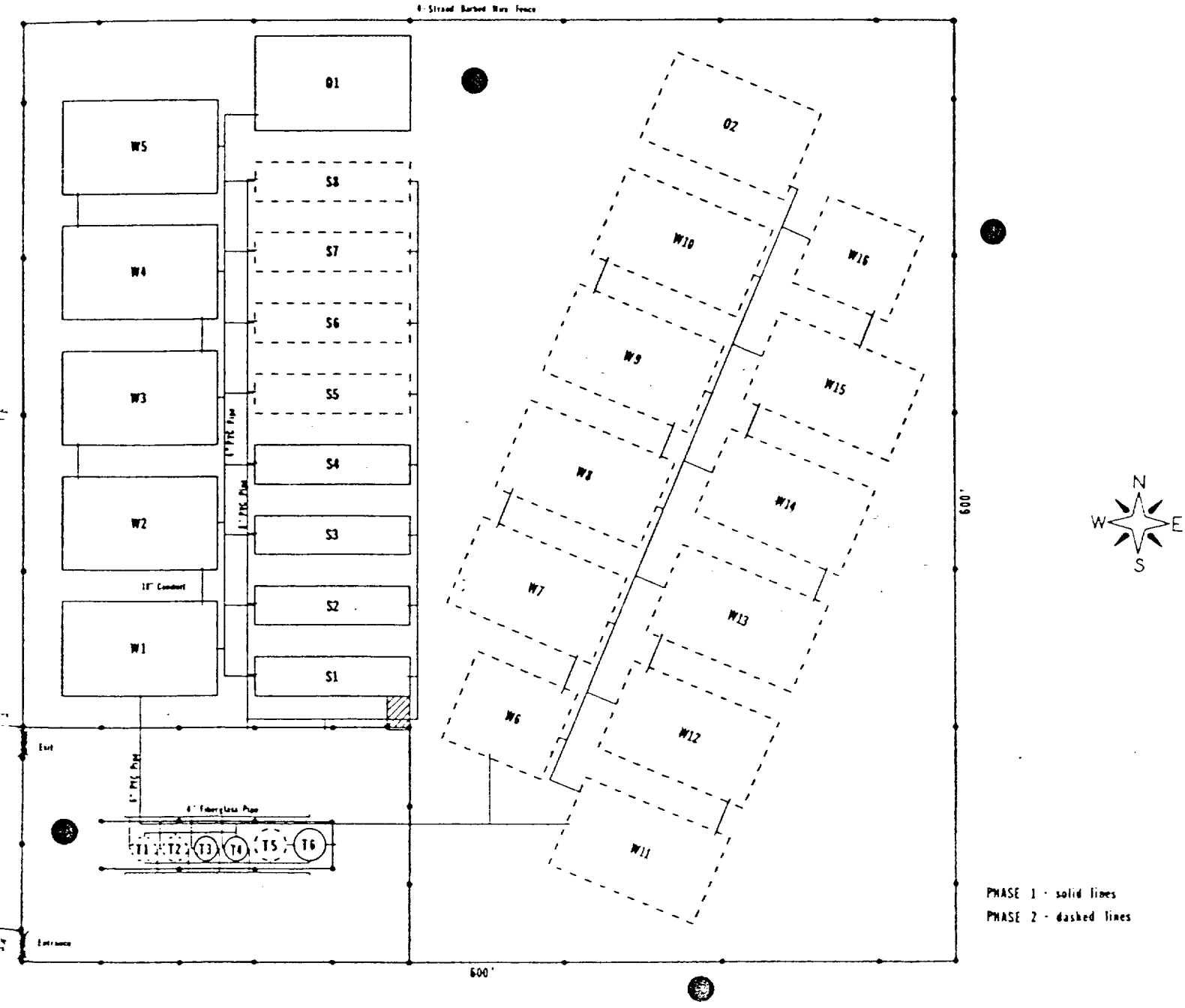
WELL NO. 1 ●

WELL NO. 2 ●

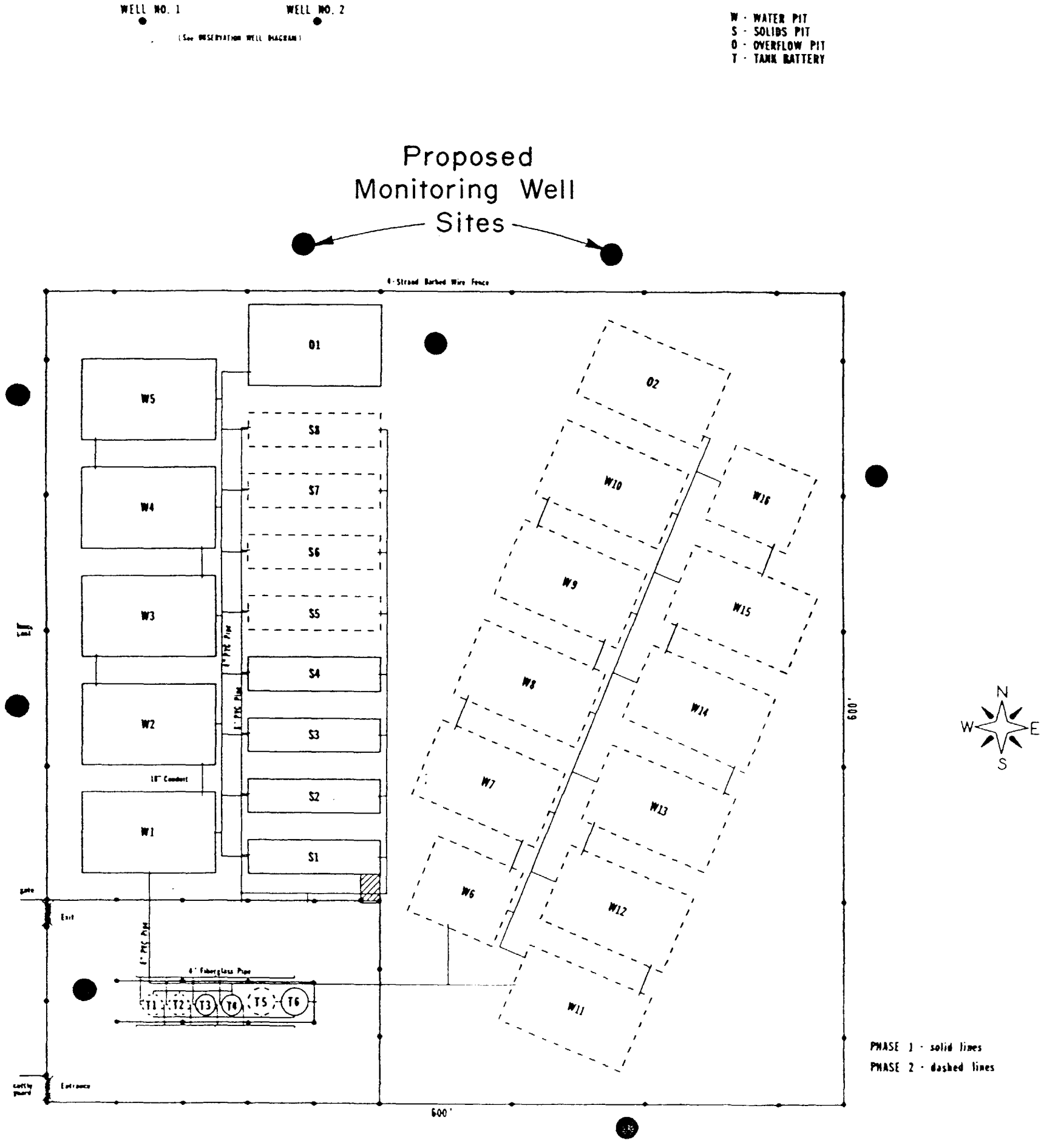
(See OBSERVATION WELL DIAGRAM)

W - WATER PIT
S - SOLIBS PIT
O - OVERFLOW PIT
T - TANK BATTERY

Proposed
Monitoring Well
Sites

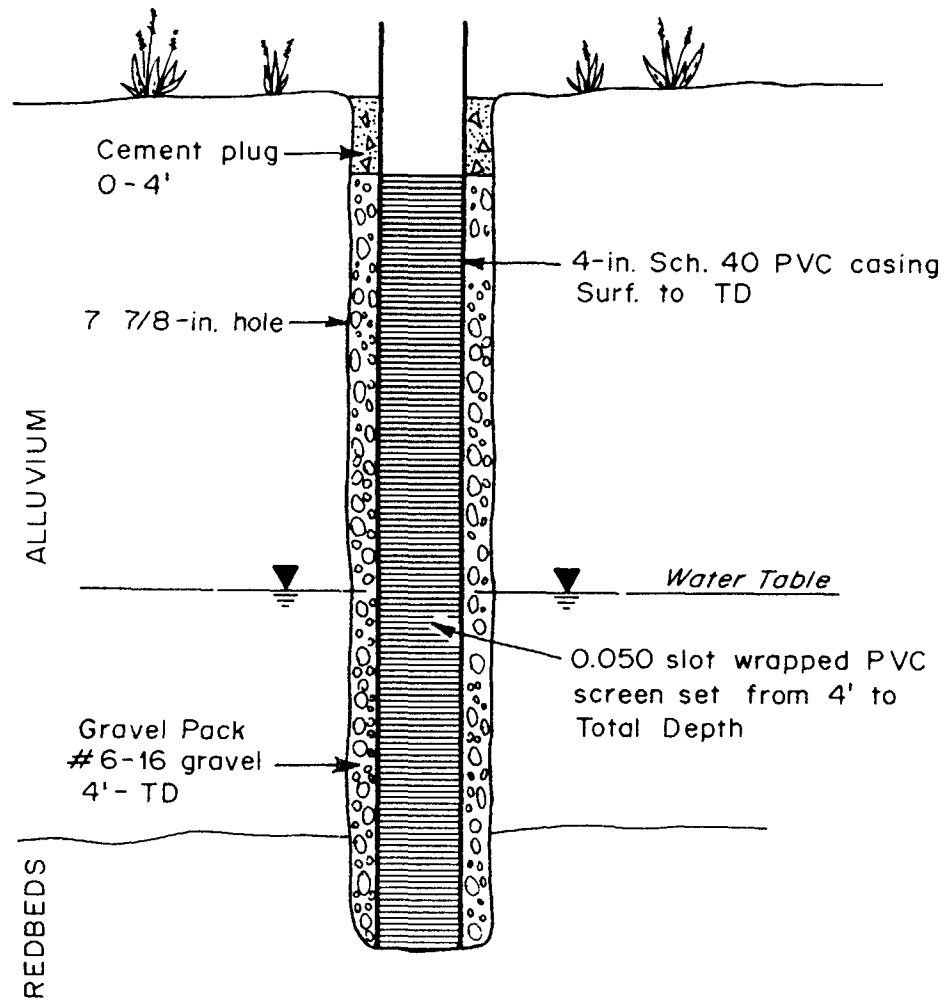



PHASE 1 - solid lines
PHASE 2 - dashed lines




## Proposed Monitoring Well

## (Schematic)




*Well should be drilled with air from surface to five feet below top of redbeds. Run geophysical logs for SP, resistivity, gamma and neutron.*

MADDOX, RENFROW & SAUNDERS
PROFESSIONAL CORPORATION
ATTORNEYS AND COUNSELORS AT LAW
POST OFFICE BOX 5370
HOBBS, NEW MEXICO 88241

DON MADDOX
JAMES M. MADDOX
JOHN M. RENFROW
JAMES P. SAUNDERS, JR.

SCOTTY HOLLOMAN
JOHN PAUL WEBER
GARY L. CLINGMAN

THIRD FLOOR
BROADMOOR BUILDING
(505) 393-0505

April 16, 1986

File
Case 8781

Mr. J. W. Neal, Esq.
Attorney for Pollution Control, Inc.
and Snyder Ranches
P. O. Box 278
Hobbs, NM 88241

Re: In the Matter of the Hearing called by the Oil Conservation Commission for the purpose of considering: Application of Petro-Thermo Corporation for an Exception to Order No. R-3221, as amended, Lea County, New Mexico; Case No. 8781

Dear Mr. Neal:

Reference is made to the directive issued by the Chairman, Oil Conservation Commission at the conclusion of the hearing on Thursday, April 10, 1986 in the above-styled and numbered case regarding the submission of photographs of the proposed disposal site and surrounding area.

This is written to advise you and your clients, Pollution Control, Inc. and Snyder Ranches, that representatives of Petro-Thermo Corporation will be present at the site of the abandoned TXO well in the SW/4 NE/4 of Section 16, Township 20 South, Range 32 East, N.M.P.M., Lea County, New Mexico at 10:00 a.m. on Tuesday, April 22, 1986. Representatives of Pollution Control, Inc. and Snyder Ranches are invited to be present and to execute a certification as to the taking of photographs.

Your cooperation in this regard will be sincerely appreciated.

Very truly yours,

John Paul Weber

JPW:rp

xc: R. L. Stamets, Director
Oil Conservation Division

W. G. Abbott, President
Petro-Thermo Corporation

Larry C. Squires
Polution Control, Inc.
and Snyder Ranches

W. Thomas Kellahin, Esq.
P. O. Box 2265
Santa Fe, NM 87504-2265

Jason Kellahin
W. Thomas Kellahin
Karen Aubrey

KELLAHIN and KELLAHIN
*Attorneys at Law*
El Patio - 117 North Guadalupe
Post Office Box 2265
Santa Fe, New Mexico 87504-2265

Telephone 982-4285
Area Code 505

RECEIVED

APR 2 - 1986

OIL CONSERVATION DIVISION

April 22, 1986

Mr. Richard L. Stamets
Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501

"Hand Delivered"

Mr. Ed Kelley
Director, Mining and Minerals
Energy and Minerals Department
525 Camino de los Marquez
Santa Fe, New Mexico 87501

Re: OCC Case 8781 - DeNovo
Petro-Thermo Corporation Application
for exception to Order R-3221 and for
Authority to Disposal of Produced
Waste in Unlined Surface Pits,
Lea County, New Mexico

Gentlemen:

On behalf of Snyder Ranches and Pollution Control, Inc., please find enclosed for your consideration our proposed order denying the application of Petro-Thermo Corporation for use of the Laguna Plata facility for surface disposal.

The Commission has no alternative but to deny this application for the following reasons:

(1) Jurisdiction

Petro-Thermo failed to establish a property interest in this case. That failure compels the Commission to deny the application in accordance with Division Rule 1203. Petro-Thermo has no lease, no ownership and no permission to utilize the proposed surface for this facility. The rights to this tract are vested in the Commissioner of Public Lands and in the absence of his prior approval, Petro-Thermo cannot bring a case before the Commission.

Under the definition section of the Division Rules and Regulations, an "Owner" is defined as the "person who has the right to drill into and to produce from any pool and to appropriate the production either for himself or for himself and another." An "Operator" is defined as a person "who, duly authorized, is in charge of the development of a lease or the operation of a producing property." Petro-Thermo Corporation under the Division's definitions is neither an owner or an operator.

(2) Surface Waste

The Division's Rules and Regulations define Surface Waste as "...the unnecessary or excessive surface loss or destruction without beneficial use, however caused,..."

The Commission has committed reversable error in precluding and ignoring evidence of "need" of this facility during the hearing held on April 10, 1986. The extent to which the surface can be "wasted" is directly linked to the question of need. For example, if all existing facilities in the area do not have the capacity to handle the volumes Petro-Thermo proposed for this facility, then the use of the surface would be reasonable and waste of the surface would not occur. Conversely, in the absence of proof of need, any use of the eight acre tract would be unreasonable and therefore constitute surface waste.

(3) Failure to Protect Fresh Water

Applicant has failed its burden to prove that the contaminated discharge water can be safely deposited into the facility without adversely affecting fresh water.

The evidence was that if the seepage from the impoundments at the proposed waste facility migrated off site towards Laguna Plata that the discharged water can migrate out the west side of the Plata into Nash Draw and on to the Pecos River. The conclusion from all of the hydrologic evidence is that from current data, none of the experts know where and at what rate the discharged water will migrate.

The Commission violates Section 70-2-12 B. (15) with the approval of this application.

(4) Trespass

It is undisputed that the discharge produced water will migrate beyond the facility. In fact, the design and construction of the facility is intended and will rely upon the produced water migrating into Laguna Plata. The offsite migration constitutes both surface and subsurface trespass. The commission's approval of this application over the objection of offset owners of valuable property rights exposes both the Commission and the applicant to liability for any and all environmental damage and waste. The commission would be in violation of and in excess of its statutory authority to allow and authorize produced water discharges in such a manner as to cause injury to neighboring leases or properties.

(5) Monitoring Wells

The Division's proposed monitoring wells, as set forth in its letter dated February 18, 1986, is not adequately designed to detect migration of the produced water. Even if they do happen to detect the produced water as it migrates, all the monitoring wells will do is confirm that the produced water has migrated off of the facility. The monitoring wells do not provide any element of protection to the adjoining owners.

Conclusion

This application is nothing but an environmental accident waiting to happen. There is nothing in the record to support approval of this application.

We do not know when, where, and how long it will take for the facility to damage the rights of others, but when it occurs both the applicant and the Commission will share the responsibility.

Very truly yours,

W. Thomas Kellahin

WTK:ca
Enc.

cc: John P. Weber, Esq.
Maddox, Renfrow & Saunders
P. O. Box 5370
Hobbs, New Mexico 88214

Mr. Larry Squires
Pollution Control
P. O. Box 1060
Lovington, New Mexico 88260

Mr. Joe Ramey
P. O. Box 6016
Hobbs, New Mexico 88241

J. W. Neal, Esq.
P. O. Box 278
Hobbs, New Mexico 88241

Tim Kelley
Geohydrology Assoc.
4015 Carlisle, N.E., Suite A
Albuquerque, New Mexico 87107

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

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

CASE NO. 8781
ORDER NO. R-8161-A
DeNovo

APPLICATION OF PETRO-THERMO
CORPORATION FOR AN EXCEPTION TO
ORDER NO. R-3221, AS AMENDED,
LEA COUNTY, NEW MEXICO.

POLLUTION CONTROL INC. AND
SNYDER RANCHES PROPOSED
ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9:00 a.m. on April 10, 1986, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this _____ day of April, 1986, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

FINDS:

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

(2) That Order (3) of the Commission Order No. R-3221, as amended, prohibits in that area encompassed by Lea, Eddy, Chaves, and Roosevelt Counties, New Mexico, the disposal, subject to minor exceptions, of water produced in conjunction of the production of oil or gas, or both, on the surface of the ground, or in any pit,

pond, lake, depression, draw, streambed, or arroyo, or in any water course, or in any other place or in any manner which would constitute a hazard to any fresh water supplies and said disposal has not previously been prohibited.

(3) That the aforesaid Order No. R-3221 was issued in order to afford reasonable protection against contamination of fresh water supplies designated by the State Engineer through disposal of water produced in conjunction with the production of oil or gas, or both, in unlined surface pits.

(4) That the State Engineer has designated, pursuant to Section 70-2-23(15), NMSA 1978 Compilation, all underground water in the State of New Mexico containing 10,000 parts per million or less of dissolved solids as fresh water supplies to be afforded reasonable protection against contamination; except that said designation does not include any water for which there is no present or reasonable foreseeable beneficial use that would be impaired by contamination.

(5) That the applicant, Petro-Thermo Corporation, seeks as an exception to the provisions of the aforesaid Order ~~(3)~~ to permit the commercial disposal of up to 30,000 barrels a day of produced salt water, associated waste hydrocarbons and other solids obtained in conjunction with the drilling and production of oil and gas into unlined surface pits to be located in the E/2 N/4 of Section 16, Township 20 South, Range 32 East, N.M.P.M. Lea County, New Mexico.

(6) That the applicant proposes to install and operate a surface salt water disposal facility consisting of separating tanks, settling pits and skimming equipment, for the removal and reclamation of oil and basic sediment from the produced salt water to be disposed in said system.

(7) That the applicant also seeks authority to dispose of solid oil-field waste products, including drilling mud and cuttings at the subject site.

(8) The matter came on for hearing on December 18, 1985, at Santa Fe, New Mexico, before Oil Conservation Division Examiner Michael E. Stogner and pursuant to his hearing, Order R-8161 was issued on February 13, 1986.

(9) On March 4, 1986, application for Hearing DeNovo was filed with the Commission by Snyder Ranches, Inc., and Pollution Control Inc.

(10) The matter came on for hearing DeNovo on April 10, 1986.

(11) That Synder Ranches, Inc., is the owner of federal grazing leases adjacent to the applicant's proposed facility, is an interested party affected by this application, and appeared in opposition to the application.

(12) That Pollution Control Inc. has an approved surface disposal facility located at Laguna Gatuna in Section 18, T20S, R32E, Lea County, New Mexico, approximately four miles from the applicant's requested facility and is also an interested party affected by this application appearing in opposition to the application.

(13) The applicant's proposed facility is to be located on approximately ~~ten~~ 5.57 acres contained within the SE/4SE/4NE/4, Section 16, T20S, R32E.

(14) Applicant's proposed facility is engineered and designed as an infiltration disposal facility where contaminated produced water will be deposited into unlined surface pits, then the contaminated water will percolate into the alluvium under the pits and is intended then to migrate beyond the facility into Laguna Plata onto Bureau of Land Management acreage.

(15) As of the date of the DeNovo Hearing, the applicant has not obtained a business lease from the Commissioner of Public Lands of New Mexico, who is the owner of the acreage included within the facility as well as the E/2NE/4 of said Section 16.

(16) As of the date of the hearing the applicant has not obtained the approval of the Bureau of Land Management for the discharge of produced water into Laguna Plata.

(17) That Applicant, Petro-Thermo Corporation does not have a property interest in the acreage and has failed to comply with Rule 1203 of the Division Rules and Regulations.

(18) The hydrogeologic evidence presented in this case is insufficient to justify the utilization of this facility for surface disposal into unlined surface pits for reasons, including the following:

(a) Within Section 16, the thickness of the alluvial cover ranges from zero feet to 130 feet, but is completely unknown at the proposed site itself.

(b) In the absence of accurate data concerning the thickness and composition of the alluvial cover from the surface to the redbeds, the hydrologists are unable to accurately project the direction and rate of subsurface migration of the discharged water.

(c) There is no evidence presented by the applicant which confirms that the redbed surface slopes directly ~~flow~~ toward Laguna Plata.

(d) In the absence of accurate data about the slope of the redbeds, it is not possible to accurately project that the discharged water will flow only into Laguna Plata and not elsewhere.

(e) Applicant failed to rebut available hydrology reports (Reed-1969) that there would be a westward migration of groundwater from Laguna Plata that eventually migrates into the Nash Draw and eventually into the Pecos River.

(f) Applicant's opinion that Laguna Plata is a closed depression is not supported by the data and the hydrology conducted by Hunter (1985) or by Geohydrology Assoc. (1979).

(g) No evidence was presented by applicant to substantiate that the disposal ponds will function properly.

(h) The applicant and its experts are without prior experience in the design, construction, and operation of a surface disposal facility.

(i) Should the facility function as proposed by applicant, the discharge water will cause hydrocarbons to be introduced into Laguna Plata.

(19) That the Triassic redbeds, comprised of the Chinle Shale, Santa Rosa sandstone and the Dewey Lake formation, underlie the proposed water disposal site and Laguna Plata.

(20) That the surface of the Triassic redbeds is depressed in the vicinity of the waste disposal site and Laguna Plata.

(21) That the seepage from the impoundments at the proposed waste disposal site will infiltrate into the subsurface and migrate off the site towards and possibly into Laguna Plata.

(22) That neither the pit(s) nor the immediate underlying sediments are impervious and a percentage of the disposed water would leak into the subsurface to enter the Santa Rosa and Rustler Anhydrite formations.

(23) That while the Santa Rosa formation contains no fresh water in the immediate vicinity of the proposed pit(s), it does contain fresh water at various locations both up-dip and down-dip therefrom.

(24) That clay zones within the Santa Rosa could contribute to the horizontal migration of waters percolating from said pits which waters could reach and contaminate down-dip fresh water supplies in said formation.

(25) That if the salt water from said pits should percolate vertically through the Santa Rosa formation, it would enter the Rustler formation.

(26) That insufficient data was presented relative to the long term effect of the disposal of salt water in the proposed pit(s) and its potential affect on surface and subsurface waters versus the economic need for the requested disposal volumes at this facility.

(27) The utilization of the proposed Petro-Thermo Corporation disposal site adjacent to Laguna Plata for the disposal of water produced in conjunction with the production of oil or gas, or both, and oil-field waste products, including drill cuttings and drilling muds will constitute a potential hazard to fresh water supplies.

(28) That Applicant's request for 30,000 barrels a day disposal rate is ten times greater than applicant's actual need for this facility.

(29) The approval of the facility as requested will result in the destruction of valuable grazing lands and poses a significant environmental threat to surrounding Federal lands and resources.

(30) That seepage of discharged water will migrate off of the facility and threaten wildlife in the area, including several threatened and endangered species.

(31) The proposed facility may adversely affect local hydrology and may affect several existing nearby salt mining operations conducting business in Laguna Plata.

(32) The proposed monitor wells are not adequate to detect migration of discharge water offsite and cannot be effectively utilized for cleanup of any environmental damages that the facility may cause.

(33) The facility is designed so that hazardous substances which are found in associated wastes, brines muds and produced waters from oil and gas well operations will be introduced into the local hydrology at proposed volumes that pose a significant environmental risk.

(34) Approval of this application will result in surface waste in violation of the Division Rules and Regulations.

(35) The utilization of this facility for produced water disposal should be denied.

(36) That applicant has failed to demonstrate that Pollution Control's site is inadequate to meet current needs of the industry.

(37) Pollution Control Inc., pursuant to Order R-3725-A operates a satisfactory repository into Laguna Gatuna for produced water and for solid oil-field waste products approximately four miles from the subject site.

(38) Unlike Laguna Plata, Laguna Gatuna is hydrologically suitable for such waste disposal because it is proven to be a closed depression with no ground water outflow.

(39) That the surface disposal of oil field solid waste materials as proposed by the applicant creates a potential environmental risk.

(40) That the surface disposal of oil field solid waste should be strictly limited to the fewest possible sites in order to prevent surface waste.

IT IS THEREFORE ORDERED:

(1) That the application of Petro-Thermo Corporation for an exception to Order (3) of Division Order No. R-3221, as amended, to dispose of water produced in conjunction with the production of oil or gas, or both, in unlined pits adjacent to Laguna Plata in a 600' x 600' area out of the SE/4NE/4 of Section 16, Township 20 South, Range 32 East, N.M.P.M., Lea County, New Mexico, is hereby DENIED.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

RICHARD L. STAMETS
Chairman

ED KELLEY
Member

S E A L

DANIEL B. STEPHENS & ASSOCIATES, INC.
CONSULTANTS IN GROUND-WATER HYDROLOGY

• GROUND-WATER CONTAMINATION • UNSATURATED ZONE INVESTIGATIONS • WATER SUPPLY DEVELOPMENT •

April 22, 1986

Mr. R.L. Stamets
Director OCD
Energy & Minerals Dept.
P.O. Box 2088
State Land Office Bldg.
Santa Fe, New Mexico 87501

Dear Mr. Stamets:

Reference is made to your direction at the close of the hearing no. 8781 that any additional submissions by Petro-Thermo Corp. be made no later than April 24, 1986. This is to forward agreements regarding the testimony provided by Mr. Tim Kelly for Pollution Control, Inc. and Snyder Ranches.

Pollution Control Inc. contends that there are eight "Problems Which Have Not Been Adequately Addressed by Petro-Thermo Report". This is attached (Attachment 1) and my responses to each follow:

1. The 10-20 feet of alluvial cover thickness beneath the site is estimated from extrapolations of the alluvium - bedrock contacts easily observed in outcrops on the north side of the property at the west end of Laguna Plata. This depth is at the low end of the range of values reported in well logs shown for section 16 on page 6 of my hydrogeologic report to Petro-Thermo in December 1985.

2. There are obvious outcrops of red beds elevations above the water level of Laguna Plata in arroyos and along the shore just north of the site. As indicated in my report on page 5, there is approximately 60 feet of difference in elevation of the red bed surface between the site and Laguna Plata. The surface slope of the red beds logically must be toward Laguna Plata.

3. My hydrogeologic report indicates the presence of red beds along the west and southwest portions of Laguna Plata just north and west of the proposed site. Small Springs and seeps were observed to exist near the red bed-alluvium contact. No evidence for a bedrock channel in the vicinity of the site was noted in field reconnaissance work. If a channel exists at the site, it is possible that it conveys ground water <u>toward</u> Laguna Plata.

600 NEEL AVENUE SOCORRO, NEW MEXICO 87801 (505) 835-3162

4. In reference to the water level contour map Figure 3 on page 13 of my report, there is adequate justification for closing the 3440 contour. The work by Hunter (1985) and Geohydrology Assoc. (1979) is in error in this locale, partly because they did not include lake and spring elevations. The free water elevation of Laguna Plata is about 3431 feet (msl), (not 3440 as shown on Figure 3). A shallow well less than 2 miles west of the site indicates a water level of 3440 ft. The elevations of Laguna Toston southwest of the site is approximately 3476 feet. There are also springs and seeps which have been noted on the west end of Laguna Plata; in fact, one of these was sampled by Mr. Dave Boyer of NMOCD. Clearly, shallow water level data indicates an east and northeast component of flow near the site which, when combined with other data, provides ample hydrogeologic evidence to close the 3440 water level contour. It may be expected that a ground water flow divide exists somewhere west of Laguna Plata which isolates flow to Nash Draw.

5. The disposal ponds may require maintenance to function properly. The soils appear to be sandy and have the potential to allow for adequate seepage if a clogging layer is not present. However, seepage is a preferred means of disposal, in that the slow travel time of flow in the soil and shallow aquifer allow natural processes to filter and degrade hydrocarbons in the seepage before they enter Laguna Plata. It is not an uncommon practice to pipe discharge directly to playa lakes as a means of disposal.

6. There is ample data in the report which will allow one to easily calculate evaporation from the disposal ponds. Evaporation is not intended to be relied upon as a means of waste disposal.

7. Springs at Laguna Plata do not have TDS concentrations less than 9,000 ppm. Springs at the east end of Laguna Plata have chloride concentrations which range from 7446 to 8864 mg/l and sulfate concentrations which are approximately 12,000 mg/l. Thus, TDS is at least 20,000 mg/l.

At my suggestion, a seep at the east end of Laguna Plata (20.32.11.323) was sampled by Mr. Jim Thornton of Petro Thermo Inc. At this seep, TDS was 196,443 mg/l and chloride was 74,000 mg/l (Attachment 2A, 2B). The spring at the west end of Laguna Plata sampled by Mr. Dave Boyer had a TDS of 36,428 mg/l (Attachment 3). Therefore, the TDS range expected for the waste water is not less than that at springs.

8. The occurrence of saline lakes in depressions of the land surface overlying salt and anhydrite formations is widespread in eastern New Mexico. There are numerous other saline lakes in the region which have not received waste water from any known source in the past. Certainly, potash mining wastes have contributed to the mineralization of Laguna Plata. The fact that a commercial salt operation exists at Laguna Plata suggests that discharge from potash mining has not had a significant impact on

the composition of the evaporite minerals. The existing concentration of salt in the lake is not likely to be significantly affected by the proposed disposal operation.

Pollution Control Inc., in their exhibit 6 contends that there are significant differences when one makes a "Comparison of Gehydrologic Conditions at Laguna Gatuna with Laguna Plata" (Attachment 4). My comments in response now follow:

1. Natural Water Quality - The TDS, not chloride, concentration of waste water is expected to range from 25,000 to 75,000 ppm (see page 15 of my hydrogeologic report). The spring which is closest to the site, sampled by Dave Boyer (Attachment 3), has a chloride concentration of 36,428 mg/l. This falls within the range of values reported for Laguna Gatuna.

2. Ground-water Flow - There are seeps and springs at the west side of Laguna Plata which have been noted in my hydrogeologic report and inspected by NMOCD. The water level in Laguna Plata is at the lowest elevation of the lakes and shallow water levels in wells which are located in the area. Shallow water level date to the west of Laguna Plata do not support a mechanism of discharge to the west.

3. Distribution of Triassic Rocks - Red beds have been observed in outcrop in arroyos at the site. It is in this area in particular where the occurrence of red beds is relevant to the waste disposal operation.

I hope this communication clarifies the questions posed by Pollution Control Inc..

Please do not hesitate to call me if I can be of further assistance.

Yours very sincerely,

Daniel B. Stephens

Daniel B. Stephens, PhD
President

DBS/mt

attachments

cc: J. Weber
J. Thornton

ATTACHMENT 1

PROBLEMS WHICH HAVE NOT BEEN ADEQUATELY ADDRESSED BY PETRO-THERMO REPORT

1. The thickness of the alluvial cover is unknown at the proposed site. Within Section 16, the thickness ranges from 0 to 130 feet, but it is completely unknown at the proposed site itself. ESTIMATED 20' OF EXPOSED ARROYO

2. The upper surface of the redbeds is an erosional surface of considerable relief. There is no evidence presented by the report which confirms that the redbed surface slopes directly toward Laguna Plata.

3. The report does not disprove work by Reed (1969) which indicates a bedrock channel which would result in a westward migration of groundwater from Laguna Plata (illustration).

4. The report, Figure 3, shows that the 3,440-foot contour is closed, thus indicating that Laguna Plata is a closed depression. Data on the map shows no justification for closing the contour. The intrepretation shown in Figure 3 is not supported by work by Hunter (1985) or by Geohydrology Assoc., (1979). (illustrations)

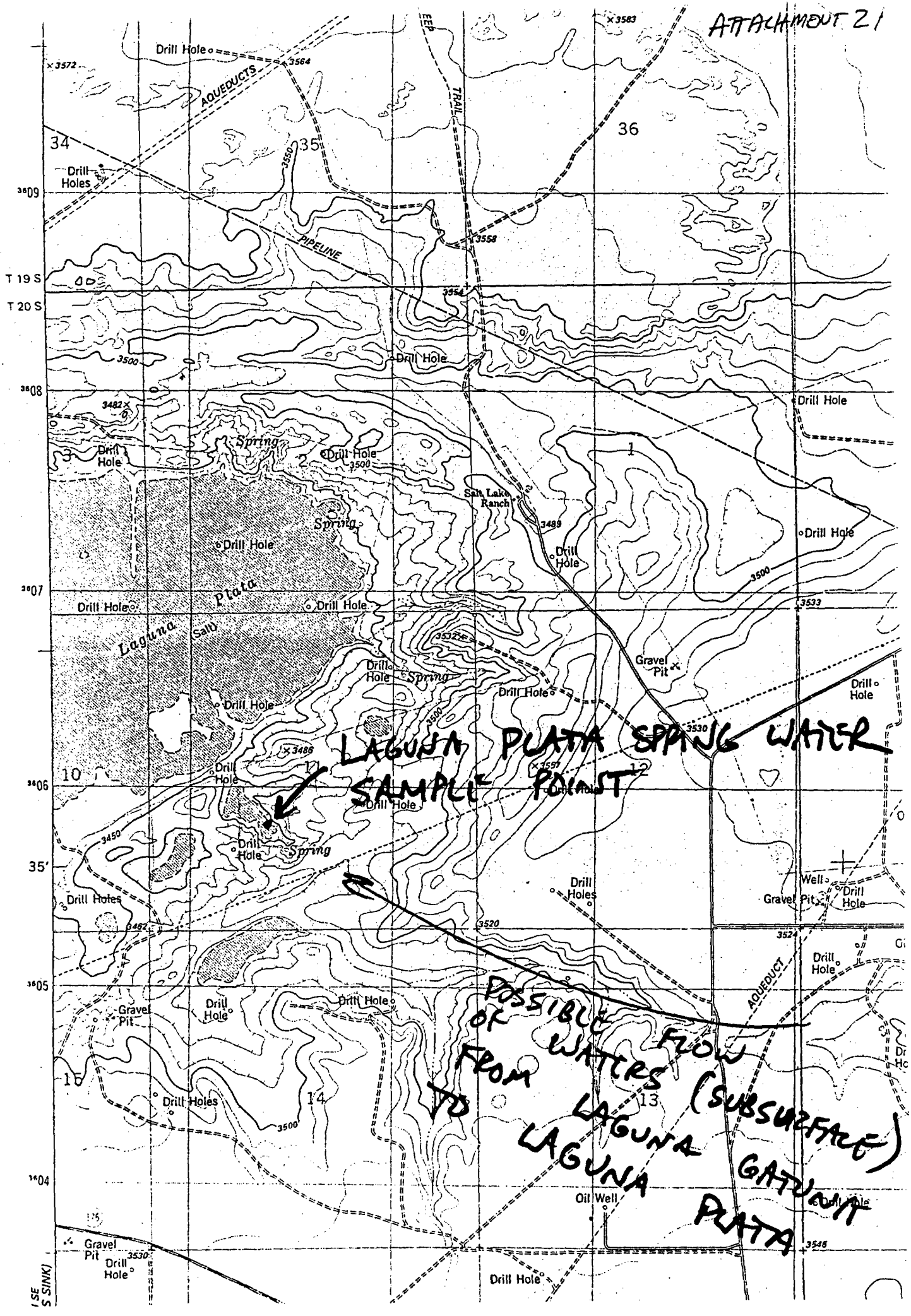
5. No evidence is presented in the report which substantiates that the disposal ponds will function properly. In fact the very nature of drilling mud is to cause plugging of natural porosity in sediments.

6. Evaporation of fluids should be calculated for surface area of the disposal ponds and NOT for Laguna Plata.

7. The report does not contain any chemical analyses of water samples from the fluid which will be disposed. The TDS range is reported to be 25,000 to 75,000 ppm but springs at Laguna Plata have less than 9,000 ppm. *

8. The concentration of 335,100 ppm reported in report for Laguna Plata is a concentrated brine resulting from evaporation on the lake floor or is a residual concentration from potash discharge by Kerr-McGee

ATTACHMENT 21



ATTACHMENT 2

UNICHEM INTERNATIONAL

707 NORTH LEECH P.O.BOX 1499

HOBBS, NEW MEXICO 88240

COMPANY : AGUA INC.
DATE : 04/18/86
FIELD,LEASE&WELL : LAGUNA PLATA SPRING WATER
SAMPLING POINT:
DATE SAMPLED : 04/14/86

SPECIFIC GRAVITY = 1.133
TOTAL DISSOLVED SOLIDS = 196443
PH = 8.01

| | | ME/L | MG/L |
|---|---|---|---|
| CATIONS | | | |
| CALCIUM | (CA)+2 | 39.3 | 787. |
| MAGNESIUM | (MG)+2 | 298. | 3625. |
| SODIUM | (NA),CALC. | 2852. | 65579. |
| ANIONS | | | |
| BICARBONATE | (HCO3)-1 | 7.4 | 451. |
| CARBONATE | (CO3)-2 | 0 | 0 |
| HYDROXIDE | (OH)-1 | 0 | 0 |
| SULFATE | (SO4)-2 | 1082. | 52000 |
| CHLORIDES | (CL)-1 | 2100 | 74000 |
| DISSOLVED GASES | | | |
| CARBON DIOXIDE | (CO2) | NOT RUN | |
| HYDROGEN SULFIDE | (H2S) | NOT RUN | |
| OXYGEN | (O2) | NOT RUN | |
| IRON(TOTAL) | (FE) | | 3.6 |
| BARIUM | (BA)+2 | 0 | .28 |
| MANGANESE | (MN) | NOT RUN | |

IONIC STRENGTH (MOLAL) =4.176

| SCALING INDEX | TEMP |
|---|---|
| | 30C |
| | 86F |
| CARBONATE INDEX | 1.55 |
| CALCIUM CARBONATE SCALING | LIKELY |
| CALCIUM SULFATE INDEX | 28.3 |
| CALCIUM SULFATE SCALING | LIKELY |

ILLEGIBLE

ION STRENGTH IS TOO HIGH FOR CARBONATE METHOD

Albuquerque, NM 87106 — (505) 841-2555 NM

# and NITROGEN ANALYSIS ATTACHMENT

| | | | |
|---|---|---|---|
| DATE RECEIVED: 2/10/86 | LAB NO.: WC 566 | USER CODE: ☐ 59300 ☐ 59600 ☒ OTHER: 82235 (PetroTherm) | |
| Collection DATE: 86/02/04 | SITE INFORM-ATION ► | Sample location: South Seep - Laguna Plata | |
| Collection TIME: 1110 | | Collection site description: Sample From South Seep in NE NW 1/4 of NE 1/4 Sec 16 T 20 S, R 32 E in Arroyo | |
| Collected by — Person/Agency: ROYER / OCD | | | |

SEND FINAL REPORT TO ►

ENVIRONMENTAL BUREAU
NM OIL CONSERVATION DIVISION
State Land Office Bldg, PO Box 2088
Santa Fe, NM 87501

Attn: David Boyer

Station/ well code:

Owner:

## SAMPLING CONDITIONS

| | | | |
|---|---|---|---|
| ☐ Bailed ☒ Dipped ☐ Pump ☐ Tap | Water level | Discharge | Sample type: Grab |
| pH (00400) | Conductivity (Uncorrected) μmho | Water Temp. (00010) °C | Conductivity at 25°C (00094) μmho |

Field comments: Water seepage forms small pond/puddle at base of arroyo cut. Water seeping from thin sandstone layer

## SAMPLE FIELD TREATMENT — *Check proper boxes*

No. of samples submitted: 1

☒ NF: Whole sample (Non-filtered) ☐ F: Filtered in field with 0.45 μmembrane filter ☐ A: 2 ml $H_2SO_4$/L added

☒ NA: No acid added ☐ Other-*specify:*

## ANALYTICAL RESULTS from SAMPLES

| NF, NA | | Units | Date analyzed |
|---|---|---|---|
| ☐ Conductivity (Corrected) 25°C (00095) | | μmho | |
| ☐ Total non-filterable residue (suspended) (00530) | | mg/l | |
| ☐ Other: | | | |
| ☐ Other: | | | |
| ☐ Other: | | | |

| F, NA | | Units | Date analyzed |
|---|---|---|---|
| ☒ Calcium (00915) | 276.0 | mg/l | 2-10 |
| ☒ Magnesium (00925) | 150.7 | mg/l | " |
| ☒ Sodium (00930) | 11760 | mg/l | " |
| ☒ Potassium (00935) | 206.7 | mg/l | " |
| ☒ Bicarbonate (00440) | 4238 | mg/l | 2/16 |
| ☒ Chloride (00940) | 15276 | mg/l | 2/20 |
| ☒ Sulfate (00945) | 11657 | mg/l | 2/18 |
| ☒ Total filterable residue (dissolved) (70300) | 36428 | mg/l | 3/13 |
| ☐ Other: | | | |

| NF, A-$H_2SO_4$ | | | |
|---|---|---|---|
| ☐ Nitrate-N +, Nitrate-N total (00630) | | mg/l | |
| ☐ Ammonia-N total (00610) | | mg/l | |
| ☐ Total Kjeldahl-N ( ) | | mg/l | |
| ☐ Chemical oxygen demand (00340) | | mg/l | |
| ☐ Total organic carbon ( ) | | mg/l | |
| ☐ Other: | | | |
| ☐ Other: | | | |

| F, A-$H_2SO_4$ | | | |
|---|---|---|---|
| ☐ Nitrate-N +, Nitrate-N dissolved (00631) | | mg/l | |
| ☐ Ammonia-N dissolved (00608) | | mg/l | |
| ☐ Total Kjeldahl-N ( ) | | mg/l | |
| ☐ Other: | | | |

| Analyst | Date Reported | Reviewed by |
|---|---|---|
| | 3/24/86 | |

Laboratory remarks:

SLD 726 (12/84) *DISTRIBUTION:* WHITE — EID, GW&HW Bureau CANARY — WS System PINK — EID Local Office GOLDENROD — SLD

ATTACHMENT 4

# COMPARISION OF GEOHYDROLOGIC CONDITIONS AT LAGUNA GATUNA WITH LAGUNA PLATA

| CRITERIA | LAGUNA GATUNA | LAGUNA PLATA |
|---|---|---|
| Natural Water Quality | Springs are more highly mineralized and are similar to water water. Chlorides from springs range from 27,657 to 163,105 ppm. | Springs are relatively low in mineralization. Chlorides range from 7,446 to 8,864 ppm whereas waste water will range from 25,000 to 75,000 ppm. |
| Ground-water Flow | Springs are located on the south and west side of Laguna Gatuna verifying that this is a closed depression with no ground-water outflow. | Springs are located only on the east end which is up-gradient on the water table. The lack of springs on the west end suggests that ourflow may occur in that direction. |
| Distribution of Triassic Rocks | Triassic redbeds present on all sides of Laguna Gatuna: the geologic conditions are well defined. | Triassic redbeds are present only on the north side of Laguna Plata. Depth of redbeds on east, south, and west sides is unknown. |

SOUTH ?
REGIONAL IN GROUND WATER FLOW

TRIASSIC RED BED FOUND IN ARROYO

BEFORE THE
OIL CONSERVATION DIVISION
Santa Fe, New Mexico
Case No. 8781 Exhibit No. 6
Submitted by Pollution Control
Hearing Date 4/10/86