge are the basal Raton conglomerate. High peaks of the Sangre de Cristo Mountains visible at 12:00. To the left, along the south side, are landslides.

0.6

43.5 Quarry in Pierre Sh., used locally as road metal. Remnants of the Beshoar and Barilla pediments lie within the park.

0.6

44.1 Cattle guard.

0.1

44.2 Junction. Road to right goes up Spring Canyon toward Stonewall, Colo. On the third day, we will enter the park on this road. To the left are old headquarters of Vermejo Ranch and Adams Cattle Co. The hummocky slopes above the ranch buildings are formed by large landslide deposits on the Pierre Sh. Above road to right, the irrigation canal shows Pierre Sh. overlain by gravelly alluvium of the pediment.

0.5

44.7 Road crosses irrigation ditch. To right at about 2:00, two upper pediment levels can be seen.

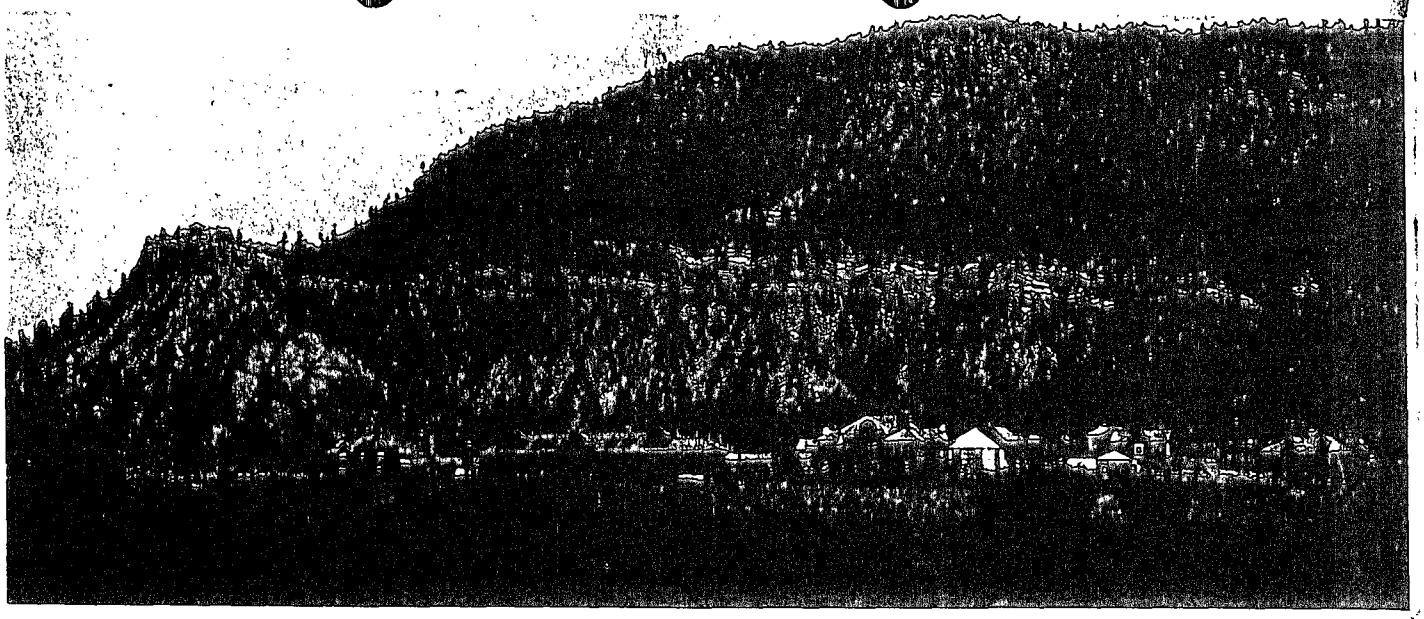


Figure 2.19. Bartlett mansions, Vermejo Park. Photograph by W. T. Lee, early 1900's.

0.4

45.1 At immediate left is site of Union Oil Co. Bartlett No. 2 well. Drilling began July 10, 1924, and ended Feb. 10, 1926. Total depth was 4,411 ft; the bottom 1,116 ft was in a pluton, which probably caused the Vermejo Park anticline. Hill above drill site is Pierre Sh. capped by gravelly alluvium. Tree-covered slope at 12:00 is a large landslide.

0.7

45.8 Approximate base of transition zone between Pierre Sh. and Trinidad Ss. Landslide deposits cover slope along road.

0.2

46.0 Lower part of Trinidad Ss. exposed in cut along irrigation canal. The Trinidad dips west off the Vermejo Park anticline, and this lower part is characterized by especially abundant *Ophiomorpha* burrows and casts. Around curve, beds of the upper Trinidad contain few burrows.

0.2

46.2 Road crosses irrigation canal at the Trinidad-Vermejo contact (Fig. 2.22). Lower part of the Vermejo is partly covered, but the Raton coal bed is evidently thin or absent and is represented by a silty carbonaceous zone.

From mile 46 to 49 the Ponderosa Pine-Piñon Pine type (Ponderosa Pine, Piñon Pine, Rocky Mountain Juniper) is prevalent on the right side of the road, and the Ponderosa Pine-Douglas Fir type (Ponderosa Pine, Douglas Fir, White Fir) is dominant on the left. The left side of the road, having north and northwest aspects, is fairly dry but cooler than the south and southeast aspects on the right side of the road. The Ponderosa is suited to both sites, whereas the Douglas Fir and Piñon Pine have too narrow a temperature range to adapt to both sites. The Piñon Pine is more suited to warm, dry sites than the Douglas Fir, which is best suited to cooler, more moist sites. Near the park, this interval contains two species of riparian trees, Willow and Narrowleaf Cottonwood, which are found near streams throughout Vermejo Park Ranch. Both propagate by root and seed.

0.1

46.3 Road crosses small bridge. Ahead and to right, slopes are formed by Vermejo Fm. capped with Raton conglomerate.

0.3

46.6 Raton conglomerate exposed at road level in canyon to right of road.

0.1

46.7 Bridge over Vermejo River.

0.4

47.1 Carbonaceous zone on curve above culvert over Rock Creek. Zone may be correlative with Left Fork coal beds seen east of Vermejo Park at mile 40.2. Road leaves Vermejo River and follows Rock Creek through rocks of the Raton Fm.

1.0

48.1 Approximate position of syncline axis. To the west, rocks rise gradually and eventually crop out, forming hogback along east flank of Sangre de Cristo Mountains.

0.4

48.5 High ridge to left is underlain by 5 ft thick coal zone, the highest and westernmost thick coal bed of the Raton Fm. in this area. Equiv-

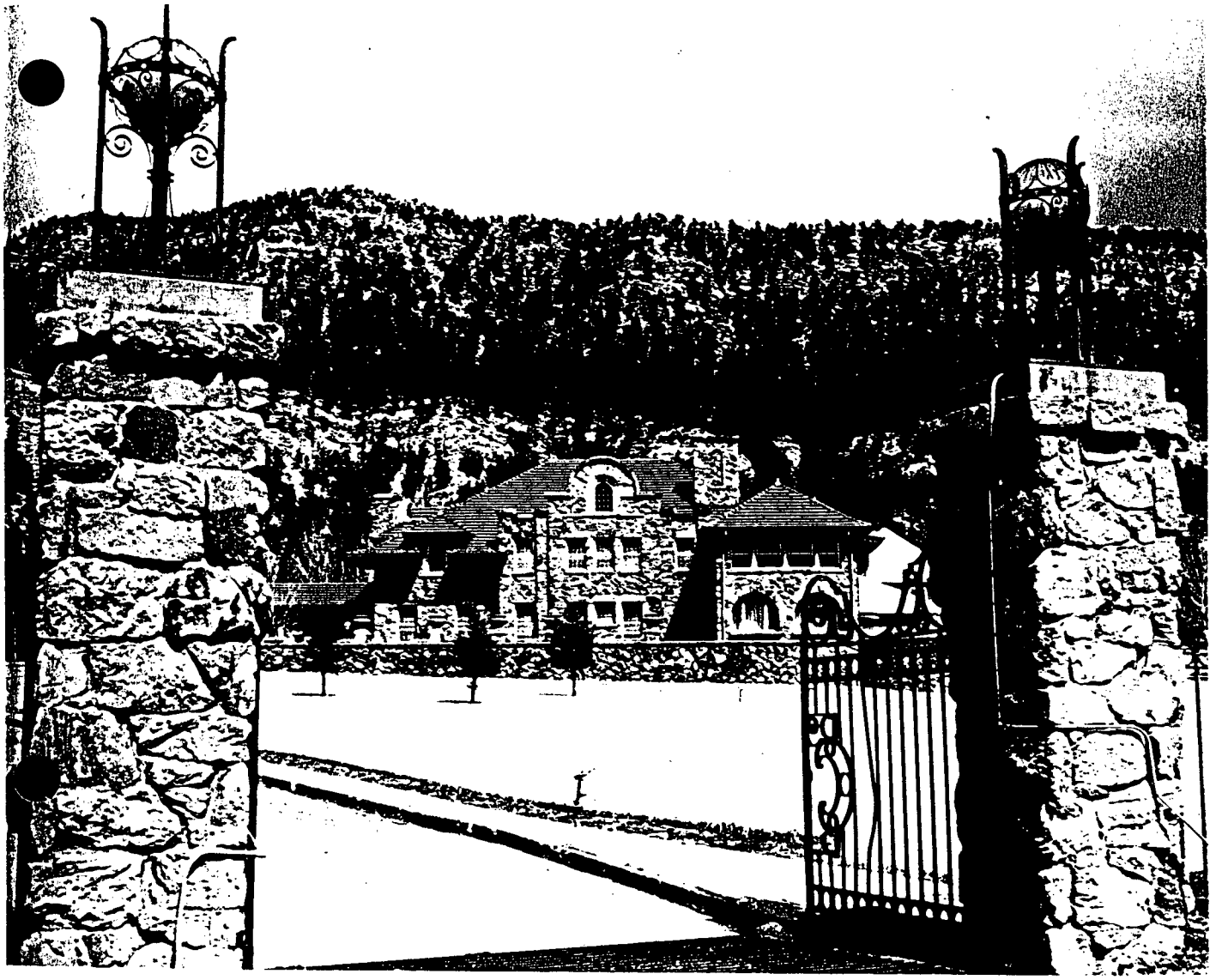


Figure 2.20. Bartlett mansion, Casa Grande, Vermejo Park. Photograph by H. L. James.

Figure 2.21. Trinidad Sandstone. View to west past pavilion to peaks of Culebra Range in background. Type–Piñon-Juniper.

alent strata to the west are much coarser and are of Poison Canyon lithology, indicating a higher energy environment.

0.4

48.9 About 100 yds east of road junction, at 10:00, are two distinctive mountain peaks—Little Costilla Peak on the left and Ash Mountain on the right. The tree line nearly defines the fault zone. Ash Mountain is a resistant rhyolite dike. It is named for its resemblance to a pile of ashes although it consists of broken blocks of rhyolite (Fig. 2.23).

0.1

49.0 Turn right on road to Costilla lodge. The left branch is the alternate exit route in Part V of the Third Day Road Log.

From mile 49 to 53, Ponderosa Pine type (Ponderosa Pine, Piñon Pine, Douglas Fir) timber is characteristic. The Ponderosa Pine

weathering characteristics and friable nature, which are believed to be related to the formation of the lake basins (Pillmore, "Origin of Lakes," this Guidebook), can be observed. To the southwest, Ash Mountain, the proposed source of the rhyolite that constitutes most of the gravel, dominates the scenery (Fig. 3.24).

Return to vehicles and retrace route back to fork in road.

0.2

2.9 Fork in road—take right fork to Bartlett Lake.

0.1

3.0 Road rejoins main road.

0.3

3.3 Junction with old trail—stay left.

0.3

3.6 **STOP 4; LUNCH.** Parking area for Bartlett Lake is along the eastern lakeshore (Fig. 3.25). At this stop, additional evidence for the deflation origin of Adams and Bartlett Lake basins can be seen. Along the eastern bank, numerous pieces of rhyolite exhibit a high degree of wind polish; striations indicate a prevalent southeast wind direction. Eolian sand can be seen over the bank a few hundred yards to the east. Time does not allow a thorough examination of the area, but the general character of the pediment gravel and the Poison Canyon Fm. on which the pediment was formed can be studied. After lunch, return to main road.

0.7

4.3 Adams-Bartlett junction. End of Vermejo Park to Adams and Bartlett Lakes log. Begin mileage over at zero.

PART V—ADAMS-BARTLETT JUNCTION TO RATON VIA CASTLE ROCK PARK AND VAN BREMMER CANYON

0.0 Continue on main road from junction to Merrick Lake entrance.

Figure 3.24. Ash Mountain at left, reflected in Adams Lake.

Figure 3.25. View looking north across Bartlett Lake to snow-covered peaks of Culebra Range in distnace.

0.5

0.5 Entrance to Merrick Lake.

1.3

1.8 Gate at top of ridge.

0.1

1.9 Turn right on bypass road to Castle Rock Park. (In case road is not passable, the route will not turn at this point but will continue to left for 1.9 miles (from mileage 52.2 to 49.0 on Second Day Road Log) and then turn right at the main junction (mile 49.0), joining this log at 4.2). For next 6 miles, route passes through the Castle Rock coal district. The Raton and Vermejo coal beds of the Vermejo Fm. are of minable thickness throughout the district.

0.9

2.8 Transition zone between Raton and Poison Canyon Fm. To left are friable, coarse-grained, cavernous-weathering, channel-fill sandstone.

1.2

4.0 Entrance to Castle Rock cow camp. For many years, this camp was the base for nearly all the branding and shipping involved in summer cattle operations of the Vermejo Ranch. It is still used for horse breaking, even though the cattle operation has been shifted to Vermejo headquarters.

0.2

4.2 Turn right onto main road. Buildings to right are Castle Rock cow camp. Ash Mountain and Little Costilla Peak are in background. Oats and wild hay are harvested from these fields during summers that have sufficient rainfall; no provision exists for irrigation of these fields.

0.3

4.5 Bridge over Rock Creek and Bubbling Spring. Drill hole at this point penetrated both the Raton and Vermejo coal beds. Methane gas (bubbling in the pond) has been escaping from the hole for nearly 30 years. Castle Rock,

composed of very coarse-grained to granule arkosic sandstone of Poison Canyon Fm. on right. This point on the trip illustrates the lateral interfingering between rocks of the Raton Fm., which cap the ridge to the east, and rocks of the Poison Canyon, which are at road level. Here, in the western part of the coal field, individual tongues cannot be mapped, and the Raton and Poison Canyon Fms. are not differentiated. The interfingering is found progressively lower in the section to the southwest, until, about 15 miles southwest, in the vicinity of Baldy Mountain and Ute Park, the entire interval normally occupied by rocks of Raton lithology consists of coarse-grained to conglomeratic sandstone of the Poison Canyon Fm.

1.0

5.5 Good view of Adams-Bartlett pediment to north, with Culebra Range in background (Fig. 3.26).

0.8

6.3 Road to left goes down Gachupin Canyon to Horse Ranch, one of the old cow camps of the Vermejo Ranch and the place used for breaking wild horses captured on the ranch in early days. Marys Lake, on right, is at its lowest level in many years (June, 1976) and partially fills a deflation basin similar in some respects to those on Adams-Bartlett Mesa. Pediments border the lake on three sides. Windblown sand deposits occur to the east. Mary Pickford's cabin, built during the days of the Vermejo Club (Laurie, this Guidebook), is on the north shore, partially hidden by big Ponderosa pine trees.

1.4

7.7 Road junction, Van Bremmer Park; Bremmer Lakes on both sides. Turn left on road to Cimarron. The wide expanses of Castle Rock and Van Bremmer Parks apparently developed at the point where stream gradients change in their courses off the mountain front and are coincident with the change in lithology of the bedrock near the contact between the Poison Canyon and Raton Fms. and a flattening in the dip of the beds. The contact is difficult to pinpoint in this area because of interfingering, but the presence of layers of coarse-grained to granule arkosic sandstone just above the level of the lakes and of a thin coal bed on the lakeshore suggests that the level of the park is probably at or near the contact.

3.3

11.0 Site of Odessa Natural Corporation well No. 1-16 Vermejo.

1.2

12.2 **STOP 5. DRILL SITE** No. 5 W. S. Ranch, just above crossing at Windmill Bremmer Camp. At this point, W. R. Speer will speak on the petroleum potential of the southern Raton Basin.

0.2

12.4 Crossing. Cow camp is called the "Windmill Bremmer Camp." This camp is mainly used as a winter home of the cowboy assigned to care for cattle wintering in "Bremmer Canyon." For the next 10-15 miles, rocks of the middle part of the Raton Fm. are exposed along the road and in the valley walls; however, coal beds greater than 2 ft thick are rare.

3.5

15.9 Cattle guard and gate. Circular Indian hunting blinds made from rock are commonly found on the toes of ridges where they intersect the canyon.

4.6

20.5 Corral at the old P. L. (Pat Lyon place). Ruins of ranch buildings and grave markers date back to the 1880's. Approximate southern edge of Casa Grande 15-minute quadrangle.

3.7

24.2 Entering lower, barren zone of Raton Fm. Note that the sandstone beds are thicker and more continuous, constituting a greater part of the section.

0.5

24.7 Corral. Trail to right goes to Van Houten cow camp.

0.5

25.2 Grayish-orange sandstone caprock on left, a tongue of the Poison Canyon Fm. (Wanke, 1963).

0.9

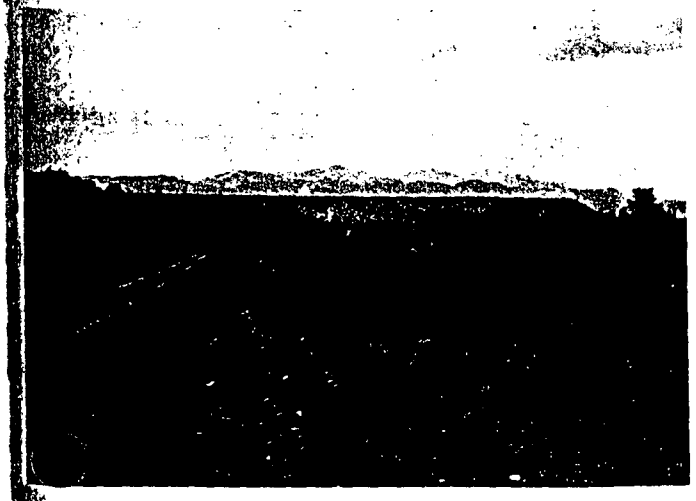


Figure 3.26. View to north of Adams-Bartlett pediment. Culebra Range in background.

26.1 Road crosses Van Bremmer Creek here and at three more places in the next 1.5 miles.

1.1

27.2 Entering narrows. Conspicuous, thick, cliff-forming sandstone beds.

0.1

27.3 Cattle guard. Rock overhang on left. Excavation by a local amateur archaeologist revealed many fine hunting and ceremonial points, awls and pot fragments, suggesting long occupancy by Indians.

2.6

29.9 Talus and landslide debris cover contact between the Raton and Vermejo Fms. Vermejo rocks form the slope below the cliffs on the east side of the valley.

1.6

31.5 Trinidad Ss. Landslide deposits on east side of valley obscure bedrock.

0.3

31.8 Raton coal bed at the top of the Trinidad Ss. In the creek bank to the left, the Trinidad occurs as two beds separated by a tongue of the Vermejo Fm. The broad valley floor below is underlain by Pierre Sh.

0.9

32.7 Pierre Shale exposures. The wide floodplain of Van Bremmer Creek, characterized by sage and buckhorn cactus, was a favorite Indian campsite; pot shards and point fragments are common.

3.2

35.9 Abandoned railroad to Cimarron. The Taos branch of the Santa Fe Trail also crossed this area.

0.3

36.2 Junction of U.S. 64 with Van Bremmer Canyon Road. If returning to Raton turn left onto U.S. 64. Turn right to Cimarron, Springer and Taos. Basalt-capped Gonzalitos and Rayado Mesas form the skyline to the southwest. On especially clear days, the distinctive shape of the mesa at Wagon Mound, 40 miles to the southeast, is visible from this highway. In 1945 W. J. Gourley (American Manufacturing Co. of Texas) drilled a dry hole, W. S. Ranch No. 1 about 3 miles to the south. The hole was considered a test for the Glorieta Sandstone; it bottomed in granite wash at 3,814 ft T.D.

1.5

37.7 At 12:30, Eagletail Mountain, a broad shield-type volcano, forms the skyline. Salt Peter Mountain, an outlier capped by sandstone of the Raton Fm., is at 10:30. To left, mouth of Vermejo Canyon. Buildings are the abandoned town of Colfax.

1.0

38.7 Railroad crossing. This is the 37.5 mile spur line of the Santa Fe Railroad, which was built in 1964-65 up the Vermejo River to the York Canyon mine for unit coal trains. The coal from the mine is hauled 1,100 miles to the Kaiser Steel Corp. mill at Fontana, Calif.

0.5

39.2 Road to Dawson to left. Dawson, an abandoned coal mining town (Fig. 3.27), is a short distance up the road, at the mouth of Vermejo Canyon. In 1867 J. B. Dawson paid Lucien Maxwell $3,700 for his homestead here, which Dawson thought was about 1,000 acres. After survey it turned out to be 20,000 acres, much of it underlain by rich coal deposits. The coal from this area was burned by local ranchers and was mined in a small way to supply the garrison at Fort Union, 50 miles to the south. Orestes St. John examined and mapped the coal deposits, and a lease was taken by the Raton Coal & Coke Co. The following are photo reproductions of pages and maps from one of St. John's original reports to the Maxwell Land Grant Company on lands adjacent to Dawson:

Figure 3.27. Coke ovens and buildings at Dawson, located at the mouth of the Vermejo River canyon. Photograph by W. T. Lee, early 1900's.

Report on the
Vermejo Northside Coal Area.

The area referred to lies on the north side ~~of the~~ and just within the debouchure of the Vermejo Cañon, or extending from a point a short distance below the mouth of Rail Cañon east

to Turkey Cañon. The north boundary conforms to the south delimitation of the Dawson claim, a line having a bearing approximately east-northeast from the above mentioned initial in the debouchure of Rail Cañon to the water-divide between Saltpetre and Turkey cañons, thence in an east of south course to the prairie north of Turkey arroyo, conforming to the northeast fence line of the Horseshoe pasture tract. As thus defined its extent within the coal area is about four miles east-west with a greatest breadth north-south of one mile and three-fourths.

The southern border, of course, conforms to the escarpment hemming the north side of Vermejo Cañon and on the east fronting the plains and limiting the coal-bearing formation in that direction throughout the great Raton coalfield. Erosion of the main cañon and its northside tributaries has given the very irregular outline characteristic of this border, as represented in the accompanying sketch-map by the heavy line approximately defining the outcrop of the coal. The before mentioned south line of the Dawson claim practically cuts the tributary Spring, Saltpetre and Turkey cañons near the point where the coal disappears beneath their beds, giving to each of these localities an added importance as relates to the practical operating of the coal, and which is doubtless of a favorable nature so far as accessibility and "lay" of the coal are concerned.

Inspection of the sketch-map shows four naturally defined coal tracts in the area: That included between the Vermejo and Spring Cañon on the west, the central tract between Spring and Saltpetre cañons, the eastern tract between Saltpetre and Turkey cañons, and the small isolated tract between and south of the two latter tracts embraced within Saltpetre Mountain. Also the approximate location of actual prospect openings and observed thickness of the coal are given in the sketch-map. From all these data the following tabular summary has been prepared showing the acreage and tonnage of coal in each of the tracts:

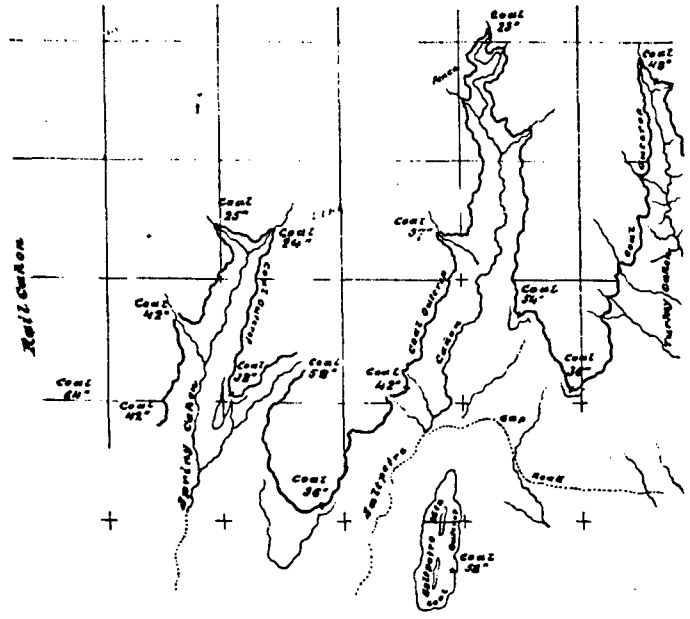
Tract.	Acres.	Average thickness.	Tonnage
Vermejo—Spring.	300	43.50 in. 3 prop.	1,631,250
Spring—Saltpetre.	900	39.16 " 6 "	4,405,500
Saltpetre-Turkey.	500	46.00 " 3 "	2,875,000
Saltpetre Mountain	100	56.00 " 2 "	650,000
Total.	1800 acres		9,561,750 tons.

The thickest coal is found in the eastern portion of the area, in the Saltpetre—Turkey tract, which for practical purposes is equally accessible from Curtis Cañon. In both Saltpetre and Spring cañons where the coal descends to drainage level it shows a local diminution in thickness. It is, however, generally of good quality, and possesses even under existing boundary conditions at least local importance.

Besides considerable timber suitable for mine purposes occurring in the hills, both Spring and Saltpetre cañons must afford a large volume

of underflow water; and the inexhaustable water supply of the Rio Vermejo is immediately at hand.

Raton, N. Mex°, Feby, 1896. Orestes St. John, Geologist.



SKETCH-MAP of the VERMEJO NORTHSIDE COAL AREAS, BETWEEN RAIL AND TURKEY CANONS 4000 Ft. = 1 in. Feb., 1896.

Coal mines were opened on the basis of St. John's work, and in 1905 Dawson sold out to Phelps Dodge Corp. for considerably more than he had paid for the property. The coal mines were considered as safe and modern as any in the world, but seemed ill-fated. On September 14, 1903, a fire in the mine claimed the lives of three men, and, 10 years later, on October 22, 1913, 265 men were lost in a disastrous explosion in Dawson No. 2 mine. Tragedy struck for a third time after another 10 years, on February 8, 1923, when 120 miners were lost in another explosion. Fortunately, the apparent 10-year cycle was not repeated, and the mines continued relatively trouble-free operations until they closed down on April 30, 1950. The town of Dawson was dismantled and only foundations remain today.

0.6

39.8 Junction with N.M. 505 to Maxwell and I-25. Continue north on U.S. 64.

0.9

40.7 Large landslides on Salt Peter Mountain at 10:00.

6.9

47.6 Entrance to Crow Creek Ranch, home of Springer Cattle Co., on right. Cross cattle crossing.

1.5

49.1 Mouth of Crow Canyon at 9:30, site of Koehler mine, abandoned by Kaiser Steel in 1966 when they opened the mine at York Canyon. Barilla and Beshoar pediments near canyon mouth.

2.4

51.5 Crossing mountain branch of Santa Fe Trail. Junction to Koehler. Route nearly parallels the Santa Fe Trail.

1.4

52.9 Junction of U.S. 64 and 85. At 10:00, well-exposed section of Cretaceous and Tertiary rocks. Vermejo Fm. thin to absent; Raton conglomerate rests directly on Trinidad Ss.

4.5

57.4 Abandoned railroad spur to Koehler. Dike on right. Van Houten Canyon, site of Van Houten mine (abandoned), on left.

2.0

59.4 Santa Fe Railroad underpass. Sharon Springs Member—equivalent of Pierre Sh. Railroad, now abandoned, served Koehler and Van Houton mines.

0.9

60.3 Bridge across Canadian River.

1.3

61.6 Clifton House at 9:00. Built as a mansion and social center to rival Lucien B. Maxwell's famous house at Cimarron, Clifton House soon became known as a stage stop as well. Today all that remain are an old crumbling adobe wall, a massive stone porch step, a rock foundation, and a historical marker on U.S. 85 south of Raton:

"¾ of a mile west of here at the Canadian River crossing was the popular overnight stage stop on Old Santa Fe Trail. Built in 1867 by Tom Stockton, rancher. Materials were brought overland from Dodge City. For years, served as headquarters for cattle roundups. After abandonment of Santa Fe Trail in 1879, fell into disuse and burned."

0.5

62.1 Enter Interstate 25 northbound.

0.4

62.5 Pierre Sh.

4.0

66.5 Leave Interstate 25, Raton exit.

0.2

66.7 Holiday Inn. End road log.

REFERENCES

Baltz, W. L., Johnson, R. B., and Carpen, T. R., 1956, Road log, second day—Walsenburg to Trinidad, via La Veta, Ojo anticline, Cucharas Pass, Stonewall, Tercio anticline and Raton Pass, *in* Guidebook to the geology of the Raton basin, Colorado: Rocky Mtn. Assoc. Geologists, p. 107-111.

Carter, D. A., 1956, Coal deposits of the Raton basin, *in* Guidebook to the geology of the Raton basin, Colorado: Rocky Mtn. Assoc. Geologists, p. 89-92.

Johnson, R. B., 1969, Geologic map of the Trinidad quadrangle, south-central Colorado: U.S. Geol. Survey Misc. Geol. Inv. Map I-558.

Lee, W. T., 1917, Geology of the Raton Mesa and other regions in Colorado and New Mexico: U.S. Geol. Survey Prof. Paper 101, p. 9-221.

Levings, W. S., 1951, Late Cenozoic erosional history of the Raton Mesa region: Colo. School Mines Quart., v. 46, no. 3, 111 p.

Marvin, R. F., Young, E. J., Mehnert, H. H., and Naeser, C. W., 1974, Summary of radiometric age determinations on Mesozoic and Cenozoic igneous rocks and uranium and base metal deposits in Colorado: Isochron West, 1974, no. 11, p. 32-3.

Pillmore, C. L., Obradovich, J. D., and Landreth, J. O., 1973, Mid-Tertiary volcanism in the Sangre de Cristo Mountains of northern New Mexico: Geol. Soc. America Abs. with Programs, v. 5, p. 502.

Smith, R. P., 1973, Age and emplacement structures of Spanish Peaks dikes, south-central Colorado: Geol. Soc. America Abs. with Programs, v. 5, p. 513-14.

Stormer, J. C., 1972, Ages and nature of volcanic activity on the southern high plains, New Mexico and Colorado: Geol. Soc. America Bull., v. 83, p. 2443-48.

Terry, B. E., 1956, Tercio anticline, Las Animas County, Colorado, *in* Guidebook to the geology of the Raton basin, Colorado: Rocky Mtn. Assoc. Geologists, p. 66-7.

Wanek, A. A., 1963, Geology and fuel resources of the southwestern part of the Raton coal field, Colfax County, New Mexico: U.S. Geol. Survey Coal Inv. Map C-45, 2 sheets [1964].

HISTORY OF VERMEJO PARK

KAREN PILLMORE LAURIE
Vermejo Park, New Mexico

From the time Indians ruled the southwestern plains, men and events have shaped the unique history of the Vermejo country. Occupying about 480,000 acres of unspoiled wilderness in northern New Mexico, the Vermejo Park Ranch remains one of the largest blocks of privately owned land in the United States. Part of the Maxwell Land Grant, Vermejo retains qualities and remnants of its rich earlier history.

EARLY DAYS

Before the advent of white settlers or adventurers in New Mexico, Utes and Jicarilla Apaches roamed the valleys and parks of northern New Mexico's Sangre de Cristo Mountains. Though New Mexico was part of the land claimed by Spain in 1524, several hundred years passed during which Indians seldom encountered white men. In 1821 the Mexican government took charge of the land and retained the Spanish policy of awarding land grants in its new colonies; most of these were grants in New Mexico. Under Spanish rule the laws governing the grants had been vague and complicated, resulting in a serious land-grant problem. Mexico inherited this problem and caused its own complications by amending and repealing rules and regulations pertaining to land grants. Consequently, its grant policy was not consistent, and many pitfalls stood between the grants and their final confirmations.

BEAUBIEN-MIRANDA

During this period of inconsistent land-grant policy, Carlos Beaubien, a French-Canadian trapper who had become a Mexican citizen, and his partner Guadalupe Miranda, private secretary to Governor Manuel Armijo of Santa Fe, petitioned the governor for a land grant. In their petition, presented on January 8, 1841, they pointed out the need for the land to be "reduced to possession," so that its natural resources could be put to use. An influential factor in their attaining a grant was proof of their intention to colonize or cultivate the land. Three days after Beaubien and Miranda presented their petition, Governor Armijo answered it, granting them the requested land to be put to good use. They did nothing to reduce the land to possession and ownership for two years. Then, on February 13, 1843, they asked Taos Justice of the Peace Don Cornelio Vigil to sign an order promising them possession of the granted land, which he did. A document, dated February 22, 1843, was drawn up and signed by Vigil, stating that he had marked the boundaries of the Grant in accordance with Beaubien and Miranda's description of the land in their original petition and that he declared the partners to be in full possession of the land.

Father Antonio José Martinez actively resisted the Grant on the grounds that the lands should be opened to the poor people and not granted in large tracts to the wealthy. He filed papers in Santa Fe contesting Beaubien and Miranda's right to land that, he said, rightfully belonged to the people who had for generations grazed their livestock on it. On February 27, 1844, after an investigation into its terms, Governor Don Mariano Chavez suspended the rights of Beaubien and Miranda to the Grant. The partners attempted to prove that the poor people had no objection to the Grant and pointed out some benefits that would come from their cultivation of the land; they thus appealed to the legislature for reinstatement of their claim to the Grant. On April 18, 1844, the assembly sustained their claim.

When the American army invaded New Mexico in 1846, Miranda fled with Governor Armijo to Mexico while Beaubien remained in Taos, becoming loyal to the United States. Along with the new territory, the United States inherited the land-grant problems. Large tracts of land had been granted to many citizens, such as Beaubien and Miranda, under ambiguous, complex laws, and many of the land-tract boundaries were vague. The United States agreed to protect the property rights of the citizens when it took over New Mexico, and thus tried to interpret the old laws and determine definite boundaries. Congress hired a surveyor to study the claims, report on their legitimacy and confirm valid claims. The Beaubien and Miranda Grant was confirmed in this way in 1857, but controversy over this Grant and others continued for several decades.

MAXWELL

Lucien B. Maxwell, pioneer, explorer and adventurer, became involved in the affairs of the Beaubien and Miranda Grant when he married Luz Beaubien, daughter of Carlos Beaubien and one of the heiresses to his interest in the Grant.

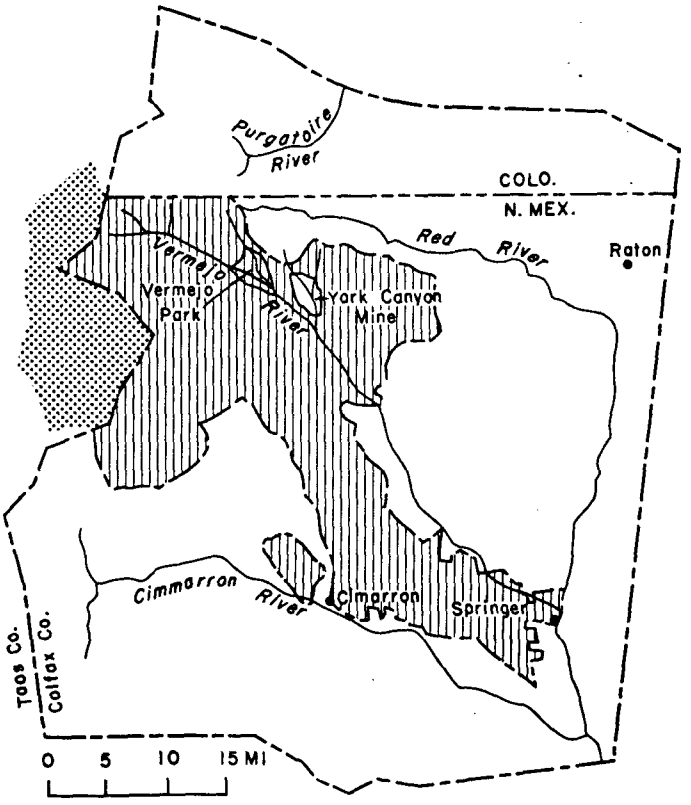


Figure 1. The Maxwell Land Grant. The hachured area shows the part of the Vermejo Park Ranch lying within the Grant boundary; the stippled area shows the part of the ranch acquired outside the Grant.

Beaubien turned over the management of his share of the Grant to Maxwell, who moved onto the Grant, settling at Rayado in 1849. Miranda, no longer interested in land in New Mexico, sold his share of the Grant to Maxwell. After Beaubien's death in 1864, Maxwell bought out all other heirs to the property, thus acquiring the rest of the Grant. By 1865 Maxwell and his wife had become sole owners of what by that time was being referred to as the Maxwell Land Grant, which encompassed 1,714,765 acres. The Grant included the town sites of Springer, French, Maxwell, Otero, Raton, Vermejo Park, Ute Park and Elizabethtown in New Mexico; and in Colorado, Virgil, Stonewall, Torres, Cuerto, Tercio, Primero and Segundo.

Maxwell's residence, renowned throughout the area as large, lavish and extravagant, became a principal stopping point on the Santa Fe Trail and a base for hunters, trappers and prospectors. Maxwell loved gambling, drinking and entertaining; and the rooms in his house reflected his tastes—a gambling room, a billiard room, a dance hall and a huge dining room for the men. Women were not allowed into these rooms; their quarters were in the rear of the house.

Maxwell's relationships with people he knew to be living on his land were peaceful, and in many instances he developed working relationships with them (Miller, 1962, p. 272).

> "He started many a small rancher in the stock business, giving him a herd of cattle, sheep, or horses and a small ranch to be run on shares. The agreement was always a verbal one and sometimes two or three years would pass without a division. Then, when Maxwell needed more stock, hay, or grain to fill his government contracts, he would call in his shareholders, ask for an accounting, always verbal, and direct them to bring in the surplus to him, which was done without question."

Also living on Maxwell's land were people whose ancestors had built homes and ranches and who, for generations, had grazed their livestock on the land and cultivated it without ever having heard of Beaubien, Miranda, or Maxwell. These people undoubtedly believed that they were the owners of the land. Settlers from the East had also moved in and settled on the Grant, hoping to establish homesteads. These people too thought they were entitled to the land upon which they had settled.

Gold was discovered on the Maxwell Land Grant along Willow Creek in 1866. When its presence became known the following year, a rush of prospectors invaded the area and mining camps were established. Elizabethtown sprang up and gold was found along many of the creeks and on Baldy Mountain as well; the surrounding area became a frenzy of mining activity. Placer mining spread into what is now part of the Vermejo Ranch, but most of the gold mining activity on the ranch occurred between 1890 and 1900, when La Belle flourished as a mining town. La Belle, along with most other camps and mines, was abandoned about 1900 because of the low grade of the ore.

The discovery of gold on the Grant came as no surprise to Maxwell, as he had known of its existence for some time. The rush of prospectors and mining camps brought by the gold discovery, however, prompted him to invest in gold mining. Shortly afterward Maxwell sold the Grant, for reasons that are still uncertain. According to some references, including Keleher (1975), Maxwell's investments in gold mining were a failure. Other references are vague about his reasons for selling and suggest that Maxwell was still quite wealthy at the time of the sale. Pearson (1961) contended that Maxwell made a decent profit from his investments in gold mining, but sold the Grant because of outside pressures to sell and because the management and control of the Grant had become a burden. Big businesses had begun looking into the Maxwell Land Grant after hearing that gold had been discovered on the Grant and that great coal, lumber and mineral potential existed, in addition to the grazing and farming possibilities.

ENGLISH CONTROL

Operating for an English syndicate, three financiers obtained an option to purchase the Grant from Maxwell in 1870 for a reported sum of $1,350,000 (Pearson, 1961). Maxwell sold the Grant, and after a brief unsuccessful banking venture in Santa Fe and several other financial reverses, he returned to ranching at Fort Sumner and lived there until his death in 1875.

The English syndicate formed the Maxwell Land Grant and Railway Company, which soon made an effort to remove squatters from the land by politely informing them that they were on Grant land and asking them to leave. Those who had lived on the Grant for many years with only Maxwell's verbal consent became irate at now being asked to leave by foreign absentee landlords. The Spanish and American people living on more remote portions of the Grant, who thought they owned their land, could not understand why they were being asked to leave. Many did leave, but others vigorously resisted. Anti-Grant sentiment grew strong and men throughout the area took up the cause, some with the aid of Winchester rifles and Colt revolvers. This period of violence, directly related to the problem of land title, became known as the Colfax County War. Conflicts continued—on the lands with gunfights and in the courts between Grant men and anti-Grant men. Lives were sacrificed with few repercussions until a minister, F. J. Tolby, known to sympathize with the squatters, was murdered. He became a martyr to the anti-Grant cause; and another minister, O. P. McMains, took up the cause. He displayed renewed vigor and published an anti-Grant newspaper filled with fiery editorials on the Grant situation.

DUTCH CONTROL

Within five years after purchasing the Grant, the Maxwell Land Grant and Railway Company was bankrupt, even unable to pay salaries and 1874 taxes. Debts mounted and the situation worsened for several more years, until foreclosure proceedings were initiated in 1879. In 1880 the Maxwell Land Grant Company was formed under the laws of the United Netherlands, and the Grant came under control of a Dutch group that included several wealthy American industrialists. Financial problems continued to plague the Company and anti-Grant sentiment increased.

In 1885 the pro-Grant faction prevailed upon Governor Lionel A. Sheldon to authorize the organization of a company of National Guards to control the situation. News leaked out that Jim Masterson, brother of gunfighter "Bat" Masterson from Dodge City, was to lead this company of militia and that these men intended to kill. This news aroused the anti-Grant men, who went to the governor and convinced him to have the militia disbanded; this action, in turn, angered Masterson and the Grant men. Grant-related violence raged on, and the Dutch Company's financial situation worsened, necessitating a reorganization that was finally completed in 1888 (Pearson, 1961). The preceding year, the case of the United States vs.

The Maxwell Land Grant Company had gone to the Supreme Court and been decided in favor of the Company. The settlers and squatters were forced to abandon hope of ever obtaining legal rights to the land upon which they lived. At this point most of the squatters left, and the Maxwell Land Grant Company sold land to some of the remaining squatters.

BARTLETT

In 1900 William H. Bartlett, a wealthy grain operator of the Chicago firm of Bartlett, Frazier, and Company, and one of the five men who cornered the Chicago grain market at the turn of the century, began negotiations to purchase a large tract of land from the Maxwell Land Grant Company. Bartlett had first looked into property in the Southwest because his younger son, William H., Jr., had tuberculosis and doctors had suggested that the southwestern climate could help his condition. In 1902 Bartlett purchased 205,000 acres of Grant Land including Vermejo Park. He made an agreement allowing him to withhold the last payment to the Maxwell Land Grant Company until all squatters on the land had been removed: "They are given two years to get the Mexicans off and I hold back $10,000" (letter to H. W. Adams, March 25, 1902).

At that time there was, and had been for generations, a predominantly Mexican settlement along the banks of the Vermejo River south of the present Park area. All of the families in this area were squatters on Grant land. The land supported crops and cattle, and many families tended small orchards. A little community existed in the 1880's that included a store, a church and even a small school. The close-knit nature of the community is illustrated by the *Springer Stockman* newspaper, July 6, 1883 edition, which reported on a Fourth of July party on the Vermejo: "At Vermejo Park the settlers up there had quite a celebration in the old fashioned way. The exercises consisted of singing, reading of the Declaration of Independence, speech-making, a basket dinner, and a big dance in the evening. Several parties from Raton went up there, but as they have not returned, it is impossible to give a full report of the good time had" (Stanley, 1952, p. 221). Apparently many of these squatters would not leave, so when Bartlett took over he let some of them remain and put them to work. Adobe ruins visible today along the Vermejo River from just below the Park area all the way downriver to the site of Dawson are the only evidence of the ranches that belonged to these squatters.

After buying the land, Bartlett built most of the buildings that make up the present Vermejo Park area. Casa Minor, the first residence built for the Bartletts, was completed in 1903. The second mansion, which was the largest and was situated between the two mansions remaining today, was begun shortly afterward. This mansion contained a huge kitchen and dining room and 27 bedrooms. In 1908 Bartlett began what is now called Casa Grande. The largest room was a library, 60 ft long by 30 ft wide, to house his collection of books, numbering more than 10,000 volumes. The house had 18 rooms: a kitchen but no dining room, a sunporch, six baths, and several bedrooms. Casa Grande became known as Bartlett's house; Casa Minor, his son Willy's house; and the center one, his son Norman's, used mainly for guests.

Although Bartlett did not move his residence to the ranch until July of 1910, his sons lived there continuously from 1903. The elder, Norman, first took charge of the lumber, which was only cut as ranch needs dictated. Later he was

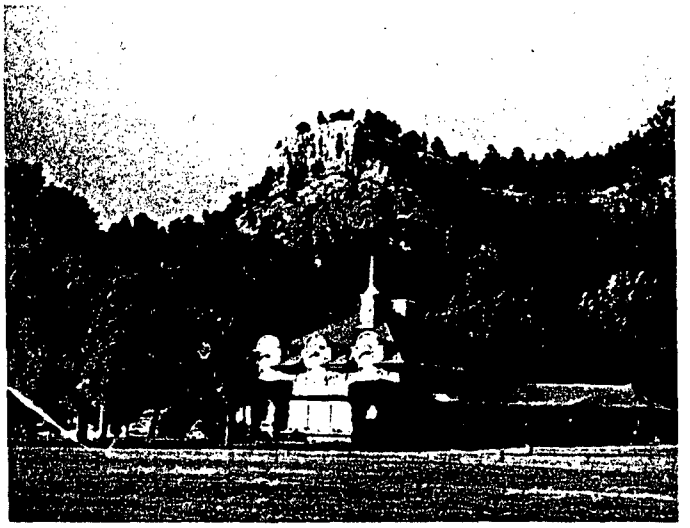


Figure 2. Casa Minor, completed in 1903; the first mansion built by W. H. Bartlett, owner of Vermejo Park. The pavilion sits atop a cliff in the upper left.

trained by H. W. Adams, Bartlett's cattle manager and owner of a part of the interest in Vermejo. Norman took over Adam's position when Bartlett bought out Adam's interest in Vermejo in December 1917. Bartlett's younger son, Willy, who lived at Vermejo with his wife, Virginia, was Postmaster of Vermejo.

Bartlett, an avid fisherman, developed and named Adams, Bartlett, Merrick, Bernal, Munn, and Marys Lakes, stocking most of them with Eastern trout. He tried stocking some lakes with varied types of fish, such as he mentioned in his March 19, 1909, letter to the Bureau of Fisheries: "I have two more lakes that are disconnected from the trout streams, in which I would like to put some black bass, yellow perch, some croppies and some walleyed pike." Only trout remain in the lakes, the other fish could not spawn and died out. Bartlett built cabins by many of the lakes, in which he and his friends stayed occasionally.

Bartlett built Costilla Lodge as a fishing and hunting lodge, and often took his good friends and frequent visitors there to stay. Among them were Noel S. Munn, for whom Munn Lake was named, and George P. Merrick, whose name was given to Merrick Lake and to "Merrick's ranch" which Bartlett built nearby.

Bartlett operated a coal mine in Spring Canyon, which supplied the ranch needs and heated the houses. The mine had coal carts that ran on tracks; the mine entry, air shafts, weigh house, and related buildings still stand in Spring Canyon at the north entrance to Vermejo Park.

First hand accounts of life as a worker on Bartlett's ranch describe it as happy and peaceful. Bartlett built a store, a schoolhouse that was attended by 65 students, a coal-fired electric power plant, a fish hatchery, an ice house, a smoke house and greenhouses, in addition to the residences built for the ranch employees. Many parties and dances were given for his friends, and his workers were welcome to join in many of them. The pavilion on the cliff above Casa Minor is said to have been the site of some of Bartlett's parties, and the place where name bands and orchestras played, "filling the park with music." Annual Christmas parties included a huge Christmas tree in the library of Casa Grande, and Bartlett provided gifts for all the children and employees on the ranch.

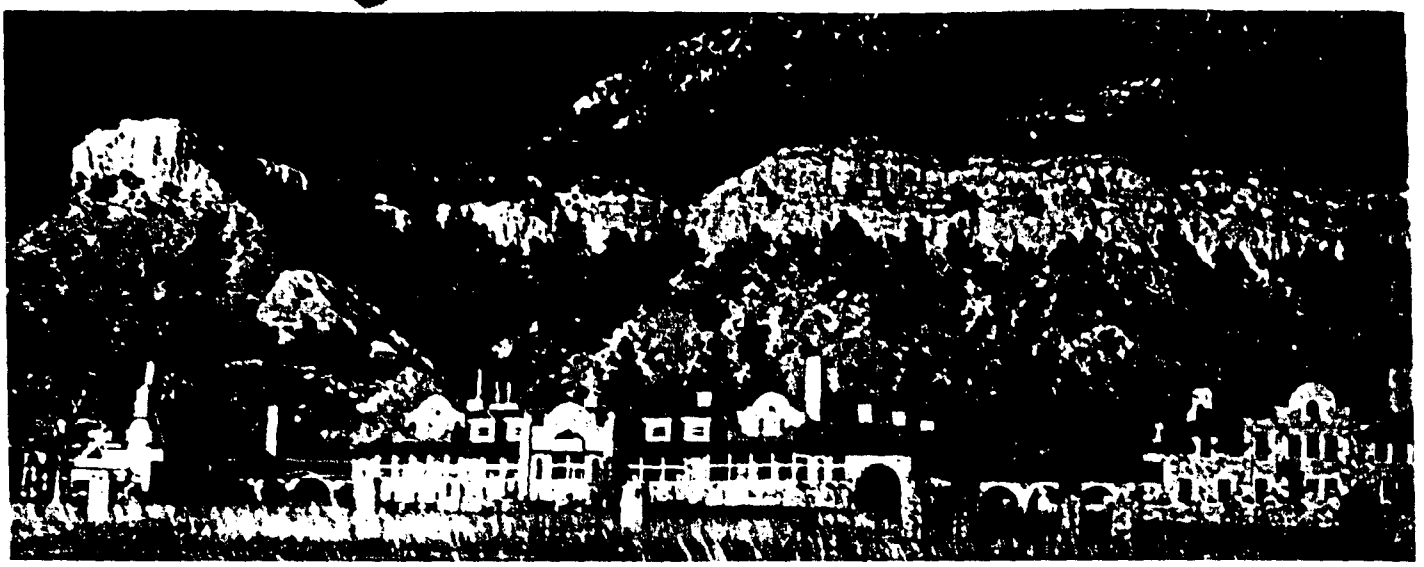


Figure 3. The Guest House (Norman's House), containing 27 bedrooms. It burned to the ground in 1955 after being remodeled by W. J. Gourley. Photograph courtesy of Mrs. Evelyn Drake, Vermejo Park, New Mexico.

At the same time that Bartlett was developing this magnificent ranch, lumber camps and mining towns were growing up in the surrounding parts of the Grant land. In 1907 T. A. Shomberg, an associate of the Maxwell Land Grant Company, formed the Continental Tie and Lumber Company. He offered to sell Bartlett one-fourth interest in the venture, but Bartlett declined. The Cimarron and Northwestern Railway Company was formed as a subsidiary. Originally, the plan was to build a railroad from Cimarron into the new logging towns on Ponil Park and on up to Van Bremmer Park, with branches to surrounding timber areas (now all within Vermejo Ranch boundaries). After completion, the railroad ran from Cimarron up North Ponil Creek to Ponil Park. It looped around at Bonito, but never reached Van Bremmer Park. The logging business around these towns flourished for a long period, supplying lumber for mines in the Raton vicinity, cross ties for the railroads and timber for the buildings. The timber supply in the area began dwindling around 1920, the last railroad tracks were pulled up in 1923, and the logging towns were abandoned.

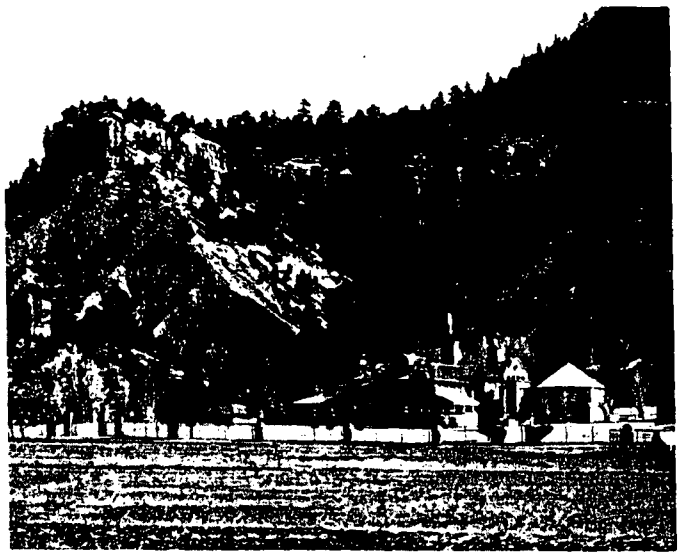


Figure 4. Casa Grande. Began for Bartlett in 1908.

Bartlett was still making improvements on the ranch when he died suddenly of heart trouble on December 10, 1918. Both of Bartlett's sons died soon after—Norman on September 5, 1919, and Willy on January 5, 1920. In the words of John Brewer, a former cow foreman at the Vermejo Ranch, who knew the Bartletts personally, "They had ever'thin' they was to have and they did ever'thin' they was to do; then they all up and died" (oral communication, 1963). The estate was left to Willy's widow, Virginia.

VERMEJO CLUB

In 1926, Virginia Bartlett and her second husband, Robert H. Doulton, sold the ranch to Harry Chandler, of the Los Angeles Times Mirror, and others who formed an elite hunting, fishing, and recreational retreat known as the Vermejo Club. Membership in the club was by invitation only, and the cost for a lifetime was $5,000. The limited membership of the Vermejo Club was "carefully selected from men worth knowing who have been prompted to give it countenance by their sympathy with its ideals and their confidence in its purpose" (Vermejo Club, 1926, p. 33). Members included William Banning, Max C. Fleischmann, Will H. Hays, Herbert Hoover, Thomas W. Warner, Harvey Firestone, Cecil B. deMille, Douglas Fairbanks, Mary Pickford, and Andrew Mellon. In this remote mountain hideaway, hunting was a popular sport and a favorite source of food. According to Elliott Barker, New Mexico State Game Warden, who spent 1930-31 working for the Vermejo Club, "The elk were the most spectacular and important game on the area, but not the most plentiful, for deer greatly outnumbered them. This elk herd has perhaps attracted more attention than any other in the state because it was the first introduced and established after the species had been exterminated over the entire state in the early 1890's" (Barker, 1946, p. 188).

The natural setting and relaxation from everyday stresses and strains were emphasized in the promotional book printed by the Club. Every effort was made to preserve the unpol-

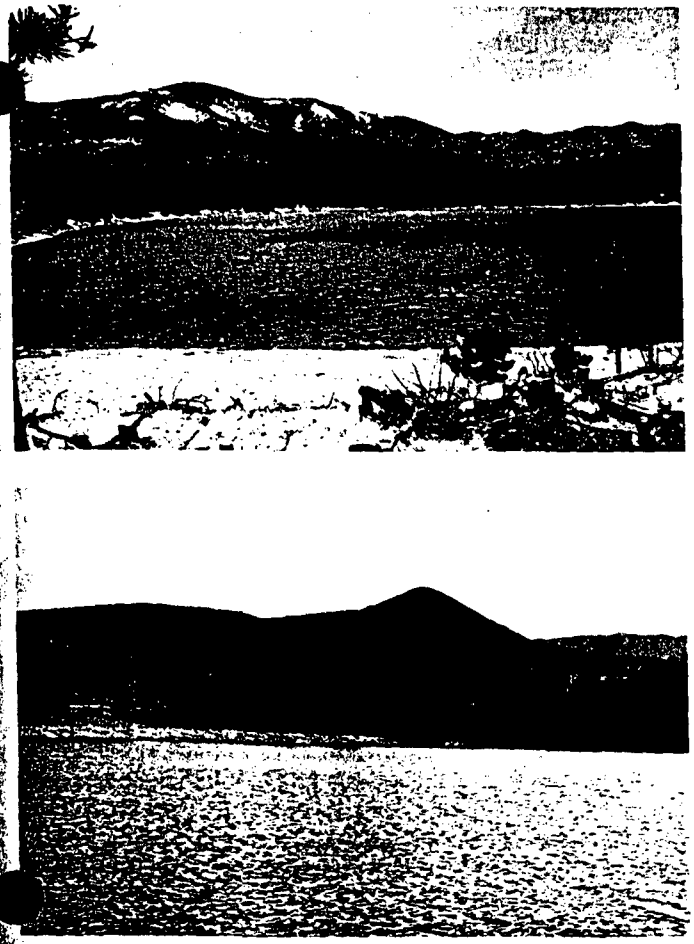


Figure 5. Bartlett (upper) and Adams (lower) Lakes, developed by Bartlett for scenic and fishing enjoyment.

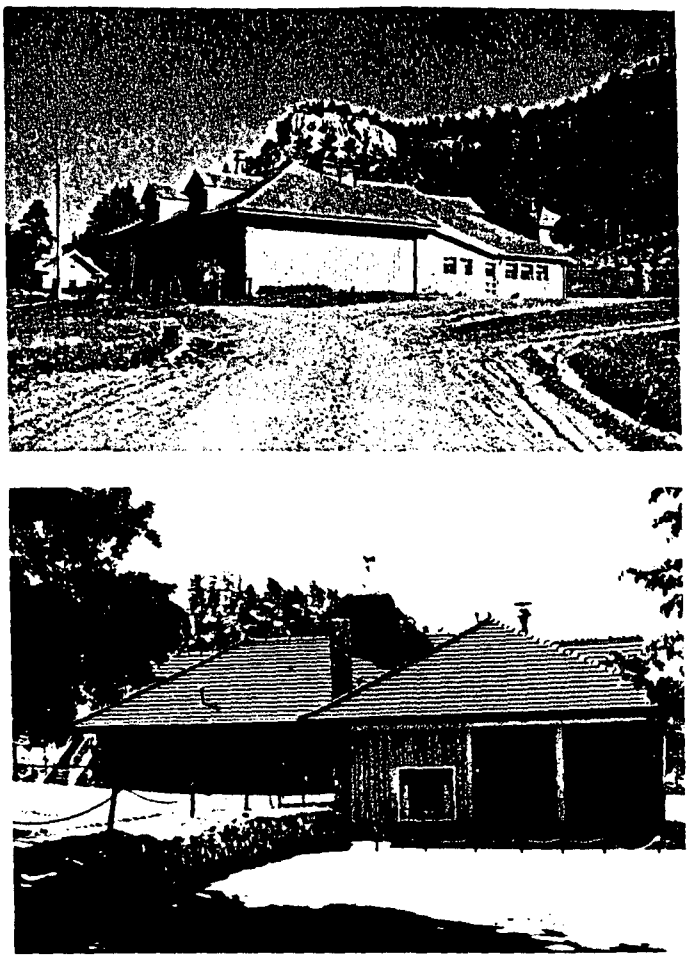


Figure 6. The "Stables." Gourley converted Bartlett's personal stables into an elegant dining room for ranch guests. The "Stables" are shown from the rear in the upper photograph and the front in the lower photograph. The pavilion is on the top of the cliff in the background.

luted, untouched wilderness aspect of the ranch. The mansions that Bartlett built were used as guest houses and club houses. A pool table in Bartlett's library and the tennis courts on the mansion grounds were available to members' use, and a landing field was built on club property. Members could come and camp, stay in one of the isolated lodges, or enjoy the wilderness free from its hardships by staying at the headquarters and engaging in a variety of activities there.

The Vermejo Club promotional book summed up what a membership entailed (Vermejo Club, 1926, p. 13):

> "A life member is entitled to all of the privileges of the club for himself and all dependent members of his family, who are at liberty to visit the club at any time as though it were their own estate. They have at their disposal the Club headquarters with its luxurious buildings, its adjoining comfortable cottages, or the various outlying hunting lodges and camps, and they may in addition, at a nominal rent of $5.00 per year, secure building sites for hunting lodges or camps of their own at any point which will not interfere with the general enjoyment of the property by its other members."

William Banning chose the latter option and built Banning ranch on Leandro Creek near Merrick. Harry Chandler's lawyer and close friend, W. T. Cresmer, was given a building site and surrounding land near Leandro Creek at the foot of Ash Mountain, where he built Cresmer Lodge in 1929. The ruins of Banning's and Merrick's ranches give some idea of the elaborate facilities that existed in this wilderness playground. Literally thousands of discarded bottles that had contained imported wines, fancy Hungarian mineral water, a variety of beers, and other unidentified liquids were found in the dump at Merrick's ranch, along with such exotic things as oyster shells!

The Vermejo Club, unable to sustain its membership when the depression hit, disbanded. In an effort to preserve the club, Harry Chandler and one of his family corporations, the Southwest Land Company, took over the land and leased it to Ira Aten to raise cattle. The mansions were closed down, and the ranch operations continued under Aten for several years.

GOURLEY

W. J. Gourley, a Fort Worth industrialist who founded the American Manufacturing Company of Texas, manufacturer of oil-field equipment and munitions, began purchasing land in the Maxwell Grant area in 1945. He first purchased 108,000 acres adjacent to the Vermejo Park land from the W. S. Land and Cattle Company, together with 3,300 head of cattle. In July of that year, he applied for a lease on land in the Ponil and Van Houten area, which contained 90,000 acres adjoining his ranch. He was granted the lease for 10 years and later exercised an option to purchase it for $4.00 an acre. Then on

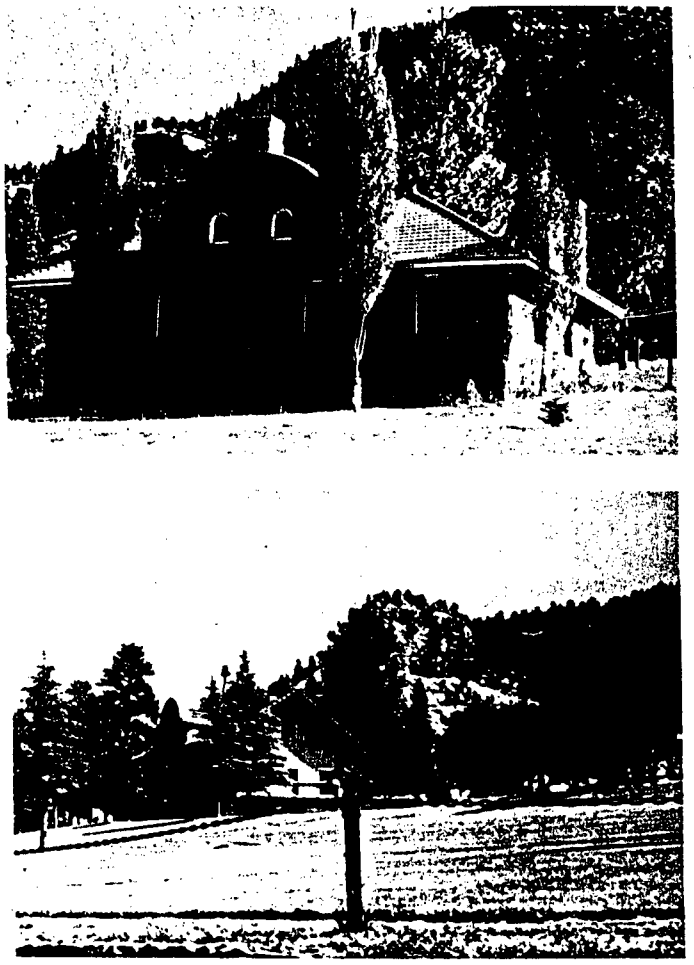


Figure 7. Guest houses. Gourley had the employees' stone cottages remodeled to accommodate fishing and hunting guests.

October 14, 1948, Gourley bought the Southwest Land Company's Vermejo Ranch property. "Within a few years he became owner of thousands of adjoining acres, most of it in Colfax County, some in Taos County, and a little in Costilla County, Colorado" (Pearson, 1961, p. 276). Gourley put together the largest single tract of land carved from the Grant. He maintained a thriving cattle business on the ranch and installed cowboys at headquarters and outlying cow camps to care for the cattle. For several years Castle Rock Park was the location of the main cow camp, as it had been in the past.

Big-game hunting became an important part of the ranch operation, and Gourley tried to enlarge the herds. In 1957, he purchased several hundred elk from Yellowstone National Park at $5.00 each and had them trucked to the ranch. He kept them in the "Elk Trap," a pasture enclosed by a high ten-strand barbed wire fence, and released them after they grew accustomed to their new surroundings. Hereford cattle and a small buffalo herd now graze in that pasture. Gourley also purchased and raised wild turkeys at the park area in the 1960's. He carefully protected the young birds from marauding predators and then released the full-grown turkeys to roam the ranch.

After purchasing the property, the Gourleys re-opened the mansions. Casa Minor was remodeled for their residence during their visits. They began a guest operation in 1952, and remodeled the middle mansion into 35 guest rooms with baths, but it burned to the ground on December 23, 1955. Little was salvaged, and the rubble was plowed under the ground. The guest operation closed down for a year after the fire. Mrs. Gourley had Bartlett's personal stable converted into the "Stables," a large kitchen, bar, and dining area, and had the adjacent stone cottages remodeled to accommodate guests. Vermejo opened for business again for the summer fishing season of 1957. When Casa Grande was remodeled for the Gourleys in the early 1960's, Casa Minor was also converted into guest accommodations. A house originally built for Adams, Bartlett's cattle manager, was used as the ranch headquarters; Ken Orr, ranch manager during Gourley's ownership, had his office there and a cook house was located in the rear of the building, where the ranch hands were fed. The store, originally built by Bartlett, was operated for ranch employees until it burned down in the late 1950's.

Gourley improved the ranch lakes and stocked them with large trout to entice fishermen. He organized and built a network of diversion ditches to utilize spring run-off in filling the lakes, greatly increasing their recreational potential. Gourley restored and re-opened existing hunting lodges at Cresmer and Costilla, and built Shuree Lodge on Middle Ponil Creek.

PENNZOIL

In August 1970, Gourley died of a heart attack at the age of 81. The ranch was put up for sale for 26.5 million dollars and remained in Mrs. Gourley's possession for three years, during which time the National Park Service, the United States Forest Service, the State of New Mexico and several private interests attempted to purchase it. In August 1973, Pennzoil Company purchased the entire Vermejo Ranch from Mrs. Gourley.

Under Pennzoil control, Vermejo has continued as a working ranch, and the guest operation has been expanded. A new office was built in 1975 near the mansion area, and the old headquarters' office now houses departmental offices, such as fish and game, forestry, and cattle management; the cook house still remains in the back section.

Although Vermejo Ranch is only a fragment of the original Maxwell Land Grant, it remains one of the largest privately owned blocks of land in the United States today. From the days of Beaubien and Miranda through Maxwell, the Dutch, Bartlett, the Vermejo Club, and Gourley to the present-day corporate ownership of Pennzoil, Vermejo has catered to an exclusive few and remained private to the general public.

REFERENCES

Barker, E. S., 1953, When the dogs bark treed: Albuquerque, University of New Mexico Press, 209 p.

Bartlett, W. H., Unpublished letters written between 1898 and 1918.

Haslanger, Mrs. R. U., April 12, 1976, Interview.

Keleher, W. A., 1975, Maxwell Land Grant, a New Mexico item: Santa Fe, New Mexico, William Gannon, 166 p.

Miller, Joseph, 1962, New Mexico, a guide to the colorful state, Alsberg, H. G., ed.: New York, Hastings House, 472 p.

Myrick, D. F., 1970, New Mexico's railroads—An historical survey: Golden, Colo., Colorado Railroad Museum, 206 p.

Pearson, J. B., 1961, The Maxwell Land Grant: Norman, Okla., University of Oklahoma Press, 305 p.

Sherman, J. E., and Sherman, B. H., 1975, Ghost towns and mining camps of New Mexico: Norman, Okla., University of Oklahoma Press, 270 p.

Stanley, F., 1952, The grant that Maxwell bought: Denver, Colo., World Press.

Vermejo Club: Los Angeles, M. H. Sherman Foundation, Inc., pamphlet.

Kieling, Martyne

From: Kieling, Martyne
Sent: Wednesday, February 05, 2003 10:31 AM
To: Johnson, Roy
Subject: Netting exemption

Roy,

I left the originals regarding the netting exemptions for VPR-A and VPR-E with you. I will keep a copy in my file and have sent copies on back to Donald Lankford.

Thanks!

Martyne J. Kieling
Martyne J. Kieling
Environmental Geologist

RECEIVED
FEB 3 2003
Environmental Bureau
Oil Conservation Division

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-134
Revised March 17, 1999

Submit 4 Copies to appropriate District Office

Permit No. 4-1
(For Division Use Only)

APPLICATION FOR EXCEPTION TO DIVISION ORDER R-8952

FOR PROTECTION OF MIGRATORY BIRDS Rule 8(b), Rule 105(b), Rule 312(h), Rule 313, or Rule711(I)

Operator Name: EL PASO ENERGY RATON, L.L.C.

Operator Address: P.O. Box 190, RATON, NM 87740

Lease or Facility Name VPR "E" Water Disposal Facility Location H Sec 5 31N 19E
Ut. Ltr. Sec. Twp. Rge

Size of pit or tank: 80' x 50' x 12 ft deep (+/- 7,000 bbls.)

Operator requests exception from the requirement to screen, net or cover the pit or tank at the above-described facility.

The pit or tank is not hazardous to migratory waterfowl. Describe completely the reason pit is non-hazardous.

During normal operations, the pit is empty of all fluids. In case of emergency overflow, pit shall be emptied within 24 hours.

1) If any oil or hydrocarbons should reach this facility, give method and time required for removal:

Oil or hydrocarbons should not reach this facility.

2) If any oil or hydrocarbons reach the above-described facility, the operator is required to notify the appropriate District Office of the OCD with 24 hours.

Operator proposes the following alternate protective measures: Electronic alarm system is in place to notify operations personnel of high tank level conditions. One-thousand barrels capacity is available in emergency tanks after overflow situation occurs.

CERTIFICATION BY OPERATOR: I hereby certify that the information given above is true and complete to the best of my knowledge and belief.

Signature DR Lankford Title Principal Engineer Date 01/28/03

Printed Name Donald R. Lankford Telephone No. (505) 445-6721

FOR OIL CONSERVATION DIVISION USE

Date Facility Inspected _____ Approved by _____

Inspected by _____ Title _____

Date 2/5/03

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District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

FEB 03 2003
Environmental Bureau
Oil Conservation Division

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-134
Revised March 17, 1999

Submit 4 Copies to Appropriate District Office

Permit No. 4-2
(For Division Use Only)

APPLICATION FOR EXCEPTION TO DIVISION ORDER R-8952

FOR PROTECTION OF MIGRATORY BIRDS Rule 8(b), Rule 105(b), Rule 312(h), Rule 313, or Rule711(I)

Operator Name: EL PASO ENERGY RATON, L.L.C.

Operator Address: P.O. Box 190, RATON, NM 87740

Lease or Facility Name VPR "A" Water Disposal Facility Location B Sec 1 31N 19E
Ut. Ltr. Sec. Twp. Rge

Size of pit or tank: 80' x 80' x 10 ft deep (+/- 9,000 bbls.)

Operator requests exception from the requirement to screen, net or cover the pit or tank at the above-described facility.

The pit or tank is not hazardous to migratory waterfowl. Describe completely the reason pit is non-hazardous.

During normal operations, the pit is empty of all fluids. In case of emergency overflow, pit shall be emptied within 24 hours.

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Signature DR Lankford Title Principal Engineer Date 01/28/03

Printed Name Donald R. Lankford Telephone No. (505) 445-6721

FOR OIL CONSERVATION DIVISION USE

Date Facility Inspected _____ Approved by _____

Inspected by _____ Title _____

Date 2/5/03

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

January 23, 2003

Donald R. Lankford
El Paso Energy Raton, L.L.C.
P.O. Box 190
Raton, NM, 87740

RE: El Paso Energy Raton VPRE Emergency Pit
VPRE Water Disposal Station Location
Receiving produced water from the VPR "E" Lease
Colfax County, New Mexico

Dear Mr. Lankford:

The New Mexico Oil Conservation Division (OCD) has received the El Paso Energy Raton, L.L.C. letter dated January 10, 2003. As stated in the above referenced letter the produced water emergency pit will receive emergency upset water from the VPRE water disposal station separator and holding tanks associated with the VPRE-99 injection well location. According to OCD **Rule 711.A.3.c, emergency pits that are designed to capture fluids during an emergency upset period only and provided such fluids will be removed from the pit within twenty-four (24) hours from introduction are exempt from permitting requirements.**

Pursuant to the OCD Order R-8952, all tanks exceeding 16 feet in diameter and all exposed pits and ponds shall be screened, netted or covered. Application for Exception to Division Order R-8952 can be applied for via Form C-134. In addition OCD Rule 310 prohibits the storage or retention of oil in earthen reservoirs, or in open receptacles.

Please be advised that OCD approval does not relieve El Paso Energy Raton, L.L.C. of liability should their operation result in pollution of the ground water, surface water or the environment. In addition, OCD approval does not relieve El Paso Energy Raton, L.L.C. of the responsibility for compliance with other federal, state and/or local regulations.

If you have any questions please do not hesitate to contact me at (505) 476-3488.

Sincerely,

Martyne J. Kieling
Environmental Geologist

Enclosure: Form C-134

xc: Roy Johnson, OCD District 4

elpaso

EL PASO ENERGY RATON, L.L.C.
P.O. BOX 190 - RATON, N.M. 87740

January 17, 2003

RECEIVED
JAN 2 2 2003
Environmental Bureau
Oil Conservation Division

Martyne J. Kieling
New Mexico Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Re: El Paso Energy Raton Emergency Pits on Vermejo Ranch

Dear Martyne:

Last week I sent you an exception request for the emergency pit in the VPRE project area on our Vermejo Park Ranch CBM Project. I failed to introduce myself and I did not understand the background correspondence that had been established. After talking with Roy Johnson and Steve O'Connell I have a better understanding.

I worked closely with Steve O'Connell from 1999 until he left our project last Summer. I have also worked closely with Roy since 1999. I'm trying to pick up some loose ends that Steve had covered. I understand that Steve and you had been in communication in 2000 about this emergency pit matter. Roy told me last week, that Steve's submittal of January 2000, got lost in the wash. So without introduction, I hit you with something out of the blue. I apologize.

Please find enclosed a copy of Steve's original submittal for the VPRA pit. Also, find an updated version for the VPRA submittal and a copy of a new request for the VPRA area that I patterned after the original. You should already have the VPRE Emergency Pit exemption request.

Sorry for the confusion. Please call me with any questions at (505)445-6721, or better yet come out for a field visit.

Sincerely,

DR Lankford

Donald R. Lankford
Principal Engineer

RECEIVED

JAN 2 2 2003

Environmental Bureau
Oil Conservation Division

elpaso

EL PASO ENERGY RATON, L.L.C.
P.O. BOX 190 - RATON, N.M. 87740

January 10, 2003

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

Re: El Paso Energy Raton VPRE Emergency Pit

Dear Martyne:

El Paso Energy Raton, L.L.C, has recently completed the VPRE-99 well as a water disposal well on the Vermejo Park Ranch in Colfax County. Under *Administrative Order SWD 850*, we are approved for disposal of produced water from coal bed methane wells in the area.

Attached is a site plot plan for the VPRE-99 location. Water from the producing coalbed methane wells on the VPR "E" Lease flows to the VPRE-99 water handling facility. The water is routed through two 600 bbl. vertical tanks known as "gun barrel" separators. These gun barrels are configured in such a way as to skim any hydrocarbons from the produced water. Clean water dumps into a battery of 4 – 500 bbl. vertical steel welded storage tanks. The water is then pumped down the VPRE-99 water disposal well into the Entrada and Glorieta formations at 7095'-7580'. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711.A that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

Attached you will find water quality data from the source wells. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-6721.

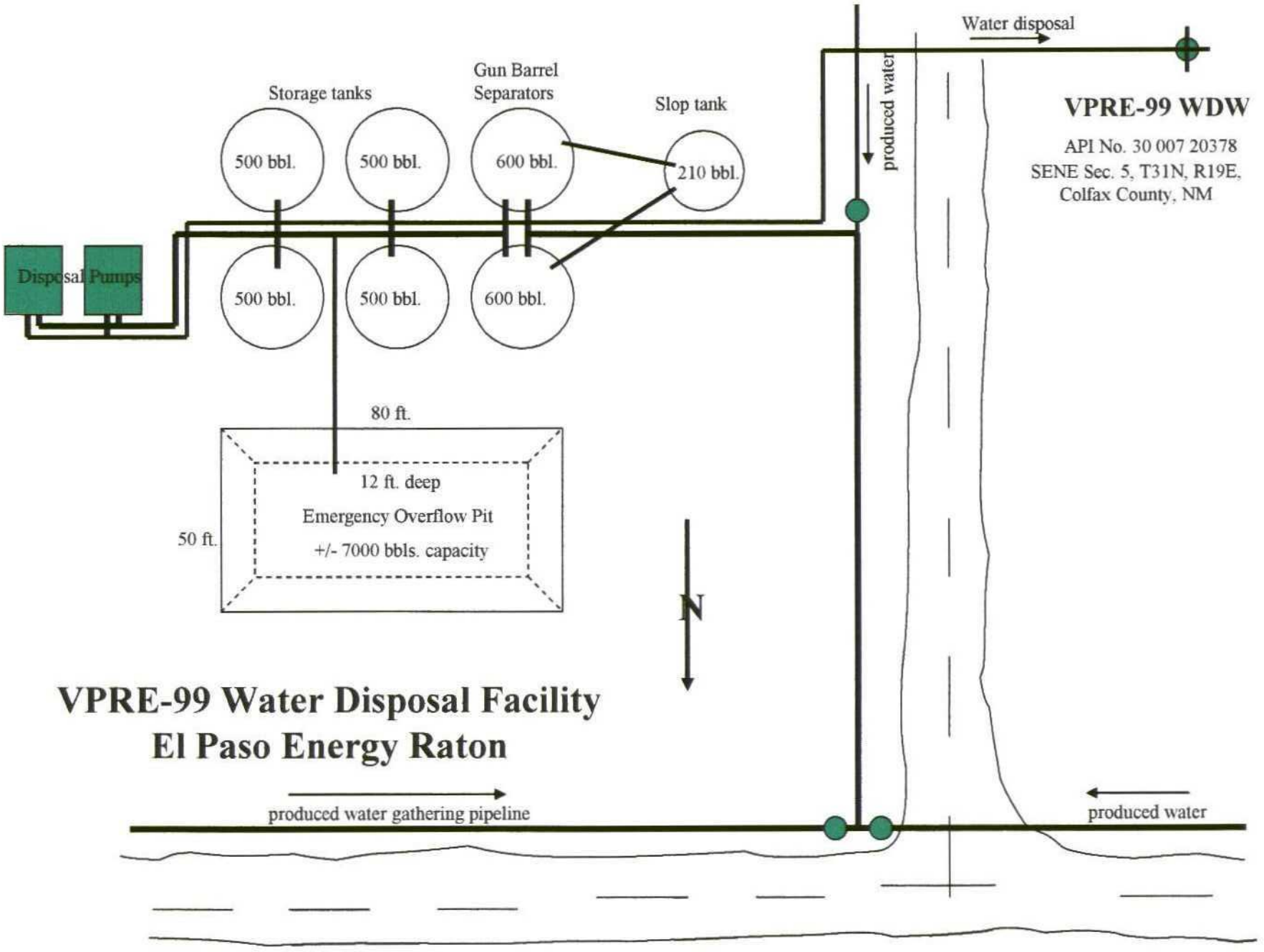
Sincerely,

DR Lankford

Donald R. Lankford
Principal Engineer

Attch: 1) Plot Plan
2) Water Analyses

Cc: Roy Johnson
Carl Lakey
Bob Dennis


Water disposal
Gun Barrel
Separators
Storage tanks
Slop tank
produced water
VPRE-99 WDW
API No. 30 007 20378
SENE Sec. 5, T31N, R19E,
Colfax County, NM
500 bbl.
500 bbl.
600 bbl.
210 bbl.
Disposal Pumps
500 bbl.
500 bbl.
600 bbl.
80 ft.
12 ft. deep
Emergency Overflow Pit
+/- 7000 bbls. capacity
50 ft.
N
VPRE-99 Water Disposal Facility
El Paso Energy Raton
produced water gathering pipeline
produced water

Rocky Mountain Region
1675 Broadway, Suite 1500
Denver, CO 80202
(303) 573-2772
Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218408
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	29217
Entity (or well #):	2	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2020.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218408 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**169.0**	**4.77**	**Sodium:**	**567.9**	**24.7**
Bicarbonate:	**1261.0**	**20.67**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**8.0**	**0.4**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**0.9**	**0.01**
Borate:			**Iron:**	**0.5**	**0.02**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.28	Lead:		
pH used in Calculation:		**8.28**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	4.90	-4.23	0.00	-4.30	0.00	-3.47	0.00	-0.33	0.00	0.09
100	0	0.67	5.25	-4.24	0.00	-4.25	0.00	-3.45	0.00	-0.46	0.00	0.14
120	0	0.72	5.60	-4.24	0.00	-4.17	0.00	-3.41	0.00	-0.57	0.00	0.21
140	0	0.79	5.60	-4.24	0.00	-4.07	0.00	-3.37	0.00	-0.65	0.00	0.31

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20105
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	3		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary

Sampling Date:	7/6/01
Analysis Date:	7/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2351.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	40 PPM
Oxygen:	
Comments:	

Analysis of Sample 185012 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**168.0**	**4.74**
Bicarbonate:	**1500.0**	**24.58**
Carbonate:	**0.0**	**0.**
Sulfate:	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		
pH at time of analysis:		8.42
pH used in Calculation:		**8.42**

Cations	mg/l	meq/l
Sodium:	**642.2**	**27.93**
Magnesium:	**2.5**	**0.21**
Calcium:	**13.0**	**0.65**
Strontium:	**1.5**	**0.03**
Barium:	**2.0**	**0.03**
Iron:	**9.0**	**0.33**
Potassium:	9.0	0.23
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.98	9.79	-3.96	0.00	-4.03	0.00	-3.13	0.00	0.10	0.35	0.08
100	0	1.02	9.79	-3.97	0.00	-3.98	0.00	-3.11	0.00	-0.04	0.00	0.13
120	0	1.06	10.14	-3.97	0.00	-3.90	0.00	-3.07	0.00	-0.15	0.00	0.2
140	0	1.10	10.14	-3.97	0.00	-3.80	0.00	-3.02	0.00	-0.23	0.00	0.3

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196066
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28439
Entity (or well #):	4	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2100
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000004
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196066 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**119.0**	**3.36**	**Sodium:**	**589.2**	**25.63**
Bicarbonate:	**1378.6**	**22.59**	**Magnesium:**	**0.9**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.5**	**0.01**
Phosphate:			**Barium:**	**0.6**	**0.01**
Borate:			**Iron:**	**0.7**	**0.03**
Silicate:			Potassium:	4.5	0.12
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.38	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.38**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.30	1.40	-4.67	0.00	-4.74	0.00	-3.69	0.00	-0.51	0.00	0.08
100	0	0.34	1.40	-4.69	0.00	-4.69	0.00	-3.67	0.00	-0.65	0.00	0.13
120	0	0.39	1.40	-4.69	0.00	-4.61	0.00	-3.63	0.00	-0.75	0.00	0.19
140	0	0.44	1.75	-4.68	0.00	-4.52	0.00	-3.58	0.00	-0.84	0.00	0.29

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	23054
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	5		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	11/28/01
Analysis Date:	12/7/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1799.3
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 195611 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**85.0**	**2.4**	**Sodium:**	**515.0**	**22.4**
Bicarbonate:	**1148.0**	**18.81**	**Magnesium:**	**0.1**	**0.**
Carbonate:	**40.0**	**1.33**	**Calcium:**	**0.1**	**0.**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.0**	**0.**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**0.1**	**0.**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.52	Lead:		
pH used in Calculation:		**8.52**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-1.09	0.00	-6.12	0.00	-6.20	0.00	0.00	0.00	-0.26	0.00	0.05
100	0	-1.05	0.00	-6.14	0.00	-6.14	0.00	0.00	0.00	-0.39	0.00	0.08
120	0	-1.01	0.00	-6.14	0.00	-6.06	0.00	0.00	0.00	-0.50	0.00	0.13
140	0	-0.97	0.00	-6.12	0.00	-5.96	0.00	0.00	0.00	-0.58	0.00	0.19

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196067
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28440
Entity (or well #):	6	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1978.7
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196067 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**291.0**	**8.21**	**Sodium:**	**579.8**	**25.22**
Bicarbonate:	**1073.6**	**17.6**	**Magnesium:**	**0.8**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.5**	**0.17**
Sulfate:	**12.0**	**0.25**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**13.0**	**0.47**
Silicate:			Potassium:	4.5	0.12
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.46	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.46**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.34	1.75	-4.00	0.00	-4.07	0.00	-3.31	0.00	-0.39	0.00	0.05
100	0	0.38	1.75	-4.01	0.00	-4.02	0.00	-3.29	0.00	-0.52	0.00	0.08
120	0	0.42	1.75	-4.01	0.00	-3.93	0.00	-3.25	0.00	-0.63	0.00	0.13
140	0	0.47	2.10	-4.00	0.00	-3.83	0.00	-3.20	0.00	-0.71	0.00	0.2

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196068
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28441
Entity (or well #):	7	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1580.5
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999997
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196068 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**120.0**	**3.38**	**Sodium:**	**446.7**	**19.43**
Bicarbonate:	**1000.4**	**16.4**	**Magnesium:**	**0.7**	**0.06**
Carbonate:	**0.0**	**0.**	**Calcium:**	**4.0**	**0.2**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**1.5**	**0.05**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.32	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.32**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.29	1.40	-4.47	0.00	-4.54	0.00	-3.84	0.00	-0.62	0.00	0.07
100	0	0.35	1.75	-4.48	0.00	-4.48	0.00	-3.81	0.00	-0.76	0.00	0.11
120	0	0.41	2.10	-4.48	0.00	-4.40	0.00	-3.78	0.00	-0.86	0.00	0.15
140	0	0.48	2.10	-4.47	0.00	-4.30	0.00	-3.73	0.00	-0.94	0.00	0.22

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20351
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	8		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary

Sampling Date:	7/17/01
Analysis Date:	7/31/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2319.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 185029 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**660.0**	**18.62**	**Sodium:**	**723.6**	**31.48**
Bicarbonate:	**839.0**	**13.75**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**31.0**	**1.03**	**Calcium:**	**9.5**	**0.47**
Sulfate:	**10.0**	**0.21**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**38.0**	**1.37**
Silicate:			Potassium:	5.5	0.14
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.49	Lead:		
pH used in Calculation:		**8.49**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.69	5.94	-3.70	0.00	-3.77	0.00	-3.14	0.00	-0.22	0.00	0.04
100	0	0.71	6.29	-3.70	0.00	-3.71	0.00	-3.12	0.00	-0.36	0.00	0.07
120	0	0.74	6.29	-3.70	0.00	-3.62	0.00	-3.08	0.00	-0.47	0.00	0.11
140	0	0.77	6.64	-3.68	0.00	-3.52	0.00	-3.03	0.00	-0.55	0.00	0.17

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196049
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	27726
Entity (or well #):	9	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2217.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196049 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**272.0**	**7.67**	**Sodium:**	**651.0**	**28.32**
Bicarbonate:	**1281.0**	**20.99**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.5**	**0.17**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.7	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.7**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.58	2.10	-4.67	0.00	-4.74	0.00	-3.54	0.00	-0.43	0.00	0.04
100	0	0.61	2.10	-4.68	0.00	-4.69	0.00	-3.51	0.00	-0.56	0.00	0.06
120	0	0.63	2.45	-4.68	0.00	-4.60	0.00	-3.47	0.00	-0.67	0.00	0.1
140	0	0.66	2.45	-4.66	0.00	-4.50	0.00	-3.42	0.00	-0.75	0.00	0.15

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218389
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	29218
Entity (or well #):	10	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2303.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218389 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**180.0**	**5.08**	**Sodium:**	**652.7**	**28.39**
Bicarbonate:	**1452.0**	**23.8**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**5.0**	**0.25**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.24	Lead:		
pH used in Calculation:		**8.24**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.41	2.45	-4.34	0.00	-4.41	0.00	-3.50	0.00	-0.48	0.00	0.12
100	0	0.46	2.80	-4.35	0.00	-4.36	0.00	-3.48	0.00	-0.62	0.00	0.18
120	0	0.52	2.80	-4.36	0.00	-4.28	0.00	-3.44	0.00	-0.73	0.00	0.26
140	0	0.58	3.15	-4.35	0.00	-4.18	0.00	-3.40	0.00	-0.81	0.00	0.38

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernandez
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218391
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	29219
Entity (or well #):	11	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1842.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218391 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**155.0**	**4.37**	**Sodium:**	**523.9**	**22.79**
Bicarbonate:	**1144.0**	**18.75**	**Magnesium:**	**0.9**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**4.0**	**0.2**
Sulfate:	**7.0**	**0.15**	**Strontium:**	**0.5**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**0.9**	**0.03**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.34	Lead:		
pH used in Calculation:		**8.34**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.34	1.75	-4.14	0.00	-4.21	0.00	-3.29	0.00	-0.29	0.00	0.07
100	0	0.39	2.10	-4.15	0.00	-4.16	0.00	-3.26	0.00	-0.43	0.00	0.11
120	0	0.45	2.10	-4.15	0.00	-4.08	0.00	-3.23	0.00	-0.53	0.00	0.17
140	0	0.51	2.45	-4.14	0.00	-3.98	0.00	-3.18	0.00	-0.62	0.00	0.25

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196069
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28442
Entity (or well #):	12	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1758.4
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196069 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**126.0**	**3.55**	**Sodium:**	**496.4**	**21.59**
Bicarbonate:	**1122.4**	**18.39**	**Magnesium:**	**0.8**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**4.0**	**0.2**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.4**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.24	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.24**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.25	1.40	-4.49	0.00	-4.56	0.00	-3.73	0.00	-0.64	0.00	0.09
100	0	0.32	1.75	-4.50	0.00	-4.50	0.00	-3.71	0.00	-0.78	0.00	0.14
120	0	0.38	2.10	-4.50	0.00	-4.42	0.00	-3.67	0.00	-0.88	0.00	0.2
140	0	0.46	2.10	-4.49	0.00	-4.32	0.00	-3.63	0.00	-0.97	0.00	0.29

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196070
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28443
Entity (or well #):	13	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2693
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196070 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**265.0**	**7.47**	**Sodium:**	**771.0**	**33.54**
Bicarbonate:	**1634.8**	**26.79**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**0.0**	**0.**	**Calcium:**	**8.0**	**0.4**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.9**	**0.02**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.11	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.11**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.52	4.54	-4.29	0.00	-4.36	0.00	-3.48	0.00	-0.44	0.00	0.18
100	0	0.58	4.89	-4.31	0.00	-4.31	0.00	-3.46	0.00	-0.58	0.00	0.26
120	0	0.65	5.24	-4.32	0.00	-4.24	0.00	-3.43	0.00	-0.69	0.00	0.38
140	0	0.72	5.59	-4.32	0.00	-4.15	0.00	-3.39	0.00	-0.77	0.00	0.53

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218398
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	29220
Entity (or well #):	14	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1736.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999991
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218398 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**73.0**	**2.06**	**Sodium:**	**491.1**	**21.36**
Bicarbonate:	**1102.0**	**18.06**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**53.0**	**1.77**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.4**	**0.01**
Phosphate:			**Barium:**	**0.3**	**0.**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
			Copper:		
pH at time of sampling:			Lead:		
pH at time of analysis:		8.54	Manganese:		
pH used in Calculation:		**8.54**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.69	4.20	-4.35	0.00	-4.42	0.00	-3.76	0.00	-0.78	0.00	0.05
100	0	0.73	4.20	-4.36	0.00	-4.36	0.00	-3.73	0.00	-0.92	0.00	0.08
120	0	0.77	4.20	-4.36	0.00	-4.28	0.00	-3.69	0.00	-1.02	0.00	0.12
140	0	0.82	4.20	-4.34	0.00	-4.18	0.00	-3.64	0.00	-1.10	0.00	0.18

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20352
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	15		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary

Sampling Date:	7/17/01
Analysis Date:	7/31/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2116.5
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	25
Oxygen:	
Comments:	

Analysis of Sample 185028 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**207.0**	**5.84**	**Sodium:**	**623.9**	**27.14**
Bicarbonate:	**1122.0**	**18.39**	**Magnesium:**	**0.9**	**0.07**
Carbonate:	**49.0**	**1.63**	**Calcium:**	**5.5**	**0.27**
Sulfate:	**96.0**	**2.**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**6.0**	**0.22**
Silicate:			Potassium:	5.5	0.14
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
			Copper:		
pH at time of sampling:			Lead:		
pH at time of analysis:		8.54	Manganese:		
pH used in Calculation:		**8.54**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	3.50	-2.95	0.00	-3.02	0.00	-2.16	0.00	0.17	0.00	0.05
100	0	0.64	3.50	-2.96	0.00	-2.96	0.00	-2.14	0.00	0.04	0.00	0.08
120	0	0.67	3.85	-2.96	0.00	-2.88	0.00	-2.10	0.00	-0.07	0.00	0.12
140	0	0.71	3.85	-2.95	0.00	-2.78	0.00	-2.06	0.00	-0.16	0.00	0.19

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20106
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	16		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary

Sampling Date:	7/6/01
Analysis Date:	7/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1781.9
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000008
Carbon Dioxide:	60 PPM
Oxygen:	
Comments:	

Analysis of Sample 185017 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**326.0**	**9.2**	**Sodium:**	**535.4**	**23.29**
Bicarbonate:	**859.0**	**14.08**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**32.0**	**1.07**	**Calcium:**	**11.0**	**0.55**
Sulfate:	**2.5**	**0.05**	**Strontium:**	**1.5**	**0.03**
Phosphate:			**Barium:**	**1.5**	**0.02**
Borate:			**Iron:**	**5.0**	**0.18**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.54	Lead:		
pH used in Calculation:		**8.54**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.85	7.70	-4.17	0.00	-4.24	0.00	-3.28	0.00	-0.18	0.00	0.04
100	0	0.89	7.70	-4.17	0.00	-4.18	0.00	-3.25	0.00	-0.31	0.00	0.06
120	0	0.93	8.05	-4.17	0.00	-4.09	0.00	-3.21	0.00	-0.42	0.00	0.09
140	0	0.97	8.40	-4.16	0.00	-3.99	0.00	-3.16	0.00	-0.50	0.00	0.14

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	23057
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	17		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	11/28/01
Analysis Date:	12/7/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2258.1
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 195614 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**130.0**	**3.67**	**Sodium:**	**633.7**	**27.56**
Bicarbonate:	**1478.0**	**24.22**	**Magnesium:**	**0.1**	**0.**
Carbonate:	**0.0**	**0.**	**Calcium:**	**0.1**	**0.**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.2**	**0.**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**5.0**	**0.18**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.21	Lead:		
pH used in Calculation:		**8.21**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-1.30	0.00	-6.15	0.00	-6.22	0.00	-4.09	0.00	-0.29	0.00	0.13
100	0	-1.25	0.00	-6.16	0.00	-6.17	0.00	-4.07	0.00	-0.43	0.00	0.19
120	0	-1.19	0.00	-6.17	0.00	-6.09	0.00	-4.03	0.00	-0.54	0.00	0.28
140	0	-1.12	0.00	-6.17	0.00	-6.00	0.00	-3.99	0.00	-0.63	0.00	0.41

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196071
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28444
Entity (or well #):	18	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1783.9
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196071 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**121.0**	**3.41**
Bicarbonate:	**1146.8**	**18.79**
Carbonate:	**0.0**	**0.**
Sulfate:	**3.0**	**0.06**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		8.22
pH at time of analysis:		
pH used in Calculation:		**8.22**

Cations	mg/l	meq/l
Sodium:	**501.5**	**21.81**
Magnesium:	**0.7**	**0.06**
Calcium:	**4.5**	**0.22**
Strontium:	**0.5**	**0.01**
Barium:	**0.4**	**0.01**
Iron:	**1.5**	**0.05**
Potassium:	4.0	0.1
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions | **Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl**

Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.29	1.75	-4.44	0.00	-4.51	0.00	-3.64	0.00	-0.64	0.00	0.1
100	0	0.36	2.10	-4.45	0.00	-4.45	0.00	-3.62	0.00	-0.78	0.00	0.15
120	0	0.43	2.45	-4.45	0.00	-4.37	0.00	-3.58	0.00	-0.89	0.00	0.21
140	0	0.50	2.45	-4.44	0.00	-4.28	0.00	-3.53	0.00	-0.97	0.00	0.3

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196072
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28445
Entity (or well #):	19	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1484.2
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196072 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**133.0**	**3.75**	**Sodium:**	**424.0**	**18.44**
Bicarbonate:	**915.0**	**15.**	**Magnesium:**	**0.7**	**0.06**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.5**	**0.17**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.3**	**0.**
Borate:			**Iron:**	**0.9**	**0.03**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.36	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.36**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.24	1.05	-4.51	0.00	-4.58	0.00	-3.83	0.00	-0.73	0.00	0.06
100	0	0.30	1.40	-4.52	0.00	-4.53	0.00	-3.80	0.00	-0.87	0.00	0.09
120	0	0.36	1.75	-4.52	0.00	-4.44	0.00	-3.76	0.00	-0.98	0.00	0.13
140	0	0.43	1.75	-4.51	0.00	-4.34	0.00	-3.72	0.00	-1.06	0.00	0.19

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	23058
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	20		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	11/28/01
Analysis Date:	12/7/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1702.8
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 176415 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**66.0**	**1.86**
Bicarbonate:	**1134.0**	**18.58**
Carbonate:	**14.0**	**0.47**
Sulfate:	**3.0**	**0.06**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		
pH at time of analysis:		8.39
pH used in Calculation:		**8.39**

Cations	mg/l	meq/l
Sodium:	**477.4**	**20.77**
Magnesium:	**0.1**	**0.**
Calcium:	**0.1**	**0.**
Strontium:	**0.1**	**0.**
Barium:	**1.0**	**0.01**
Iron:	**0.1**	**0.**
Potassium:	7.0	0.18
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-1.21	0.00	-6.09	0.00	-6.16	0.00	-4.34	0.00	-0.24	0.00	0.07
100	0	-1.15	0.00	-6.10	0.00	-6.11	0.00	-4.31	0.00	-0.37	0.00	0.1
120	0	-1.10	0.00	-6.10	0.00	-6.03	0.00	-4.27	0.00	-0.48	0.00	0.16
140	0	-1.04	0.00	-6.09	0.00	-5.93	0.00	-4.22	0.00	-0.56	0.00	0.23

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20104
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	21		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary

Sampling Date:	7/6/01
Analysis Date:	7/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1344.3
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000007
Carbon Dioxide:	55 PPM
Oxygen:	
Comments:	

Analysis of Sample 185013 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**84.0**	**2.37**	**Sodium:**	**374.3**	**16.28**
Bicarbonate:	**826.0**	**13.54**	**Magnesium:**	**0.7**	**0.06**
Carbonate:	**33.0**	**1.1**	**Calcium:**	**7.0**	**0.35**
Sulfate:	**5.0**	**0.1**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**1.5**	**0.02**
Borate:			**Iron:**	**7.0**	**0.25**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.54	Lead:		
pH used in Calculation:		**8.54**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.68	4.55	-3.99	0.00	-4.06	0.00	-3.18	0.00	0.19	0.35	0.04
100	0	0.73	4.55	-4.00	0.00	-4.01	0.00	-3.15	0.00	0.06	0.00	0.06
120	0	0.77	4.90	-4.00	0.00	-3.92	0.00	-3.11	0.00	-0.05	0.00	0.09
140	0	0.83	4.90	-3.98	0.00	-3.81	0.00	-3.06	0.00	-0.13	0.00	0.13

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218397
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	29221
Entity (or well #):	22	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2349.8
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218397 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**179.0**	**5.05**
Bicarbonate:	**1488.0**	**24.39**
Carbonate:	**0.0**	**0.**
Sulfate:	**3.0**	**0.06**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		
pH at time of analysis:		8.26
pH used in Calculation:		**8.26**

Cations	mg/l	meq/l
Sodium:	**666.0**	**28.97**
Magnesium:	**1.0**	**0.08**
Calcium:	**5.0**	**0.25**
Strontium:	**0.7**	**0.02**
Barium:	**0.6**	**0.01**
Iron:	**0.5**	**0.02**
Potassium:	6.0	0.15
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.43	2.45	-4.47	0.00	-4.54	0.00	-3.57	0.00	-0.53	0.00	0.12
100	0	0.48	2.80	-4.49	0.00	-4.49	0.00	-3.54	0.00	-0.67	0.00	0.17
120	0	0.54	3.15	-4.49	0.00	-4.41	0.00	-3.51	0.00	-0.78	0.00	0.26
140	0	0.60	3.15	-4.49	0.00	-4.32	0.00	-3.46	0.00	-0.86	0.00	0.38

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	23060
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis Cost:	$40.00
Entity (or well #):	23		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	11/28/01
Analysis Date:	12/7/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3526.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 176413 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**159.0**	**4.48**	**Sodium:**	**994.3**	**43.25**
Bicarbonate:	**2313.0**	**37.91**	**Magnesium:**	**0.1**	**0.**
Carbonate:	**39.0**	**1.3**	**Calcium:**	**0.1**	**0.**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**9.0**	**0.33**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.41	Lead:		
pH used in Calculation:		**8.41**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-1.04	0.00	-6.19	0.00	-6.26	0.00	-3.93	0.00	0.00	0.00	0.13
100	0	-1.02	0.00	-6.21	0.00	-6.21	0.00	-3.91	0.00	-0.13	0.00	0.2
120	0	-1.00	0.00	-6.22	0.00	-6.14	0.00	-3.87	0.00	-0.24	0.00	0.33
140	0	-0.97	0.00	-6.21	0.00	-6.05	0.00	-3.83	0.00	-0.33	0.00	0.51

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196074
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28446
Entity (or well #):	26	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1476.6
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999992
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196074 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**118.0**	**3.33**	**Sodium:**	**419.1**	**18.23**
Bicarbonate:	**927.2**	**15.2**	**Magnesium:**	**0.7**	**0.06**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.3**	**0.**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.38	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.38**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.20	1.05	-4.58	0.00	-4.65	0.00	-3.83	0.00	-0.73	0.00	0.06
100	0	0.25	1.05	-4.59	0.00	-4.59	0.00	-3.80	0.00	-0.87	0.00	0.09
120	0	0.32	1.40	-4.59	0.00	-4.51	0.00	-3.76	0.00	-0.97	0.00	0.13
140	0	0.38	1.40	-4.57	0.00	-4.41	0.00	-3.71	0.00	-1.06	0.00	0.19

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196073
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28447
Entity (or well #):	28	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2809.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196073 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**224.0**	**6.32**	**Sodium:**	**797.5**	**34.69**
Bicarbonate:	**1769.0**	**28.99**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.5**	**0.32**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.05	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.05**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.40	3.15	-4.39	0.00	-4.46	0.00	-3.44	0.00	-0.65	0.00	0.22
100	0	0.47	3.50	-4.41	0.00	-4.41	0.00	-3.42	0.00	-0.79	0.00	0.32
120	0	0.54	3.84	-4.42	0.00	-4.34	0.00	-3.39	0.00	-0.90	0.00	0.45
140	0	0.61	4.19	-4.42	0.00	-4.25	0.00	-3.35	0.00	-0.98	0.00	0.63

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
1675 Broadway, Suite 150(
Denver, CO 80202
(303) 573-2772
Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196075
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28448
Entity (or well #):	29	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2572.9
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196075 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**447.0**	**12.61**
Bicarbonate:	**1329.8**	**21.79**
Carbonate:	**0.0**	**0.**
Sulfate:	**3.0**	**0.06**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		8.16
pH at time of analysis:		
pH used in Calculation:		**8.16**

Cations	mg/l	meq/l
Sodium:	**773.4**	**33.64**
Magnesium:	**1.5**	**0.12**
Calcium:	**9.5**	**0.47**
Strontium:	**1.0**	**0.02**
Barium:	**0.7**	**0.01**
Iron:	**1.5**	**0.05**
Potassium:	5.5	0.14
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.56	5.59	-4.21	0.00	-4.28	0.00	-3.43	0.00	-0.49	0.00	0.13
100	0	0.62	5.94	-4.22	0.00	-4.23	0.00	-3.41	0.00	-0.63	0.00	0.19
120	0	0.68	6.29	-4.23	0.00	-4.15	0.00	-3.38	0.00	-0.74	0.00	0.28
140	0	0.75	6.64	-4.22	0.00	-4.05	0.00	-3.33	0.00	-0.83	0.00	0.4

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
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Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196076
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28449
Entity (or well #):	31	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2028.3
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000008
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196076 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**126.0**	**3.55**	**Sodium:**	**559.1**	**24.32**
Bicarbonate:	**1317.6**	**21.59**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**0.0**	**0.**	**Calcium:**	**5.5**	**0.27**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.7**	**0.02**
Phosphate:			**Barium:**	**0.9**	**0.01**
Borate:			**Iron:**	**10.0**	**0.36**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.35	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.35**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.52	3.15	-4.40	0.00	-4.47	0.00	-3.54	0.00	-0.33	0.00	0.08
100	0	0.57	3.50	-4.41	0.00	-4.42	0.00	-3.51	0.00	-0.47	0.00	0.13
120	0	0.62	3.50	-4.42	0.00	-4.34	0.00	-3.48	0.00	-0.57	0.00	0.2
140	0	0.68	3.85	-4.41	0.00	-4.24	0.00	-3.43	0.00	-0.66	0.00	0.29

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
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Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196077
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28450
Entity (or well #):	33	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1183.8
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999991
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196077 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**93.0**	**2.62**	**Sodium:**	**334.3**	**14.54**
Bicarbonate:	**744.2**	**12.2**	**Magnesium:**	**0.5**	**0.04**
Carbonate:	**0.0**	**0.**	**Calcium:**	**2.5**	**0.12**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.25	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.25**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.05	0.00	-4.60	0.00	-4.67	0.00	-3.77	0.00	-0.46	0.00	0.06
100	0	0.02	0.00	-4.60	0.00	-4.61	0.00	-3.75	0.00	-0.60	0.00	0.09
120	0	0.10	0.35	-4.60	0.00	-4.52	0.00	-3.71	0.00	-0.70	0.00	0.13
140	0	0.19	0.70	-4.58	0.00	-4.42	0.00	-3.66	0.00	-0.78	0.00	0.18

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
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Denver, CO 80202
(303) 573-2772
Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196078
Lease/Platform:	VERMEJO PARK RANCH 'E'	Analysis ID #:	28451
Entity (or well #):	34	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1516.5
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196078 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**101.0**	**2.85**	**Sodium:**	**422.7**	**18.39**
Bicarbonate:	**976.0**	**16.**	**Magnesium:**	**0.6**	**0.05**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.5**	**0.17**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**5.0**	**0.18**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.95	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.95**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.10	0.00	-4.49	0.00	-4.56	0.00	-3.82	0.00	-0.60	0.00	0.16
100	0	0.00	0.00	-4.50	0.00	-4.50	0.00	-3.79	0.00	-0.74	0.00	0.22
120	0	0.10	0.70	-4.50	0.00	-4.42	0.00	-3.75	0.00	-0.84	0.00	0.29
140	0	0.20	1.05	-4.49	0.00	-4.32	0.00	-3.71	0.00	-0.93	0.00	0.39

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

BILL RICHARDSON
Governor
Joanna Prukop
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

January 22, 2003

Donald R. Lankford
El Paso Energy Raton, L.L.C.
P.O. Box 190
Raton, NM, 87740

RE: El Paso Energy Raton VPRA Emergency Pit
VPRA Water Disposal Station Location
Receiving produced water from the VPR "A" Lease
Colfax County, New Mexico

Dear Mr. Lankford:

The New Mexico Oil Conservation Division (OCD) has received the El Paso Energy Raton, L.L.C. letter dated January 16, 2003. As stated in the above referenced letter and previously in the Devon letter dated January 13, 2000 the produced water emergency pit will receive emergency upset water from the VPRA water disposal station separator and holding tanks associated with the VPRA-7 and VPRA-42 injection well locations. According to OCD **Rule 711.A.3.c, emergency pits that are designed to capture fluids during an emergency upset period only and provided such fluids will be removed from the pit within twenty-four (24) hours from introduction are exempt from permitting requirements.**

Pursuant to the OCD Order R-8952, all tanks exceeding 16 feet in diameter and all exposed pits and ponds shall be screened, netted or covered. Application for Exception to Division Order R-8952 can be applied for via Form C-134. In addition OCD Rule 310 prohibits the storage or retention of oil in earthen reservoirs, or in open receptacles.

Please be advised that OCD approval does not relieve El Paso Energy Raton, L.L.C. of liability should their operation result in pollution of the ground water, surface water or the environment. In addition, OCD approval does not relieve El Paso Energy Raton, L.L.C. of the responsibility for compliance with other federal, state and/or local regulations.

If you have any questions please do not hesitate to contact me at (505) 476-3488.

Sincerely,

Martyne J. Kieling
Environmental Geologist

Enclosure: NMOCD Letter dated February 4, 2000 and Form C-134

xc: Roy Johnson, OCD District 4

RECEIVED

JAN 2 2 2003
Environmental Bureau
Oil Conservation Division

elpaso

EL PASO ENERGY RATON, L.L.C.
P.O. BOX 190 - RATON, N.M. 87740

January 16, 2003

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

Re: El Paso Energy Raton VPRA Emergency Pit

Dear Martyne:

As you may know, El Paso Energy Raton, L.L.C, has two produced water disposal wells in Sec 1, T31N, R19W, in Colfax County. The disposal wells VPRA-7 and VPRA-42 are approved for injection by NMOCD under *Administrative Order 755-A* and *Administrative Order 770*, respectively. The reserve pit used during the drilling of VPRA-7 has been left open to be used as an emergency overflow pit in the operation of the VPRA Water Disposal Station.

Attached is a site plot plan for the VPRA Water Disposal Station location. Water from the producing coalbed methane wells on the VPR "A" Lease flows to the VPRA Water Disposal Station. The water is routed through two 600 bbl. vertical tanks known as "gun barrel" separators. These gun barrels are configured in such a way as to skim any hydrocarbons from the produced water. Clean water dumps into a battery of 4 – 500 bbl. vertical steel welded storage tanks. The water is then pumped down the VPRA-7 and the VPRA-42 water disposal wells into the Entrada and Glorieta formations. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711.A that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

Attached you will find water quality data from the source wells. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-6721.

Sincerely,

D R Lankford

Donald R. Lankford
Principal Engineer

Attch: 1) Plot Plan
2) Water Analyses

Cc: Roy Johnson
Carl Lakey
Bob Dennis

devon
ENERGY CORPORATION

P.O. Box 190
Raton, NM 87740
Telephone: (505) 445-4620

January 13, 2000

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

Dear Martyne,

In response to our phone conversation on Wednesday, January 12, 2000, I would like to provide a description of our water disposal facility on the Vermejo Park Ranch. Attached is a site plot plan for the VPR "A" 7 location. Water from the producing wells on the VPR "A" Lease flows to the VPR "A" 7 water handling facility. The water is routed through a separator that dumps into two above ground 500-barrel steel welded tanks. The water is then pumped into an injection well with perforations at 6400 – 6564' in the Dakota formation. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711.A that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

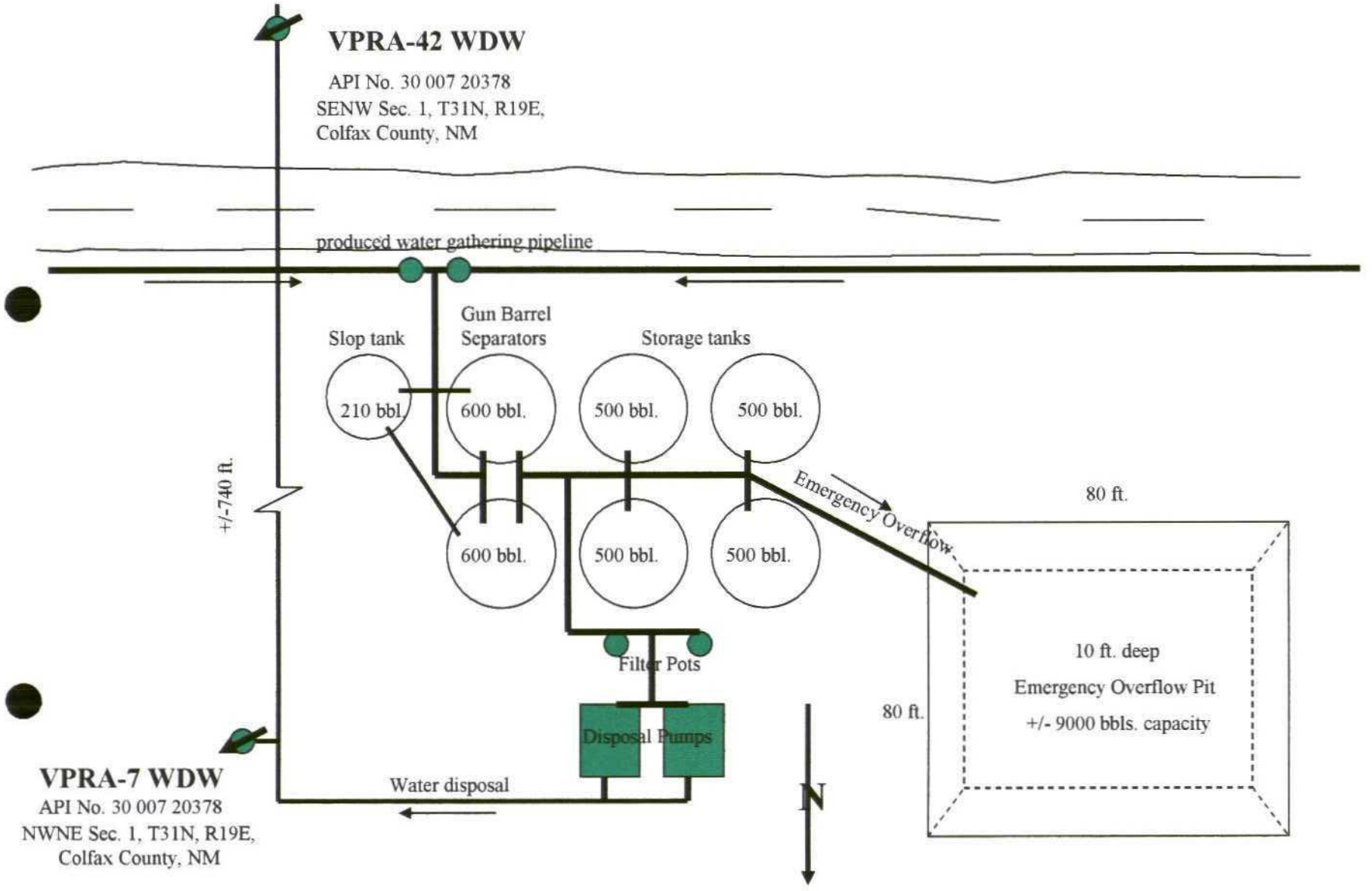
Attached you will find water quality data from the source wells, as well as results of analyses taken from actual injection water at the "A" 7 wellhead. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-4620.

Sincerely,

Steven C. O'Connell
Environmental, Safety &
Health Coordinator

Attch: 1) Plot Plan
2) Water Analyses
Cc: Roy Johnson
Don Lankford
Tad Lynch



VPRA Water Disposal Facility
El Paso Energy Raton

Rocky Mountain Regior
1675 Broadway, Suite 15(
Denver, CO 80202
(303) 573-277?
Lab Team Leader - Sheila Hernande
(915) 495-724(

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18222
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	A		
Formation:	UNKNOWN		
Sample Point:	PUMP OUTLET		

Summary		Analysis of Sample 145786 @ 75 °F			Cations		
		Anions	mg/l	meq/l		mg/l	meq/l
Sampling Date:	3/21/01	**Chloride:**	**246.0**	**6.94**	**Sodium:**	**713.5**	**31.04**
Analysis Date:	3/28/01	**Bicarbonate:**	**1492.0**	**24.45**	**Magnesium:**	**0.1**	**0.**
Analyst:	MARILYN BRANNON	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
TDS (mg/l or g/m3):	2466.9	**Sulfate:**	**4.5**	**0.09**	**Strontium:**	**0.4**	**0.01**
Density (g/cm3, tonne/m3):	1.002	Phosphate:			**Barium:**	**0.8**	**0.01**
Anion/Cation Ratio:	1.0000004	Borate:			**Iron:**	**0.6**	**0.02**
		Silicate:			Potassium:	2.0	0.05
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:			Copper:		
Comments:		pH at time of analysis:		8.18	Lead:		
		pH used in Calculation:		**8.18**	Manganese:	0.0	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.50	3.85	-4.15	0.00	-4.23	0.00	-3.64	0.00	-0.24	0.00	0.14
100	0	0.56	4.20	-4.17	0.00	-4.17	0.00	-3.62	0.00	-0.38	0.00	0.21
120	0	0.62	4.55	-4.17	0.00	-4.10	0.00	-3.58	0.00	-0.49	0.00	0.3
140	0	0.69	4.55	-4.17	0.00	-4.00	0.00	-3.54	0.00	-0.57	0.00	0.43

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Denver, CO 8020(
(303) 573-277(
Lab Team Leader - Sheila Hernande
(915) 495-724(

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20977
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	1		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/14/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2886.3
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186146 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**498.0**	**14.05**	**Sodium:**	**863.5**	**37.56**
Bicarbonate:	**1488.0**	**24.39**	**Magnesium:**	**4.0**	**0.33**
Carbonate:	**0.0**	**0.**	**Calcium:**	**9.0**	**0.45**
Sulfate:	**11.0**	**0.23**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	9.0	0.23
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.42	4.19	-3.70	0.00	-3.77	0.00	-2.59	0.00	0.10	0.00	0.2
100	0	0.49	4.89	-3.71	0.00	-3.71	0.00	-2.57	0.00	-0.04	0.00	0.29
120	0	0.57	5.59	-3.72	0.00	-3.64	0.00	-2.54	0.00	-0.15	0.00	0.41
140	0	0.65	5.94	-3.71	0.00	-3.55	0.00	-2.50	0.00	-0.24	0.00	0.57

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20979
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	2		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2723.4
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000004
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186101 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**168.0**	**4.74**	**Sodium:**	**760.6**	**33.08**
Bicarbonate:	**1732.0**	**28.39**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
Sulfate:	**40.0**	**0.83**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	9.0	0.23
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.38	3.15	-3.23	0.00	-3.30	0.00	-2.02	0.00	0.68	0.35	0.24
100	0	0.45	3.85	-3.25	0.00	-3.25	0.00	-2.00	0.00	0.54	0.35	0.34
120	0	0.53	4.19	-3.25	0.00	-3.18	0.00	-1.97	0.00	0.43	0.35	0.48
140	0	0.61	4.54	-3.26	0.00	-3.09	0.00	-1.93	0.00	0.34	0.35	0.66

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19085
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	3		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary		Analysis of Sample 184968 @ 75 °F					
Sampling Date:	5/10/01	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	5/22/01	**Chloride:**	**450.0**	**12.69**	**Sodium:**	**616.0**	**26.79**
Analyst:	MARILYN BRANNON	**Bicarbonate:**	**1173.0**	**19.22**	**Magnesium:**	**3.0**	**0.25**
TDS (mg/l or g/m3):	2406.5	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**12.0**	**0.6**
Density (g/cm3, tonne/m3):	1.002	**Sulfate:**	**19.0**	**0.4**	**Strontium:**	**1.0**	**0.02**
Anion/Cation Ratio:	1.0000001	Phosphate:			**Barium:**	**1.5**	**0.02**
		Borate:			**Iron:**	**120.0**	**4.34**
		Silicate:			Potassium:	10.0	0.26
Carbon Dioxide:					Aluminum:		
Oxygen:		Hydrogen Sulfide:			Chromium:		
Comments:		pH at time of sampling:			Copper:		
		pH at time of analysis:		8.15	Lead:		
		pH used in Calculation:		**8.15**	Manganese:	1.0	0.04
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.60	6.99	-3.33	0.00	-3.40	0.00	-2.66	0.00	0.61	0.70	0.12
100	0	0.64	7.34	-3.34	0.00	-3.35	0.00	-2.64	0.00	0.47	0.70	0.18
120	0	0.70	7.69	-3.35	0.00	-3.27	0.00	-2.61	0.00	0.36	0.35	0.27
140	0	0.75	8.04	-3.34	0.00	-3.17	0.00	-2.56	0.00	0.27	0.35	0.4

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218388
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29200
Entity (or well #):	4	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	10/21/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2034.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218388 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**184.0**	**5.19**
Bicarbonate:	**1252.0**	**20.52**
Carbonate:	**0.0**	**0.**
Sulfate:	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		
pH at time of analysis:		8.08
pH used in Calculation:		**8.08**

Cations	mg/l	meq/l
Sodium:	**579.4**	**25.2**
Magnesium:	**1.0**	**0.08**
Calcium:	**6.0**	**0.3**
Strontium:	**0.6**	**0.01**
Barium:	**0.7**	**0.01**
Iron:	**0.8**	**0.03**
Potassium:	6.0	0.15
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions

Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.31	2.45	-4.21	0.00	-4.28	0.00	-3.46	0.00	-0.30	0.00	0.15
100	0	0.38	2.80	-4.23	0.00	-4.23	0.00	-3.44	0.00	-0.44	0.00	0.21
120	0	0.46	3.15	-4.23	0.00	-4.15	0.00	-3.40	0.00	-0.55	0.00	0.3
140	0	0.55	3.50	-4.22	0.00	-4.06	0.00	-3.36	0.00	-0.63	0.00	0.41

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196054
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28427
Entity (or well #):	6	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2295.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999994
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196054 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**186.0**	**5.25**	**Sodium:**	**650.3**	**28.29**
Bicarbonate:	**1439.6**	**23.59**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.6**	**0.18**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**6.0**	**0.22**
Silicate:			Potassium:	4.5	0.12
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.11	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.11**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.15	0.70	-4.59	0.00	-4.66	0.00	-3.62	0.00	-0.60	0.00	0.16
100	0	0.22	1.05	-4.61	0.00	-4.61	0.00	-3.59	0.00	-0.74	0.00	0.23
120	0	0.29	1.40	-4.61	0.00	-4.54	0.00	-3.56	0.00	-0.85	0.00	0.33
140	0	0.36	1.75	-4.61	0.00	-4.44	0.00	-3.52	0.00	-0.93	0.00	0.46

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218406
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29201
Entity (or well #):	7	Analysis Cost:	$40.00
Formation:	GLORIETTA		
Sample Point:	TANK BATTERY		

Summary	
Sampling Date:	10/22/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2109.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218406 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**322.0**	**9.08**	**Sodium:**	**625.9**	**27.22**
Bicarbonate:	**1141.0**	**18.7**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
Sulfate:	**5.0**	**0.1**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.9**	**0.01**
Borate:			**Iron:**	**0.3**	**0.01**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.03	Lead:		
pH used in Calculation:		**8.03**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.28	2.45	-4.06	0.00	-4.13	0.00	-3.16	0.00	-0.11	0.00	0.15
100	0	0.36	3.15	-4.07	0.00	-4.08	0.00	-3.13	0.00	-0.25	0.00	0.21
120	0	0.45	3.50	-4.07	0.00	-4.00	0.00	-3.10	0.00	-0.36	0.00	0.3
140	0	0.54	4.20	-4.07	0.00	-3.90	0.00	-3.05	0.00	-0.44	0.00	0.41

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18223
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	8		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	3/21/01
Analysis Date:	3/28/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2705.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000026
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 145787 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**295.0**	**8.32**
Bicarbonate:	**1491.0**	**24.44**
Carbonate:	**89.0**	**2.97**
Sulfate:	**5.0**	**0.1**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		
pH at time of analysis:		8.48
pH used in Calculation:		**8.48**

Cations	mg/l	meq/l
Sodium:	**814.9**	**35.44**
Magnesium:	**0.3**	**0.02**
Calcium:	**4.0**	**0.2**
Strontium:	**0.8**	**0.02**
Barium:	**1.0**	**0.01**
Iron:	**1.0**	**0.04**
Potassium:	3.5	0.09
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:	0.0	0.
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.52	2.45	-4.41	0.00	-4.48	0.00	-3.34	0.00	-0.14	0.00	0.07
100	0	0.54	2.45	-4.43	0.00	-4.43	0.00	-3.32	0.00	-0.28	0.00	0.12
120	0	0.57	2.45	-4.43	0.00	-4.35	0.00	-3.28	0.00	-0.38	0.00	0.19
140	0	0.60	2.45	-4.42	0.00	-4.25	0.00	-3.23	0.00	-0.47	0.00	0.29

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18225
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	9		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	3/21/01
Analysis Date:	3/28/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2206.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 145789 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**96.0**	**2.71**	**Sodium:**	**646.1**	**28.1**
Bicarbonate:	**1354.0**	**22.19**	**Magnesium:**	**0.1**	**0.**
Carbonate:	**100.0**	**3.33**	**Calcium:**	**3.0**	**0.15**
Sulfate:	**4.5**	**0.09**	**Strontium:**	**0.1**	**0.**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	0.9	0.02
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.57	Lead:		
pH used in Calculation:		**8.57**	Manganese:	0.0	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.47	1.75	-4.54	0.00	-4.61	0.00	-4.25	0.00	-0.44	0.00	0.06
100	0	0.49	1.75	-4.55	0.00	-4.56	0.00	-4.22	0.00	-0.58	0.00	0.09
120	0	0.52	1.75	-4.56	0.00	-4.48	0.00	-4.18	0.00	-0.68	0.00	0.14
140	0	0.56	1.75	-4.55	0.00	-4.38	0.00	-4.13	0.00	-0.76	0.00	0.22

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196086
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28629
Entity (or well #):	10	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/2/02
Analysis Date:	9/11/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2460.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196086 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**428.0**	**12.07**
Bicarbonate:	**1268.8**	**20.79**
Carbonate:	**0.0**	**0.**
Sulfate	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		8.8
pH at time of analysis:		
pH used in Calculation:		**8.8**

Cations	mg/l	meq/l
Sodium:	**746.6**	**32.47**
Magnesium:	**1.0**	**0.08**
Calcium:	**3.5**	**0.17**
Strontium:	**0.7**	**0.02**
Barium:	**2.0**	**0.03**
Iron:	**2.0**	**0.07**
Potassium:	4.0	0.1
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.64	2.45	-4.59	0.00	-4.66	0.00	-3.51	0.00	0.06	0.00	0.03
100	0	0.65	2.45	-4.60	0.00	-4.61	0.00	-3.48	0.00	-0.08	0.00	0.05
120	0	0.67	2.45	-4.60	0.00	-4.52	0.00	-3.44	0.00	-0.18	0.00	0.08
140	0	0.70	2.45	-4.58	0.00	-4.41	0.00	-3.39	0.00	-0.26	0.00	0.13

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hemande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18913
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	11		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/16/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2118.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184912 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**324.0**	**9.14**	**Sodium:**	**645.9**	**28.09**
Bicarbonate:	**1068.0**	**17.5**	**Magnesium:**	**0.5**	**0.04**
Carbonate:	**61.0**	**2.03**	**Calcium:**	**5.5**	**0.27**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**5.5**	**0.2**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.67	Lead:		
pH used in Calculation:		**8.67**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.72	3.85	-4.45	0.00	-4.52	0.00	-3.43	0.00	1.32	0.00	0.03
100	0	0.74	3.85	-4.46	0.00	-4.47	0.00	-3.40	0.00	-1.45	0.00	0.06
120	0	0.77	3.85	-4.46	0.00	-4.38	0.00	-3.36	0.00	-1.56	0.00	0.09
140	0	0.80	3.85	-4.44	0.00	-4.28	0.00	-3.31	0.00	-1.64	0.00	0.14

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18914
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	12		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/16/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1963.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184939 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**204.0**	**5.75**	**Sodium:**	**514.6**	**22.38**
Bicarbonate:	**1100.0**	**18.03**	**Magnesium:**	**0.4**	**0.03**
Carbonate:	**51.0**	**1.7**	**Calcium:**	**6.5**	**0.32**
Sulfate:	**5.5**	**0.11**	**Strontium:**	**0.9**	**0.02**
Phosphate:			**Barium:**	**0.6**	**0.01**
Borate:			**Iron:**	**74.0**	**2.67**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.56	Lead:		
pH used in Calculation:		**8.56**	Manganese:	0.7	0.03
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.72	4.55	-4.10	0.00	-4.17	0.00	-3.20	0.00	-0.27	0.00	0.04
100	0	0.74	4.55	-4.11	0.00	-4.12	0.00	-3.17	0.00	-0.41	0.00	0.07
120	0	0.76	4.55	-4.11	0.00	-4.03	0.00	-3.13	0.00	-0.52	0.00	0.12
140	0	0.79	4.55	-4.10	0.00	-3.93	0.00	-3.09	0.00	-0.60	0.00	0.2

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18915
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	13		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/16/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2294.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000003
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184915 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**338.0**	**9.53**	**Sodium:**	**673.9**	**29.31**
Bicarbonate:	**1201.0**	**19.68**	**Magnesium:**	**0.8**	**0.07**
Carbonate:	**38.0**	**1.27**	**Calcium:**	**6.5**	**0.32**
Sulfate:	**8.0**	**0.17**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**21.0**	**0.76**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.45	Lead:		
pH used in Calculation:		**8.45**	Manganese:	0.3	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.63	4.20	-3.95	0.00	-4.02	0.00	-3.00	0.00	-0.90	0.00	0.06
100	0	0.67	4.20	-3.96	0.00	-3.97	0.00	-2.98	0.00	-1.04	0.00	0.1
120	0	0.70	4.55	-3.96	0.00	-3.89	0.00	-2.94	0.00	-1.15	0.00	0.16
140	0	0.74	4.55	-3.95	0.00	-3.78	0.00	-2.89	0.00	-1.23	0.00	0.24

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19086
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	14		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary	
Sampling Date:	5/10/01
Analysis Date:	5/22/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1456.6
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184969 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**22.0**	**0.62**	**Sodium:**	**376.2**	**16.36**
Bicarbonate:	**1026.0**	**16.81**	**Magnesium:**	**2.6**	**0.21**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.9**	**0.02**
Phosphate:			**Barium:**	**0.9**	**0.01**
Borate:			**Iron:**	**9.5**	**0.34**
Silicate:			Potassium:	9.5	0.24
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.51	Lead:		
pH used in Calculation:		**8.51**	Manganese:	0.0	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.65	3.85	-4.30	0.00	-4.37	0.00	-3.37	0.00	-0.27	0.00	0.05
100	0	0.69	3.85	-4.31	0.00	-4.31	0.00	-3.34	0.00	-0.40	0.00	0.07
120	0	0.74	4.20	-4.31	0.00	-4.23	0.00	-3.30	0.00	-0.51	0.00	0.11
140	0	0.80	4.20	-4.30	0.00	-4.13	0.00	-3.25	0.00	-0.59	0.00	0.17

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18919
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	15		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1987.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000007
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108414 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**155.0**	**4.37**	**Sodium:**	**562.9**	**24.48**
Bicarbonate:	**1174.0**	**19.24**	**Magnesium:**	**0.5**	**0.04**
Carbonate:	**63.0**	**2.1**	**Calcium:**	**17.0**	**0.85**
Sulfate:	**2.5**	**0.05**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**6.0**	**0.22**
Silicate:			Potassium:	5.5	0.14
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.65	Lead:		
pH used in Calculation:		**8.65**	Manganese:	0.2	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.23	13.64	-4.03	0.00	-4.10	0.00	-3.50	0.00	1.09	0.00	0.04
100	0	1.26	13.64	-4.04	0.00	-4.05	0.00	-3.47	0.00	-1.22	0.00	0.06
120	0	1.29	13.99	-4.04	0.00	-3.97	0.00	-3.43	0.00	-1.33	0.00	0.1
140	0	1.33	13.99	-4.03	0.00	-3.86	0.00	-3.37	0.00	-1.41	0.00	0.16

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20982
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	16		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/14/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2347
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186102 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**273.0**	**7.7**
Bicarbonate:	**1318.0**	**21.6**
Carbonate:	**0.0**	**0.**
Sulfate:	**54.0**	**1.12**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		7.5
pH at time of analysis:		
pH used in Calculation:		**7.5**

Cations	mg/l	meq/l
Sodium:	**678.7**	**29.52**
Magnesium:	**2.0**	**0.16**
Calcium:	**7.0**	**0.35**
Strontium:	**2.0**	**0.05**
Barium:	**0.3**	**0.**
Iron:	**3.0**	**0.11**
Potassium:	9.0	0.23
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.19	0.00	-3.05	0.00	-3.12	0.00	-1.85	0.00	0.42	0.00	0.57
100	0	-0.07	0.00	-3.06	0.00	-3.06	0.00	-1.83	0.00	0.28	0.00	0.76
120	0	0.06	0.70	-3.06	0.00	-2.99	0.00	-1.80	0.00	0.17	0.00	0.97
140	0	0.19	2.10	-3.06	0.00	-2.89	0.00	-1.76	0.00	0.08	0.00	1.21

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18920
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	17		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2056.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184937 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**124.0**	**3.5**	**Sodium:**	**594.8**	**25.87**
Bicarbonate:	**1208.0**	**19.8**	**Magnesium:**	**0.2**	**0.02**
Carbonate:	**60.0**	**2.**	**Calcium:**	**4.5**	**0.22**
Sulfate:	**54.0**	**1.12**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**3.5**	**0.13**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.6	Lead:		
pH used in Calculation:		**8.6**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	2.80	-3.28	0.00	-3.35	0.00	-2.17	0.00	-0.06	0.00	0.04
100	0	0.64	3.15	-3.29	0.00	-3.30	0.00	-2.15	0.00	-0.20	0.00	0.07
120	0	0.67	3.15	-3.29	0.00	-3.22	0.00	-2.11	0.00	-0.30	0.00	0.12
140	0	0.71	3.15	-3.28	0.00	-3.11	0.00	-2.06	0.00	-0.39	0.00	0.18

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19084
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	18		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary	
Sampling Date:	5/10/01
Analysis Date:	5/22/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	3469.4
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184967 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1413.0**	**39.86**	**Sodium:**	**1187.9**	**51.67**
Bicarbonate:	**817.0**	**13.39**	**Magnesium:**	**3.5**	**0.29**
Carbonate:	**0.0**	**0.**	**Calcium:**	**20.0**	**1.**
Sulfate:	**10.0**	**0.21**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**5.0**	**0.18**
Silicate:			Potassium:	10.0	0.26
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.18	Lead:		
pH used in Calculation:		**8.18**	Manganese:	0.0	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.64	9.78	-3.46	0.00	-3.53	0.00	-2.70	0.00	0.09	0.00	0.07
100	0	0.69	10.83	-3.47	0.00	-3.47	0.00	-2.68	0.00	-0.05	0.00	0.11
120	0	0.74	11.88	-3.46	0.00	-3.39	0.00	-2.65	0.00	-0.17	0.00	0.17
140	0	0.80	12.57	-3.45	0.00	-3.28	0.00	-2.61	0.00	-0.25	0.00	0.26

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196055
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28428
Entity (or well #):	19	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2631.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196055 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**655.0**	**18.48**	**Sodium:**	**830.7**	**36.13**
Bicarbonate:	**1122.4**	**18.39**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**0.0**	**0.**	**Calcium:**	**8.5**	**0.42**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.57	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.57**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.11	0.00	-4.25	0.00	-4.32	0.00	-3.43	0.00	-0.04	0.00	0.41
100	0	0.00	0.00	-4.26	0.00	-4.26	0.00	-3.40	0.00	-0.18	0.00	0.55
120	0	0.12	1.75	-4.26	0.00	-4.18	0.00	-3.37	0.00	-0.29	0.00	0.71
140	0	0.25	2.80	-4.25	0.00	-4.08	0.00	-3.33	0.00	-0.37	0.00	0.89

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196056
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28429
Entity (or well #):	20	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2093.3
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196056 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**166.0**	**4.68**	**Sodium:**	**596.8**	**25.96**
Bicarbonate:	**1317.6**	**21.59**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.7**	**0.01**
Borate:			**Iron:**	**0.6**	**0.02**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.61	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.61**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.47	1.75	-4.71	0.00	-4.78	0.00	-3.64	0.00	-0.46	0.00	0.05
100	0	0.50	1.75	-4.72	0.00	-4.72	0.00	-3.61	0.00	-0.60	0.00	0.07
120	0	0.53	1.75	-4.72	0.00	-4.64	0.00	-3.57	0.00	-0.70	0.00	0.12
140	0	0.56	1.75	-4.71	0.00	-4.54	0.00	-3.52	0.00	-0.78	0.00	0.18

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18224
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	21		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 145788 @ 75 °F			Cations		
Sampling Date:	3/21/01	**Anions**	mg/l	meq/l		mg/l	meq/l
Analysis Date:	3/28/01	**Chloride:**	**123.0**	**3.47**	**Sodium:**	**618.2**	**26.89**
Analyst:	MARILYN BRANNON	**Bicarbonate:**	**1461.0**	**23.94**	**Magnesium:**	**0.1**	**0.01**
TDS (mg/l or g/m3):	2219.2	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**9.0**	**0.45**
Density (g/cm3, tonne/m3):	1.002	**Sulfate:**	**3.0**	**0.06**	**Strontium:**	**0.7**	**0.02**
Anion/Cation Ratio:	1.0000000	Phosphate:			**Barium:**	**0.7**	**0.01**
		Borate:			**Iron:**	**1.0**	**0.04**
		Silicate:			Potassium:	2.5	0.06
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:			Copper:		
Comments:		pH at time of analysis:		7.91	Lead:		
		pH used in Calculation:		**7.91**	Manganese:	0.0	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.38	4.20	-4.18	0.00	-4.25	0.00	-3.53	0.00	-0.44	0.00	0.25
100	0	0.47	4.90	-4.19	0.00	-4.19	0.00	-3.51	0.00	-0.58	0.00	0.35
120	0	0.56	5.25	-4.19	0.00	-4.12	0.00	-3.48	0.00	-0.69	0.00	0.47
140	0	0.66	5.95	-4.19	0.00	-4.03	0.00	-3.43	0.00	-0.77	0.00	0.63

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218419
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29657
Entity (or well #):	22	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2183.7
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.0000007
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218419 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**327.0**	**9.22**	**Sodium:**	**646.7**	**28.13**
Bicarbonate:	**1189.0**	**19.49**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		7.96	Lead:		
pH used in Calculation:		**7.96**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.16	1.40	-4.23	0.00	-4.30	0.00	-3.48	0.00	-0.56	0.00	0.18
100	0	0.25	2.10	-4.24	0.00	-4.24	0.00	-3.46	0.00	-0.70	0.00	0.26
120	0	0.34	2.80	-4.24	0.00	-4.17	0.00	-3.42	0.00	-0.81	0.00	0.35
140	0	0.43	3.15	-4.24	0.00	-4.07	0.00	-3.38	0.00	-0.90	0.00	0.48

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19082
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	23		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary	
Sampling Date:	5/10/01
Analysis Date:	5/22/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2593.4
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184965 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**675.0**	**19.04**	**Sodium:**	**797.3**	**34.68**
Bicarbonate:	**1052.0**	**17.24**	**Magnesium:**	**3.5**	**0.29**
Carbonate:	**11.0**	**0.37**	**Calcium:**	**15.0**	**0.75**
Sulfate:	**6.5**	**0.14**	**Strontium:**	**1.5**	**0.03**
Phosphate:			**Barium:**	**1.1**	**0.02**
Borate:			**Iron:**	**22.0**	**0.79**
Silicate:			Potassium:	8.5	0.22
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.35	Lead:		
pH used in Calculation:		**8.35**	Manganese:	0.0	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.83	10.14	-3.70	0.00	-3.77	0.00	-2.95	0.00	0.01	0.00	0.07
100	0	0.86	10.49	-3.71	0.00	-3.72	0.00	-2.92	0.00	-0.12	0.00	0.11
120	0	0.90	10.84	-3.71	0.00	-3.64	0.00	-2.89	0.00	-0.23	0.00	0.17
140	0	0.95	11.19	-3.70	0.00	-3.53	0.00	-2.84	0.00	-0.32	0.00	0.25

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20985
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	24		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 186103 @ 75 °F					
Sampling Date:	8/14/01	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	8/28/01	**Chloride:**	**359.0**	**10.13**	**Sodium:**	**730.2**	**31.76**
Analyst:	JAMES AHRLETT	**Bicarbonate:**	**1366.0**	**22.39**	**Magnesium:**	**4.0**	**0.33**
TDS (mg/l or g/m3):	2497	**Carbonate:**	**9.0**	**0.3**	**Calcium:**	**10.0**	**0.5**
Density (g/cm3, tonne/m3):	1.002	**Sulfate:**	**6.0**	**0.12**	**Strontium:**	**1.0**	**0.02**
Anion/Cation Ratio:	0.9999994	Phosphate:			**Barium:**	**0.8**	**0.01**
		Borate:			**Iron:**	**3.0**	**0.11**
		Silicate:			Potassium:	8.0	0.2
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:		8	Copper:		
Comments:		pH at time of analysis:			Lead:		
		pH used in Calculation:		8	Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.46	4.89	-3.87	0.00	-3.94	0.00	-3.12	0.00	-0.12	0.00	0.19
100	0	0.54	5.59	-3.89	0.00	-3.89	0.00	-3.10	0.00	-0.26	0.00	0.27
120	0	0.62	6.29	-3.89	0.00	-3.81	0.00	-3.06	0.00	-0.37	0.00	0.38
140	0	0.70	6.64	-3.89	0.00	-3.72	0.00	-3.02	0.00	-0.46	0.00	0.52

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19080
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	25		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary		Analysis of Sample 184963 @ 75 °F					
Sampling Date:	5/10/01	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	5/22/01	**Chloride:**	**308.0**	**8.69**	**Sodium:**	**695.6**	**30.26**
Analyst:	MARILYN BRANNON	**Bicarbonate:**	**1336.0**	**21.9**	**Magnesium:**	**2.0**	**0.16**
TDS (mg/l or g/m3):	2380.7	**Carbonate:**	**13.0**	**0.43**	**Calcium:**	**8.0**	**0.4**
Density (g/cm3, tonne/m3):	1.002	**Sulfate:**	**6.0**	**0.12**	**Strontium:**	**1.0**	**0.02**
Anion/Cation Ratio:	0.9999997	Phosphate:			**Barium:**	**0.6**	**0.01**
		Borate:			**Iron:**	**2.0**	**0.07**
		Silicate:			Potassium:	8.5	0.22
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:			Copper:		
Comments:		pH at time of analysis:		8.33	Lead:		
		pH used in Calculation:		**8.33**	Manganese:	0.0	0.
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.65	5.25	-3.98	0.00	-4.05	0.00	-3.12	0.00	-0.25	0.00	0.09
100	0	0.70	5.25	-3.99	0.00	-4.00	0.00	-3.10	0.00	-0.38	0.00	0.14
120	0	0.74	5.59	-3.99	0.00	-3.92	0.00	-3.06	0.00	-0.49	0.00	0.21
140	0	0.80	5.59	-3.99	0.00	-3.82	0.00	-3.02	0.00	-0.58	0.00	0.31

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Lab Team Leader - Sheila Hernandez
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196084
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28630
Entity (or well #):	26	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196084 @ 75 °F					
Sampling Date:	9/2/02	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	9/11/02	**Chloride:**	**143.0**	**4.03**	**Sodium:**	**544.4**	**23.68**
Analyst:	SHEILA HERNANDEZ	**Bicarbonate:**	**1220.0**	**19.99**	**Magnesium:**	**0.8**	**0.07**
TDS (mg/l or g/m3):	1921.4	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**2.5**	**0.12**
Density (g/cm3, tonne/m3):	1.002	**Sulfate**	**3.0**	**0.06**	**Strontium:**	**0.5**	**0.01**
Anion/Cation Ratio:	1.000001	Phosphate:			**Barium:**	**0.7**	**0.01**
		Borate:			**Iron:**	**3.0**	**0.11**
		Silicate:			Potassium:	3.5	0.09
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:					Copper:		
Comments:		pH at time of sampling:		7.9	Lead:		
		pH at time of analysis:			Manganese:		
		pH used in Calculation:		**7.9**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.24	0.00	-4.69	0.00	-4.76	0.00	-3.64	0.00	-0.41	0.00	0.22
100	0	-0.14	0.00	-4.70	0.00	-4.71	0.00	-3.62	0.00	-0.54	0.00	0.3
120	0	-0.04	0.00	-4.71	0.00	-4.63	0.00	-3.58	0.00	-0.65	0.00	0.4
140	0	0.06	0.35	-4.70	0.00	-4.53	0.00	-3.54	0.00	-0.74	0.00	0.53

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18226
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	27		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	3/21/01
Analysis Date:	3/28/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2719.9
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 145790 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**444.0**	**12.52**	**Sodium:**	**816.4**	**35.51**
Bicarbonate:	**1440.0**	**23.6**	**Magnesium:**	**0.6**	**0.05**
Carbonate:	**0.0**	**0.**	**Calcium:**	**8.0**	**0.4**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**0.6**	**0.01**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.19	Lead:		
pH used in Calculation:		**8.19**	Manganese:	0.0	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.54	4.54	-4.30	0.00	-4.37	0.00	-3.54	0.00	-0.57	0.00	0.13
100	0	0.59	4.89	-4.32	0.00	-4.32	0.00	-3.52	0.00	-0.71	0.00	0.2
120	0	0.65	5.24	-4.32	0.00	-4.24	0.00	-3.49	0.00	-0.82	0.00	0.29
140	0	0.71	5.59	-4.32	0.00	-4.15	0.00	-3.44	0.00	-0.91	0.00	0.42

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18959
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	28		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1525
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108411 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**50.0**	**1.41**	**Sodium:**	**433.6**	**18.86**
Bicarbonate:	**974.0**	**15.96**	**Magnesium:**	**0.1**	**0.**
Carbonate:	**54.0**	**1.8**	**Calcium:**	**2.0**	**0.1**
Sulfate:	**2.5**	**0.05**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**3.5**	**0.13**
Silicate:			Potassium:	4.5	0.12
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
			Lead:		
pH at time of analysis:		8.56	Manganese:	0.1	0.
pH used in Calculation:		**8.56**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.21	0.70	-4.87	0.00	-4.94	0.00	-3.63	0.00	1.31	0.00	0.04
100	0	0.25	0.70	-4.88	0.00	-4.88	0.00	-3.60	0.00	-1.44	0.00	0.07
120	0	0.29	0.70	-4.87	0.00	-4.80	0.00	-3.56	0.00	-1.55	0.00	0.1
140	0	0.34	1.05	-4.86	0.00	-4.70	0.00	-3.51	0.00	-1.63	0.00	0.15

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20987
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	29		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2205.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186104 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**124.0**	**3.5**	**Sodium:**	**610.0**	**26.54**
Bicarbonate:	**1440.0**	**23.6**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
Sulfate:	**11.0**	**0.23**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**0.6**	**0.01**
Borate:			**Iron:**	**0.5**	**0.02**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.34	3.15	-3.73	0.00	-3.80	0.00	-2.52	0.00	0.05	0.00	0.2
100	0	0.43	3.50	-3.74	0.00	-3.74	0.00	-2.50	0.00	-0.08	0.00	0.29
120	0	0.51	3.85	-3.75	0.00	-3.67	0.00	-2.46	0.00	-0.19	0.00	0.4
140	0	0.60	4.55	-3.74	0.00	-3.58	0.00	-2.42	0.00	-0.28	0.00	0.54

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196057
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28430
Entity (or well #):	30	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2344.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000006
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196057 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**391.0**	**11.03**	**Sodium:**	**707.4**	**30.77**
Bicarbonate:	**1230.0**	**20.16**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**4.0**	**0.2**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.7**	**0.01**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.63	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.63**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.57	2.45	-4.61	0.00	-4.68	0.00	-3.44	0.00	-0.49	0.00	0.04
100	0	0.59	2.45	-4.62	0.00	-4.63	0.00	-3.42	0.00	-0.63	0.00	0.07
120	0	0.62	2.45	-4.62	0.00	-4.54	0.00	-3.38	0.00	-0.73	0.00	0.11
140	0	0.65	2.80	-4.61	0.00	-4.44	0.00	-3.33	0.00	-0.82	0.00	0.17

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20990
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	31		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2173.9
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999992
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186105 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**36.0**	**1.02**	**Sodium:**	**579.2**	**25.19**
Bicarbonate:	**1513.0**	**24.8**	**Magnesium:**	**4.0**	**0.33**
Carbonate:	**0.0**	**0.**	**Calcium:**	**10.0**	**0.5**
Sulfate:	**22.0**	**0.46**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**0.9**	**0.03**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.52	5.60	-3.27	0.00	-3.34	0.00	-2.52	0.00	0.48	0.35	0.21
100	0	0.60	5.95	-3.29	0.00	-3.29	0.00	-2.50	0.00	0.34	0.35	0.3
120	0	0.69	6.65	-3.29	0.00	-3.22	0.00	-2.46	0.00	0.23	0.35	0.42
140	0	0.77	6.99	-3.29	0.00	-3.12	0.00	-2.42	0.00	0.15	0.00	0.56

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20992
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	32		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2698.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000003
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186106 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**293.0**	**8.26**	**Sodium:**	**780.3**	**33.94**
Bicarbonate:	**1562.0**	**25.6**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**42.0**	**0.87**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.27	2.10	-3.27	0.00	-3.34	0.00	-2.00	0.00	0.70	0.35	0.22
100	0	0.35	2.80	-3.29	0.00	-3.29	0.00	-1.98	0.00	0.56	0.35	0.31
120	0	0.42	3.15	-3.30	0.00	-3.22	0.00	-1.95	0.00	0.45	0.35	0.43
140	0	0.50	3.50	-3.29	0.00	-3.13	0.00	-1.91	0.00	0.36	0.35	0.6

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18921
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	33		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	1735
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000008
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184946 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**112.0**	**3.16**	**Sodium:**	**469.0**	**20.4**
Bicarbonate:	**1093.0**	**17.91**	**Magnesium:**	**0.1**	**0.01**
Carbonate:	**19.0**	**0.63**	**Calcium:**	**8.0**	**0.4**
Sulfate:	**4.5**	**0.09**	**Strontium:**	**0.9**	**0.02**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**23.0**	**0.83**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.38	Lead:		
pH used in Calculation:		**8.38**	Manganese:	0.3	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.67	5.25	-4.03	0.00	-4.10	0.00	-3.22	0.00	-0.78	0.00	0.07
100	0	0.71	5.25	-4.04	0.00	-4.05	0.00	-3.20	0.00	-0.92	0.00	0.1
120	0	0.76	5.60	-4.04	0.00	-3.97	0.00	-3.16	0.00	-1.02	0.00	0.16
140	0	0.82	5.60	-4.03	0.00	-3.86	0.00	-3.11	0.00	-1.11	0.00	0.24

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19078
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	34		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary	
Sampling Date:	5/10/01
Analysis Date:	5/22/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	5208.1
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184961 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2568.0**	**72.43**	**Sodium:**	**1868.1**	**81.26**
Bicarbonate:	**676.0**	**11.08**	**Magnesium:**	**6.0**	**0.49**
Carbonate:	**0.0**	**0.**	**Calcium:**	**21.0**	**1.05**
Sulfate:	**26.0**	**0.54**	**Strontium:**	**5.0**	**0.11**
Phosphate:			**Barium:**	**5.0**	**0.07**
Borate:			**Iron:**	**20.0**	**0.72**
Silicate:			Potassium:	12.0	0.31
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		7.67	Lead:		
pH used in Calculation:		**7.67**	Manganese:	1.0	0.04
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.02	0.35	-3.14	0.00	-3.21	0.00	-2.00	0.00	1.09	2.79	0.18
100	0	0.12	2.44	-3.15	0.00	-3.15	0.00	-1.99	0.00	0.94	2.44	0.25
120	0	0.22	4.53	-3.15	0.00	-3.07	0.00	-1.96	0.00	0.83	2.44	0.34
140	0	0.32	6.63	-3.14	0.00	-2.97	0.00	-1.92	0.00	0.73	2.44	0.46

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18922
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	35		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2581.4
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000003
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108426 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**223.0**	**6.29**	**Sodium:**	**759.0**	**33.02**
Bicarbonate:	**1489.0**	**24.4**	**Magnesium:**	**0.6**	**0.05**
Carbonate:	**84.0**	**2.8**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**9.0**	**0.19**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**4.0**	**0.14**
Silicate:			Potassium:	5.5	0.14
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.66	Lead:		
pH used in Calculation:		**8.66**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.84	4.54	-4.00	0.00	-4.07	0.00	-3.01	0.00	-0.59	0.00	0.05
100	0	0.85	4.54	-4.02	0.00	-4.02	0.00	-2.98	0.00	-0.73	0.00	0.08
120	0	0.87	4.54	-4.02	0.00	-3.94	0.00	-2.94	0.00	-0.83	0.00	0.13
140	0	0.90	4.54	-4.00	0.00	-3.84	0.00	-2.89	0.00	-0.91	0.00	0.21

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18961
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	36		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	5323.3
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108415 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2232.0**	**62.96**	**Sodium:**	**1826.0**	**79.43**
Bicarbonate:	**1156.0**	**18.95**	**Magnesium:**	**11.0**	**0.9**
Carbonate:	**0.0**	**0.**	**Calcium:**	**28.0**	**1.4**
Sulfate:	**36.0**	**0.75**	**Strontium:**	**7.0**	**0.16**
Phosphate:			**Barium:**	**5.0**	**0.07**
Borate:			**Iron:**	**11.0**	**0.4**
Silicate:			Potassium:	11.0	0.28
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.29	Lead:		
pH used in Calculation:		**8.29**	Manganese:	0.3	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.94	18.48	-2.90	0.00	-2.97	0.00	-1.74	0.00	1.22	2.79	0.08
100	0	0.96	19.18	-2.91	0.00	-2.91	0.00	-1.72	0.00	1.07	2.79	0.13
120	0	0.98	19.87	-2.91	0.00	-2.84	0.00	-1.69	0.00	0.96	2.44	0.21
140	0	1.01	20.22	-2.91	0.00	-2.74	0.00	-1.65	0.00	0.86	2.44	0.33

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18962
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	37		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	3672.4
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184940 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1131.0**	**31.9**	**Sodium:**	**1195.2**	**51.99**
Bicarbonate:	**1249.0**	**20.47**	**Magnesium:**	**3.5**	**0.29**
Carbonate:	**37.0**	**1.23**	**Calcium:**	**18.0**	**0.9**
Sulfate:	**14.0**	**0.29**	**Strontium:**	**3.0**	**0.07**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**11.0**	**0.4**
Silicate:			Potassium:	8.5	0.22
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
			Lead:		
pH at time of analysis:		8.42	Manganese:	0.2	0.01
pH used in Calculation:		**8.42**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.98	13.27	-3.40	0.00	-3.47	0.00	-2.41	0.00	0.52	0.70	0.07
100	0	1.00	13.27	-3.41	0.00	-3.41	0.00	-2.39	0.00	0.38	0.70	0.11
120	0	1.02	13.62	-3.41	0.00	-3.33	0.00	-2.35	0.00	0.26	0.35	0.18
140	0	1.05	13.97	-3.40	0.00	-3.23	0.00	-2.31	0.00	0.18	0.35	0.28

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18923
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	38		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2232.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000006
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184951 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**589.0**	**16.61**	**Sodium:**	**714.3**	**31.07**
Bicarbonate:	**888.0**	**14.55**	**Magnesium:**	**0.7**	**0.06**
Carbonate:	**18.0**	**0.6**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**2.5**	**0.05**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**0.7**	**0.01**
Borate:			**Iron:**	**3.5**	**0.13**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.38	Lead:		
pH used in Calculation:		**8.38**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.42	2.80	-4.47	0.00	-4.54	0.00	-3.19	0.00	-0.55	0.00	0.05
100	0	0.46	3.15	-4.47	0.00	-4.48	0.00	-3.16	0.00	-0.69	0.00	0.08
120	0	0.51	3.50	-4.47	0.00	-4.39	0.00	-3.13	0.00	-0.79	0.00	0.13
140	0	0.56	3.50	-4.46	0.00	-4.29	0.00	-3.08	0.00	-0.88	0.00	0.2

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218425
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29661
Entity (or well #):	39 X	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1896.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218425 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**121.0**	**3.41**	**Sodium:**	**538.6**	**23.43**
Bicarbonate:	**1216.0**	**19.93**	**Magnesium:**	**0.6**	**0.05**
Carbonate:	**7.0**	**0.23**	**Calcium:**	**2.0**	**0.1**
Sulfate:	**6.0**	**0.12**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**0.2**	**0.01**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.34	Lead:		
pH used in Calculation:		**8.34**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.06	0.35	-4.52	0.00	-4.59	0.00	-3.58	0.00	-0.26	0.00	0.08
100	0	0.11	0.35	-4.53	0.00	-4.53	0.00	-3.56	0.00	-0.40	0.00	0.12
120	0	0.17	0.70	-4.53	0.00	-4.45	0.00	-3.52	0.00	-0.51	0.00	0.18
140	0	0.23	0.70	-4.52	0.00	-4.35	0.00	-3.47	0.00	-0.59	0.00	0.27

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18924
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	40		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2123.9
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184945 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**140.0**	**3.95**	**Sodium:**	**601.2**	**26.15**
Bicarbonate:	**1333.0**	**21.85**	**Magnesium:**	**0.5**	**0.04**
Carbonate:	**27.0**	**0.9**	**Calcium:**	**5.0**	**0.25**
Sulfate:	**5.0**	**0.1**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.1**	**0.**
Borate:			**Iron:**	**4.5**	**0.16**
Silicate:			Potassium:	6.5	0.17
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.4	Lead:		
pH used in Calculation:		**8.4**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.53	2.80	-4.24	0.00	-4.31	0.00	-3.18	0.00	1.07	0.00	0.08
100	0	0.57	3.15	-4.25	0.00	-4.26	0.00	-3.15	0.00	-1.21	0.00	0.12
120	0	0.62	3.15	-4.25	0.00	-4.18	0.00	-3.11	0.00	-1.32	0.00	0.19
140	0	0.67	3.50	-4.25	0.00	-4.08	0.00	-3.07	0.00	-1.40	0.00	0.28

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218421
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29663
Entity (or well #):	41	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2375.9
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.0000006
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218421 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**512.0**	**14.44**	**Sodium:**	**736.2**	**32.02**
Bicarbonate:	**1109.0**	**18.18**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.0**	**0.3**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**0.7**	**0.03**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.16	Lead:		
pH used in Calculation:		**8.16**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.30	2.45	-4.39	0.00	-4.46	0.00	-3.41	0.00	-0.32	0.00	0.11
100	0	0.36	2.80	-4.40	0.00	-4.40	0.00	-3.39	0.00	-0.46	0.00	0.16
120	0	0.43	3.15	-4.40	0.00	-4.32	0.00	-3.35	0.00	-0.57	0.00	0.23
140	0	0.50	3.50	-4.39	0.00	-4.22	0.00	-3.31	0.00	-0.65	0.00	0.33

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20995
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	43		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1798.6
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186108 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**8.0**	**0.23**	**Sodium:**	**473.4**	**20.59**
Bicarbonate:	**1293.0**	**21.19**	**Magnesium:**	**3.0**	**0.25**
Carbonate:	**0.0**	**0.**	**Calcium:**	**9.0**	**0.45**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**0.8**	**0.03**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.44	4.55	-4.00	0.00	-4.07	0.00	-3.21	0.00	-0.51	0.00	0.18
100	0	0.53	5.25	-4.01	0.00	-4.02	0.00	-3.18	0.00	-0.65	0.00	0.26
120	0	0.62	5.60	-4.02	0.00	-3.94	0.00	-3.15	0.00	-0.76	0.00	0.35
140	0	0.72	5.95	-4.01	0.00	-3.85	0.00	-3.10	0.00	-0.84	0.00	0.48

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218420
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29656
Entity (or well #):	44	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	5315
Density (g/cm3, tonne/m3):	1.005
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218420 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2550.0**	**71.93**	**Sodium:**	**1868.0**	**81.25**
Bicarbonate:	**786.0**	**12.88**	**Magnesium:**	**14.0**	**1.15**
Carbonate:	**0.0**	**0.**	**Calcium:**	**49.0**	**2.45**
Sulfate:	**26.0**	**0.54**	**Strontium:**	**7.0**	**0.16**
Phosphate:			**Barium:**	**5.0**	**0.07**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	9.0	0.23
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		7.74	Lead:		
pH used in Calculation:		**7.74**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.51	14.99	-2.79	0.00	-2.86	0.00	-1.87	0.00	1.07	2.79	0.18
100	0	0.61	18.48	-2.80	0.00	-2.80	0.00	-1.86	0.00	0.93	2.44	0.25
120	0	0.70	22.31	-2.80	0.00	-2.72	0.00	-1.83	0.00	0.81	2.44	0.35
140	0	0.79	25.80	-2.79	0.00	-2.62	0.00	-1.79	0.00	0.72	2.44	0.47

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20997
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	45		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3189.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000004
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186110 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**813.0**	**22.93**	**Sodium:**	**974.8**	**42.4**
Bicarbonate:	**1318.0**	**21.6**	**Magnesium:**	**6.0**	**0.49**
Carbonate:	**0.0**	**0.**	**Calcium:**	**25.0**	**1.25**
Sulfate:	**24.0**	**0.5**	**Strontium:**	**4.0**	**0.09**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**17.0**	**0.61**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.5	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.5**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.31	8.73	-2.95	0.00	-3.02	0.00	-1.99	0.00	0.80	1.05	0.56
100	0	0.43	11.53	-2.96	0.00	-2.96	0.00	-1.97	0.00	0.66	1.05	0.74
120	0	0.55	13.63	-2.96	0.00	-2.89	0.00	-1.94	0.00	0.54	0.70	0.95
140	0	0.67	15.72	-2.96	0.00	-2.79	0.00	-1.90	0.00	0.45	0.70	1.2

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19079
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	46		
Formation:	UNKNOWN		
Sample Point:	BLEEDER		

Summary		Analysis of Sample 184962 @ 75 °F					
Sampling Date:	5/10/01	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	5/22/01	**Chloride:**	**3259.0**	**91.92**	**Sodium:**	**2436.9**	**106.**
Analyst:	MARILYN BRANNON	**Bicarbonate:**	**1166.0**	**19.11**	**Magnesium:**	**13.0**	**1.07**
TDS (mg/l or g/m3):	6994.5	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**48.0**	**2.4**
Density (g/cm3, tonne/m3):	1.005	**Sulfate:**	**9.5**	**0.2**	**Strontium:**	**9.0**	**0.21**
Anion/Cation Ratio:	0.9999998	Phosphate:			**Barium:**	**9.0**	**0.13**
		Borate:			**Iron:**	**29.0**	**1.05**
		Silicate:			Potassium:	15.0	0.38
Carbon Dioxide:					Aluminum:		
		Hydrogen Sulfide:			Chromium:		
Oxygen:					Copper:		
		pH at time of sampling:			Lead:		
Comments:		pH at time of analysis:		7.78	Manganese:	0.1	0.
		pH used in Calculation:		**7.78**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.66	21.93	-3.32	0.00	-3.39	0.00	-2.28	0.00	0.82	3.83	0.24
100	0	0.73	25.06	-3.33	0.00	-3.34	0.00	-2.26	0.00	0.67	3.48	0.35
120	0	0.81	28.19	-3.34	0.00	-3.26	0.00	-2.24	0.00	0.55	3.13	0.49
140	0	0.89	30.63	-3.34	0.00	-3.17	0.00	-2.20	0.00	0.45	2.44	0.68

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218417
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29660
Entity (or well #):	47	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3806.4
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218417 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1326.0**	**37.4**	**Sodium:**	**1276.1**	**55.51**
Bicarbonate:	**1173.0**	**19.22**	**Magnesium:**	**4.0**	**0.33**
Carbonate:	**0.0**	**0.**	**Calcium:**	**11.0**	**0.55**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**3.0**	**0.07**
Phosphate:			**Barium:**	**3.0**	**0.04**
Borate:			**Iron:**	**0.3**	**0.01**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.12	Lead:		
pH used in Calculation:		**8.12**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.46	5.24	-4.26	0.00	-4.33	0.00	-3.07	0.00	0.03	0.00	0.12
100	0	0.51	5.94	-4.27	0.00	-4.28	0.00	-3.05	0.00	-0.11	0.00	0.18
120	0	0.57	6.29	-4.27	0.00	-4.20	0.00	-3.01	0.00	-0.23	0.00	0.27
140	0	0.63	6.98	-4.27	0.00	-4.10	0.00	-2.97	0.00	-0.32	0.00	0.4

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	20999
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	48		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/14/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	4641.9
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.0000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186112 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1526.0**	**43.04**	**Sodium:**	**1492.9**	**64.94**
Bicarbonate:	**1513.0**	**24.8**	**Magnesium:**	**8.0**	**0.66**
Carbonate:	**0.0**	**0.**	**Calcium:**	**36.0**	**1.8**
Sulfate:	**30.0**	**0.62**	**Strontium:**	**6.0**	**0.14**
Phosphate:			**Barium:**	**3.0**	**0.04**
Borate:			**Iron:**	**19.0**	**0.69**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		8	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.93	23.72	-2.82	0.00	-2.89	0.00	-1.84	0.00	0.96	1.74	0.2
100	0	0.99	25.12	-2.83	0.00	-2.84	0.00	-1.82	0.00	0.82	1.40	0.3
120	0	1.05	26.17	-2.84	0.00	-2.76	0.00	-1.79	0.00	0.70	1.40	0.44
140	0	1.11	27.21	-2.84	0.00	-2.67	0.00	-1.75	0.00	0.61	1.40	0.62

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18926
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	49		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	2859.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184936 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**613.0**	**17.29**	**Sodium:**	**876.6**	**38.13**
Bicarbonate:	**1337.0**	**21.91**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**0.0**	**0.**	**Calcium:**	**10.0**	**0.5**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**1.5**	**0.02**
Borate:			**Iron:**	**7.0**	**0.25**
Silicate:			Potassium:	7.5	0.19
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.19	Lead:		
pH used in Calculation:		**8.19**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.59	5.94	-4.22	0.00	-4.29	0.00	-3.16	0.00	-0.19	0.00	0.12
100	0	0.64	6.29	-4.24	0.00	-4.24	0.00	-3.14	0.00	-0.33	0.00	0.18
120	0	0.70	6.64	-4.24	0.00	-4.16	0.00	-3.11	0.00	-0.44	0.00	0.27
140	0	0.76	6.99	-4.23	0.00	-4.06	0.00	-3.06	0.00	-0.53	0.00	0.4

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218413
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29664
Entity (or well #):	50	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	4392
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218413 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1536.0**	**43.32**	**Sodium:**	**1464.0**	**63.68**
Bicarbonate:	**1347.0**	**22.08**	**Magnesium:**	**6.0**	**0.49**
Carbonate:	**0.0**	**0.**	**Calcium:**	**18.0**	**0.9**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**4.0**	**0.09**
Phosphate:			**Barium:**	**3.0**	**0.04**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.03	Lead:		
pH used in Calculation:		**8.03**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.62	10.12	-3.97	0.00	-4.04	0.00	-2.86	0.00	0.11	0.35	0.17
100	0	0.68	10.82	-3.98	0.00	-3.98	0.00	-2.84	0.00	-0.03	0.00	0.25
120	0	0.74	11.87	-3.98	0.00	-3.91	0.00	-2.81	0.00	-0.14	0.00	0.37
140	0	0.80	12.56	-3.98	0.00	-3.81	0.00	-2.77	0.00	-0.24	0.00	0.53

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernande
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	19201
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	51		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/26/01
Analysis Date:	5/31/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	3244.4
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999997
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 187037 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**888.0**	**25.05**	**Sodium:**	**1039.5**	**45.22**
Bicarbonate:	**1282.0**	**21.01**	**Magnesium:**	**2.5**	**0.21**
Carbonate:	**4.0**	**0.13**	**Calcium:**	**11.0**	**0.55**
Sulfate:	**3.5**	**0.07**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**5.5**	**0.08**
Borate:			**Iron:**	**0.3**	**0.01**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.32	Lead:		
pH used in Calculation:		**8.32**	Manganese:	0.1	0.
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.71	6.99	-4.16	0.00	-4.23	0.00	-3.14	0.00	0.40	1.05	0.08
100	0	0.74	7.34	-4.17	0.00	-4.18	0.00	-3.12	0.00	0.26	0.70	0.14
120	0	0.78	7.69	-4.17	0.00	-4.10	0.00	-3.08	0.00	0.15	0.35	0.21
140	0	0.82	8.04	-4.17	0.00	-4.00	0.00	-3.04	0.00	0.06	0.35	0.32

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18927
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	52		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 108420 @ 75 °F					
Sampling Date:	4/24/01	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	5/17/01	**Chloride:**	**653.0**	**18.42**	**Sodium:**	**886.4**	**38.55**
Analyst:	MARILYN BRANNON	**Bicarbonate:**	**1336.0**	**21.9**	**Magnesium:**	**2.0**	**0.16**
TDS (mg/l or g/m3):	2924.2	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**13.0**	**0.65**
Density (g/cm3, tonne/m3):	1.003	**Sulfate:**	**2.5**	**0.05**	**Strontium:**	**2.0**	**0.05**
Anion/Cation Ratio:	0.9999995	Phosphate:			**Barium:**	**1.0**	**0.01**
		Borate:			**Iron:**	**20.0**	**0.72**
		Silicate:			Potassium:	8.0	0.2
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:			Copper:		
Comments:		pH at time of analysis:		8.15	Lead:		
		pH used in Calculation:		**8.15**	Manganese:	0.3	0.01
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.66	8.04	-4.20	0.00	-4.27	0.00	-3.25	0.00	-0.46	0.00	0.13
100	0	0.72	8.39	-4.21	0.00	-4.21	0.00	-3.23	0.00	-0.60	0.00	0.2
120	0	0.78	8.74	-4.21	0.00	-4.14	0.00	-3.20	0.00	-0.71	0.00	0.29
140	0	0.84	9.44	-4.21	0.00	-4.04	0.00	-3.15	0.00	-0.80	0.00	0.42

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	21001
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	53		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	4469.3
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186114 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1300.0**	**36.67**	**Sodium:**	**1409.3**	**61.3**
Bicarbonate:	**1684.0**	**27.6**	**Magnesium:**	**9.0**	**0.74**
Carbonate:	**0.0**	**0.**	**Calcium:**	**33.0**	**1.65**
Sulfate:	**7.0**	**0.15**	**Strontium:**	**6.0**	**0.14**
Phosphate:			**Barium:**	**4.0**	**0.06**
Borate:			**Iron:**	**9.0**	**0.33**
Silicate:			Potassium:	8.0	0.2
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.5	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.5**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.48	16.05	-3.46	0.00	-3.53	0.00	-2.44	0.00	0.48	1.40	0.69
100	0	0.59	18.49	-3.47	0.00	-3.48	0.00	-2.42	0.00	0.34	1.05	0.92
120	0	0.70	20.94	-3.48	0.00	-3.40	0.00	-2.39	0.00	0.22	0.70	1.19
140	0	0.82	22.68	-3.48	0.00	-3.31	0.00	-2.35	0.00	0.13	0.35	1.51

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218418
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29659
Entity (or well #):	54	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/03
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2346.2
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	0.9999994
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218418 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**215.0**	**6.06**	**Sodium:**	**675.6**	**29.39**
Bicarbonate:	**1441.0**	**23.62**	**Magnesium:**	**0.8**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**0.2**	**0.01**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.27	Lead:		
pH used in Calculation:		**8.27**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.21	1.05	-4.57	0.00	-4.64	0.00	-3.51	0.00	-0.19	0.00	0.11
100	0	0.26	1.05	-4.58	0.00	-4.59	0.00	-3.48	0.00	-0.32	0.00	0.17
120	0	0.31	1.40	-4.58	0.00	-4.51	0.00	-3.45	0.00	-0.43	0.00	0.25
140	0	0.37	1.40	-4.58	0.00	-4.41	0.00	-3.40	0.00	-0.52	0.00	0.36

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	21002
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	55		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/15/01
Analysis Date:	8/28/01
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	6670.6
Density (g/cm3, tonne/m3):	1.005
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 186115 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2760.0**	**77.85**	**Sodium:**	**2244.6**	**97.64**
Bicarbonate:	**1537.0**	**25.19**	**Magnesium:**	**17.0**	**1.4**
Carbonate:	**0.0**	**0.**	**Calcium:**	**60.0**	**2.99**
Sulfate:	**7.0**	**0.15**	**Strontium:**	**12.0**	**0.27**
Phosphate:			**Barium:**	**7.0**	**0.1**
Borate:			**Iron:**	**11.0**	**0.4**
Silicate:			Potassium:	15.0	0.38
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.5	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.5**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	29.94	-3.34	0.00	-3.41	0.00	-2.27	0.00	0.59	2.44	0.6
100	0	0.72	34.12	-3.35	0.00	-3.36	0.00	-2.25	0.00	0.45	2.09	0.81
120	0	0.83	37.95	-3.36	0.00	-3.28	0.00	-2.23	0.00	0.33	1.39	1.06
140	0	0.93	41.09	-3.36	0.00	-3.19	0.00	-2.19	0.00	0.23	1.04	1.37

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218423
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29658
Entity (or well #):	56	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2008.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.9999995
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218423 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**80.0**	**2.26**	**Sodium:**	**558.6**	**24.3**
Bicarbonate:	**1358.0**	**22.26**	**Magnesium:**	**0.9**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**2.0**	**0.1**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**0.3**	**0.01**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.27	Lead:		
pH used in Calculation:		**8.27**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	**Gauge Press.**	**Calcite CaCO3**		**Gypsum CaSO4*2H20**		**Anhydrite CaSO4**		**Celestite SrSO4**		**Barite BaSO4**		**CO2 Press**
°F	**psi**	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.03	0.00	-4.70	0.00	-4.77	0.00	-3.77	0.00	-0.54	0.00	0.1
100	0	0.09	0.35	-4.71	0.00	-4.72	0.00	-3.74	0.00	-0.68	0.00	0.16
120	0	0.15	0.35	-4.72	0.00	-4.64	0.00	-3.71	0.00	-0.79	0.00	0.23
140	0	0.21	0.70	-4.71	0.00	-4.54	0.00	-3.66	0.00	-0.87	0.00	0.33

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18964
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	57		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	4274.4
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	0.9999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108419 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1645.0**	**46.4**	**Sodium:**	**1414.6**	**61.53**
Bicarbonate:	**1125.0**	**18.44**	**Magnesium:**	**9.5**	**0.78**
Carbonate:	**0.0**	**0.**	**Calcium:**	**42.0**	**2.1**
Sulfate:	**12.0**	**0.25**	**Strontium:**	**6.0**	**0.14**
Phosphate:			**Barium:**	**4.0**	**0.06**
Borate:			**Iron:**	**6.0**	**0.22**
Silicate:			Potassium:	10.0	0.26
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.07	Lead:		
pH used in Calculation:		**8.07**	Manganese:	0.3	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.95	24.78	-3.13	0.00	-3.20	0.00	-2.21	0.00	0.71	1.75	0.13
100	0	1.01	26.87	-3.14	0.00	-3.14	0.00	-2.19	0.00	0.56	1.75	0.19
120	0	1.06	28.62	-3.14	0.00	-3.06	0.00	-2.16	0.00	0.45	1.40	0.29
140	0	1.12	30.36	-3.13	0.00	-2.96	0.00	-2.12	0.00	0.36	1.05	0.42

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18965
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	58		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	4971.6
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 184938 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2186.0**	**61.66**	**Sodium:**	**1697.4**	**73.83**
Bicarbonate:	**978.0**	**16.03**	**Magnesium:**	**12.0**	**0.99**
Carbonate:	**0.0**	**0.**	**Calcium:**	**53.0**	**2.64**
Sulfate:	**19.0**	**0.4**	**Strontium:**	**7.0**	**0.16**
Phosphate:			**Barium:**	**6.0**	**0.09**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	10.0	0.26
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		7.88	Lead:		
pH used in Calculation:		**7.88**	Manganese:	0.2	0.01
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.79	24.76	-2.87	0.00	-2.94	0.00	-1.99	0.00	1.04	3.14	0.17
100	0	0.86	27.90	-2.88	0.00	-2.88	0.00	-1.97	0.00	0.89	3.14	0.24
120	0	0.94	31.39	-2.88	0.00	-2.81	0.00	-1.94	0.00	0.78	2.79	0.34
140	0	1.02	34.18	-2.88	0.00	-2.71	0.00	-1.91	0.00	0.68	2.79	0.48

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218424
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29666
Entity (or well #):	59	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3418.4
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	0.9999996
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218424 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1124.0**	**31.7**	**Sodium:**	**1130.4**	**49.17**
Bicarbonate:	**1132.0**	**18.55**	**Magnesium:**	**3.0**	**0.25**
Carbonate:	**0.0**	**0.**	**Calcium:**	**12.0**	**0.6**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.24	Lead:		
pH used in Calculation:		**8.24**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	6.99	-4.07	0.00	-4.14	0.00	-3.09	0.00	0.00	0.00	0.09
100	0	0.65	7.34	-4.08	0.00	-4.09	0.00	-3.07	0.00	-0.14	0.00	0.14
120	0	0.70	7.68	-4.08	0.00	-4.01	0.00	-3.04	0.00	-0.25	0.00	0.21
140	0	0.75	8.03	-4.08	0.00	-3.91	0.00	-2.99	0.00	-0.34	0.00	0.32

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (970) 749-7375
Area:	RATON, NM	ID #:	18932
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis Cost:	$40.00
Entity (or well #):	60		
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	4/24/01
Analysis Date:	5/17/01
Analyst:	MARILYN BRANNON
TDS (mg/l or g/m3):	5207.6
Density (g/cm3, tonne/m3):	1.005
Anion/Cation Ratio:	0.9999997
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 108412 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2368.0**	**66.79**	**Sodium:**	**1793.8**	**78.02**
Bicarbonate:	**945.0**	**15.49**	**Magnesium:**	**10.0**	**0.82**
Carbonate:	**0.0**	**0.**	**Calcium:**	**50.0**	**2.5**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**5.5**	**0.13**
Phosphate:			**Barium:**	**6.0**	**0.09**
Borate:			**Iron:**	**15.0**	**0.54**
Silicate:			Potassium:	10.0	0.26
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
			Lead:		
pH at time of analysis:		8.06	Manganese:	0.3	0.01
pH used in Calculation:		**8.06**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.91	25.11	-3.59	0.00	-3.66	0.00	-2.79	0.00	0.35	1.05	0.11
100	0	0.95	27.55	-3.60	0.00	-3.60	0.00	-2.77	0.00	0.20	0.70	0.17
120	0	1.00	30.34	-3.60	0.00	-3.52	0.00	-2.74	0.00	0.09	0.35	0.25
140	0	1.06	32.78	-3.59	0.00	-3.42	0.00	-2.70	0.00	-0.01	0.00	0.37

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196042
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27718
Entity (or well #):	62	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1658.5
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196042 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**157.0**	**4.43**	**Sodium:**	**475.4**	**20.68**
Bicarbonate:	**1012.6**	**16.6**	**Magnesium:**	**0.8**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**2.5**	**0.09**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.34	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.34**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.18	0.70	-4.61	0.00	-4.68	0.00	-3.85	0.00	-0.63	0.00	0.07
100	0	0.24	1.05	-4.62	0.00	-4.62	0.00	-3.83	0.00	-0.77	0.00	0.1
120	0	0.30	1.40	-4.61	0.00	-4.54	0.00	-3.79	0.00	-0.88	0.00	0.15
140	0	0.36	1.40	-4.60	0.00	-4.44	0.00	-3.74	0.00	-0.96	0.00	0.22

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196043
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27719
Entity (or well #):	64	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1690.2
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1.000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196043 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**166.0**	**4.68**	**Sodium:**	**486.6**	**21.17**
Bicarbonate:	**1024.8**	**16.8**	**Magnesium:**	**0.6**	**0.05**
Carbonate:	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.11	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.11**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.02	0.00	-4.59	0.00	-4.66	0.00	-3.84	0.00	-0.63	0.00	0.11
100	0	0.06	0.35	-4.60	0.00	-4.61	0.00	-3.82	0.00	-0.76	0.00	0.16
120	0	0.14	0.70	-4.60	0.00	-4.53	0.00	-3.78	0.00	-0.87	0.00	0.23
140	0	0.23	1.05	-4.59	0.00	-4.43	0.00	-3.74	0.00	-0.96	0.00	0.32

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196082
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28631
Entity (or well #):	67	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/2/02
Analysis Date:	9/11/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2025.3
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	0.999999
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196082 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**135.0**	**3.81**	**Sodium:**	**571.0**	**24.84**
Bicarbonate:	**1305.0**	**21.39**	**Magnesium:**	**0.9**	**0.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**2.0**	**0.1**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.4**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**3.5**	**0.13**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.1	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.1**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.13	0.00	-4.81	0.00	-4.88	0.00	-3.76	0.00	-0.57	0.00	0.15
100	0	-0.06	0.00	-4.83	0.00	-4.83	0.00	-3.74	0.00	-0.71	0.00	0.21
120	0	0.02	0.00	-4.83	0.00	-4.75	0.00	-3.70	0.00	-0.81	0.00	0.3
140	0	0.10	0.35	-4.83	0.00	-4.66	0.00	-3.66	0.00	-0.90	0.00	0.42

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218396
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29190
Entity (or well #):	68	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	10/4/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1879.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218396 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**279.0**	**7.87**
Bicarbonate:	**1024.8**	**16.8**
Carbonate:	**0.0**	**0.**
Sulfate:	**5.5**	**0.11**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		8.99
pH at time of analysis:		
pH used in Calculation:		**8.99**

Cations	mg/l	meq/l
Sodium:	**556.8**	**24.22**
Magnesium:	**1.0**	**0.08**
Calcium:	**7.0**	**0.35**
Strontium:	**0.8**	**0.02**
Barium:	**0.7**	**0.01**
Iron:	**0.6**	**0.02**
Potassium:	3.0	0.08
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions — Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	1.03	5.60	-4.12	0.00	-4.19	0.00	-3.28	0.00	-0.22	0.00	0.01
100	0	1.06	5.60	-4.13	0.00	-4.14	0.00	-3.25	0.00	-0.35	0.00	0.02
120	0	1.08	5.60	-4.13	0.00	-4.05	0.00	-3.20	0.00	-0.45	0.00	0.04
140	0	1.11	5.60	-4.10	0.00	-3.94	0.00	-3.15	0.00	-0.53	0.00	0.06

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218387
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29191
Entity (or well #):	69	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/4/02
Analysis Date:	10/28/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	1481.6
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	0.9999992
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218387 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**109.0**	**3.07**	**Sodium:**	**422.5**	**18.38**
Bicarbonate:	**939.4**	**15.4**	**Magnesium:**	**0.4**	**0.03**
Carbonate:	**0.0**	**0.**	**Calcium:**	**2.0**	**0.1**
Sulfate:	**5.5**	**0.11**	**Strontium:**	**0.2**	**0.**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**0.4**	**0.01**
Silicate:			Potassium:	2.0	0.05
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.97	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.97**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.48	1.05	-4.60	0.00	-4.67	0.00	-3.82	0.00	-0.70	0.00	0.01
100	0	0.51	1.05	-4.61	0.00	-4.62	0.00	-3.79	0.00	-0.83	0.00	0.02
120	0	0.54	1.40	-4.61	0.00	-4.53	0.00	-3.74	0.00	-0.94	0.00	0.04
140	0	0.58	1.40	-4.59	0.00	-4.42	0.00	-3.69	0.00	-1.01	0.00	0.06

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Lab Team Leader - Sheila Hernandez
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196044
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27720
Entity (or well #):	70	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2402.2
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196044 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**487.0**	**13.74**	**Sodium:**	**732.7**	**31.87**
Bicarbonate:	**1159.0**	**18.99**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**11.0**	**0.55**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.7**	**0.02**
Phosphate:			**Barium:**	**0.8**	**0.01**
Borate:			**Iron:**	**2.5**	**0.09**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.67	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.67**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.12	1.75	-4.11	0.00	-4.18	0.00	-3.56	0.00	-0.41	0.00	0.34
100	0	0.24	3.50	-4.12	0.00	-4.13	0.00	-3.54	0.00	-0.55	0.00	0.46
120	0	0.35	4.55	-4.12	0.00	-4.05	0.00	-3.50	0.00	-0.66	0.00	0.6
140	0	0.47	5.94	-4.12	0.00	-3.95	0.00	-3.46	0.00	-0.75	0.00	0.76

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196045
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27721
Entity (or well #):	71	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2118.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196045 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**324.0**	**9.14**	**Sodium:**	**628.2**	**27.33**
Bicarbonate:	**1146.8**	**18.79**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**0.7**	**0.01**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.28	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.28**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.51	3.85	-4.30	0.00	-4.37	0.00	-3.49	0.00	-0.45	0.00	0.09
100	0	0.56	4.20	-4.31	0.00	-4.31	0.00	-3.46	0.00	-0.59	0.00	0.13
120	0	0.62	4.55	-4.31	0.00	-4.23	0.00	-3.43	0.00	-0.69	0.00	0.2
140	0	0.68	4.55	-4.30	0.00	-4.13	0.00	-3.38	0.00	-0.78	0.00	0.28

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196080
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28632
Entity (or well #):	74	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196080 @ 75 °F					
Sampling Date:	9/2/02	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	9/11/02	**Chloride:**	**196.0**	**5.53**	**Sodium:**	**878.7**	**38.22**
Analyst:	SHEILA HERNANDEZ	**Bicarbonate:**	**2013.0**	**32.99**	**Magnesium:**	**1.0**	**0.08**
TDS (mg/l or g/m3):	3100.3	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**2.0**	**0.1**
Density (g/cm3, tonne/m3):	1.002	**Sulfate**	**3.0**	**0.06**	**Strontium:**	**0.6**	**0.01**
Anion/Cation Ratio:	1.000000	Phosphate:			**Barium:**	**1.0**	**0.01**
		Borate:			**Iron:**	**2.0**	**0.07**
		Silicate:			Potassium:	3.0	0.08
Carbon Dioxide:					Aluminum:		
		Hydrogen Sulfide:			Chromium:		
Oxygen:					Copper:		
		pH at time of sampling:		8.5	Lead:		
Comments:		pH at time of analysis:			Manganese:		
		pH used in Calculation:		**8.5**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.30	0.70	-4.98	0.00	-5.05	0.00	-3.73	0.00	-0.40	0.00	0.09
100	0	0.32	1.05	-5.00	0.00	-5.00	0.00	-3.70	0.00	-0.53	0.00	0.14
120	0	0.34	1.05	-5.01	0.00	-4.93	0.00	-3.67	0.00	-0.64	0.00	0.23
140	0	0.37	1.05	-5.00	0.00	-4.83	0.00	-3.62	0.00	-0.72	0.00	0.36

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196083
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28633
Entity (or well #):	75	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/2/02
Analysis Date:	9/11/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	4374.8
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196083 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1336.0**	**37.68**	**Sodium:**	**1441.5**	**62.7**
Bicarbonate:	**1573.8**	**25.79**	**Magnesium:**	**3.0**	**0.25**
Carbonate:	**0.0**	**0.**	**Calcium:**	**6.5**	**0.32**
Sulfate	**3.0**	**0.06**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**2.5**	**0.04**
Borate:			**Iron:**	**1.5**	**0.05**
Silicate:			Potassium:	5.0	0.13
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.1	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.1**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.31	2.79	-4.53	0.00	-4.60	0.00	-3.28	0.00	-0.08	0.00	0.17
100	0	0.36	3.14	-4.54	0.00	-4.55	0.00	-3.26	0.00	-0.22	0.00	0.26
120	0	0.41	3.14	-4.55	0.00	-4.47	0.00	-3.23	0.00	-0.34	0.00	0.38
140	0	0.46	3.49	-4.55	0.00	-4.38	0.00	-3.19	0.00	-0.43	0.00	0.56

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196046
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27722
Entity (or well #):	77	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2065.8
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196046 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**282.0**	**7.95**	**Sodium:**	**608.2**	**26.45**
Bicarbonate:	**1159.0**	**18.99**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**5.5**	**0.27**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.6**	**0.01**
Phosphate:			**Barium:**	**0.5**	**0.01**
Borate:			**Iron:**	**2.5**	**0.09**
Silicate:			Potassium:	3.5	0.09
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.88	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.88**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.05	0.35	-4.37	0.00	-4.44	0.00	-3.59	0.00	-0.58	0.00	0.21
100	0	0.15	1.05	-4.38	0.00	-4.39	0.00	-3.56	0.00	-0.71	0.00	0.29
120	0	0.25	1.75	-4.38	0.00	-4.31	0.00	-3.53	0.00	-0.82	0.00	0.4
140	0	0.35	2.45	-4.38	0.00	-4.21	0.00	-3.48	0.00	-0.91	0.00	0.53

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196047
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	27723
Entity (or well #):	78	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	7/29/02
Analysis Date:	8/7/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2918.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196047 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**586.0**	**16.53**	**Sodium:**	**894.2**	**38.9**
Bicarbonate:	**1415.2**	**23.19**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**10.0**	**0.5**
Sulfate	**3.0**	**0.06**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**0.6**	**0.01**
Borate:			**Iron:**	**2.5**	**0.09**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.93	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.93**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.38	4.54	-4.21	0.00	-4.28	0.00	-3.46	0.00	-0.59	0.00	0.23
100	0	0.46	5.24	-4.23	0.00	-4.23	0.00	-3.44	0.00	-0.73	0.00	0.32
120	0	0.55	5.94	-4.23	0.00	-4.15	0.00	-3.40	0.00	-0.84	0.00	0.45
140	0	0.63	6.29	-4.23	0.00	-4.06	0.00	-3.36	0.00	-0.93	0.00	0.61

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196087
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28634
Entity (or well #):	79	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196087 @ 75 °F					
Sampling Date:	9/2/02	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	9/11/02	**Chloride:**	**88.0**	**2.48**	**Sodium:**	**660.9**	**28.75**
Analyst:	SHEILA HERNANDEZ	**Bicarbonate:**	**1622.6**	**26.59**	**Magnesium:**	**0.8**	**0.07**
TDS (mg/l or g/m3):	2384.7	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**3.0**	**0.15**
Density (g/cm3, tonne/m3):	1.002	**Sulfate**	**3.0**	**0.06**	**Strontium:**	**0.4**	**0.01**
Anion/Cation Ratio:	1	Phosphate:			**Barium:**	**1.0**	**0.01**
		Borate:			**Iron:**	**2.0**	**0.07**
		Silicate:			Potassium:	3.0	0.08
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:		8.6	Copper:		
Comments:		pH at time of analysis:			Lead:		
		pH used in Calculation:		**8.6**	Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.52	1.75	-4.75	0.00	-4.82	0.00	-3.85	0.00	-0.34	0.00	0.06
100	0	0.54	1.75	-4.76	0.00	-4.77	0.00	-3.82	0.00	-0.47	0.00	0.09
120	0	0.57	1.75	-4.76	0.00	-4.69	0.00	-3.78	0.00	-0.58	0.00	0.15
140	0	0.60	2.10	-4.75	0.00	-4.59	0.00	-3.73	0.00	-0.66	0.00	0.23

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196085
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28635
Entity (or well #):	80	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/2/02
Analysis Date:	9/11/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2714.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196085 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**574.0**	**16.19**	**Sodium:**	**836.6**	**36.39**
Bicarbonate:	**1281.0**	**20.99**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**10.0**	**0.5**
Sulfate	**3.0**	**0.06**	**Strontium:**	**1.5**	**0.03**
Phosphate:			**Barium:**	**2.0**	**0.03**
Borate:			**Iron:**	**1.5**	**0.05**
Silicate:			Potassium:	3.0	0.08
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.7	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.7**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.13	1.75	-4.19	0.00	-4.26	0.00	-3.26	0.00	-0.04	0.00	0.35
100	0	0.24	3.15	-4.20	0.00	-4.20	0.00	-3.24	0.00	-0.18	0.00	0.47
120	0	0.35	4.19	-4.20	0.00	-4.12	0.00	-3.20	0.00	-0.29	0.00	0.62
140	0	0.46	5.24	-4.20	0.00	-4.03	0.00	-3.16	0.00	-0.38	0.00	0.8

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196081
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28636
Entity (or well #):	81	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/2/02
Analysis Date:	9/11/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	2526.1
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196081 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**317.0**	**8.94**	**Sodium:**	**738.0**	**32.1**
Bicarbonate:	**1451.8**	**23.79**	**Magnesium:**	**1.5**	**0.12**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.5**	**0.37**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.8**	**0.02**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**2.5**	**0.09**
Silicate:			Potassium:	3.0	0.08
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.3	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.3**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 * 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.62	4.55	-4.32	0.00	-4.39	0.00	-3.53	0.00	-0.34	0.00	0.1
100	0	0.66	4.89	-4.33	0.00	-4.34	0.00	-3.51	0.00	-0.47	0.00	0.16
120	0	0.71	5.24	-4.34	0.00	-4.26	0.00	-3.47	0.00	-0.58	0.00	0.24
140	0	0.76	5.24	-4.33	0.00	-4.16	0.00	-3.43	0.00	-0.67	0.00	0.35

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196092
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28726
Entity (or well #):	83	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196092 @ 75 °F					
Sampling Date:	9/10/02	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	9/18/02	**Chloride:**	**415.0**	**11.71**	**Sodium:**	**793.6**	**34.52**
Analyst:	JAMES AHRLETT	**Bicarbonate:**	**1440.0**	**23.6**	**Magnesium:**	**2.0**	**0.16**
TDS (mg/l or g/m3):	2671.6	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**9.0**	**0.45**
Density (g/cm3, tonne/m3):	1.002	**Sulfate**	**3.0**	**0.06**	**Strontium:**	**2.0**	**0.05**
Anion/Cation Ratio:	1	Phosphate:			**Barium:**	**1.0**	**0.01**
		Borate:			**Iron:**	**2.0**	**0.07**
		Silicate:			Potassium:	4.0	0.1
Carbon Dioxide:					Aluminum:		
Oxygen:		Hydrogen Sulfide:			Chromium:		
Comments:		pH at time of sampling:		7.99	Copper:		
		pH at time of analysis:			Lead:		
		pH used in Calculation:		**7.99**	Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	**Gauge Press.**	Calcite $CaCO_3$		Gypsum $CaSO_4{*}2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	**psi**	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.41	4.19	-4.24	0.00	-4.31	0.00	-3.13	0.00	-0.34	0.00	0.2
100	0	0.49	4.89	-4.25	0.00	-4.25	0.00	-3.11	0.00	-0.48	0.00	0.29
120	0	0.57	5.24	-4.25	0.00	-4.18	0.00	-3.08	0.00	-0.59	0.00	0.41
140	0	0.65	5.94	-4.25	0.00	-4.08	0.00	-3.04	0.00	-0.68	0.00	0.56

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218422
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29662
Entity (or well #):	84	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1330.6
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.0000005
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218422 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**84.0**	**2.37**	**Sodium:**	**383.9**	**16.7**
Bicarbonate:	**826.0**	**13.54**	**Magnesium:**	**0.4**	**0.03**
Carbonate:	**27.0**	**0.9**	**Calcium:**	**0.9**	**0.04**
Sulfate:	**4.0**	**0.08**	**Strontium:**	**0.1**	**0.**
Phosphate:			**Barium:**	**0.2**	**0.**
Borate:			**Iron:**	**0.1**	**0.**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		8.47	Lead:		
pH used in Calculation:		**8.47**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.27	0.00	-4.96	0.00	-5.03	0.00	-4.16	0.00	-0.77	0.00	0.04
100	0	-0.21	0.00	-4.97	0.00	-4.97	0.00	-4.14	0.00	-0.90	0.00	0.07
120	0	-0.16	0.00	-4.97	0.00	-4.89	0.00	-4.10	0.00	-1.01	0.00	0.1
140	0	-0.10	0.00	-4.95	0.00	-4.78	0.00	-4.05	0.00	-1.09	0.00	0.14

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196095
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28729
Entity (or well #):	84	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	1970.9
Density (g/cm3, tonne/m3):	1.001
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196095 @ 75 °F

Anions	mg/l	meq/l	**Cations**	mg/l	meq/l
Chloride:	**112.0**	**3.16**	**Sodium:**	**553.7**	**24.08**
Bicarbonate:	**1293.0**	**21.19**	**Magnesium:**	**0.5**	**0.04**
Carbonate:	**0.0**	**0.**	**Calcium:**	**2.0**	**0.1**
Sulfate	**3.0**	**0.06**	**Strontium:**	**0.3**	**0.01**
Phosphate:			**Barium:**	**0.4**	**0.01**
Borate:			**Iron:**	**2.0**	**0.07**
Silicate:			Potassium:	4.0	0.1
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		8.65	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**8.65**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	**Gauge Press.**	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press.
°F	**psi**	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	
80	0	0.33	1.05	-4.87	0.00	-4.94	0.00	-3.93	0.00	-0.69	0.00	0.04
100	0	0.35	1.05	-4.89	0.00	-4.89	0.00	-3.90	0.00	-0.83	0.00	0.07
120	0	0.39	1.05	-4.88	0.00	-4.81	0.00	-3.86	0.00	-0.93	0.00	0.11
140	0	0.42	1.05	-4.87	0.00	-4.70	0.00	-3.81	0.00	-1.01	0.00	0.17

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218416
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29667
Entity (or well #):	86	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	5258
Density (g/cm3, tonne/m3):	1.005
Anion/Cation Ratio:	1.0000002
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218416 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**2442.0**	**68.88**	**Sodium:**	**1833.0**	**79.73**
Bicarbonate:	**890.0**	**14.59**	**Magnesium:**	**13.0**	**1.07**
Carbonate:	**0.0**	**0.**	**Calcium:**	**45.0**	**2.25**
Sulfate:	**9.0**	**0.19**	**Strontium:**	**8.0**	**0.18**
Phosphate:			**Barium:**	**6.0**	**0.09**
Borate:			**Iron:**	**3.0**	**0.11**
Silicate:			Potassium:	9.0	0.23
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:			Copper:		
pH at time of analysis:		7.88	Lead:		
pH used in Calculation:		**7.88**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.67	18.48	-3.28	0.00	-3.35	0.00	-2.27	0.00	0.70	2.44	0.15
100	0	0.74	21.27	-3.29	0.00	-3.29	0.00	-2.25	0.00	0.56	2.09	0.22
120	0	0.81	24.41	-3.29	0.00	-3.21	0.00	-2.22	0.00	0.44	1.74	0.31
140	0	0.89	27.20	-3.28	0.00	-3.11	0.00	-2.18	0.00	0.34	1.39	0.44

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196098
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28730
Entity (or well #):	86	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196098 @ 75 °F					
Sampling Date:	9/10/02	**Anions**	mg/l	meq/l	**Cations**	mg/l	meq/l
Analysis Date:	9/18/02	**Chloride:**	**3322.0**	**93.7**	**Sodium:**	**2442.2**	**106.23**
Analyst:	SHEILA HERNANDEZ	**Bicarbonate:**	**1196.0**	**19.6**	**Magnesium:**	**23.0**	**1.89**
		Carbonate:	**0.0**	**0.**	**Calcium:**	**73.0**	**3.64**
TDS (mg/l or g/m3):	7125.2	**Sulfate**	**7.0**	**0.15**	**Strontium:**	**16.0**	**0.37**
Density (g/cm3, tonne/m3):	1.006	Phosphate:			**Barium:**	**10.0**	**0.15**
Anion/Cation Ratio:	1	Borate:			**Iron:**	**24.0**	**0.87**
		Silicate:			Potassium:	12.0	0.31
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:		7.56	Copper:		
Comments:		pH at time of analysis:			Lead:		
		pH used in Calculation:		**7.56**	Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in Lb/1000 bbl										CO_2 Press
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.63	30.97	-3.28	0.00	-3.35	0.00	-2.17	0.00	0.72	3.48	0.4
100	0	0.73	36.19	-3.30	0.00	-3.30	0.00	-2.16	0.00	0.57	2.78	0.55
120	0	0.83	41.07	-3.30	0.00	-3.22	0.00	-2.13	0.00	0.45	2.44	0.73
140	0	0.94	45.59	-3.30	0.00	-3.13	0.00	-2.10	0.00	0.35	2.09	0.97

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	218415
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	29665
Entity (or well #):	87	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	10/25/02
Analysis Date:	11/25/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	4161.9
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 218415 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1749.0**	**49.33**	**Sodium:**	**1405.9**	**61.15**
Bicarbonate:	**927.0**	**15.19**	**Magnesium:**	**9.0**	**0.74**
Carbonate:	**0.0**	**0.**	**Calcium:**	**46.0**	**2.3**
Sulfate:	**5.0**	**0.1**	**Strontium:**	**6.0**	**0.14**
Phosphate:			**Barium:**	**6.0**	**0.09**
Borate:			**Iron:**	**1.0**	**0.04**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
			Copper:		
pH at time of sampling:			Lead:		
pH at time of analysis:		7.82	Manganese:		
pH used in Calculation:		**7.82**	Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	**Gauge Press.**	**Calcite CaCO3**		**Gypsum CaSO4*2H20**		**Anhydrite CaSO4**		**Celestite SrSO4**		**Barite BaSO4**		**CO2 Press**
°F	**psi**	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.68	20.25	-3.45	0.00	-3.52	0.00	-2.58	0.00	0.51	1.75	0.18
100	0	0.77	23.39	-3.46	0.00	-3.47	0.00	-2.56	0.00	0.37	1.40	0.26
120	0	0.86	26.18	-3.46	0.00	-3.39	0.00	-2.53	0.00	0.25	1.05	0.36
140	0	0.95	29.32	-3.46	0.00	-3.29	0.00	-2.49	0.00	0.16	0.70	0.49

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	195853
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28732
Entity (or well #):	87	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3139.5
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 195853 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**781.0**	**22.03**
Bicarbonate:	**1342.0**	**21.99**
Carbonate:	**0.0**	**0.**
Sulfate	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		7.63
pH at time of analysis:		
pH used in Calculation:		**7.63**

Cations	mg/l	meq/l
Sodium:	**968.5**	**42.13**
Magnesium:	**5.0**	**0.41**
Calcium:	**24.0**	**1.2**
Strontium:	**4.0**	**0.09**
Barium:	**3.0**	**0.04**
Iron:	**3.0**	**0.11**
Potassium:	5.0	0.13
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.44	10.83	-3.73	0.00	-3.80	0.00	-2.76	0.00	0.21	0.35	0.42
100	0	0.54	12.93	-3.74	0.00	-3.75	0.00	-2.74	0.00	0.07	0.35	0.57
120	0	0.66	14.68	-3.75	0.00	-3.67	0.00	-2.70	0.00	-0.04	0.00	0.74
140	0	0.77	16.07	-3.74	0.00	-3.58	0.00	-2.66	0.00	-0.13	0.00	0.95

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196052
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28069
Entity (or well #):	88	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/16/02
Analysis Date:	8/21/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3820.5
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196052 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**621.0**	**17.52**	**Sodium:**	**1111.5**	**48.35**
Bicarbonate:	**2013.0**	**32.99**	**Magnesium:**	**2.0**	**0.16**
Carbonate:	**0.0**	**0.**	**Calcium:**	**14.0**	**0.7**
Sulfate	**12.0**	**0.25**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**3.0**	**0.04**
Borate:			**Iron:**	**36.0**	**1.3**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.69	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.69**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4*2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.40	6.63	-3.54	0.00	-3.61	0.00	-2.93	0.00	0.64	1.40	0.54
100	0	0.49	7.68	-3.56	0.00	-3.57	0.00	-2.91	0.00	0.50	1.05	0.74
120	0	0.59	8.73	-3.57	0.00	-3.50	0.00	-2.88	0.00	0.39	1.05	0.99
140	0	0.69	9.43	-3.58	0.00	-3.41	0.00	-2.85	0.00	0.29	0.70	1.29

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196091
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28733
Entity (or well #):	89	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	3890
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196091 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**1337.0**	**37.71**
Bicarbonate:	**1220.0**	**19.99**
Carbonate:	**0.0**	**0.**
Sulfate	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		7.59
pH at time of analysis:		
pH used in Calculation:		**7.59**

Cations	mg/l	meq/l
Sodium:	**1287.0**	**55.98**
Magnesium:	**6.0**	**0.49**
Calcium:	**15.0**	**0.75**
Strontium:	**4.0**	**0.09**
Barium:	**3.0**	**0.04**
Iron:	**7.0**	**0.25**
Potassium:	7.0	0.18
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.11	2.44	-4.00	0.00	-4.07	0.00	-2.82	0.00	0.15	0.35	0.41
100	0	0.22	4.19	-4.01	0.00	-4.01	0.00	-2.80	0.00	0.01	0.00	0.55
120	0	0.34	5.94	-4.01	0.00	-3.93	0.00	-2.77	0.00	-0.11	0.00	0.72
140	0	0.45	7.68	-4.01	0.00	-3.84	0.00	-2.73	0.00	-0.20	0.00	0.93

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196094
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28735
Entity (or well #):	90	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2378.9
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196094 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**409.0**	**11.54**	**Sodium:**	**712.9**	**31.01**
Bicarbonate:	**1232.0**	**20.19**	**Magnesium:**	**1.0**	**0.08**
Carbonate:	**0.0**	**0.**	**Calcium:**	**7.0**	**0.35**
Sulfate	**4.0**	**0.08**	**Strontium:**	**1.0**	**0.02**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**5.0**	**0.18**
Silicate:			Potassium:	6.0	0.15
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.67	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.67**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.04	0.00	-4.18	0.00	-4.25	0.00	-3.27	0.00	-0.18	0.00	0.36
100	0	0.07	0.70	-4.19	0.00	-4.19	0.00	-3.25	0.00	-0.32	0.00	0.49
120	0	0.18	1.75	-4.19	0.00	-4.11	0.00	-3.22	0.00	-0.43	0.00	0.64
140	0	0.30	2.80	-4.18	0.00	-4.02	0.00	-3.17	0.00	-0.52	0.00	0.81

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	195852
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28737
Entity (or well #):	91	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2188.5
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 195852 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**211.0**	**5.95**
Bicarbonate:	**1330.0**	**21.8**
Carbonate:	**0.0**	**0.**
Sulfate	**5.0**	**0.1**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		7.75
pH at time of analysis:		
pH used in Calculation:		**7.75**

Cations	mg/l	meq/l
Sodium:	**627.3**	**27.28**
Magnesium:	**0.7**	**0.06**
Calcium:	**4.0**	**0.2**
Strontium:	**0.7**	**0.02**
Barium:	**0.8**	**0.01**
Iron:	**5.0**	**0.18**
Potassium:	4.0	0.1
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions — Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.16	0.00	-4.30	0.00	-4.37	0.00	-3.31	0.00	-0.16	0.00	0.33
100	0	-0.06	0.00	-4.31	0.00	-4.31	0.00	-3.28	0.00	-0.29	0.00	0.45
120	0	0.05	0.35	-4.31	0.00	-4.24	0.00	-3.25	0.00	-0.40	0.00	0.59
140	0	0.17	1.05	-4.31	0.00	-4.14	0.00	-3.21	0.00	-0.49	0.00	0.76

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196096
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28739
Entity (or well #):	92	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2597.9
Density (g/cm3, tonne/m3):	1.003
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196096 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**594.0**	**16.75**	**Sodium:**	**792.9**	**34.49**
Bicarbonate:	**1171.0**	**19.19**	**Magnesium:**	**3.0**	**0.25**
Carbonate:	**0.0**	**0.**	**Calcium:**	**12.0**	**0.6**
Sulfate	**3.0**	**0.06**	**Strontium:**	**2.0**	**0.05**
Phosphate:			**Barium:**	**1.0**	**0.01**
Borate:			**Iron:**	**12.0**	**0.43**
Silicate:			Potassium:	7.0	0.18
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.23	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.23**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4{:}2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	-0.28	0.00	-4.09	0.00	-4.16	0.00	-3.13	0.00	-0.34	0.00	0.93
100	0	-0.15	0.00	-4.10	0.00	-4.11	0.00	-3.10	0.00	-0.48	0.00	1.22
120	0	-0.02	0.00	-4.10	0.00	-4.03	0.00	-3.07	0.00	-0.59	0.00	1.54
140	0	0.12	2.45	-4.10	0.00	-3.93	0.00	-3.03	0.00	-0.68	0.00	1.88

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196100
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28740
Entity (or well #):	93	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	7027.1
Density (g/cm3, tonne/m3):	1.005
Anion/Cation Ratio:	1
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196100 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**3066.0**	**86.48**	**Sodium:**	**2420.1**	**105.27**
Bicarbonate:	**1427.0**	**23.39**	**Magnesium:**	**15.0**	**1.23**
Carbonate:	**0.0**	**0.**	**Calcium:**	**50.0**	**2.5**
Sulfate	**7.0**	**0.15**	**Strontium:**	**12.0**	**0.27**
Phosphate:			**Barium:**	**10.0**	**0.15**
Borate:			**Iron:**	**8.0**	**0.29**
Silicate:			Potassium:	12.0	0.31
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.62	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.62**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.61	24.36	-3.43	0.00	-3.50	0.00	-2.28	0.00	0.73	3.48	0.42
100	0	0.70	27.84	-3.45	0.00	-3.45	0.00	-2.27	0.00	0.59	2.78	0.58
120	0	0.80	30.98	-3.45	0.00	-3.38	0.00	-2.24	0.00	0.47	2.44	0.79
140	0	0.89	33.41	-3.45	0.00	-3.28	0.00	-2.21	0.00	0.37	2.09	1.04

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196097
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28742
Entity (or well #):	94	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary

Sampling Date:	9/10/02
Analysis Date:	9/18/02
Analyst:	JAMES AHRLETT
TDS (mg/l or g/m3):	2726.7
Density (g/cm3, tonne/m3):	1.002
Anion/Cation Ratio:	1.000000
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196097 @ 75 °F

Anions	mg/l	meq/l
Chloride:	**478.0**	**13.48**
Bicarbonate:	**1403.0**	**22.99**
Carbonate:	**0.0**	**0.**
Sulfate	**4.0**	**0.08**
Phosphate:		
Borate:		
Silicate:		
Hydrogen Sulfide:		
pH at time of sampling:		7.85
pH at time of analysis:		
pH used in Calculation:		**7.85**

Cations	mg/l	meq/l
Sodium:	**820.7**	**35.7**
Magnesium:	**2.0**	**0.16**
Calcium:	**8.0**	**0.4**
Strontium:	**2.0**	**0.05**
Barium:	**1.0**	**0.01**
Iron:	**3.0**	**0.11**
Potassium:	5.0	0.13
Aluminum:		
Chromium:		
Copper:		
Lead:		
Manganese:		
Nickel:		

Conditions | Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl

Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.22	2.45	-4.16	0.00	-4.23	0.00	-3.01	0.00	-0.22	0.00	0.27
100	0	0.31	3.15	-4.17	0.00	-4.18	0.00	-2.99	0.00	-0.36	0.00	0.38
120	0	0.40	3.85	-4.18	0.00	-4.10	0.00	-2.96	0.00	-0.47	0.00	0.51
140	0	0.50	4.54	-4.18	0.00	-4.01	0.00	-2.91	0.00	-0.56	0.00	0.68

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
1675 Broadway, Suite 1500
Denver, CO 80202
(303) 573-2772
Lab Team Leader - Sheila Hernandez
(915) 495-7240

Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196089
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28744
Entity (or well #):	95	Analysis Cost	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary		Analysis of Sample 196089 @ 75 °F			Cations		
Sampling Date:	9/10/02	**Anions**	mg/l	meq/l		mg/l	meq/l
Analysis Date:	9/18/02	**Chloride:**	**6332.0**	**178.6**	**Sodium:**	**4372.2**	**190.18**
Analyst:	JAMES AHRLETT	**Bicarbonate:**	**1537.0**	**25.19**	**Magnesium:**	**40.0**	**3.29**
TDS (mg/l or g/m3):	12550.2	**Carbonate:**	**0.0**	**0.**	**Calcium:**	**155.0**	**7.73**
Density (g/cm3, tonne/m3):	1.009	**Sulfate**	**8.0**	**0.17**	**Strontium:**	**31.0**	**0.71**
Anion/Cation Ratio:	1	Phosphate:			**Barium:**	**24.0**	**0.35**
		Borate:			**Iron:**	**37.0**	**1.34**
		Silicate:			Potassium:	14.0	0.36
					Aluminum:		
Carbon Dioxide:		Hydrogen Sulfide:			Chromium:		
Oxygen:		pH at time of sampling:		6.98	Copper:		
Comments:		pH at time of analysis:			Lead:		
		pH used in Calculation:		**6.98**	Manganese:		
					Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in Pounds per										
Temp	Gauge Press.	Calcite $CaCO_3$		Gypsum $CaSO_4 \cdot 2H_2O$		Anhydrite $CaSO_4$		Celestite $SrSO_4$		Barite $BaSO_4$		CO_2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.38	44.65	-3.10	0.00	-3.16	0.00	-2.01	0.00	0.97	5.54	1.81
100	0	0.50	57.46	-3.12	0.00	-3.12	0.00	-2.00	0.00	0.82	5.19	2.36
120	0	0.62	70.27	-3.13	0.00	-3.05	0.00	-1.98	0.00	0.69	4.85	2.98
140	0	0.75	82.38	-3.13	0.00	-2.96	0.00	-1.95	0.00	0.59	4.15	3.65

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196058
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28431
Entity (or well #):	96	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	13466.3
Density (g/cm3, tonne/m3):	1.01
Anion/Cation Ratio:	1.0000001
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196058 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**7264.0**	**204.89**	**Sodium:**	**4795.3**	**208.58**
Bicarbonate:	**1098.0**	**17.99**	**Magnesium:**	**47.0**	**3.87**
Carbonate:	**0.0**	**0.**	**Calcium:**	**166.0**	**8.28**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**32.0**	**0.73**
Phosphate:			**Barium:**	**26.0**	**0.38**
Borate:			**Iron:**	**20.0**	**0.72**
Silicate:			Potassium:	15.0	0.38
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		6.83	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**6.83**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.10	11.41	-3.52	0.00	-3.58	0.00	-2.45	0.00	0.56	1.73	1.8
100	0	0.22	25.25	-3.54	0.00	-3.54	0.00	-2.44	0.00	0.41	1.38	2.35
120	0	0.35	39.77	-3.55	0.00	-3.46	0.00	-2.42	0.00	0.28	1.04	2.94
140	0	0.49	54.30	-3.55	0.00	-3.37	0.00	-2.39	0.00	0.17	0.69	3.58

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the five scales.

Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

Rocky Mountain Region
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Water Analysis Report by Baker Petrolite

Company:	EL PASO ENERGY RATON LLC	Sales RDT:	44625
Region:	ROCKY MOUNTAINS	Account Manager:	BOB WILLIAMS (505) 447-0621
Area:	RATON, NM	Sample #:	196059
Lease/Platform:	VERMEJO PARK RANCH 'A'	Analysis ID #:	28432
Entity (or well #):	97	Analysis Cost:	$40.00
Formation:	UNKNOWN		
Sample Point:	WELLHEAD		

Summary	
Sampling Date:	8/28/02
Analysis Date:	9/5/02
Analyst:	SHEILA HERNANDEZ
TDS (mg/l or g/m3):	5198.7
Density (g/cm3, tonne/m3):	1.004
Anion/Cation Ratio:	0.9999998
Carbon Dioxide:	
Oxygen:	
Comments:	

Analysis of Sample 196059 @ 75 °F

Anions	mg/l	meq/l	Cations	mg/l	meq/l
Chloride:	**1888.0**	**53.25**	**Sodium:**	**1733.9**	**75.42**
Bicarbonate:	**1512.8**	**24.79**	**Magnesium:**	**7.5**	**0.62**
Carbonate:	**0.0**	**0.**	**Calcium:**	**30.0**	**1.5**
Sulfate:	**3.0**	**0.06**	**Strontium:**	**5.5**	**0.13**
Phosphate:			**Barium:**	**5.0**	**0.07**
Borate:			**Iron:**	**4.0**	**0.14**
Silicate:			Potassium:	9.0	0.23
			Aluminum:		
Hydrogen Sulfide:			Chromium:		
pH at time of sampling:		7.28	Copper:		
pH at time of analysis:			Lead:		
pH used in Calculation:		**7.28**	Manganese:		
			Nickel:		

Conditions		Values Calculated at the Given Conditions - Amounts of Scale in lb/1000 bbl										
Temp	Gauge Press.	Calcite CaCO3		Gypsum CaSO4*2H20		Anhydrite CaSO4		Celestite SrSO4		Barite BaSO4		CO2 Press
°F	psi	Index	Amount	Index	Amount	Index	Amount	Index	Amount	Index	Amount	psi
80	0	0.15	5.93	-3.91	0.00	-3.98	0.00	-2.89	0.00	0.17	0.35	1
100	0	0.27	9.76	-3.93	0.00	-3.93	0.00	-2.87	0.00	0.02	0.00	1.32
120	0	0.39	13.25	-3.93	0.00	-3.85	0.00	-2.84	0.00	-0.10	0.00	1.68
140	0	0.52	16.39	-3.93	0.00	-3.76	0.00	-2.80	0.00	-0.19	0.00	2.08

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered.

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Note 3: The reported CO2 pressure is actually the calculated CO2 fugacity. It is usually nearly the same as the CO2 partial pressure.

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

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

February 4, 2000

CERTIFIED MAIL
RETURN RECEIPT NO. Z-559-573-271

Steven C. O'Connell
Vermejo Minerals Corp.
P.O.Box 190
Raton, NM, 87740

RE: Emergency Pit
VPR "A" 7 Location
Receiving produced water from the VPR "A" Lease
Colfax County, New Mexico

Mr. O'Connell:

The New Mexico Oil Conservation Division (OCD) has received the Devon Energy Corporations' letter (now Vermejo Minerals Corporation (VMC)) dated January 13, 2000. As stated in Devon's letter the produced water emergency pit will receive emergency upset water from the VPR "A" separator, holding tanks and injection well location.

According to OCD Rule 711.A.3.c, emergency pits that are designed to capture fluids during an emergency upset period only and provided such fluids will be removed from the pit within twenty-four (24) hours from introduction are exempt from permitting requirements.

Pursuant to the OCD Order R-8952, all tanks exceeding 16 feet in diameter and all exposed pits and ponds shall be screened, netted or covered. In addition, OCD Rule 310 prohibits the storage or retention of oil in earthen reservoirs, or in open receptacles.

Please be advised that OCD approval does not relieve Vermejo Minerals Corporation. of liability should their operation result in pollution of the ground water, surface water or the environment. In addition, OCD approval does not relieve Vermejo Minerals Corporation of the responsibility for compliance with other federal, state and/or local regulations.

If you have any questions please do not hesitate to contact me at (505) 827-7153.

Sincerely,

Martyne J. Kieling
Environmental Geologist

xc: Roy Johnson, OCD District 4 Supervisor

Kieling, Martyne

From: Johnson, Roy
Sent: Thursday, February 10, 2000 8:14 AM
To: Kieling, Martyne
Subject: Vermejo Emergency Pit

Martyne, I have a concern on your pit permit to Vermejo Minerals Corp. My biggest concern is the netting of this pit. The wildlife in this area has little to no regard for fencing or any other types of barriers when water is involved and the placement of netting over these structures would probably endanger these animals. Secondly, this water is relatively fresh, posses no threat to wildlife, and is not on major flight paths of migratory birds. In lieu of this does the division still accept form C-134, Application for Exception to Division Order R-8952? If we do, how is this approved? ROY

P.O. Box 190
309 Silver
Raton, New Mexico 87740

Ph# 505-445-4620
Fax 505-4454688

El Paso Energy Raton, L.L.C.

Fax

To: Roy Johnson	**From:** Don Lankford
Fax: (505) 827 ~~1389~~ 8177	**Pages:** 5 to Follow
Phone:	**Date:** ~~1/14/00~~ 1/18/00
Re:	**CC:**

☐ Urgent ☒ For Review ☐ Please Comment ☐ Please Reply ☐ Please Recycle

• **Comments:**

Roy:
Please review draft copy of pit exemption proposal / request.
Hard copy to be sent our Monday

Regards DRL

devon
ENERGY CORPORATION

P.O. Box 190
Raton, NM 87740
Telephone: (505) 445-4620

January 13, 2000

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

DRAFT

Dear Martyne,

In response to our phone conversation on Wednesday, January 12, 2000, I would like to provide a description of our water disposal facility on the Vermejo Park Ranch. Attached is a site plot plan for the VPR "A" 7 location. Water from the producing wells on the VPR "A" Lease flows to the VPR "A" 7 water handling facility. The water is routed through a separator that dumps into two above ground 500-barrel steel welded tanks. The water is then pumped into an injection well with perforations at 6400 – 6564' in the Dakota formation. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711A. that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

Attached you will find water quality data from the source wells, as well as results of analyses taken from actual injection water at the "A" 7 wellhead. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-4620.

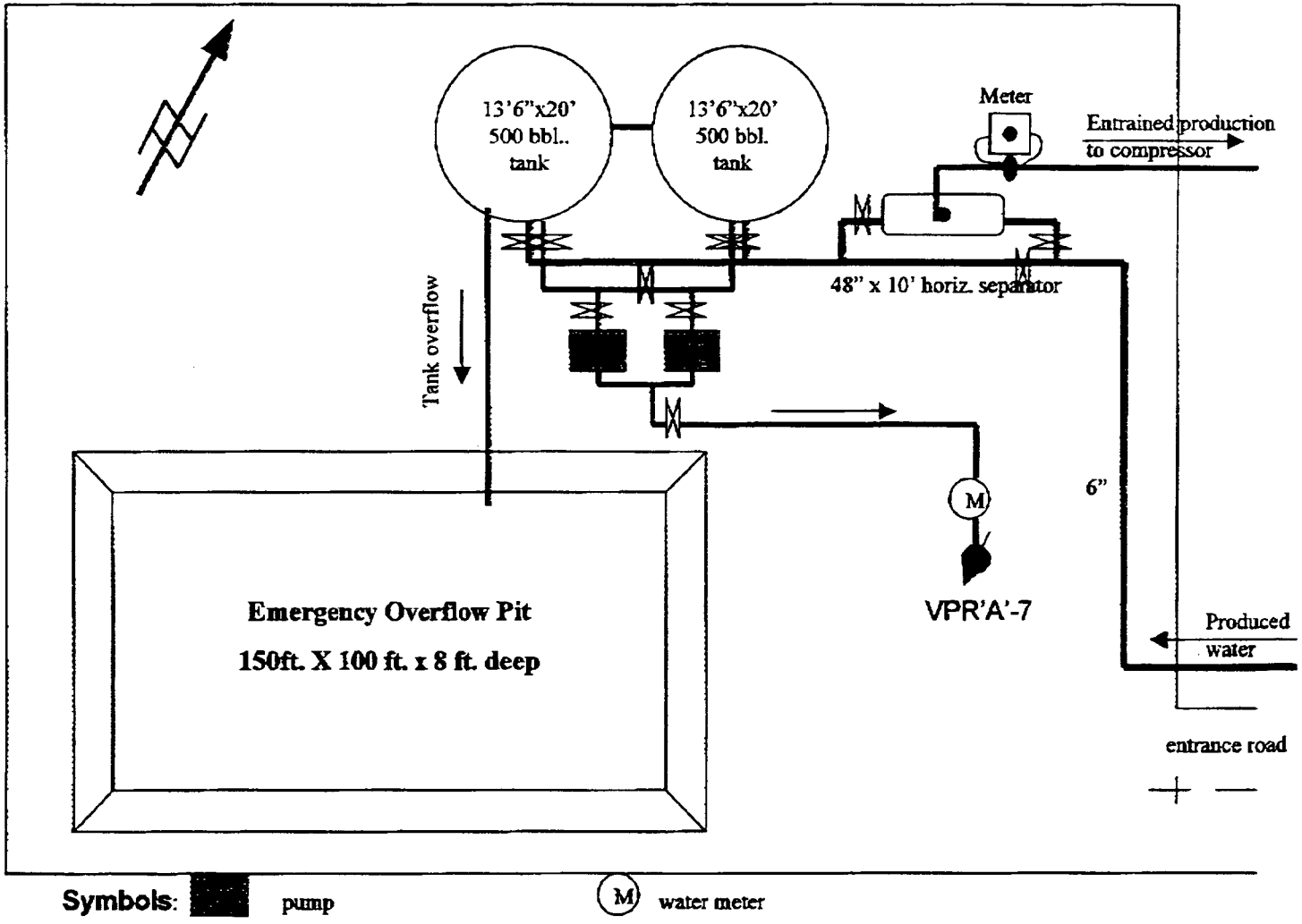
Sincerely,

Steven C. O'Connell
Environmental, Safety &
Health Coordinator

Cc: Roy Johnson
Don Lankford
Tad Lynch

Water Disposal Well VPR'A'-7

Well Location Schematic Showing Surface Equipment



Vermejo Ranch

EL PASO RATON, L.L.C.

Produced Water Analysis Summary

WELL	DATE	CA (MG/L)	MG (MG/L)	BICARB (PPM)	SO4 (MG/L)	CL (MG/L)	IRON (PPM)	CO2 (MG/L)	H2S (PPM)	PH	TDS (MG/L)
VPRA - 1	9/25/99	667	148	1464	64	29	2	0	2	0	8.2	3301
	10/21/99	848	20	1720	152	22	4	0	2	0.5	8.1	3754
	11/4/99	727	14	1622	72	5	3	0	2	0	8.1	3437
	11/11/99	545	30	1647	148	22	8	0	2	0	7.8	3169
	aver	**697**	**53**	**1613**	**109**	**20**	**4**	**0**	**2**	**0**	**8.1**	**3415**
VPRA - 2	8/31/99	190	0	1351	7	3	3	0	0	0	7.8	2170
	9/25/99	182	12	1462	60	44	5	0	2	0	7.8	2288
	10/14/99	364	11	1488	92	66	1	0	3	0.5	7.9	2593
	10/21/99	606	8	1476	204	46	1	0	2	1	7.8	2972
	11/4/99	667	18	1220	44	24	1	0	2	0	8.2	2778
	aver	**402**	**10**	**1399**	**81**	**37**	**2**	**0**	**2**	**0**	**7.9**	**2660**
VPRA - 3	9/25/99	49	31	1317	96	49	12	0	2	0	7.9	1894
VPRA - 4X	9/25/99	17	27	1356	180	51	25	0	2	0	7.7	1888
VPRA - 6	8/31/99	105	0	1337	3	2	3	0	0	0	7.8	2012
VPRA - 8	9/25/99	364	21	1513	56	24	5	0	2	0	7.8	2690
	10/14/99	303	14	1395	88	22	2	0	8	0	8	2408
	10/21/99	727	14	1647	160	73	1	0	2	1	8	3398
	10/28/99	545	16	1406	156	34	3	0	2	0	8.4	2540
	11/4/99	182	11	1561	64	12	1	0	2	0.5	8.4	2445
	11/11/99	424	13	1549	136	27	1	0	2	0	8.4	2807
	aver	**424**	**16**	**1512**	**110**	**32**	**2**	**0**	**3**	**0**	**8.2**	**2715**
VPRA - 9	9/25/99	485	30	1112	92	44	9	0	2	0	7.7	2331
	10/14/99	242	22	1054	72	27	4	0	3	0.5	7.5	1848
	10/21/99	545	30	1348	172	22	7	0	2	1	7.9	2754
	10/28/99	667	22	1034	180	12	3	0	2	0	7.5	2324
	11/4/99	364	63	1244	224	24	8	0	2	0.5	7.9	2352
	11/11/99	545	28	1244	148	22	8	0	2	0.5	8	2611
	aver	**475**	**33**	**1173**	**148**	**25**	**7**	**0**	**2**	**0**	**7.8**	**2370**
VPRA - 10	9/25/99	152	22	1317	108	113	3	0	3	0	7.8	1983
	10/21/99	1151	17	1354	188	51	3	0	2	1	7.9	3714
	10/28/99	1454	20	1288	228	34	2	0	2	0	8.2	3893
	11/4/99	848	62	1366	216	24	1	0	2	1.5	8.4	3317
	11/11/99	848	15	1366	196	7	3	0	2	1.5	8.3	3266
	aver	**891**	**27**	**1338**	**187**	**46**	**2**	**0**	**2**	**1**	**8.1**	**3235**
VPRA - 11	9/25/99	909	27	1366	56	22	4	0	2	0	7.5	3395
	10/14/99	788	14	1210	128	46	3	0	3	0	7.9	2926
	10/21/99	1030	20	1220	176	68	3	0	2	1	7.9	3321
	10/28/99	1151	24	1016	196	51	3	0	2	0	8	3066
	11/4/99	727	55	1183	212	17	3	0	2	0	8	2862
	11/11/99	303	14	1415	188	12	4	0	2	0.5	7.8	2430
	aver	**818**	**26**	**1235**	**159**	**36**	**3**	**0**	**2**	**0**	**7.9**	**3000**
VPRA - 12	9/25/99	121	36	1044	68	35	3	0	2	0	9	1650

Vermejo Ranch

EL PASO RATON, L.L.C.

Produced Water Analysis Summary

WELL	DATE	CHLORIDES (MG/L)	BUFFER (MG/L)	CARB (PPM)	CAL (MG/L)	MAG (MG/L)	IRON (PPM)	BARIUM (MG/L)	O2 (PPM)	H2S (PPM)	PH	TDS (MG/L)
	10/14/99	1394	25	939	84	32	3	0	2	2	8.2	3587
	10/21/99	1030	15	1110	152	63	1	0	2	3	8	3170
	11/4/99	1091	60	1061	244	19	3	0	2	2	8.1	3295
	11/11/99	909	14	951	152	17	1	0	2	0.5	8.3	2791
	aver	**909**	**30**	**1021**	**140**	**33**	**2**	**0**	**2**	**2**	**8.3**	**2899**
VPRA - 13	9/25/99	2182	62	74	144	39	98	0	2	0	7.1	4751
	11/4/99	1394	72	793	296	32	16	0	2	0.5	8	3424
	aver	**1788**	**67**	**434**	**220**	**36**	**57**	**0**	**2**	**0**	**7.6**	**4088**
VPRA - 14	9/25/99	424	20	1327	72	45	4	0	2	0	8.2	2508
	10/21/99	545	32	1549	136	32	5	0	2	0.5	7.8	3030
	10/28/99	667	20	1268	172	41	3	0	2	0	8	2574
	11/4/99	485	54	1464	232	41	2	0	2	0.5	8	2824
	11/11/99	364	15	1451	192	27	2	0	2	0.5	8	2568
	aver	**497**	**28**	**1412**	**161**	**37**	**3**	**0**	**2**	**0**	**8.0**	**2701**
VPRA - 15	8/31/99	1650	4	1088	27	6	1	0	0	0.5	8.4	4215
	9/25/99	970	21	1390	68	51	8	0	2	0	7.8	3488
	11/11/99	1879	37	1183	228	17	27	0	0	0	7.2	4732
	aver	**1500**	**21**	**1220**	**108**	**25**	**12**	**0**	**1**	**0**	**7.8**	**4145**
VPRA - 16	9/24/99	1879	23	1268	56	53	7	0	2	0	7.8	4829
	10/21/99	1151	60	1488	244	51	32	0	2	0.5	7.8	3953
	10/28/99	1454	22	1250	148	39	3	0	2	0	8.2	3858
	11/4/99	545	75	1354	284	27	25	0	2	0	7.6	2808
	11/11/99	848	24	1317	208	27	11	0	2	0	7.8	3192
	aver	**1175**	**41**	**1335**	**188**	**39**	**16**	**0**	**2**	**0**	**7.8**	**3728**
VPRA - 17	9/24/99	485	25	1512	48	36	4	0	3	0	7.8	2883
	10/14/99	424	47	1695	92	46	3	0	2	0.5	7.8	3048
	11/4/99	424	59	1525	216	17	2	0	2	0.5	7.7	2839
	aver	**444**	**44**	**1577**	**119**	**33**	**3**	**0**	**2**	**0**	**7.8**	**2923**
VPRA - 18	9/24/99	1333	67	751	92	44	21	0	2	0	7.1	3299
	10/14/99	2182	77	1024	212	32	9	0	4	0	7	5061
	aver	**1758**	**72**	**888**	**152**	**38**	**15**	**0**	**3**	**0**	**7.1**	**4180**
VPRA - 19	9/24/99	909	35	1647	52	31	4	0	3	0	7.8	3786
	10/28/99	909	34	1328	236	24	25	0	2	0	7.8	3071
	11/4/99	545	93	1451	252	32	22	0	2	0	7.7	2968
	11/11/99	545	41	1549	136	19	10	0	2	0	7.8	3055
	aver	**727**	**51**	**1494**	**169**	**27**	**15**	**0**	**2**	**0**	**7.8**	**3220**
VPRA - 20	9/24/99	242	14	1539	64	27	6	0	2	0	7.9	2511
	10/14/99	303	12	1622	64	32	2	0	2	0.1	7.9	2712
	aver	**273**	**13**	**1581**	**64**	**30**	**4**	**0**	**2**	**0**	**7.9**	**2612**
VPRA - 21	9/24/99	121	72	1222	188	46	25	0	2	0	7.7	1945

Vermejo Ranch

EL PASO RATON, L.L.C.

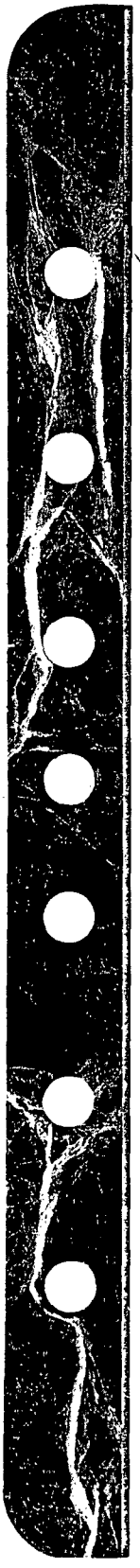
Produced Water Analysis Summary

WELL	DATE	CHLORIDES (MG/L)	SULFATES (MG/L)	BICARB (PPM)	CALCIUM (MG/L)	MAGNESIUM (MG/L)	IRON (PPM)	H2S (MG/L)	CO2 (PPM)	O2 (PPM)	PH	SOLIDS (MG/L)
VPRA - 22	9/24/99	364	23	1439	76	36	12	0	1	0	7.7	2574
	10/14/99	727	16	1717	144	41	7	0	4	0	7.8	3528
	10/21/99	545	14	1512	156	29	5	0	2	0.5	7.7	2952
	10/28/99	848	11	1288	212	80	0	0	2	0	8.2	2842
	11/4/99	545	56	1390	212	34	3	0	2	1	7.8	2833
	11/11/99	364	17	1378	128	34	2	0	2	0.5	7.8	2473
	aver	**566**	**23**	**1454**	**155**	**42**	**5**	**0**	**2**	**0**	**7.8**	**2867**
VPRA - 23X	9/24/99	970	15	1390	96	56	5	0	2	0	7.7	3476
	10/14/99	1333	38	1102	104	56	3	0	3	0	8	3706
	10/21/99	909	27	1329	224	27	3	0	2	1	7.9	3311
	10/28/99	1273	29	1346	208	53	5	0	2	0	8.2	3663
	11/4/99	848	58	1281	256	22	3	0	2	0.5	8	3190
	11/11/99	667	21	1220	216	17	4	0	0	0.5	7.8	2763
	aver	**1000**	**31**	**1278**	**184**	**39**	**4**	**0**	**2**	**0**	**7.9**	**3352**
VPRA -24	9/24/99	1454	13	1586	188	63	0	0	1	0	7.6	4516
	10/21/99	1212	77	1500	168	83	31	0	2	0.5	7.5	4078
	10/28/99	1212	62	1328	172	44	50	0	2	0	7.8	3603
	11/4/99	970	124	1500	192	5	32	0	2	0	7.6	3815
	11/11/99	667	53	1427	224	15	24	0	2	1	7.5	3096
	aver	**1103**	**66**	**1468**	**189**	**42**	**27**	**0**	**2**	**0**	**7.6**	**3822**
VPRA - 7 WDW	10/14/99	424	37	1229	152	61	1	0	1	0	7.6	2369
	10/21/99	788	24	1637	176	41	1	0	2	0.5	7.9	3388
	10/28/99	788	44	1308	200	51	0	0	2	0	8	2844
	11/4/99	424	21	1366	52	7	0	0	2	0	8.1	2597
	11/11/99	485	19	1342	216	29	0	0	2	0	7.9	2618
	aver	**582**	**29**	**1356**	**159**	**38**	**0**	**0**	**2**	**0**	**7.9**	**2763**

Kieling, Martyne

From: Johnson, Roy
Sent: Thursday, February 10, 2000 8:14 AM
To: Kieling, Martyne
Subject: Vermejo Emergency Pit

Martyne, I have a concern on your pit permit to Vermejo Minerals Corp. My biggest concern is the netting of this pit. The wildlife in this area has little to no regard for fencing or any other types of barriers when water is involved and the placement of netting over these structures would probably endanger these animals. Secondly, this water is relatively fresh, posses no threat to wildlife, and is not on major flight paths of migratory birds. In lieu of this does the division still accept form C-134, Application for Exception to Division Order R-8952? If we do, how is this approved? ROY



A wise man gets more use from his enemies than a fool from his friends.
— Baltasar Gracián

Monthly Focus:
Relationships—*Who are the people that matter most?*

1
Tuesday
February 2000

10:00 Am

Daily Record of Events — 32nd Day, 334 Left, Week 5

Meeting with Devon / Vernejo Minerals Corp
Depth to GW — Steven C. O'Connel, Tad?
Roger Anderson, Marilyn Kielin

Can Remove in 24 Hours Now

When Drilling Pump in to Frac Tanks
Treating

Drilling Second Injection well

Write Letter Approving as Emergency
Overflow pit with Requirements
24 Hour Removal.
Call Dist Supervisor If Major upset occurs
For extensions.

exemption A.3.C.

Van Bremmer - High TDS

Discharge Permit From OCD
Road Spreading Requirements.

Castle Rock - Treated water Into Mungs Lake
500 TDS in Mungs Lake.....
1000 to 30000 TDS

Mulle Changes New Comment Period

devon
ENERGY CORPORATION

P.O. Box 190
Raton, NM 87740
Telephone: (505) 445-4620

January 13, 2000

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

Dear Martyne,

In response to our phone conversation on Wednesday, January 12, 2000, I would like to provide a description of our water disposal facility on the Vermejo Park Ranch. Attached is a site plot plan for the VPR "A" 7 location. Water from the producing wells on the VPR "A" Lease flows to the VPR "A" 7 water handling facility. The water is routed through a separator that dumps into two above ground 500-barrel steel welded tanks. The water is then pumped into an injection well with perforations at 6400 – 6564' in the Dakota formation. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711.A that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

Attached you will find water quality data from the source wells, as well as results of analyses taken from actual injection water at the "A" 7 wellhead. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-4620.

Sincerely,

Steven C. O'Connell
Environmental, Safety &
Health Coordinator

Attch: 1) Plot Plan
2) Water Analyses
Cc: Roy Johnson
Don Lankford
Tad Lynch

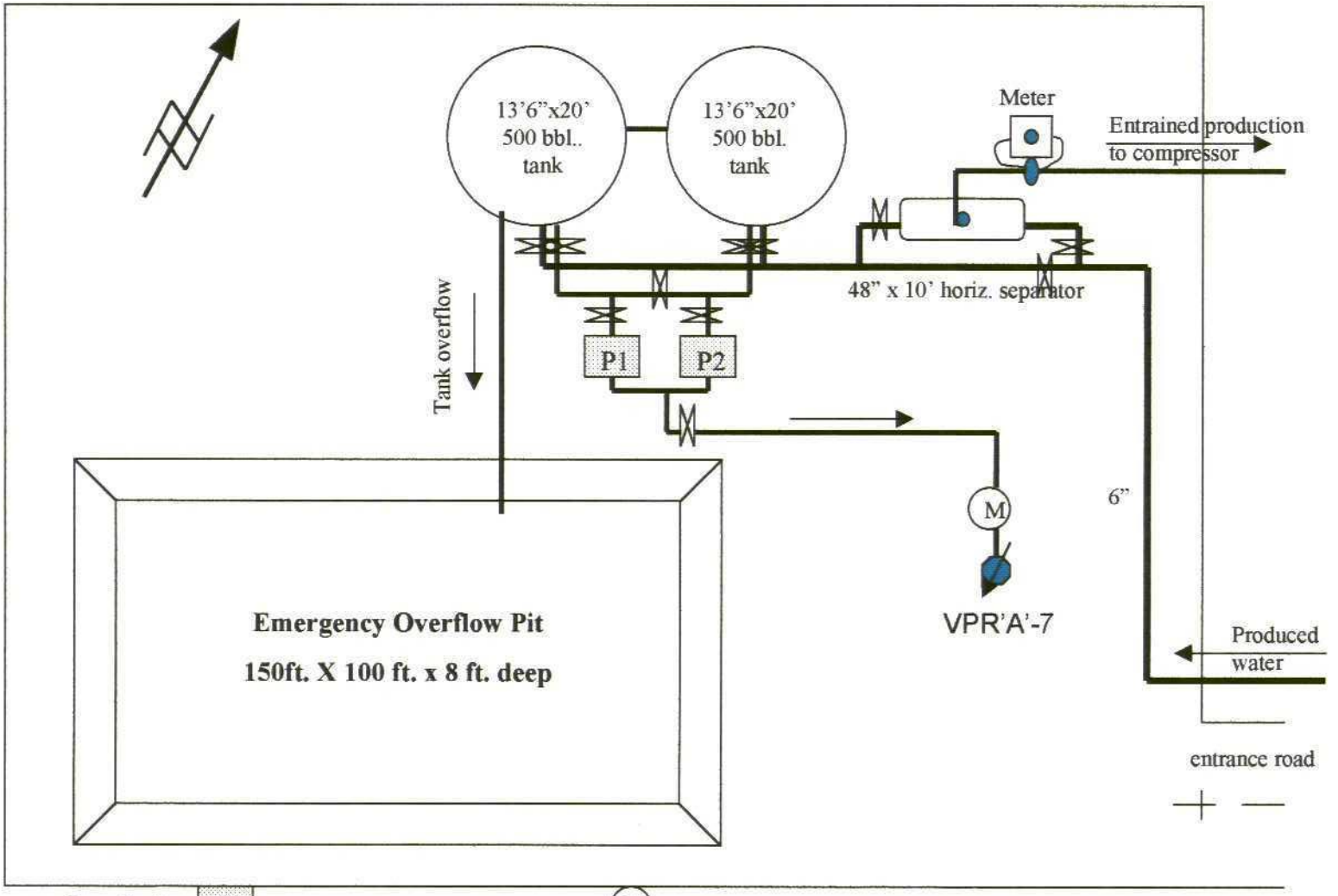
Steven C. O'Connell
Environmental, Safety and Health Coordinator
VERMEJO MINERALS CORPORATION

P.O. Box 190
309 Silver
Raton, NM 87740
Office: 505-445-4620

Fax: 505-445-4688
Mobile: 505-447-4621
E-Mail: Steve.Oconnell@dvn.com

Water Disposal Well VPR'A'-7

Well Location Schematic Showing Surface Equipment

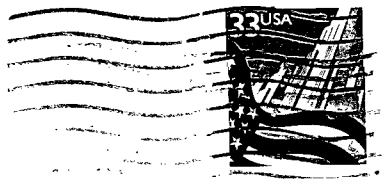


WELL #	DATE	CHLOR (MG/L)	SULF. (MG/L)	BICARB. (PPM)	CAL. (MG/L)	MAG. (MG/L)	IRON (PPM)	BAR. (MG/L)	CO2 (PPM)	H2S (PPM)	Ph	TDS (MG/L)
VPRA - 1	9/25/1999	667	148	1464	64	29	2	0	2	0	8.2	3301
	10/21/1999	848	20	1720	152	22	4	0	2	0.5	8.1	3754
	11/4/1999	727	14	1622	72	5	3	0	2	0	8.1	3437
	11/11/1999	545	30	1647	148	22	8	0	2	0	7.8	3169
	aver	**697**	**53**	**1613**	**109**	**20**	**4**	**0**	**2**	**0**	**8.1**	**3415**
VPRA - 2	8/31/1999	190	0	1351	7	3	3	0	0	0	7.8	2170
	9/25/1999	182	12	1462	60	44	5	0	2	0	7.8	2288
	10/14/1999	364	11	1488	92	66	1	0	3	0.5	7.9	2593
	10/21/1999	606	8	1476	204	46	1	0	2	1	7.8	2972
	11/4/1999	667	18	1220	44	24	1	0	2	0	8.2	2778
	aver	**402**	**10**	**1399**	**81**	**37**	**2**	**0**	**2**	**0**	**7.9**	**2560**
VPRA - 3	9/25/1999	49	31	1317	96	49	12	0	2	0	7.9	1894
VPRA - 4X	9/25/1999	17	27	1356	180	51	25	0	2	0	7.7	1888
VPRA - 6	8/31/1999	105	0	1337	3	2	3	0	0	0	7.8	2012
VPRA - 8	9/25/1999	364	21	1513	56	24	5	0	2	0	7.8	2690
	10/14/1999	303	14	1395	88	22	2	0	8	0	8	2408
	10/21/1999	727	14	1647	160	73	1	0	2	1	8	3398
	10/28/1999	545	16	1406	156	34	3	0	2	0	8.4	2540
	11/4/1999	182	11	1561	64	12	1	0	2	0.5	8.4	2445
	11/11/1999	424	13	1549	136	27	1	0	2	0	8.4	2807
	aver	**424**	**15**	**1512**	**110**	**32**	**2**	**0**	**3**	**0**	**8.2**	**2715**
VPRA - 9	9/25/1999	485	30	1112	92	44	9	0	2	0	7.7	2331
	10/14/1999	242	22	1054	72	27	4	0	3	0.5	7.5	1848
	10/21/1999	545	30	1348	172	22	7	0	2	1	7.9	2754
	10/28/1999	667	22	1034	180	12	3	0	2	0	7.5	2324
	11/4/1999	364	63	1244	224	24	8	0	2	0.5	7.9	2352
	11/11/1999	545	28	1244	148	22	8	0	2	0.5	8	2611
	aver	**475**	**33**	**1173**	**148**	**25**	**7**	**0**	**2**	**0**	**7.8**	**2370**
VPRA - 10	9/25/1999	152	22	1317	108	113	3	0	3	0	7.8	1983
	10/21/1999	1151	17	1354	188	51	3	0	2	1	7.9	3714
	10/28/1999	1454	20	1288	228	34	2	0	2	0	8.2	3893
	11/4/1999	848	62	1366	216	24	1	0	2	1.5	8.4	3317
	11/11/1999	848	15	1366	196	7	3	0	2	1.5	8.3	3266
	aver	**891**	**27**	**1338**	**187**	**46**	**2**	**0**	**2**	**1**	**8.1**	**3235**

VPRA - 11	9/25/1999	909	27	1366	56	22	4	0	2	0	7.5	3395
	10/14/1999	788	14	1210	128	46	3	0	3	0	7.9	2926
	10/21/1999	1030	20	1220	176	68	3	0	2	1	7.9	3321
	10/28/1999	1151	24	1016	196	51	3	0	2	0	8	3066
	11/4/1999	727	55	1183	212	17	3	0	2	0	8	2862
	11/11/1999	303	14	1415	188	12	4	0	2	0.5	7.8	2430
	aver	**818**	**26**	**1235**	**159**	**36**	**3**	**0**	**2**	**0**	**7.9**	**3000**
VPRA - 12	9/25/1999	121	36	1044	68	35	3	0	2	0	9	1650
	10/14/1999	1394	25	939	84	32	3	0	2	2	8.2	3587
	10/21/1999	1030	15	1110	152	63	1	0	2	3	8	3170
	11/4/1999	1091	60	1061	244	19	3	0	2	2	8.1	3295
	11/11/1999	909	14	951	152	17	1	0	2	0.5	8.3	2791
	aver	**909**	**30**	**1021**	**140**	**33**	**2**	**0**	**2**	**2**	**8.3**	**2899**
VPRA - 13	9/25/1999	2182	62	74	144	39	98	0	2	0	7.1	4751
	11/4/1999	1394	72	793	296	32	16	0	2	0.5	8	3424
	aver	**1788**	**67**	**434**	**220**	**36**	**57**	**0**	**2**	**0**	**7.6**	**4088**
VPRA - 14	9/25/1999	424	20	1327	72	45	4	0	2	0	8.2	2508
	10/21/1999	545	32	1549	136	32	5	0	2	0.5	7.8	3030
	10/28/1999	667	20	1268	172	41	3	0	2	0	8	2574
	11/4/1999	485	54	1464	232	41	2	0	2	0.5	8	2824
	11/11/1999	364	15	1451	192	27	2	0	2	0.5	8	2568
	aver	**497**	**28**	**1412**	**161**	**37**	**3**	**0**	**2**	**0**	**8.0**	**2701**
VPRA - 15	8/31/1999	1650	4	1088	27	6	1	0	0	0.5	8.4	4215
	9/25/1999	970	21	1390	68	51	8	0	2	0	7.8	3488
	11/11/1999	1879	37	1183	228	17	27	0	0	0	7.2	4732
	aver	**1500**	**21**	**1220**	**108**	**25**	**12**	**0**	**1**	**0**	**7.8**	**4145**
VPRA - 16	9/24/1999	1879	23	1268	56	53	7	0	2	0	7.8	4829
	10/21/1999	1151	60	1488	244	51	32	0	2	0.5	7.6	3953
	10/28/1999	1454	22	1250	148	39	3	0	2	0	8.2	3858
	11/4/1999	545	75	1354	284	27	25	0	2	0	7.6	2808
	11/11/1999	848	24	1317	208	27	11	0	2	0	7.8	3192
	aver	**1175**	**41**	**1335**	**188**	**39**	**16**	**0**	**2**	**0**	**7.8**	**3728**
VPRA - 17	9/24/1999	485	25	1512	48	36	4	0	3	0	7.8	2883
	10/14/1999	424	47	1695	92	46	3	0	2	0.5	7.8	3048
	11/4/1999	424	59	1525	216	17	2	0	2	0.5	7.7	2839
	aver	**444**	**44**	**1577**	**119**	**33**	**3**	**0**	**2**	**0**	**7.8**	**2923**

VPRA - 18	9/24/1999	1333	67	751	92	44	21	0	2	0	7.1	3299
	10/14/1999	2182	77	1024	212	32	9	0	4	0	7	5061
	aver	**1758**	**72**	**888**	**152**	**38**	**15**	**0**	**3**	**0**	**7.1**	**4180**
VPRA - 19	9/24/1999	909	35	1647	52	31	4	0	3	0	7.8	3786
	10/28/1999	909	34	1328	236	24	25	0	2	0	7.8	3071
	11/4/1999	545	93	1451	252	32	22	0	2	0	7.7	2968
	11/11/1999	545	41	1549	136	19	10	0	2	0	7.8	3055
	aver	**727**	**51**	**1494**	**169**	**27**	**15**	**0**	**2**	**0**	**7.8**	**3220**
VPRA - 20	9/24/1999	242	14	1539	64	27	6	0	2	0	7.9	2511
	10/14/1999	303	12	1622	64	32	2	0	2	0.1	7.9	2712
	aver	**273**	**13**	**1581**	**64**	**30**	**4**	**0**	**2**	**0**	**7.9**	**2612**
VPRA - 21	9/24/1999	121	72	1222	188	46	25	0	2	0	7.7	1945
VPRA - 22	9/24/1999	364	23	1439	76	36	12	0	1	0	7.7	2574
	10/14/1999	727	16	1717	144	41	7	0	4	0	7.8	3528
	10/21/1999	545	14	1512	156	29	5	0	2	0.5	7.7	2952
	10/28/1999	848	11	1288	212	80	0	0	2	0	8.2	2842
	11/4/1999	545	56	1390	212	34	3	0	2	1	7.8	2833
	11/11/1999	364	17	1378	128	34	2	0	2	0.5	7.8	2473
	aver	**566**	**23**	**1454**	**155**	**42**	**5**	**0**	**2**	**0**	**7.8**	**2867**
VPRA - 23X	9/24/1999	970	15	1390	96	56	5	0	2	0	7.7	3476
	10/14/1999	1333	38	1102	104	56	3	0	3	0	8	3706
	10/21/1999	909	27	1329	224	27	3	0	2	1	7.9	3311
	10/28/1999	1273	29	1346	208	53	5	0	2	0	8.2	3663
	11/4/1999	848	58	1281	256	22	3	0	2	0.5	8	3190
	11/11/1999	667	21	1220	216	17	4	0	0	0.5	7.8	2763
	aver	**1000**	**31**	**1278**	**184**	**39**	**4**	**0**	**2**	**0**	**7.9**	**3352**
VPRA -24	9/24/1999	1454	13	1586	188	63	0	0	1	0	7.6	4516
	10/21/1999	1212	77	1500	168	83	31	0	2	0.5	7.5	4078
	10/28/1999	1212	62	1328	172	44	50	0	2	0	7.8	3603
	11/4/1999	970	124	1500	192	5	32	0	2	0	7.6	3815
	11/11/1999	667	53	1427	224	15	24	0	2	1	7.5	3096
	aver	**1103**	**66**	**1468**	**189**	**42**	**27**	**0**	**2**	**0**	**7.6**	**3822**
VPRA - 7 WDW	10/14/1999	424	37	1229	152	61	1	0	1	0	7.6	2369
	10/21/1999	788	24	1537	176	41	1	0	2	0.5	7.9	3388
	10/28/1999	788	44	1308	200	51	0	0	2	0	8	2844
	11/4/1999	424	21	1366	52	7	0	0	2	0	8.1	2597
	11/11/1999	485	19	1342	216	29	0	0	2	0	7.9	2618
	aver	**582**	**29**	**1356**	**159**	**38**	**0**	**0**	**2**	**0**	**7.9**	**2763**

Steve O'Connell
Vermejo Minerals Corp.
P.O. Box 190
Raton, NM 87740



Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

87502+6423

devon
ENERGY CORPORATION

Fax Cover Sheet

P.O. Box 190
Raton, NM 87740
Telephone: (505) 445-4620

To: Martyne J. Kieling

From: Steve O'Connell

Pages to follow: 5

Martyne,
A hard copy of this document has been mailed to your office. Thanks again for your cooperation regarding this matter.
-Steve

devon
ENERGY CORPORATION

P.O. Box 190
Raton, NM 87740
Telephone: (505) 445-4620

January 13, 2000

Martyne J. Kieling
New Mexico Oil Conservation Division
P.O. Box 6429
Santa Fe, NM 87504-6429

Dear Martyne,

In response to our phone conversation on Wednesday, January 12, 2000, I would like to provide a description of our water disposal facility on the Vermejo Park Ranch. Attached is a site plot plan for the VPR "A" 7 location. Water from the producing wells on the VPR "A" Lease flows to the VPR "A" 7 water handling facility. The water is routed through a separator that dumps into two above ground 500-barrel steel welded tanks. The water is then pumped into an injection well with perforations at 6400 – 6564' in the Dakota formation. Should an emergency situation arise that would cause the water tanks to overflow, the water is routed to the emergency pit.

It is our interpretation of the New Mexico Oil Conservation Division's Rule 711.A that this facility qualifies as a surface waste management facility. The pit in question is not used for management of waste and is intended for emergency situations only. We feel this qualifies the facility under 711.A (a) which exempts it from rule 711.

Attached you will find water quality data from the source wells, as well as results of analyses taken from actual injection water at the "A" 7 wellhead. We feel the water quality is sufficient to prove that a release to an impermeable emergency pit would not present a risk to public health or the environment. Therefore, we contend this facility also qualifies for exemption from permitting under 711.A (3) (d).

Please review the attached information and notify this office of your determination on our request for exemption. Thank you for your prompt attention and response to this inquiry. Should you have any questions, feel free to call me at 505-445-4620.

Sincerely,

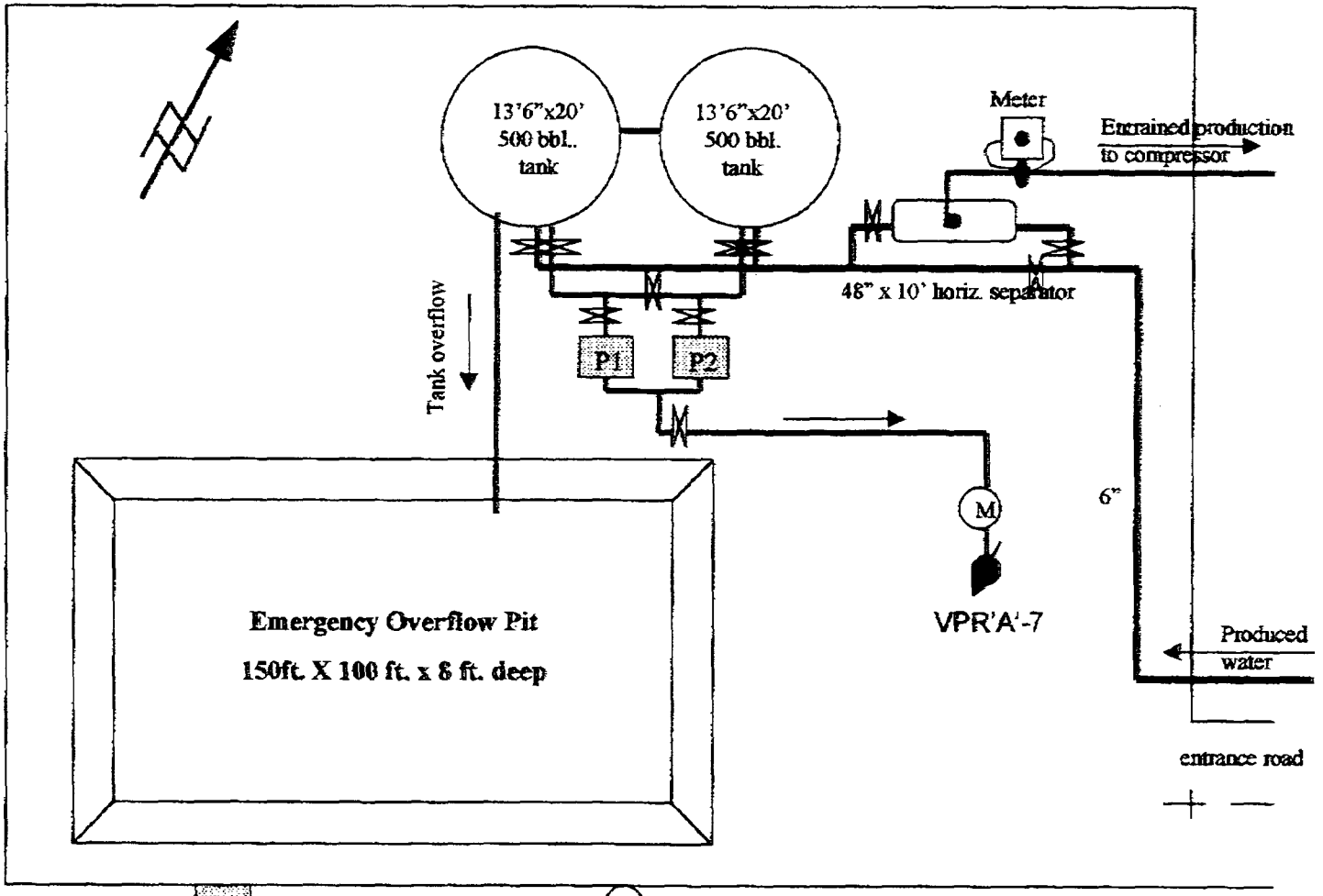
Steven C. O'Connell
Environmental, Safety &
Health Coordinator

Attch: 1) Plot Plan
2) Water Analyses

Cc: Roy Johnson
Don Lankford
Tad Lynch

Water Disposal Well VPR'A'-7

Well Location Schematic Showing Surface Equipment



Symbols: P1 pump M water meter

WELL #	DATE	CHLOR. (MG/L)	SULF. (MG/L)	BICARB. (PPM)	CAL. (MG/L)	MAG. (MG/L)	IRON (PPM)	BAR. (MG/L)	CO2 (PPM)	H2S (PPM)	Ph	TDS (MG/L)
VPRA - 1	9/25/1999	667	148	1464	64	29	2	0	2	0	8.2	3301
	10/21/1999	848	20	1720	152	22	4	0	2	0.5	8.1	3754
	11/4/1999	727	14	1622	72	5	3	0	2	0	8.1	3437
	11/11/1999	545	30	1647	148	22	8	0	2	0	7.8	3169
	aver	**697**	**53**	**1613**	**108**	**20**	**4**	**0**	**2**	**0**	**8.1**	**3415**
VPRA - 2	8/31/1999	190	0	1351	7	3	3	0	0	0	7.8	2170
	9/25/1999	182	12	1462	60	44	5	0	2	0	7.8	2288
	10/14/1999	364	11	1488	92	66	1	0	3	0.5	7.9	2593
	10/21/1999	606	8	1476	204	46	1	0	2	1	7.8	2972
	11/4/1999	667	18	1220	44	24	1	0	2	0	8.2	2778
	aver	**402**	**10**	**1399**	**81**	**37**	**2**	**0**	**2**	**0**	**7.9**	**2560**
VPRA - 3	9/25/1999	49	31	1317	96	49	12	0	2	0	7.9	1894
VPRA - 4X	9/25/1999	17	27	1356	180	51	25	0	2	0	7.7	1888
VPRA - 6	8/31/1999	105	0	1337	3	2	3	0	0	0	7.8	2012
VPRA - 8	9/25/1999	364	21	1513	56	24	5	0	2	0	7.8	2690
	10/14/1999	303	14	1385	88	22	2	0	8	0	8	2408
	10/21/1999	727	14	1647	160	73	1	0	2	1	8	3398
	10/28/1999	545	16	1406	156	34	3	0	2	0	8.4	2540
	11/4/1999	182	11	1561	64	12	1	0	2	0.5	8.4	2445
	11/11/1999	424	13	1549	136	27	1	0	2	0	8.4	2807
	aver	**424**	**15**	**1512**	**110**	**32**	**2**	**0**	**3**	**0**	**8.2**	**2715**
VPRA - 9	9/25/1999	485	30	1112	92	44	9	0	2	0	7.7	2331
	10/14/1999	242	22	1054	72	27	4	0	3	0.5	7.5	1848
	10/21/1999	545	30	1348	172	22	7	0	2	1	7.9	2754
	10/28/1999	667	22	1034	180	12	3	0	2	0	7.5	2324
	11/4/1999	364	63	1244	224	24	8	0	2	0.5	7.9	2352
	11/11/1999	545	28	1244	148	22	8	0	2	0.5	8	2611
	aver	**475**	**33**	**1173**	**148**	**25**	**7**	**0**	**2**	**0**	**7.8**	**2370**
VPRA - 10	9/25/1999	152	22	1317	108	113	3	0	3	0	7.8	1983
	10/21/1999	1151	17	1354	188	51	3	0	2	1	7.9	3714
	10/28/1999	1454	20	1288	228	34	2	0	2	0	8.2	3893
	11/4/1999	848	62	1366	216	24	1	0	2	1.5	8.4	3317
	11/11/1999	848	15	1366	196	7	3	0	2	1.5	8.3	3286
	aver	**891**	**27**	**1338**	**187**	**46**	**2**	**0**	**2**	**1**	**8.1**	**3235**

VPRA - 11	9/25/1999	909	27	1366	56	22	4	0	2	0	7.5	3395
	10/14/1999	788	14	1210	128	46	3	0	3	0	7.9	2926
	10/21/1999	1030	20	1220	176	68	3	0	2	1	7.9	3321
	10/28/1999	1151	24	1016	196	51	3	0	2	0	8	3066
	11/4/1999	727	55	1183	212	17	3	0	2	0	8	2962
	11/11/1999	303	14	1415	188	12	4	0	2	0.5	7.8	2430
	aver	**818**	**26**	**1235**	**159**	**36**	**3**	**0**	**2**	**0**	**7.9**	**3000**
VPRA - 12	9/25/1999	121	36	1044	68	35	3	0	2	0	9	1650
	10/14/1999	1394	25	939	84	32	3	0	2	2	8.2	3587
	10/21/1999	1030	15	1110	152	63	1	0	2	3	8	3170
	11/4/1999	1091	60	1061	244	19	3	0	2	2	8.1	3295
	11/11/1999	909	14	951	152	17	1	0	2	0.5	8.3	2791
	aver	**909**	**30**	**1021**	**140**	**33**	**2**	**0**	**2**	**2**	**8.3**	**2899**
VPRA - 13	9/25/1999	2182	62	74	144	39	98	0	2	0	7.1	4751
	11/4/1999	1394	72	793	296	32	16	0	2	0.5	8	3424
	aver	**1788**	**67**	**434**	**220**	**36**	**57**	**0**	**2**	**0**	**7.6**	**4088**
VPRA - 14	9/25/1999	424	20	1327	72	45	4	0	2	0	8.2	2508
	10/21/1999	545	32	1549	136	32	5	0	2	0.5	7.8	3030
	10/28/1999	667	20	1268	172	41	3	0	2	0	8	2574
	11/4/1999	485	54	1464	232	41	2	0	2	0.5	8	2624
	11/11/1999	364	15	1451	192	27	2	0	2	0.5	8	2568
	aver	**497**	**28**	**1412**	**161**	**37**	**3**	**0**	**2**	**0**	**8.0**	**2701**
VPRA - 15	8/31/1999	1650	4	1088	27	6	1	0	0	0.5	8.4	4215
	9/25/1999	970	21	1390	68	51	8	0	2	0	7.8	3488
	11/11/1999	1879	37	1183	228	17	27	0	0	0	7.2	4732
	aver	**1500**	**21**	**1220**	**108**	**25**	**12**	**0**	**1**	**0**	**7.8**	**4145**
VPRA - 16	9/24/1999	1879	23	1268	56	53	7	0	2	0	7.8	4829
	10/21/1999	1151	60	1488	244	51	32	0	2	0.5	7.6	3953
	10/28/1999	1454	22	1250	148	39	3	0	2	0	8.2	3858
	11/4/1999	545	75	1354	284	27	25	0	2	0	7.6	2808
	11/11/1999	848	24	1317	208	27	11	0	2	0	7.8	3192
	aver	**1175**	**41**	**1335**	**188**	**39**	**16**	**0**	**2**	**0**	**7.8**	**3728**
VPRA - 17	9/24/1999	485	25	1512	48	36	4	0	3	0	7.8	2883
	10/14/1999	424	47	1695	92	46	3	0	2	0.5	7.8	3048
	11/4/1999	424	59	1525	216	17	2	0	2	0.5	7.7	2839
	aver	**444**	**44**	**1577**	**119**	**33**	**3**	**0**	**2**	**0**	**7.8**	**2923**

VPRA - 18	9/24/1999	1333	67	751	92	44	21	0	2	0	7.1	3299
	10/14/1999	2182	77	1024	212	32	9	0	4	0	7	5061
	aver	**1758**	**72**	**886**	**152**	**38**	**15**	**0**	**3**	**0**	**7.1**	**4180**
VPRA - 19	9/24/1999	909	35	1647	52	31	4	0	3	0	7.8	3786
	10/28/1999	909	34	1328	236	24	25	0	2	0	7.8	3071
	11/4/1999	545	93	1451	252	32	22	0	2	0	7.7	2988
	11/11/1999	545	41	1549	136	19	10	0	2	0	7.8	3055
	aver	**727**	**51**	**1494**	**169**	**27**	**15**	**0**	**2**	**0**	**7.8**	**3220**
VPRA - 20	9/24/1999	242	14	1539	64	27	6	0	2	0	7.9	2511
	10/14/1999	303	12	1622	64	32	2	0	2	0.1	7.9	2712
	aver	**273**	**13**	**1581**	**64**	**30**	**4**	**0**	**2**	**0**	**7.9**	**2612**
VPRA - 21	9/24/1999	121	72	1222	188	46	25	0	2	0	7.7	1945
VPRA - 22	9/24/1999	364	23	1439	76	36	12	0	1	0	7.7	2574
	10/14/1999	727	16	1717	144	41	7	0	4	0	7.8	3528
	10/21/1999	545	14	1512	156	29	5	0	2	0.5	7.7	2952
	10/28/1999	848	11	1288	212	80	0	0	2	0	8.2	2842
	11/4/1999	545	56	1390	212	34	3	0	2	1	7.8	2833
	11/11/1999	364	17	1378	128	34	2	0	2	0.5	7.8	2473
	aver	**566**	**23**	**1454**	**155**	**42**	**5**	**0**	**2**	**0**	**7.8**	**2867**
VPRA - 23X	9/24/1999	970	15	1390	96	56	5	0	2	0	7.7	3476
	10/14/1999	1333	38	1102	104	56	3	0	3	0	8	3706
	10/21/1999	909	27	1329	224	27	3	0	2	1	7.9	3311
	10/28/1999	1273	29	1346	208	53	5	0	2	0	8.2	3663
	11/4/1999	848	58	1281	256	22	3	0	2	0.5	8	3190
	11/11/1999	667	21	1220	216	17	4	0	0	0.5	7.8	2763
	aver	**1000**	**31**	**1278**	**184**	**39**	**4**	**0**	**2**	**0**	**7.9**	**3352**
VPRA -24	9/24/1999	1454	13	1586	188	63	0	0	1	0	7.6	4516
	10/21/1999	1212	77	1500	168	83	31	0	2	0.5	7.5	4078
	10/28/1999	1212	62	1328	172	44	50	0	2	0	7.8	3603
	11/4/1999	970	124	1500	192	5	32	0	2	0	7.6	3815
	11/11/1999	667	53	1427	224	15	24	0	2	1	7.5	3096
	aver	**1103**	**66**	**1468**	**189**	**42**	**27**	**0**	**2**	**0**	**7.6**	**3822**
VPRA - 7 WDW	10/14/1999	424	37	1229	152	61	1	0	1	0	7.6	2369
	10/21/1999	788	24	1537	176	41	1	0	2	0.5	7.9	3388
	10/28/1999	788	44	1308	200	51	0	0	2	0	8	2844
	11/4/1999	424	21	1366	52	7	0	0	2	0	8.1	2597
	11/11/1999	485	19	1342	216	29	0	0	2	0	7.9	2618
	aver	**582**	**29**	**1356**	**159**	**38**	**0**	**0**	**2**	**0**	**7.9**	**2763**

NEW MEXICO ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT

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PS Form **3800**, April 1995

January 6, 2000

Certified Mail

Sonat Raton, LLC
P. O. Box 190
Raton, NM 87740
Attn: Paul Bruce

RE: Vermejo Park Ranch Operations

Dear Mr. Bruce:

According to our records, Sonat Raton, LLC is delinquent in filing Form C-115, Operators Monthly Report. New Mexico Oil Conservation Division Rule No. 1115 requires that this report be timely and accurately filed 45 days after the production month being reported. Be advised that failure to respond within 30 days of the date of this letter will result in enforcement action being imposed including shutting in the production on your lease until you are in compliance with Rule No. 1115.

In other matters, be advised that your company is also delinquent in filing for the necessary permits on your disposal pit and submitting the required data to authorize downhole commingling. While I appreciate your unique working environment with the owner of Vermejo Park Ranch, this scenario does not preclude Sonat Raton from the Rules and Regulations of the New Mexico Oil Conservation Division. Our rule book can be found on the Internet at www.emnrd.state.nm.us/ocd and I would like to suggest at this time that you read it.

I have also been directed by the Division Director, not to approve any new drilling permits or workovers until Sonat Raton, LLC is in full compliance with the Division's Rules and Regulations.

Roy Johnson
District IV Supervisor

cc: Lori Wrotenbery, Director OCD
Roger Anderson, Environmental Bureau Chief
Mike Stogner, Chief Hearing Examiner

Kieling, Martyne

From: Johnson, Roy
Sent: Thursday, January 06, 2000 8:49 AM
To: Kieling, Martyne
Subject: FW: Permits

Martyne, FYI. All of this was supposed to be completed by the first of the year. Instead they choose to start the process yesterday. We are having serious problems with these guys and we should do business with them accordingly. ROY

From: Don_Lankford@sonat.com[SMTP:Don_Lankford@sonat.com]
Sent: Wednesday, January 05, 2000 5:15 PM
To: Johnson, Roy
Subject: Re: Permits

Roy:
10 re-entry APD's received. Thanks.

Champion is here, now, collecting January water samples. We are compiling for you a complete collection of all water analyses, well by well.

Also, since I cannot find a form for application for approval of an emergency surface discharge pit, I will begin working on an application in letter form, with attachments. Do you know of such a form? My letter will include a request to line with clay spray, location, dimensions, volume, sources, quality of source water, conditions of discharge, emptying procedure, etc. Any further suggestions (besides "get a life").

I plan to submit, by early next week, APD for VPR'A'-42 WDW which will be on location VPR'A'-8, approx. 2000 ft. west of VPR'A'-7. No additional surface facilities are planned for the new disposal well.

Thanks, DRL

"Johnson, Roy" <REJOHNSON@state.nm.us> on 12/28/99 09:03:21 AM

To: Don Lankford/Sonat
cc:
Subject: Permits

Don, your permits for the re-entry's went out today. I made a few changes on them as multiple completions imply several tubing strings and I believe we are after commingling the production.