

Public Service Company
of New Mexico
Alvarado Square MS 0408
Albuquerque, NM 87158

November 2, 1999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED



Mr. Carl Will
New Mexico Environment Department
Hazardous & Radioactive Materials Bureau
2044 Galisteo
P.O. Box 26110
Santa Fe, NM 87502

RE: Person Generating Station (NMT 360010342) – Construction and Testing of the Cobisa Person
Station Production Well Report

Dear Mr. Will:

Enclosed please find one copy of the following report: "Construction and Testing of the Cobisa Person
Station Production Well," October 1999.

If you have any questions, please contact me at (505) 241-2014.

Sincerely,

A handwritten signature in cursive script that reads "John Hale".

John Hale
Environmental Engineer

Enclosure

**CONSTRUCTION AND TESTING OF THE
COBISA PERSON STATION PRODUCTION WELL**

**PREPARED FOR
COBISA - PERSON POWER COMPANY, INC.
HOUSTON, TEXAS**

**PREPARED BY
METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO**

OCTOBER 1999

TABLE OF CONTENTS

INTRODUCTION	1
WELL DRILLING	1
WELL COMPLETION	1
WELL DEVELOPMENT	2
PUMP TESTING	2
PERMANENT PUMP DESIGN	2
FIGURE 1	PRODUCTION WELL LOCATION MAP
FIGURE 2	COMPLETION DIAGRAM
FIGURE 3	40 YEAR DRAWDOWN
APPENDIX A	ROBERT DINWIDDIE LETTER TO RON JOHNSON
APPENDIX B	SAMPLE LOGS
APPENDIX C	GEOPHYSICAL LOGS
APPENDIX D	DRAWDOWN AND RECOVERY DATA
APPENDIX E	TIME/DRAWDOWN AND RESIDUAL/DRAWDOWN GRAPHS
APPENDIX F	DRAWDOWN AND RECOVERY DATA AND TIME/DRAWDOWN GRAPHS FOR SHALLOW MONITORING WELLS
APPENDIX G	PUMP CURVE

CONSTRUCTION AND TESTING OF THE COBISA PERSON STATION PRODUCTION WELL

INTRODUCTION

Between July 19, 1999 and September 17, 1999, a 250 gpm production well was constructed and tested at Person Station to meet the water demands of a gas turbine being constructed at the site. The primary design constraint is a chlorinated solvent plume located in the shallow groundwater (about 150 ft. below ground level at the production well location) to the north of the production well location (FIGURE 1). The design considerations and well specifications are contained in METRIC Corporation, January 1999, "Design Report Person Station Gas Turbine Production Well". The well design and specifications were approved by the New Mexico Environment Department, Hazardous and Radioactive Materials Bureau. The letter from Robert S. Dinwiddie to Ron Johnson, dated April 12, 1999, contains the approval (APPENDIX A).

WELL DRILLING

The pilot hole was drilled to a depth of 500 ft. below ground level (FIGURE 2). A sample log of the drill cuttings is presented in APPENDIX B. A series of geophysical logs was performed on the pilot hole. The geophysical logs are presented in APPENDIX C. The pilot hole was reamed to 12 1/4 in. diameter.

WELL COMPLETION

Based on interpretation of the logs, the bottom 10 ft. of the hole was backfilled with 3/4 in. bentonite chips to preserve the integrity of the clayey sand present at that level. The screened intervals shown in FIGURE 2 were selected based on interpretation of the logs. The 5% bentonite cement shown on FIGURE 2 was placed with a tremie pipe placed to a depth of 403 ft.

WELL DEVELOPMENT

The well was developed using simultaneous jetting and pumping with a submersible pump. Development continued for a total of 26 hours until further improvements in specific capacity were not being obtained.

PUMP TESTING

The completed well was subjected to 48 hours of pumping and 48 hours of recovery beginning on September 13, 1999 and continuing to September 17, 1999. The test was conducted at a rate of 258 gpm. The drawdown and recovery data is presented in APPENDIX D. Time/drawdown and residual/drawdown plots of the pump test data are presented in APPENDIX E. Conservative interpretation of the plots yield an aquifer transmissivity of 11,000 gpd/ft.

During the pumping and recovery periods, water levels in five of the closest shallow monitoring wells were monitored to determine if the completed Cobisa Production Well has any direct hydraulic connection with the shallow aquifer. The data and plots of these measurements are presented in APPENDIX F. The plots show that the water levels in the shallow monitoring wells actually rose during the pumping and recovery periods. The observed fluctuations are due to fluctuations in the barometric pressure during the period. The data in APPENDIX F indicate that no direct hydraulic connection exists between the Cobisa Production Well and the shallow aquifer.

PERMANENT PUMP DESIGN

A permanent pump was designed for the Cobisa Production Well to meet the following requirements:

- Capacity - 250 gpm
- Static water level - 161 ft.

- 40 year drawdown - 95 ft. (FIGURE 3)
- Ground elevation at well - 5045 ft.
- Top storage tank elevation - 5081 ft.
- Friction loss in piping - 37 ft.
- Total dynamic head - $5081 - [5045 - (161 + 95)] + 37 = 329$ ft.

The 40 year drawdown was estimated to be 95 ft. as shown on FIGURE 3. The pump was set at 294 ft. which is below the 40 year pumping level of 256 ft. (161 + 95) as shown on FIGURE 2. The selected pump curve is presented in APPENDIX G.

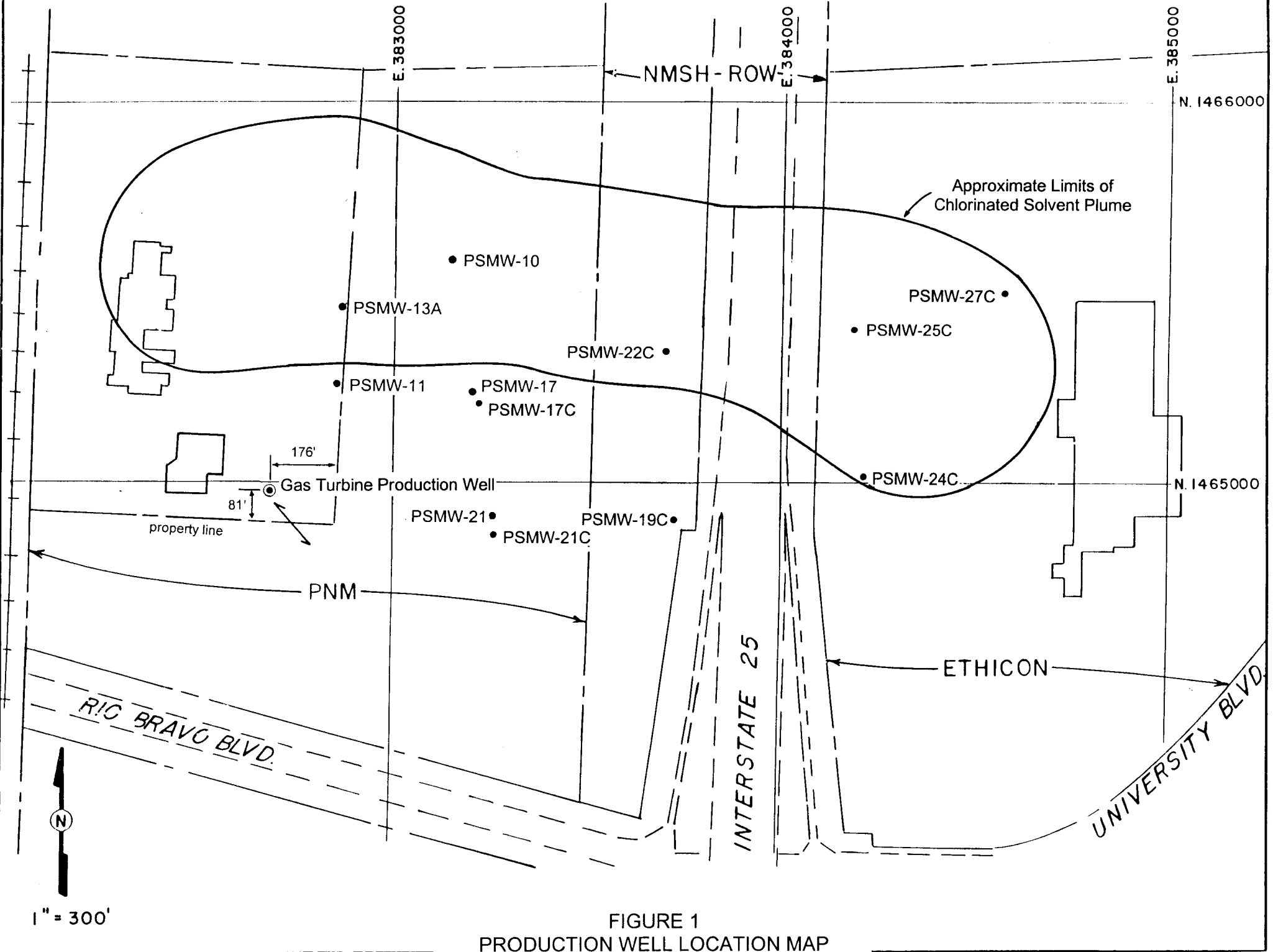


FIGURE 1
 PRODUCTION WELL LOCATION MAP
 PERSON STATION

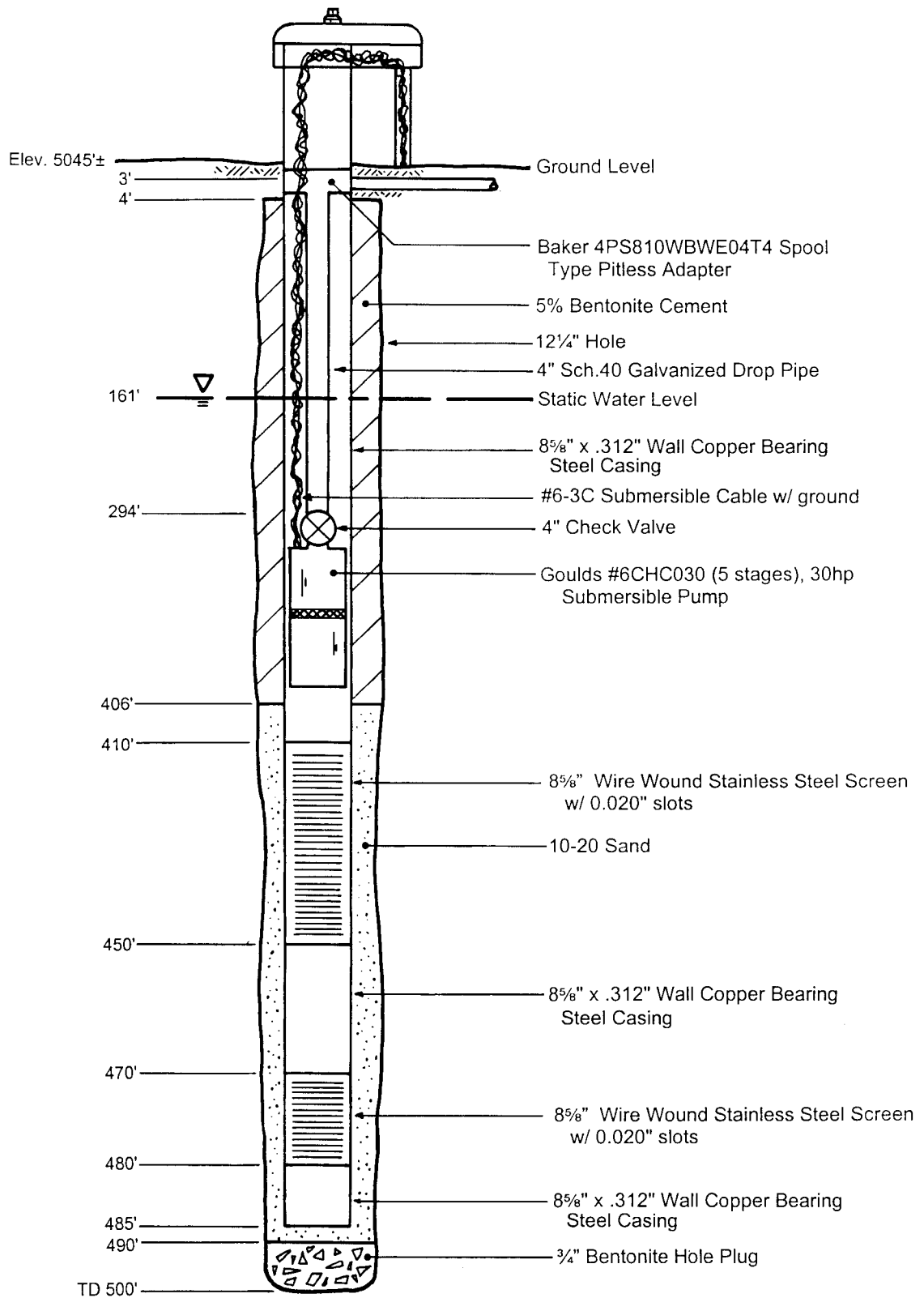
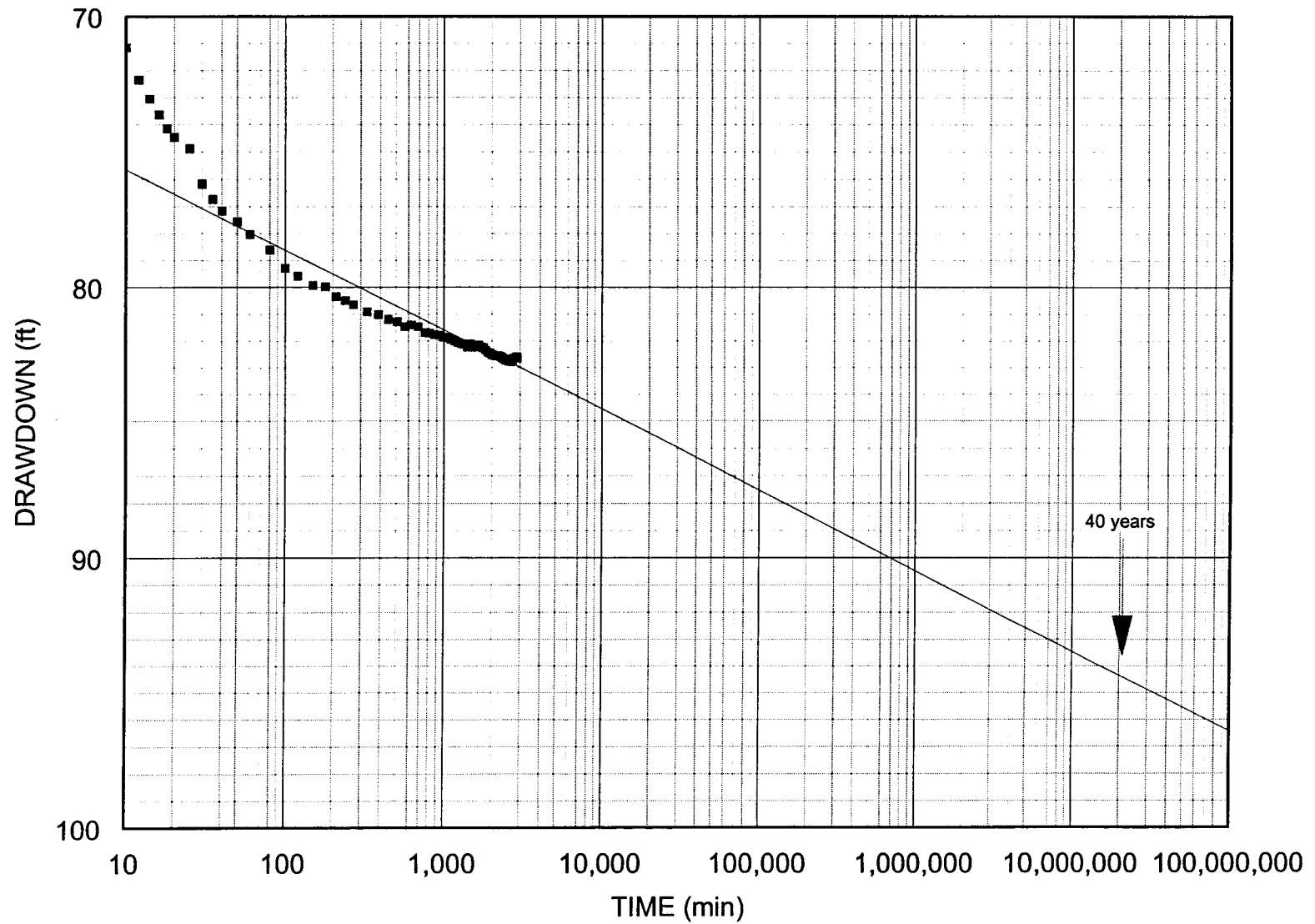


FIGURE 2

COMPLETION DIAGRAM
COBISA PRODUCTION WELL

FIGURE 3
COBISA PRODUCTION WELL
40 YEAR DRAWDOWN AT Q = 250 gpm



APPENDIX A
ROBERT DINWIDDIE LETTER TO RON JOHNSON



GARY E. JOHNSON
GOVERNOR

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous & Radioactive Materials Bureau
2044 Galisteo Street
P.O. Box 26110
Santa Fe, New Mexico 87502
(505) 827-1557
Fax (505) 827-1544



PETER MAGGIORE
SECRETARY

Post-It Fax Note

To: **Robert K. Leadley, Jr.**
Co. **Leadley Electric**

Phone # _____ Fax # _____

7671

Date: **7-30-99**

From: **LGT**

Page: **1**

Certified Mail
Return Receipt Requested

April 12, 1999

Ron Johnson
Technical Group Leader
Public Service Company of New Mexico
Alvarado Square - Mail Stop 0408
Albuquerque, NM 87158

Subject: Design Report - Person Station Gas Turbine Production Well
Cobisa-Person Power Company, Inc.
RCRA Permit No. NMT 360010342

Dear Mr. Johnson:

The Hazardous and Radioactive Materials Bureau (HRMB) of the New Mexico Environment Department (NMED) has reviewed the above-referenced Report, dated January, 1999.

The Report provides design specifications for a proposed new production well (the Well) to provide cooling and fire protection water for a Cobisa-Person Power Company, Inc. (Cobisa) gas turbine electric generator (the Plant) planned for construction this Summer at the Public Service Company of New Mexico's (PNM) Person Generating Station site in Albuquerque (the Site).

PNM is currently carrying out a corrective action program to remediate groundwater contamination at the Site, under the above-referenced RCRA Post-Closure Care Permit (the Permit).

In a letter from Benito Garcia to Ron Johnson, dated December 4, 1998, regarding proposed alternatives for discharge of water from the Well, HRMB requested that PNM submit design

Ron Johnson
April 12, 1999
Page 2

specifications for the Well prior to installation, so that HRMB can ensure that the Well does not interfere with the corrective action program at the Site. The Report serves as that submittal.

HRMB approves construction of the Well as specified in the Report, with the following conditions.

The groundwater contamination plume with the highest concentrations of contaminants at the Site, and which is being remediated under the corrective action program, is located at approximately 150 feet bgs (the Shallower Aquifer). The Well will be screened at 420 to 490 feet bgs (the Deeper Aquifer). The Shallower and Deeper Aquifers are separated by clay soil layers. In order to provide certainty about whether the clay layers prevent the Well from drawing the Shallower Aquifer contaminants into the Deeper Aquifer, the Shallower Aquifer water elevations will have to be monitored when the Well is in use. In addition, sampling of the water from the Well will be required in order to monitor for evidence of contaminants moving into the Deeper Aquifer.

Water Elevation Monitoring

The effect of the Well on the Shallower Aquifer shall be determined by a pump test to monitor the Shallower Aquifer elevations during development of the Well at the time of its installation. Shallower Aquifer elevations will also be monitored on a long-term basis as part of the ongoing groundwater monitoring program at the Site. If Shallower Aquifer elevations indicate that the Well is drawing on the Shallower Aquifer to an unacceptable degree, an alternate source of water for the Plant may be required.

Water Quality Monitoring

Two options have been proposed by Cobisa for discharge of water from the Well after it is used in the Plant. One option is discharge under authority of a U.S. Environmental Protection Agency NPDES permit. A second option is discharge of the water into the existing groundwater contaminant treatment stream either at the inlet or outlet point of the existing treatment system, under authority of approved NMED Groundwater Quality Bureau Discharge Plan DP-1006. If the water is discharged under an NPDES permit, sampling requirements can be covered under that permit, if the Hazardous Constituents specified in the RCRA Permit are included in the NPDES permit's sampling requirements. If the water is discharged into the existing treatment system, HRMB will require that samples be taken for Hazardous Constituents specified in the Permit on a quarterly basis, which can be done at the time of groundwater sampling at the Site under the existing groundwater monitoring program. If sample results indicate the Well is drawing contamination into the Deeper Aquifer, an alternate source of water for the Plant may be required.

Ron Johnson
April 12, 1999
Page 3

If you have any questions please contact Carl Will of my staff at 505-827-1561.

Sincerely,



Robert S. ("Stu") Dinwiddie, Program Manager
RCRA Permits Management Program
Hazardous and Radioactive Materials Bureau

cc: Benito J. Garcia, HRMB
Carl Will, HRMB
David Neleigh, EPA Region 6
Baird Swanson, GWQB

file: Red/PNMPS/1999
track: PNMPS/4-12-99/Johnson/Dinwiddie/Cobisa Production Well Approval

APPENDIX B
SAMPLE LOGS

METRIC
Corporation

SAMPLE LOG

Borehole Number Cobisa 1 Borehole Location Person Station
Property Owner Public Service Company of New Mexico, leased to Cobisa-Person
Power Company, Inc.
Sample Logger Cindie Salisbury/Peter Metzner, METRIC Corporation
Driller Rodgers Environmental Services
Drilling Medium Mud Rotary
Date of Completion September 8, 1999 Ground Elevation 5045 feet ±

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 10	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, very fine sand to pebble gravel.
10 - 40	30.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, fine sand to granule gravel.
40 - 45	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, fine sand to granule gravel with grayish orange (10YR 7/4) clay.
45 - 65	20.0	Grayish orange (10YR 7/4), poorly sorted, subangular to subrounded, clayey fine sand to granule gravel with clay.
65 - 70	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, fine to coarse sand with some clay.
70 - 105	35.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to subrounded, very fine sand to granule gravel with grayish orange (10YR 7/4) to light brown (5YR 6/4) clay.
105 - 115	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, fine to very coarse sand.

METRIC

Corporation

SAMPLE LOG

Borehole Number Cobisa 1 Borehole Location Person Station

Depth (feet)	Thickness (feet)	Stratigraphic Description
205 - 225	20.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, very fine to coarse sand with some granule gravel.
225 - 230	5.0	Pale yellowish brown (10YR 6/2), medium sorted, subangular to rounded, very fine to medium sand.
230 - 240	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, very fine to medium sand with some coarse sand.
240 - 250	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to subrounded, medium sand to granule gravel with some clay.
250 - 260	10.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to rounded, fine sand to small pebble gravel with some clay.
260 - 285	25.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to subrounded, medium sand to granule gravel with some clay.
285 - 300	15.0	Pale yellowish brown (10YR 6/2), medium sorted, subangular to rounded, fine to medium sand with some granule gravel and some clay.
300 - 305	5.0	Pale yellowish brown (10YR 6/2), medium sorted, subangular to rounded, medium sand with some coarse sand.
305 - 325	20.0	Grayish orange (10YR 7/4), poorly sorted, subangular to rounded, fine to medium sand with some coarse sand and some clay.

METRIC

Corporation

SAMPLE LOG

Borehole Number Cobisa 1 Borehole Location Person Station

Depth (feet)	Thickness (feet)	Stratigraphic Description
325 - 330	5.0	Grayish orange (10YR 7/4), poorly sorted, subangular to subrounded, clayey fine to very coarse sand.
330 - 335	5.0	Grayish orange (10YR 7/4), clay with some very coarse sand.
335 - 405	70.0	Grayish orange (10YR 7/4), poorly sorted, subangular to rounded, clayey fine sand to granule gravel.
405 - 420	15.0	Pale yellowish brown (10YR 6/2), medium sorted, subangular to rounded, fine to coarse sand.
420 - 445	25.0	Pale yellowish brown (10YR 6/2), medium sorted, subangular to subrounded, fine to coarse sand.
445 - 450	5.0	Pale yellowish brown (10YR 6/2), poorly sorted, subangular to subrounded, fine to coarse sand with some granule gravel.
450 - 455	5.0	Grayish orange (10YR 7/4), well sorted, subangular to subrounded, fine to medium sand.
455 - 465	10.0	Grayish orange (10YR 7/4), medium sorted, subangular to subrounded, clayey fine to medium sand.
465 - 490	25.0	Grayish orange (10YR 7/4), medium sorted, subangular to rounded, fine to medium sand with some clay.
490 - 500	10.0	Grayish orange (10YR 7/4), medium sorted, subangular to rounded, clayey fine to medium sand.

APPENDIX C
GEOPHYSICAL LOGS

**TO VIEW THE MAP AND/OR
MAPS WITH THIS DOCUMENT,
PLEASE CALL THE
HAZARDOUS WASTE BUREAU
AT 505-476-6000 TO MAKE AN
APPOINTMENT**