STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

TONEY ANAYA
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5800

NOTICE **** NOTICE **** NOTICE

NOTICE OF CONTINUATION OF CASE NO. 8224, PROHIBITION OF DISPOSAL OF PRODUCED WATER ON THE SURFACE OF THE GROUND, IN ANY WATER COURSE, OR IN ANY BODY OF WATER IN McKINLEY, RIO ARRIBA, SANDOVAL, AND SAN JUAN COUNTIES, NEW MEXICO.

It appearing that Division Staff would not be prepared to carry forward in the subject case scheduled for hearing on June 7, 1984, and it appearing that the Division might benefit from the results of a related ongoing investigation, Case No. 8224 is being continued to an indefinite date.

Because of the apparent wide interest in this case and to provide a forum for directing any studies which may or should be conducted while this case is being continued, a meeting of all interested parties is being scheduled for July 18, 1984, at 9:00 o'clock at the Division office in the State Land Office Building. At this meeting, interested parties will have the opportunity to express their ideas of any investigations or studies which should be undertaken or any focus which the future hearing should take. Also to be considered will be whether there should be a study committee formed to address the issues raised. If appropriate, such a committee will be formed.

IN THE MATTER OF
CASE NUMBER 8224
BEFORE THE OIL CONSERVATION COMMISSION

ENVIRONMENTAL IMPROVEMENT DIVISION'S
LIST OF POST-HEARING DOCUMENTS

Pursuant to Commissioner Stamets' request, the Environmental Improvement Division submits this list of post-hearing documents requested from the following witnesses, who agreed during testimony to provide these documents for review.

From Witness Gary Miller:

Creosote site data supporting testimony in reference to Tabak article, in which rapid biodegradation of benzene and toluene was observed, or another reference documenting one hundred per cent (100%) biodegradation of benzene in ground water in seven days.

From Witness Randall Hicks:

Field data forms for all fifty to sixty wells studied and inspected in the vulnerable area, including any and all accompanying hydrogeologic studies, heavy metals data and field notes.

All chemical analyses reports from both Assagai and Rocky Mountain Laboratories for any and all samples done of soil, ground water or produced water samples in the vulnerable area.

Specific conductance measurements on ground-water samples from the three study sites, with information on who performed such measurements and when.

All volume records from Tenneco and Amoco on which you based your volume calculations of produced water at the fifty to sixty sites you studied.

Any and all data you considered in order to reach your conclusion that the effects of rain and snow during the period of your study were insignificant.

Any report or written material from any consultant regarding the statistical evaluation supporting your method of selecting sites, and regarding the statistical significance of your sampling results.

From Witness David Boyer:

Proposed pit registration form with all proposed parameters to be analyzed.

Proposed pollutant load limits for produced water into unlined pits, which could be calculated according to volumes and concentrations.

ORGANIC CHEMISTRY ANALYTICAL REQUEST FORM

SCIENTIFIC LABORATORY DIVISION
700 CAMINO DE SALUD N.E., ALBUQUERQUE, NM 87106
Organic Chemistry Section - Telephone: (505) 841-2570

SLD No. OR92 0514 C

Request ID No. 028740-C

Date Received: 3/20/92

2 User Code #: 7 0 3 2 0

3 Request ID No.:

4 Priority Code #: (If "1" or "2", call EID-SLD Coordinator)

5 Facility Name: NAVAJO REFINERY

6 County: EDDY

7 City: ARTESIA

8 State:

9 Sample Location: FINAL EFFLUENT

10 Collected By: ROGER (First) ANDERSON (Last) On: 92/03/16 (Date: YY/MM/DD) At: 1110 (Time: 24 hr. clock, 3:00 pm = 1500 hrs.) hrs.

11 Codes: Submitter | WSS # | Organization

12 Latitude (DDMMSS) Longitude (DDDMMSS) 2 Digit ID (If needed)

13 Report To: Name ROGER ANDERSON

14 Phone #: (505) 827-5812

Address: New Mexico Oil Conservation Division
P. O. Box 2088
City, State Zip: Santa Fe, New Mexico 87504-2088

15 Sample Purpose:
- ☐ - Compliance
- ☐ - Check
- ☐ - Monitoring
- ☐ - Special

Sampling Information:
- ☐ - Grab
- ☐ - Composite _____ (Composite Time Period)
  - ☐ - Flow Proportioned
  - ☐ - Equal Aliquot
- ☐ - Sample Split w/Permittee
- ☐ - Chain of Custody

16 Field Data: pH: 12.5, Conductivity: 12800 umhos @ 35 °C, Temperature: _____ °C, Chlorine Residual: _____ mg/l, Flow: _____

17 Sample Source:
- ☐ - Stream
- ☐ - Lake
- ☐ - Drain
- ☐ - Pool
- ☐ - WWTP
- ☐ - Well; Depth: _____
- ☐ - Spring
- ☐ - Distribution
- ☒ - Point-of-Entry
- ☐ - Other: _____

18 Field Notes/ Sample #:

19 Sample Type: ☐ - Water, ☐ - Soil, ☐ - Food, ☒ - Wastewater, ☐ - Other _____

This form accompanies a single sample consisting of:
2 - septum vial(s) (volume = _____)
_____ - glass jugs (volume = _____)
_____ - _____ (volume = _____)

20 Preservation:
- ☐ - NP — No Preservation; Sample stored at room temperature
- ☒ - P-Ice — Sample stored in an ice bath (Not Frozen)
- ☐ - P-TS — Sample Preserved with Sodium Thiosulfate to remove chlorine residual
- ☐ - P-HCl — Sample Preserved with Hydrochloric Acid (2 drops/40 ml)
- ☒ - Other — HgCl

21 Analyses Requested: Please check the appropriate box(es) below to indicate the type of analytical screen(s) required. Whenever possible, list specific compounds suspected or required.

Volatile Screens:

- ☐ - (753) Aliphatic Headspace (1-5 Carbons)
- ☒ - (754) Aromatic & Halogenated Purgeables (EPA 601 & 602)
- ☐ - (765) Mass Spectrometer Purgeables (EPA 624)
- ☐ - (766) SDWA Total Trihalomethanes (EPA 501.1)
- ☐ - (774) SDWA VOC's I [8 Regulated +] (EPA 502.2)
- ☐ - (775) SDWA VOC's II [EDB & DBCP] (EPA 504)

Other Specific Compounds or Classes:

- ☐ - ( ) _____
- ☐ - ( ) _____
- ☐ - ( ) _____

Semivolatile Screens:

- ☐ - (763) Acid Extractables
- ☐ - (751) Aliphatic Hydrocarbons
- ☐ - (755) Base/Neutral Extractables (EPA 625)
- ☐ - (756) Base/Neutral/Acid Extractables (EPA 8270)
- ☐ - (758) Herbicides, Chlorophenoxy Acid
- ☐ - (759) Herbicides, Triazines
- ☐ - (760) Organochlorine Pesticides
- ☐ - (761) Organophosphate Pesticides
- ☐ - (767) Polychlorinated Biphenyls (PCB's)
- ☐ - (764) Polynuclear Aromatic Hydrocarbons
- ☐ - (762) SDWA Pesticides & Herbicides

Remarks:

This Form Will NOT Be Returned With Your Results. Please RETAIN A COPY!

NMOCD CASE #8224

GIANT INDUSTRIES, INC. STATEMENT

Giant Industries, Inc. has been participating in the process of developing recommendations for a draft order and establishing the criteria which should be considered in the development of such an order. Giant has been represented on the committee by Geoscience Consultants, Ltd., a professional hydrogeologic and engineering firm specializing in ground water quality assessment and waste management. During the meetings that have taken place over the last 8-10 months, regulatory agencies, industry and environmental groups have attempted to arrive at a consensus that protects ground water and does not place an undue burden on the regulated industry.

Giant Industries, Inc. strongly supports the January 18, 1985 recommendations of the short-term study group on all of the points on which the committee was in agreement. This includes the definitions and prohibitions and exemptions on which the committee agreed and which are listed below:

PROHIBITIONS AND EXEMPTIONS

Disposal of produced water or fluids produced in connection with the production of oil and natural gas, or both, in unlined pits is prohibited, except for disposal of produced water as described herein:

1. Pits lying outside vulnerable or special areas are exempt from this order.

2. Any pits, ponds, lagoons, or impoundments resulting from activities regulated by a discharge plan approved and permit issued by NMOCD or NMEID under Water Quality Control Commission Regulations authorized under the New Mexico Water Quality Act.

3. Any pits, ponds, lagoons or impoundments resulting from activities regulated by a RCRA or NPDES permit issued by NMEID or EPA under RCRA or NPDES regulations authorized under the Resource Conservation and Recovery Act, New Mexico Hazardous Waste Act, Clean Water Act or Safe Drinking Water Act.

4. Any pits, ponds, lagoons or impoundments resulting from activities regulated by a mining plan approved and permit issued by the New Mexico Coal Surface Mining Commission under the authority of the Surface Mined Lands Reclamation Act.

In addition, based on an analysis of the available data, it is the professional opinion of hydrogeologists, chemists and engineers at Geoscience that a low volume exemption within the vulnerable area of approximately 5 bbls/day should be permitted at the present time. This opinion is based on existing Federal practices and an analysis of the available data on produced water quality, site conditions at produced water pits, soils data, ground water hydrology and the data presented at the initial hearing.

The long-term committee will examine this question in greater detail and attempt to more accurately determine the volume of produced water which could be discharged without presenting a threat to ground water quality in the vulnerable area. This work by the long-term committee could be used to modify the amount of a low volume exemption without the unnecessary and costly burden on industry that a total ban would cause. In addition, Giant strongly supports the establishment of a mechanism by which producers could permit an unlined pit where produced water quality or site-specific conditions preclude a threat to ground water.

Giant looks forward to continuing participation on the long-term committee and congratulates NMOCD on their foresight in involving all the interested parties in the regulatory development process.

Case 5224

Statement of Qualifications

Name William F. Lorang

Employer: El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

Education: BSCE 1969 NMSU
MSCE 1972 NMSU

Subject of Thesis: The Hydraulics of Unconfined Aquifer Recharge, November, 1971.

Professional Registration: Registered by the New Mexico State Board of Registration for Professional Engineers and Land Surveyors and authorized to practice Professional Engineering; Certificate #5668.

Related Work Experience: Mr. Lorang was employed by EPNG June 15, 1969 and since then has worked on various water resource problems related to natural gas transmission, preparation of coal mining plans and environmental statements in the states of Oklahoma, Texas, New Mexico, Wyoming, North Dakota, Arizona and Utah. During this time, numerous monitoring facilities for ground and surface water were designed and operated and aquifer tests were performed and evaluated.

Disposition of Produced Waters

This is a statement for the record of the hearing called by the New Mexico Oil Conservation Commission to define the extent of aquifers potentially vulnerable to contamination by the surface disposition of water produced in conjunction with the production of oil and gas in McKinley, Rio Arriba, Sandoval and San Juan counties, New Mexico. The Oil Conservation Commission seeks to define such areas and prohibit and/or limit the disposition of such produced waters on the surface of the ground.

This statement is intended as testimony to be presented at a hearing February 20, 1985 in Santa Fe, New Mexico. The statement provides information in support of continued use of certain unlined pits in the area. The statement also urges the Commission to consider exemptions to any forthcoming order which would provide for the continued use of certain unlined earthen pits.

El Paso Natural Gas Company (EPNG) has been in business in the San Juan Basin of northwest New Mexico for some 33 years. Gas reserves have been developed through our own exploration and development, and through the purchase of gas from many other operators. EPNG operates some 5000 wells in the Basin and has tied literally thousands of others into its gathering system.

We feel that we have operated these many years in a prudent manner as good citizens and good neighbors. There are some 1966 EPNG employees in New Mexico generating about $54,000,000 combined annual income. We also pay our taxes as a good citizen must. EPNG paid in excess of $61,000,000 in taxes to New Mexico last year.

In all our 33 years of operation, we have never had a complaint of groundwater contamination from landowners or groundwater users in the San Juan Basin. This record strongly suggests that a large problem of groundwater contamination simply does not exist. If there were a problem, surely in the last three decades evidence would have appeared in one of the 300 shallow water wells in the area.

The Short Term Water Study Committee has delineated a vulnerable area which, in the committee's opinion, includes the bulk of the area now being used for shallow water supply. This vulnerable area lies principally along the river bottoms of the San Juan, Animas and La Plata Rivers. The committee also identified other "special" areas which should be protected much like the vulnerable area.

Within the vulnerable and special areas, EPNG has 547 earthen pits. These pits vary in size and purpose. Some are used for disposal of water from primary separation of water from produced hydrocarbons, others are used only for disposal of water separated and/or dehydrated from the gas stream. To replace all these pits with tankage would cost EPNG in the neighborhood of $1.8 million.

The amount of water discharged to these various pits is generally not measured. Thus, we are uncertain of the volumes of water that, over a period of time, are discharged to them. We do know, however, that many pits are normally dry while others normally contain produced water. Of the 547 pits EPNG has in the vulnerable areas, 421 of them are normally dry. We offer that if a pit has water discharged to it less than 10 days in any calendar month, it can be considered normally dry.

We feel that we have a very large stake in the protection of the State's environment and that each incident of probable contamination of the groundwwater should be checked. However, to line normally dry pits would not provide any additional protection to the State's groundwaters, but would reduce the economic benefits to our stockholders, our employees, and the State of New Mexico. Therefore, we feel that we must have a small volume exemption to the pit control order from OCD.

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If water is discharged onto soil, we have all observed that the soil is wetted but after a time again dries to its original condition by evapotranspiration. Soils will dry to depths of several feet due to the high evaporation and low precipitation rates common to the San Juan Basin. If water is discharged to a pit at a frequency to allow drying between discharges, then saturated soil conditions will not exist thereby precluding the transport of contaminants.

It is our understanding that many pits in which occasional discharges containing small amounts of crude oil have been made tend to be relatively impervious due to the sealing of pit bottom and sides. In such cases, the only means available for water to leave the pit is evaporation, thus further reducing any threat to the groundwater. It is also our understanding that water in a pit must have a driving force - a hydraulic head - before significant infiltration takes place. Absence of a hydraulic head - such as in the case of a normally dry pit - would indicate that there is no threat to groundwater.

Once the water infiltrates, native soils have an affinity to adsorb various substances - crude oil being one - thus providing an attenuation of contaminant transport. If the pit lies substantially above the water table, the infiltrating water passes through a column of soil thus providing the contact for adsorption of contaminants.

In short, at least two conditions are necessary in order for a pit to be a threat to the local groundwater. First, the pit must contain enough water to maintain a hydraulic head sufficient to act as the driving force of infiltration and overcome any sealing of surface pores. Second, it must be near the groundwater table for otherwise contaminants percolating downward would be adsorbed on soil particles before reaching the water table.

We would offer that there are many pits that don't meet the aforementioned criteria for being a threat. If they lie substantially above the water table and are normally dry - receiving discharges of water less than 10 days in a calendar month, they would not contain sufficient water to effect the transport of contaminants into the groundwater. Indeed, of EPNG's 547 pits, 421 - more than 3/4 - are normally dry. Such normally dry pits should be exempt from any order of regulation.

I repeat that EPNG believes each incident of probable contamination should be checked. And, EPNG is presently inspecting all of its pits with or without a pit control order from OCD. I believe that EPNG may have pits in use today which should be lined, or replaced with a tank. But, there is the continuing problem of determining which pits are a threat and which are not. We are aware of at least three laboratories, Sandia National Laboratory, Woodward Clyde Consultants, and the Southwest Research Institute, which are working on technology to determine the leaking potential of a particular pit at a cost which the government and industry could afford. EPNG is planning to provide Sandia National Laboratories in Albuquerque with several site locations for field testing of such technologies to verify its commercial applicability.

In summary, we urge the Commission to consider the fact that there are many pits, both in the vulnerable areas and elsewhere, that are doing no harm. Those pits should be allowed to continue unlined because they meet one of two critical criteria: 1) they are substantially above the groundwater table or 2) they are normally dry.

EPNG urges the Commission to adopt as a part of any order for control of unlined pits an exemption for those pits which meet the criteria of minimal threat. By providing for such exemptions, the resources available can be utilized to address those situations where there is a real threat to groundwater and to try new technologies in detecting those situations where the threat to groundwater is not clear.

EPNG, therefore recommends that any requirement of an order to prohibit and/or limit the disposition of produced waters should contain the following language:

Exemptions: The following earthen pits are exempt from the requirements of this order.

1) Pits lying outside vulnerable or special areas;
2) Pits to which no more than 5 barrels of produced water are discharged per day except where the depth to groundwater is less than 10 feet; and
3) Pits which are normally dry, i.e. to which produced water is discharged less than 10 days in any calendar month.

Thank you for this opportunity to express our concerns with respect to the pending order.

William F. Lorang, P.E.
Manager, Environmental Engineer
Environmental Affairs Department
El Paso Natural Gas Company
P. O. Box 1492
El Paso, Texas 79978

mts

Dick,

As per your request, please add the following info. to the order:

- Part 21 (c)

The location of said seven ditches are as marked on the following USGS 1/4 quadrangle maps which are available to operators at the Division district office in Aztec:

- 7½' Navajo Dam
- 15' Aztec
- 7½' Burnt Mesa
- 7½' Pine River
- 15' Gould Pass
- 15' Bloomfield
- 7½' Flora Vista
- 7½' Farmington North
- 7½' La Plata
- 7½' Farmington South
- 7½' Horn Canyon
- 7½' Kirtland
- 7½' Youngs Lake
- 7½' Waterflow
- 7½' Fruitland
- 7½' The Hogback North
- 7½' Sulfur Spring
- 15' Chimney Rock
- 15' Rattlesnake
- 7½' Shiprock

- Part 26

Contaminants in the produced water include but are not limited to TDS above stock, chlorides, sulfates, arsenic, iron, [illegible]

and aromatic organics including benzene, toluene, and the xylenes.

Jeff Taylor 3

Tom Kellahin Tenneco
Bill Carr NW PPI Amoco
Tom Wright CPNG
Chris Shuey self
Gary Paulson Amoco

Jeff Direct

Marty Buys Tenneco Chairman
BS Environ Chem Rutgers
PH Water Qual 1.6 2 yr
MS
St NJ Haz Waste NJ & Tenneco
Short Term committee

? ~~Exhibit No~~
? Committee agrees this protects most water

Townships w/o ~~water~~ oil or gas prod or only
isolated prod were not studied

? Intent of 4 (b) - Area between ditch
& river included in vulnerable areas
where described
? Expansion based on meeting 50 ft criteria

? Prohibitions
? Permits SE only after notice and hearing

do volumes vary well to well
Separator - tank drain - dehydrator

levels of hazard - phase out by well

? Options if all or most prohibited
injection - solar evaporation - Treatment & disposal

X Tom K

Are aquifers in vulnerable area contaminated (evidence - committee agree)
No, at risk

Need to use topo sheets to determine if ~~well~~ pit in vulnerable area.

1200 org wells in vulnerable area

18 mo needed to avoid winter months and to get costs into budget

X Chris Shuey

Committee would not have had time to get into on water contamination

X Tom Wright

X Gary Paulsen

Water quality in vulnerable area not obtained.

Dave Boyer
BS MS Hydrology

EID tests of community wells in area do not show dissolved hydrocarbons

* Do we need a letter from Steve Reynolds re protection from dissolved hydrocarbons in prod water

No small [illegible] exemptions (blanket)

Tanks - integrity
pits double lined?

X Carr

X Tom K

X Frank C

X Shuey

Phil Baca

April 3 or 17

Jennifer Pruett

Paul Rouse Cedar Hill Farms local and individual - no notice to community both tanks have leaked Struct

---

Perry Pearce Meridian - Grant
WF Carr add ARCO
EL Padilla BCOG En
Jen Pruett

Massud Zaman Geohydrologist
BS Geo
MS Structural

One well Exhibit 2
Prod 2 BW PD
Dug down 3 ft below dirt about 40 ft away - detected some "oily substance"

X Chris Shuey

X Tom Kellahin
reason select this site - complaints re this well was familiar w/ area.

Dr Gary Eiceman Assoc Prof
NM St Univ
BS Winchester }
Dr U Col }

Ms Pruett

X Tom
Ex 1 Does not have data here
on these samples
x Chris Shuey
x Frank Chavez

~~Jeff~~ Taylor

Richard Meyerhyne
BS ms Chemistry 15 yrs St Lab

2 grams/liter solubility of benzene in water

Dave Boyer

X Tom

Jennifer Pruett
Douglas Corp Water Resource Spec EID
BS UNM Bio minor Geo
MS Geo U Ariz
3 yrs EID surf water
1 yrs consulting

Doug Earp
don't have to have ponded water
for infiltration

Perry Pearce Meridian Largest opr of
Wells NW NM

Thomas R Schultz Cons Denver
BS OSU } Geo
MS "
PHD U Arizona 79

Attenuation
Removal or Delay

X Frank
X Dr Eiceman
X Ms Pruitt
X Shuey
X Jeff Taylor

4-22-85

Marx Elmer

Jennifer Pruett

Perry Pearce
Ex 2 Calculations Benzene-Toluene Vaporization

Dr Gary Miller

~~Missed Zamora~~

May degrade area of science immature fewer certainties

PAHs other organics

{Did show up in Flora Vista

JJ Basis Exp Actual case {How see, How long}

could recommend no of sites

X Tom K

overloaded system won't work

failure of equipment Large dump

The science still developing

30% per week biodegradation in saturated zone

X Pruett
real world ?

5 WPD } 18 month
~~400 000~~
500 000

ADAPTATION
Minimum volume
5 BWPD

X Chris Shuey

pit - well - volume

Dr Miller

Tom Kellahin Tenneco

Randy Hix BS MS Geo

? Ex 1 How many How long

? Did Byers testimony indicate that potential for pollution exists

D Plan review process

simple model only

D Plan requires each party to prove no problem. Is that what you propose

Relative availability of resources

State

Industry

Flora Vista not prod water

or not necessarily

? Aware any other water contam besides gas in SJ B

other organics

work shows drying pits

* migration

Hydrocarbons out a problem

volumes

Break down hydrocarbons on surface

TDS Levels chlorides

Monitor wells b... available for sampling

looked at 21 sites selected 3

Made hydrologic investigation of 75 well sites

X Frank Chavez

X Pruett

X Jeff

NCCD
complete prod
Water Analysis
at 3 sites

More complete
analysis from
Monitor wells

Ban over 5 BWPD
require
Pit registration
~~Opt loc~~
Owner location
Analysis
Volume

TDS
WQCC standards
Toxics
upset
Spill Contingency plan

No contamination prod water

Rain

4-23-85   Joe Rush
Tom K
AR Kendrick   Richard Thurstonson

? Lined pits to keep hydrocarbons off soil

? Manana pit lined - any upsets at Mary Wheeler Well

? upset   upset at ppl separator
5 BWPD mo average

Would new registration be required to move a pit from one location to another at a well location

---

X Frank   Hix agrees water enters groundwater
contaminants can enter water

pit registration - self deciding
Factors
TDS chl Sul
other
may redirect

10,000 TDS

Jeff Taylor
Dave Boyer

Prod 1460 BPYr
@ 26 BPYr rainfall

? Some oil w/ prod water

Safe level small volume exemption
Do we have enough info   Possibly 1/2 barrel isn't better than SE

Is 40 yrs w/o contamination significant
WO organics water

What wrong w/ Hix study
Why should OCC not rely on them
not be convinced by

X Tom
Flora Vista no benzene levels in dry pit

Could recommend based on evidence putting prod in unlined pit/water Mary Wheeler

Alberto ~~Gutierrez~~ Gutierez Pres Geo Science

bio degradation

Amoco Tennecd agree to install some monitor wells ?