Public Service Company of New Mexico
Person Generating Station
Groundwater Treatment System

Treatment Effectiveness Report
First Quarter 1996

May 1, 1996

Report Prepared Pursuant to Requirements Contained in:

The Person Generating Station Corrective Action Directive (NMT 360010342)
and
The New Mexico Environment Department Discharge Plan, DP-1006

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I. Introduction

This report is prepared pursuant to requirements contained in the Person Generating Station Corrective Action Directive (NMT360010342) issued by the New Mexico Environment Department (NMED) Hazardous and Radioactive Materials Bureau, and requirements contained in Discharge Plan DP-1006 issued by the NMED Groundwater Protection and Remediation Bureau.

This report contains information on sampling results and operational activities at the Person Station Ground Water Treatment System which is designed to extract volatile organic compound contaminated groundwater, treat through an air stripper and granular activated carbon filter and discharge the treated water to an irrigation pond at the UNM Championship Golf Course.

Figure 1 is a site map of the Person Generating Station vicinity and shows well locations and the location of the pipeline system.

E 382000
E 383000
E 384000
E 385000
E 386000
N 1468000
N 1467000
N 1466000
N 1465000
SOUTH DIVERSION CHANNEL
RAILROAD TRACK
BROADWAY
INTERSTATE 25
SCHWARTZMAN TRUST
TREATED WATER-DISCHARGE TO-POND
CHAMPIONSHIP GOLF COURSE
UNM PROPERTY
PARKING
UNIVERSITY BLVD.
APPROX. PIPE ALIGNMENTS
S14 SECTION 893 CORNER
AIR STRIPPER BUILDING
PSMW-12B
PSMW-12A VEW/DW WELL
EW-1
PSMW-8B
PSMW-8A
PNM
PNM CONCRETE HOLDING POND
PSMW-13B
PSMW-13A
PERSON GENERATING STATION
PSMW-15B
APPROXIMATE LOCATION OF VAPOR EXTRACTION SYSTEM
CAPITAL LUMBER CO.
POWER OPERATIONS BUILDING
RCRA FACILITY BOUNDARY
PNM
RIO BRAVO BLVD.
N.M. STATE HIGHWAY DEPT. (R.O.W)
EXISTING CULVERT
ETHICON PROPERTY
PSMW-16 P&T WELL
PSMW-1
PSMW-2
PSMW-3
PSMW-4
PSMW-5
PSMW-6
PSMW-7
PSMW-8
PSMW-9
PSMW-10
PSMW-11
PSMW-12
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PSMW-26
PSMW-27
PSMW-28
PSMW-29
PSMW-31
PSMW-32
PSMW-35
PSMW-36
PSMW-37
PSMW-38
PSPW-1
PSPW-2
PSPW-3
PSPW-4
PSPW-5
PSPW-6

200 100 0 200 400
SCALE: 1" = 200'

LEGEND
- GROUNDWATER PUMPING WELL
- MONITORING WELL
- PRODUCTION WELL (SEALED)
- ROADS
- PROPERTY LINES
- WATER PIPELINE

Figure 1
Person Generating Station
Groundwater Treatment System
Site Map

PUBLIC SERVICE COMPANY of NEW MEXICO

January 25, 1996

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II. Operational History

The Person Station Groundwater Treatment system was started on Friday, January 27, 1995 with treated effluent being sent to the University of New Mexico Championship Golf Course.

During the first month of operation, a series of groundwater level measurements were taken at monitoring wells in the vicinity of PSMW-16 and the VEW in order to determine the radius of influence of each well on the surrounding aquifer. Results from that data indicate that PSMW-16 has a radius of influence of 600 feet when pumped at 13.3 gpm, and the VEW has a radius of influence of 80 feet when pumped at 5.6 gpm.

In August 1995, a third extraction well was added to the system. This well was designated EW-1 and was drilled and completed specifically for extraction purposes.

During 1995, the system encountered periodic minor problems as well as a more serious problem with mineralization of the system components down stream from the air stripper. PNM contractor Parsons-Engineering Science, Inc. was asked to evaluate potential solutions for this problem. In late November, the mineralization problem became so severe that the system was shut down pending resolution of the problem.

The system was kept down during most of the first quarter of 1996 while the mineralization problem was studied. Parsons-Engineering Science, Inc. evaluated several alternatives including chemical treatment by acid addition, chemical treatment by inhibitors, chemical treatment by water softening, and a mixed oxidant process. After discussing the various alternatives with the NMED Groundwater Bureau (as to the affect of treatment on the discharge plan) and the UNM Championship Golf Course superintendent, PNM selected the acid treatment system for implementation. This system is currently under design and will be installed during the second quarter of 1996.

The acid treatment system will consist of the introduction of up to 35 mg/l of concentrated sulfuric acid into the incoming groundwater effluent. The acid will be sufficient to prevent precipitation of carbonates in the system due to pH elevation caused by the air stripping process.

The system was restarted on March 20, 1996 with PSMW-16 and VEW operating. EW-1 was not placed into operation at this time because it was felt to be the primary contributor to the mineralization problem. EW-1 will be kept down until the acid treatment system is operational.

III. Groundwater Treatment Effectiveness

Figures 2, 3 and 4 show graphs of concentration of total VOC's as measured at wells PSMW-16, VEW, and EW-1 over the operation of the groundwater treatment system. More detailed data for 1995 and 1996 are shown in Tables 1, 2 and 3. From February 1, 1995 through March 8, 1995 the total Chlorinated VOC's dropped from 318.4 ppb to 128.3 ppb at PSMW-16. During the same period total Chlorinated VOC's dropped from 6.1 ppb to 1.8 ppb at the VEW. As anticipated, concentrations rose again when the system was restarted in April.

During the remainder of 1995 concentrations have held relatively steady at PSMW-16 prior to shutdown in November. Concentrations at VEW have fluctuated up and down. Concentrations at EW-1 have risen over the period of its operation. At re-start in March 1996, total Chlorinated VOC's rose dramatically at both PSMW-16 and VEW (EW-1 was not re-started at this time and was not tested).

Laboratory reports for this quarter are contained in Appendix A.

Figure 2
Total VOCs at PSMW-16

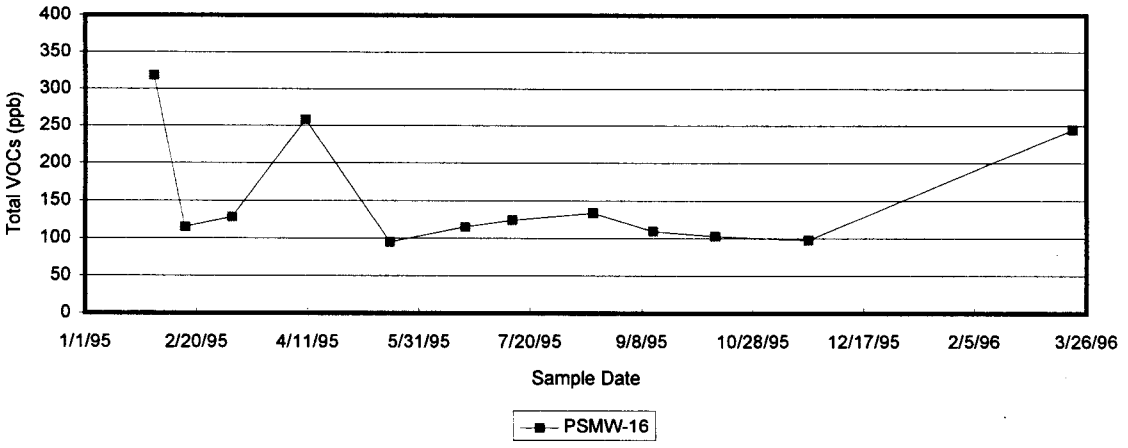

Figure 3
Total VOCs at the VEW

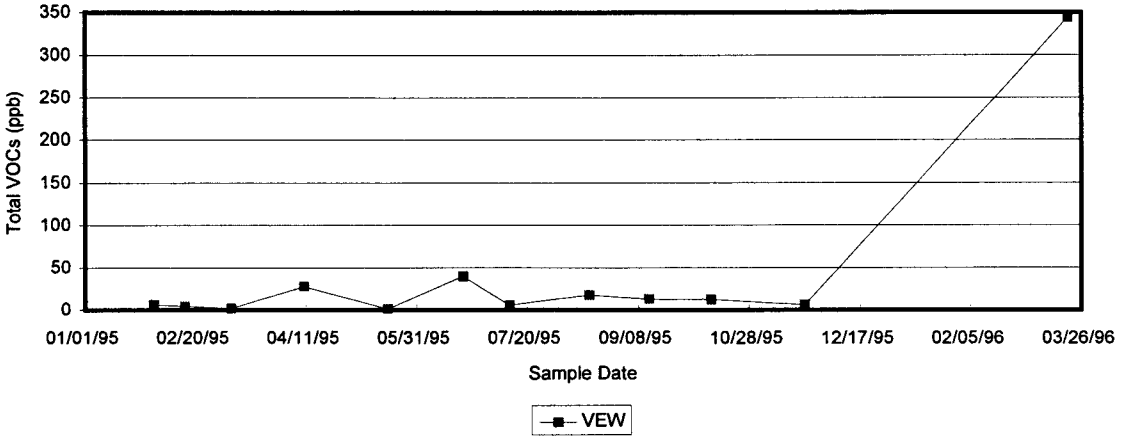

Figure 4
Total VOCs at EW-1

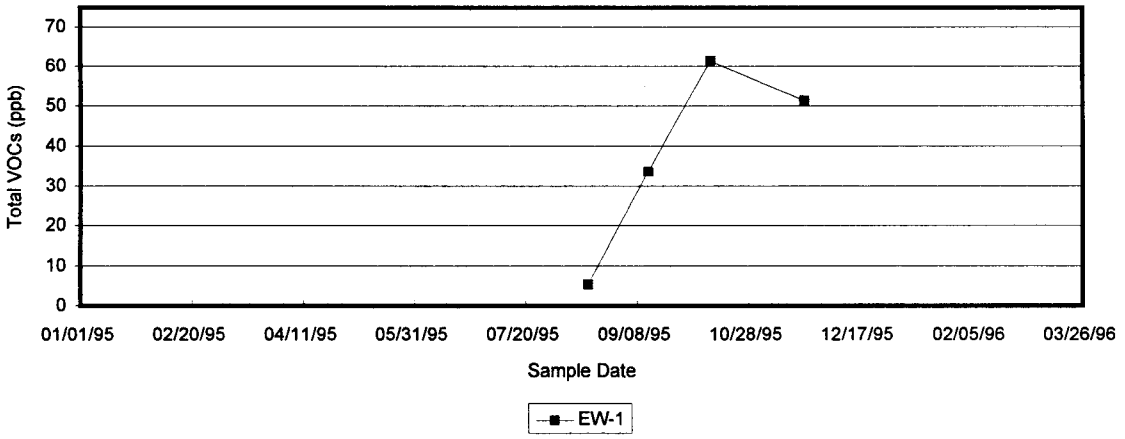

Table 1
Influent Concentrations From PSMW-16

Date	Laboratory Report No.	PCE (ppb)	DCE (ppb)	Total VOC's (ppb)
2/1/95	502304	200	110	318.4
2/15/95	502376	69	39	115.0
3/8/95	503317	78	46	128.3
4/10/95	504341	170	81	258.6
5/18/95	505371	62	30	94.6
6/21/95	506396	76	36	114.8
7/12/95	507327	75	41	124.3
8/17/95	508405	83	45	134.0
9/13/95	509339	69	35	109.2
10/11/95	510335	66	32	102.8
11/22/95	511367	58	35	97.5
3/20/96	603347	180	63	245.3

Table 2
Influent Concentrations From VEW

Date	Laboratory Report No.	PCE (ppb)	DCE (ppb)	Total VOC's (ppb)
2/1/95	502304	5.3	0.8	6.1
2/15/95	502376	4	0.5	4.5
3/8/95	503317	1.5	0.3	1.8
4/10/95	504341	21	5.8	28.1
5/18/95	505371	1.4	< 0.2	1.4
6/21/95	506396	25	9.4	39.8
7/12/95	507327	3.5	1.0	5.8
8/17/95	508405	6.4	1.1	17.7
9/13/95	509405	9.7	1.9	12.9
10/11/95	510335	9.3	1.8	12.5
11/22/95	511367	4.6	1.1	6.0
03/20/96	603347	270	72	344.3

Table 3
Influent Concentrations From EW-1

Date	Laboratory Report No.	PCE (ppb)	DCE(ppb)	Total VOC's (ppb)
8/17/95	508405	3.5	0.9	5.4
9/13/95	509339	25	6.1	33.6
10/11/95	510335	49	8.8	61.4
11/22/95	511367	38	9.5	51.3

IV. Operational Dates

The Person Station Groundwater Treatment system was not operated from January 1, 1996 through March 19, 1996 due to mineralization problems as discussed above. The system was re-started on March 20, 1996 and should remain operational even though the acid treatment system has not yet been installed. During the second quarter 1996 the acid treatment system will be installed. Also, monitor wells PSMW-24, PSMW-25, and PSMW-26 will be converted to extraction wells as part of Corrective Action Program Phase II implementation. Water from these wells should help to aleviate the mineralization problem in addition to the acid treatment system. The table below details significant operational activities for this report quarter.

Table 4
Significant Operational Activities
First Quarter 1996

Date	Activity
3/20/96	GTS re-started after replacement of the granular activiated carbon material. Clay valve assembly cleaned.

V. Influent and Effluent Flow Volumes

Flow totalizing meters are present on each influent well line and on the effluent flow line. The table below details flow volumes from each influent well and the effluent line. Differences between total effluent and total influent may be attributed to water loss (evaporation) out the stack in the air stripper system and to differences, inaccuracies, and operational problems with the flow meters.

Table 5
Influent and Effluent Flow Volumes

Source	Meter Number	Start Reading	End Reading	Volume (Gallons)
Flow Volumes for January 1996:				
Influent (VEW)	Badger Meter No. 94976130	1,427,063	1,427,063	0
Influent (PSMW-16)	Badger Meter No. 94398832	3,385,030	3,385,030	0
Influent (EW-1)	Badger Meter No. 94398833	822,955	822,955	0
Effluent (to Golf Course)	Badger Meter No. 94398834	5,487,924	5,487,924	0
Flow Volumes for February 1996:				
Influent (VEW)	Badger Meter No. 94976130	1,427,063	1,427,063	0
Influent (PSMW-16)	Badger Meter No. 94398832	3,385,030	3,385,030	0
Influent (EW-1)	Badger Meter No. 94398833	822,955	822,955	0
Effluent (to Golf Course)	Badger Meter No. 94398834	5,487,924	5,487,924	0
Flow Volumes for March 1996:				
Influent (VEW)	Badger Meter No. 94976130	1,427,063	1,432,596	5,533
Influent (PSMW-16)	Badger Meter No. 94398832	3,385,030	3,567,452	182,422
Influent (EW-1)	Badger Meter No. 94398833	822,955	822,955	0
Effluent (to Golf Course)	Badger Meter No. 94398834	5,487,924	5,666,780	178,856
Quarterly Total for Influent (VEW + PSMW-16 + EW-1):				187,955
Quarterly Total for Effluent:				178,856
Annual Totals				
Annual Cumulative Influent Total for 1996:				187,955
Annual Cumulative Effluent Total for 1996:				178,856

VI. Laboratory Analysis

A. Influent/Effluent Sampling for VOC's (8010 analysis)

During the fourth operational quarter of the groundwater treatment system, influent and effluent sampling was conducted pursuant to the routine schedule outlined in the NMED approved discharge plan, i.e., once each month. (The system was not operational during January or February 1996, thus no influent/effluent samples were collected.) Total VOC analysis of GTS Influent and Effluent (after GAC units) is shown graphically in Figure 5. More detailed data results are shown in Table 6 below. Laboratory analytical data reports are contained in Appendix A. All influent/effluent sampling results show that the treatment system has consistently removed chlorinated VOC contaminants in the 50 to 200 ppb range to levels below laboratory detection limits in the effluent sent to the golf course. Laboratory analysis of the water stream at a point after the air stripper and before the granular activated carbon treatment also show that at these influent concentrations and a flow rate of approximately 20 to 25 gpm, the air stripper alone is capable of treating the groundwater to concentrations consistently below or near laboratory detection limits for chlorinated VOCs.

Figure 5
Total VOCs GTS Influent vs. Effluent

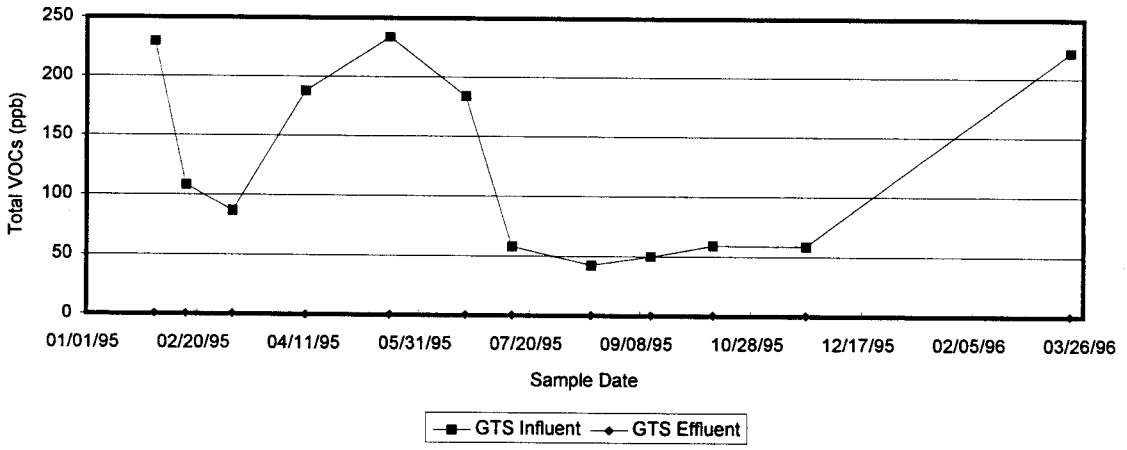

Table 6
Influent and Effluent VOC Concentrations

Sampling Date: 3/20/96	Lab Report Number: 603347		
VOC Compound	Influent (ppb)	Effluent After Air Stripper (ppb)	Effluent After GAC Unit (ppb)
Chloroform	1.6	< 0.5	< 0.5
1,1-Dichloroethane	0.9	< 0.3	< 0.3
1,1-Dichloroethene	42	< 0.2	< 0.2
Tetrachloroethene	170	< 0.5	< 0.5
1,1,1-Trichloroethane	7.1	< 1.0	< 1.0
Trichloroethene	0.6	< 0.3	< 0.3
TOTAL VOC'S	222.2	BDL	BDL

B. Golf Course Pond Sampling

The GTS NMED Discharge Plan (DP 1006) requires monthly sampling of the East and West ponds for 8010 analysis after the first month of operation, and during each subsequent month of operation. During the first quarter of 1996, the ponds were sampled three times pursuant to this requirement. No EPA Method 8010 parameters were detected in the samples. Copies of the laboratory reports are contained in Appendix A.

VII. Groundwater Sampling

Under the RCRA permit, a network of groundwater monitoring wells are sampled on a twice per year schedule (normally in the Spring and Fall). Once sampling is complete and analytical results have been received, contour maps showing the distribution of the contaminants in the groundwater are prepared. Contour maps for PCE, DCE, and TCA for the most recent sampling event are shown in Figures 6, 7, and 8.