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**EVALUATION OF GAS REBURNING AND LOW NO<sub>x</sub> BURNERS  
ON A WALL-FIRED BOILER**

Environmental Monitoring Report  
Public Service of Colorado's Cherokee Station Unit 3  
Optimization Testing Period  
November 9, 1992 - April 23, 1993

Prepared for:  
U.S. Department of Energy  
Gas Research Institute  
Public Service Company of Colorado  
Colorado Interstate Gas Company  
Electric Power Research Institute

Prepared by:  
Energy and Environmental Research Corporation  
18 Mason  
Irvine, CA 92718

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## 1.0 INTRODUCTION

An evaluation of Gas Reburning (GR) and Low NO<sub>x</sub> Burners (LNB) has been completed at Public Service Company of Colorado's Cherokee Station Unit 3. The goal of the demonstration, which was carried out in a U.S. DOE Clean Coal Technology Round 3 Program, was to reduce NO<sub>x</sub> emissions by 70%. The reduction was to be achieved from the pre-project level prior to LNB retrofit. The GR system was supplied by Energy and Environmental Research Corporation (EER) and the LNBs were supplied by the Foster Wheeler Energy Corporation. The project was carried out in three phases in which EER designed the GR system and obtained necessary permits (Phase 1), constructed the system and completed start-up tasks (Phase 2), and evaluated its performance with both Optimization Tests and a Long-Term Demonstration (Phase 3). As directed by the Cooperative Agreement, environmental monitoring was conducted in each phase. Measurements were taken by plant personnel and an EER Field Testing Team and were divided into two types. "Compliance Monitoring" was conducted by plant personnel to satisfy requirements of regulatory agencies, while "Supplemental Monitoring" was conducted by EER personnel to develop a database of environmental impacts of the technology and to ensure environmental acceptability of the project. This document presents environmental monitoring data obtained during the Optimization Testing period, November 11, 1992 to April 23, 1993. In addition to the DOE, program co-sponsors include the Gas Research Institute, Electric Power Research Institute, Public Service Company of Colorado, and the Colorado Interstate Gas Company.

Compliance Monitoring was conducted primarily in two areas, air emissions and aqueous discharges. The unit is required to meet an SO<sub>2</sub> limit of 1.2 lb/MBtu and an opacity limit of 20 percent (6 minute average). Therefore, the plant monitors flue gas SO<sub>2</sub> and opacity continuously and submits Excess Emissions Reports to the Colorado Air Pollution Control Division (AQCD) on a quarterly basis. These reports state the periods when emissions exceeded the standards and the reason for the emissions excursion. Discharge limits for the aqueous effluent from the plant and monitoring requirements are specified by a permit issued by the Colorado Water Quality Control Division (WQCD). The plant submits National Pollutant

Discharge Elimination System (NPDES) monitoring reports to the WQCD on a monthly basis. The aqueous stream discharged to the South Platte River has limits for total flow, pH, total suspended solids, oil and grease, temperature, total residual chlorine, total chromium, and total recoverable zinc. Plant personnel conduct daily to monthly monitoring to ensure compliance with limits stated in a subsequent section of this report.

Supplemental Monitoring was in the areas of gaseous emissions from the boiler, ambient Total Suspended Particulates (TSP) inside and outside of the plant, noise levels near GR equipment, and limited characterization of the ash waste. Boiler emissions were monitored continuously with EER's Continuous Emissions Monitoring System (CEMS). Flue gas samples were extracted from a 16 point stainless steel grid installed at the economizer outlet. Gas samples drawn from the duct cross-section were mixed, dried, then analyzed for concentration of  $\text{NO}_x$ ,  $\text{SO}_2$ ,  $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{HC}$ , and  $\text{O}_2$ . These species were measured and logged continuously by the Boiler Performance Monitoring System (BPMS). In addition, limited measurements of nitrous oxide ( $\text{N}_2\text{O}$ ) were made at the conclusion of the Optimization Testing period. This species was measured with a portable analyzer and not by collection of a grab sample and analysis by GC/EPC as originally planned. Ash analysis was limited to determination of carbon content used to evaluate combustion completion.

## **2.0 GAS REBURNING-LOW $\text{NO}_x$ BURNERS**

Gas Reburning and Low  $\text{NO}_x$  Burners are synergistic  $\text{NO}_x$  control technologies. In Gas Reburning, natural gas is injected into the furnace above the coal burners to create a fuel rich region in which  $\text{NO}_x$  is reduced to atmospheric nitrogen,  $\text{N}_2$ . Overfire air is added higher up to burn out the primary and reburning fuels under a normal excess air level. The natural gas input is typically 15 to 25% of the total heat input, therefore there is a corresponding decrease in the coal fired by the burners. The reduced fuel input and limited burner excess air result in reduction in the level of "primary  $\text{NO}_x$ ." The natural gas addition produces a variety of hydrocarbons and free radicals which reduce  $\text{NO}_x$  to intermediates such as  $\text{HCN}$  and  $\text{NH}_2$  then to  $\text{N}_2$ . Overfire air is added higher up in the furnace to burn out the fuels under a normal

excess air level of 15 to 20%. The process reduces SO<sub>2</sub> emissions at a percentage equal to the gas heat input. Emissions of CO<sub>2</sub> also decrease since the fuels (natural gas and coal) have different hydrogen/carbon ratios. Also, reductions in fly ash and bottom ash result in lower disposal requirement of the solid waste and potentially lower stack particulate emissions.

At this site, Gas Reburning was applied with Low NO<sub>x</sub> Burners (LNB). The LNBs selected are Foster Wheeler Controlled Flow/Split Flame Low NO<sub>x</sub> Burners. Generally, LNBs reduce NO<sub>x</sub> emissions by staging the mixing of coal with combustion air. LNBs have secondary (and in some cases tertiary) air zones in which the air split determines the mixing rate and hence the burner NO<sub>x</sub> level. They produce longer flames with a lower peak flame temperature. LNBs typically reduce NO<sub>x</sub> emissions by 30 to 50%. Therefore, the combined application of Gas Reburning and Low NO<sub>x</sub> Burners was expected to achieve 70% NO<sub>x</sub> reduction.

### **3.0 DESCRIPTION OF HOST UNIT**

Cherokee Station Unit 3 is a front wall-fired steam generating unit supplied by Babcock and Wilcox which has a rated electric capacity of 172 MW<sub>e</sub> (gross). At its capacity it produces steam at a rate of 1,140,000 lb/hr, at a pressure of 1925 psig and temperature of 1005°F. It is equipped with a reheat cycle which reheats steam to the same design temperature. It fires low sulfur western bituminous coal with a typical sulfur content of 0.4% and ash content of 10%. Coal is pulverized by four Riley Stoker No. 556 duplex drum pulverizers and is carried by 160°F primary air to a 4x4 array of burners on the front wall of the unit. The burners mix coal/primary air with 600°F secondary air and fire it into a radiant furnace. Flue gas flows up the furnace through a secondary superheater, reheater, primary superheater, economizer then to two Ljungstrom air heaters. The unit is equipped with a Baghouse Fabric Filter, which is designed to handle 825,000 acfm of flue gas at a temperature of 290°F. The Baghouse has a gross air/cloth ratio of 2.03 and was designed to limit particulate emissions to 0.007 gr/dscf.

## 4.0 RESULTS

The results of Environmental Monitoring conducted during the period November 9, 1992 through April 23, 1993 are presented in this section. During this period, GR-LNB was evaluated for 107 hours.

### 4.1 AIR EMISSIONS

Boiler emissions data are presented in Table 1. Under GR-LNB operation,  $\text{NO}_x$  emissions averaged 0.261 lb/MBtu, which is a reduction of 64% from the pre-project baseline of 0.73 lb/MBtu. CO emissions varied widely, with the highest emissions recorded under low gas inputs. This resulted from relatively low overfire air flows and velocities in this "off-design" condition (design gas heat input equal to 18%). On average, CO emissions were 149 ppm (@ 3%  $\text{O}_2$ ).  $\text{SO}_2$  emissions averaged 0.554 lb/MBtu, with a high of 0.720 lb/MBtu and a low of 0.473 lb/MBtu. A typical coal composition indicating a sulfur level of 0.44% and higher heating value of 11,015 Btu/lb theoretically forms  $\text{SO}_2$  at a rate of 0.80 lb/MBtu. Therefore the measured  $\text{SO}_2$  values are somewhat lower than expected based on fuel composition.

Table 2 shows the emissions of nitrous oxide ( $\text{N}_2\text{O}$ ) from the boiler under LNB and GR-LNB operation.  $\text{N}_2\text{O}$  is believed to be a major contributor to depletion of stratospheric ozone. The measurements indicate that  $\text{N}_2\text{O}$  varied from 1 to 5 ppm under LNB and GR-LNB. These levels were below the limit of 10 ppm, above which more extensive measurements were planned. Currently there exists no federal standard for  $\text{N}_2\text{O}$  emissions from utility boilers.

### 4.2 AMBIENT AIR MONITORING

Measurement of ambient Total Suspended Particulates (TSP) under 10 microns in diameter,  $\text{PM}_{10}$ , were made at the boundary of the facility at both upwind and downwind locations. High volume air samplers supplied by General Metal Works Inc. were used. The purpose of the measurements was to quantify the plant contribution to ambient  $\text{PM}_{10}$  levels. Table 3 summarize

the data which show great variability. The plant is situated in a heavily industrialized area with many other contributors to ambient dust levels. On average, the plant appears to contribute to ambient dust levels but there is no consistent correlation to LNB or GR-LNB operation.

Work area dust levels were measured at various locations in the boiler house. Table 4 summarizes the results. The samplers used were manufactured by Gilian Instrument Corp. Sampling was conducted under LNB and GR-LNB operation to verify that dust levels are below the Labor Department's Occupational Safety and Health Administration (OSHA) standard of 15 mg/m<sup>3</sup>. Very low levels were measured, typically below 0.1 mg/m<sup>3</sup>, with one unusually high reading of 1.72 mg/m<sup>3</sup> outside of the CEM trailer.

Noise levels were measured at various locations in the boiler house, near to GR equipment in some cases. The measurements presented in Table 5 indicate noise levels were slightly higher when the GR equipment was in operation. In some cases the noise levels were above OSHA's action limit of 85 decibels, which is applicable over an eight hour period. Therefore, workers exposed to these noise levels over extended periods would be required to wear audiometric protective devices.

#### 4.3 ASH ANALYSIS

Ash samples were taken from the unit with a high volume SLM sampler for analysis of carbon content. The unburned carbon level indicates the extent of fuel burnout. Table 6 lists the unburned carbon in ash measured under LNB and GR-LNB operation. Wide variations are evident, with higher excess air levels achieving enhanced fuel burnout. On average, LNB and GR-LNB data are comparable, i.e. neither condition results in higher carbon-in-ash levels.

#### 4.4 AQUEOUS DISCHARGE

GR-LNB operation was not expected to change either the quantity or makeup of the aqueous discharge from the facility. Plant personnel monitor the aqueous discharge as required by the

Colorado Water Quality Control Division. Monitoring frequency and discharge limits are listed in Table 7. Appendix A contains discharge monitoring reports covering the Optimization Testing period. These show that all limits for the aqueous discharge were met during the monitoring period.

#### 4.5 OPACITY AND PLANT SO<sub>2</sub> MONITORING

The plant measured opacity of the flue gas from each unit with Lear Siegler Model Number RM-41 monitors. Periods of excess opacity (20 percent, six minute average) were reported with the likely cause. Appendix B contains the Excess Emissions Reports for the three quarters covering the Optimization Testing period. Periods of excess opacity were typically due to unit start-up or baghouse bypass during gas firing. Also reported are periods of SO<sub>2</sub> emissions exceeding the 1.2 lb/MBtu standard and maximum theoretical SO<sub>2</sub> emissions based on coal analyses. The plant employed Rosemount Model Number EC960 and Altech Model Number MCS100 SO<sub>2</sub> monitors. The SO<sub>2</sub> monitors did not measure excursions above the limit and, on average, coal sampling results were also below the limit.

#### 5.0 CONCLUSIONS

Environmental monitoring was conducted to evaluate the impacts of Gas Reburning and Low NO<sub>x</sub> Burners on gaseous emissions, ambient air particulate matter inside and outside of the plant, worker area noise levels, unburned carbon-in-fly ash, and aqueous effluent pollutant levels. GR-LNB operation resulted in a NO<sub>x</sub> reduction of 64% from the original baseline, CO emissions at an acceptable level (below 200 ppm), and SO<sub>2</sub> emissions well below the 1.2 lb/MBtu standard. Nitrous oxide emissions were low under LNB and GR-LNB, with a maximum of 5 ppm. The plant contribution to PM<sub>10</sub> at its boundary is small relative to the contribution of surrounding industry and there was no direct relationship with GR operation. Worker area dust levels were well below the standard of 15 mg/m<sup>3</sup>. Noise levels near GR equipment and the boiler were higher than the standard of 85 decibels (averaged over 8 hours) in some cases, therefore workers exposed to these noise levels over extended periods would be

required to wear audiometric protection. Carbon-in-fly ash, measured under many conditions (GR and GR-LNB), was generally acceptable (under 10%) with no change due to GR operation determined. The aqueous effluent met its discharge standard in each case.



TABLE 1. SUMMARY OF GR-LNB EMISSIONS AT CHEROKEE UNIT 3

Test Date	Test Dur.	Net Power (MWe)	Gas Heat (% totl)	CEMS O2 (% dry)	COc (ppm)	CO2c (%)	NOxc (ppm)	NOx (lb/MBtu)	SO2c (ppm)	SO2 (lb/MBtu)	HCc (ppm)
11/11/92	1:01	157	20.60	3.38	256	15.5	208	0.278	276	0.516	7.2
11/12/92	1:05	156	19.50	3.85	29	15.5	227	0.303	269	0.503	1.2
11/17/92	1:00	150	20.86	3.52	86	15.5	206	0.274	280	0.521	3.0
11/17/92	1:00	150	21.08	3.57	13	15.5	200	0.266	278	0.517	0.3
11/18/92	1:04	151	20.94	3.67	14	15.4	201	0.268	281	0.523	0.0
11/18/92	1:05	149	15.96	3.79	31	15.7	203	0.272	306	0.573	0.1
11/19/92	1:00	149	5.27	3.12	986	16.3	208	0.282	338	0.641	7.0
11/19/92	1:00	152	10.33	2.64	955	16.0	176	0.238	326	0.614	58.2
11/19/92	1:00	150	23.41	2.83	92	15.2	175	0.232	275	0.511	0.8
11/20/92	0:58	150	18.61	2.66	530	15.7	164	0.219	285	0.532	34.1
11/20/92	1:00	150	18.69	3.25	43	15.7	186	0.248	291	0.544	1.5
11/20/92	1:00	150	20.51	3.60	32	15.5	189	0.251	281	0.525	1.2
12/1/92	1:06	120	21.03	4.07	34	15.4	168	0.224	271	0.504	1.2
12/1/92	0:50	116	8.24	5.26	11	16.0	208	0.281	310	0.585	0.5
12/2/92	1:35	153	17.97	3.69	172	15.4	196	0.262	334	0.623	13.9
12/7/92	1:05	119	11.40	4.12	671	16.0	175	0.236	320	0.602	9.2
12/7/92	1:00	119	15.70	4.03	23	15.8	173	0.231	302	0.566	0.0
12/7/92	1:00	119	20.85	3.90	8	15.5	163	0.217	281	0.524	
12/8/92	1:00	90	21.01	3.87	202	15.4	158	0.210	281	0.523	5.1
12/8/92	1:23	88	21.24	6.10	8	15.1	183	0.242	275	0.512	0.2
12/8/92	1:00	91	11.13	4.17	240	15.9	168	0.227	304	0.573	1.6
12/9/92	1:00	89	20.87	4.68	17	15.3	171	0.226	262	0.489	0.5
12/9/92	0:56	92	20.99	4.19	13	15.3	146	0.194	265	0.494	0.2
12/14/92	1:02	150	5.42	3.87	326	16.0	237	0.322	309	0.586	1.2
12/14/92	0:17	150	2.65	4.12	54	16.2	235	0.319	314	0.597	0.9
12/15/92	0:36	152	19.62	3.54	53	15.5	194	0.258	263	0.490	1.7
12/16/92	2:19	152	10.38	3.75	74	16.0	214	0.288	288	0.542	1.3
1/15/93	1:00	150	7.53	4.02	31	16.3	242	0.328	292	0.553	2.4
1/15/93	1:00	151	12.25	3.89	17	16.0	212	0.285	282	0.531	1.6
1/15/93	0:58	151	17.05	3.67	13	15.7	185	0.248	275	0.514	1.1
1/15/93	0:50	152	21.76	3.38	77	15.5	175	0.233	262	0.488	1.1
1/18/93	0:15	150	18.86	2.48	343	15.8	180	0.240	290	0.541	6.6
1/18/93	0:17	150	18.81	2.69	360	15.8	196	0.262	283	0.528	9.5
1/19/93	1:00	149	5.10	4.56	20	16.4	256	0.348	310	0.589	0.9
1/19/93	1:00	149	18.54	3.42	33	15.7	185	0.247	269	0.503	0.9
1/20/93	1:10	152	18.08	3.50	28	15.8	199	0.266	277	0.518	2.2
1/20/93	1:05	151	15.17	3.81	12	15.9	204	0.274	283	0.532	1.7
1/20/93	0:59	150	9.84	3.52	57	16.2	216	0.292	312	0.589	0.9
1/21/93	1:05	152	22.48	3.15	54	15.6	185	0.246	269	0.500	1.8
1/21/93	1:00	122	24.62	3.47	13	15.5	160	0.213	255	0.473	1.7
1/25/93	5:10	144	17.50	4.42	8	15.6	218	0.291	278	0.520	2.4
1/26/93		141	16.61	3.95	22	15.8	197	0.263	283	0.530	1.0
1/27/93	5:55	151	16.15	4.03	31	15.7	220	0.295	276	0.517	2.0
2/2/93	1:12	152	19.43	2.32	688	15.8	162	0.216	0		5.2
2/2/93		152	19.32	2.44	642	15.8	166	0.222	0		5.8
3/22/93	1:02	147	20.22	2.53	158	15.6	150	0.200	280	0.523	4.2
3/22/93	1:03	147	20.34	2.27	144	15.6	150	0.200	272	0.507	3.4
3/22/93	0:59	148	20.26	2.87	16	15.6	181	0.241	271	0.504	1.2

Subscript c denotes correction to 3% O2

TABLE 1. SUMMARY OF GR-LNB EMISSIONS AT CHEROKEE UNIT 3 (CON.)

Test Date	Test Dur.	Net Power (MWe)	Gas Heat (% totl)	CEMS O2 (% dry)	COc (ppm)	CO2c (%)	NOxc (ppm)	NOx (lb/MBtu)	SO2c (ppm)	SO2 (lb/MBtu)	HCc (ppm)
4/19/93	0:56	151	19.50	3.69	59	15.7	220	0.293	386	0.720	
4/19/93	0:52	151	19.51	3.68	58	15.7	219	0.292	385	0.720	
4/19/93	2:29	150	19.73	4.18	9	15.7	236	0.315	371	0.693	
4/19/93	1:10	151	19.72	4.27	9	15.8	246	0.329	383	0.716	
4/19/93	5:42	150	19.71	4.10	12	15.8	235	0.313	376	0.702	
<b>Average</b>		141	17.03	3.63	149	15.7	195	0.261	285	0.554	4.5
<b>Maximum</b>		157	24.62	5.26	986	16.4	256	0.348	386	0.720	58.2
<b>Minimum</b>		88	2.65	2.27	8	15.1	146	0.194	0	0.473	0.0
<b>St. Dev.</b>		20	5.28	0.67	239	0.3	27	0.037	66	0.064	9.7

Subscript c denotes correction to 3% O2

TABLE 2. MEASUREMENT OF NITROUS OXIDE UNDER LNB AND GR-LNB OPERATION

Test Date	Test Duration (hours)	Operating Condition	Load (MWe, net)	Gas Heat Input (% , total)	Boiler O2 (% , dry)	Nitrous Oxide (ppm)
4/15/93	2.1	LNB	150	0	3.38	4.37
4/16/93	6.0	LNB	150	0	4.05	5.14
4/19/93	5.7	GR-LNB	150	20	4.19	3.33
4/20/93	3.3	LNB	130	0	3.31	1.04
4/20/93	2.8	LNB	120	0	4.51	1.01

TABLE 3. AMBIENT DUST LEVELS OUTSIDE OF PLANT

Sampling Date		Sampling Time		Filter Number	Test I.D.	Sampling Location	TSP < PM10 micrograms/cubic meter	Plant Contribution micrograms/cubic meter
Start	Finish	Start	Finish					
1/25/93	1/25/93	9:00	15:02	2000	GR REP 1	Upwind	110.1	
1/25/93	1/25/93	9:00	15:12	2001		Downwind	148.2	38.1
1/25/93	1/26/93	15:05	8:00	2003	Baseline REP 1	Upwind	100.7	
1/25/93	1/26/93	15:15	7:53	2002		Downwind	118.6	17.9
1/26/93	1/26/93	8:16	14:45	2004	GR REP 2	Upwind	61.8	
1/26/93	1/26/93	8:15	14:55	2005		Downwind	77.2	15.4
1/26/93	1/27/93	14:52	8:25	2006	Baseline REP 2	Upwind	70.7	
1/26/93	1/27/93	15:00	8:15	2007		Downwind	77.2	6.5
1/27/93	1/27/93	9:28	15:28	2009	GR REP 3	Upwind	77.5	
1/27/93	1/27/93	9:23	15:23	2008		Downwind	93.1	15.6
1/27/93	1/28/93	15:40	7:56	2010	Baseline REP 3	Upwind	94.6	
1/27/93	1/28/93	15:30	7:46	2011		Downwind	105.6	11
1/28/93	1/28/93	8:01	14:38	2013	Baseline REP 4	Upwind	35	
1/28/93	1/28/93	8:05	14:45	2012		Downwind	24.7	-10.3
1/28/93	1/29/93	14:41	10:00	2015	Baseline REP 5	Upwind	21.3	
1/28/93	1/29/93	14:51	10:00	2014		Downwind	23.3	2

TABLE 4. WORKER AREA DUST LEVELS.

Test I.D.	Sampling Location	Date	Dust Collected (mg)	Time (min)	Flow Rate, Avg. (l/min)	Concentration milligram/cubic meter
Baseline REP 1	Siemens Fan on	1/26/93	0.00	240	2.223	0.000
Baseline REP 2	Ground Level	1/29/93	0.09	184	2.464	0.198
GR REP 1		1/27/93	0.01	180	2.219	0.025
Baseline REP 1	4th Floor, at	1/26/93	0.00	240	2.367	0.000
Baseline REP 2	Gas Header	1/29/93	0.01	180	2.219	0.025
GR REP 1		1/27/93	0.02	180	2.406	0.046
Baseline REP 1	5th Floor, Back	1/27/93	0.00	240	2.425	0.000
Baseline REP 2	Part of Injection	1/28/93	0.02	180	2.404	0.046
GR REP 1	Area (left of Elev.)	1/27/93	0.11	213	2.397	0.215
Baseline REP 1	5th Floor, Front	1/27/93	0.00	240	2.214	0.000
Baseline REP 2	Part of Injection	1/28/93	0.04	180	2.247	0.099
GR REP 1	Area (Right of Elev.)	1/27/93	0.05	214	2.226	0.105
Baseline REP 1	5.5 Floor, Nozzle	1/28/93	0.00	190	2.248	0.000
Baseline REP 2	Cooling Fans	1/29/93	0.00	180	2.450	0.000
Baseline REP 1	6th Floor, Above	1/28/93	0.00	190	2.430	0.000
Baseline REP 2	FGR Inlet	1/29/93	0.20	180	2.248	0.494
Baseline REP 1	CEM Trailer Inside	1/28/93	0.05	247	2.413	0.084
Baseline REP 1	CEM Trailer Outside	1/28/93	0.96	247	2.256	1.720

Measurements Listed Are in Order of Elevation (Ground Level First)

TABLE 5. NOISE LEVELS IN BOILER HOUSE.

Test I.D.	Measurement Location	Date	Noise Level (db)
Baseline REP 1	Siemens Fan on Ground Level	1/26/93	92
Baseline REP 2		1/27/93	90.4
Baseline REP 3		1/28/93	89.4
Baseline REP 4		1/29/93	92.4
GR REP 1		1/25/93	91.4
GR REP 2		1/26/93	91
GR REP 3		1/27/93	91.9
Baseline REP 1	4th Floor, at Gas Header	1/26/93	78.4
Baseline REP 2		1/27/93	78.4
Baseline REP 3		1/28/93	79.9
Baseline REP 4		1/29/93	77.9
GR REP 1		1/25/93	90.6
GR REP 2		1/26/93	84.9
GR REP 3		1/27/93	89.4
Baseline REP 1	5th Floor, Scanner Cooling Fan (Maxon)	1/26/93	81.9
Baseline REP 2		1/27/93	83.9
Baseline REP 3		1/28/93	84.4
Baseline REP 4		1/29/93	82.9
GR REP 1		1/25/93	95.4
GR REP 2		1/26/93	93
GR REP 3		1/27/93	94.4
Baseline REP 1	5th Floor, Back Part of Injection Area (Left of Elevator)	1/26/93	75.9
Baseline REP 2		1/27/93	76.4
Baseline REP 3		1/28/93	78.4
Baseline REP 4		1/29/93	75.9
GR REP 1		1/25/93	94.4
GR REP 2		1/26/93	92.9
GR REP 3		1/27/93	92.9
Baseline REP 1	5th Floor, Front Part of Injection Area (Right of Elevator)	1/26/93	79.4
Baseline REP 2		1/27/93	79.9
Baseline REP 3		1/28/93	79.9
Baseline REP 4		1/29/93	79.1
GR REP 1		1/25/93	97.9
GR REP 2		1/26/93	93.9
GR REP 3		1/27/93	95.4

TABLE 5. NOISE LEVELS IN BOILER HOUSE (Con.)

Test I.D.	Measurement Location	Date	Noise Level (db)
Baseline REP 1	5.5 Floor, Nozzle Cooling Fans	1/26/93	80
Baseline REP 2		1/27/93	80.8
Baseline REP 3		1/28/93	83.4
Baseline REP 4		1/29/93	80.4
GR REP 1		1/25/93	89.9
GR REP 2		1/26/93	89.9
GR REP 3		1/27/93	90.4
Baseline REP 1	6th Floor, Above FGR Inlet	1/26/93	81.9
Baseline REP 2		1/27/93	78.9
Baseline REP 3		1/28/93	81
Baseline REP 4		1/29/93	79.5
GR REP 1		1/25/93	81.5
GR REP 2		1/26/93	80.5
GR REP 3		1/27/93	80.4

Measurements Listed Are in Order of Elevation (Ground Level First)

TABLE 6. CARBON-IN-FLY ASH DATA.

Test Condition	Date	Gross Power (MWe)	Net Power (MWe)	CEMS O <sub>2</sub> (% , dry)	Gas Heat (% , totl)	Coal Zone Stoich	Reburn Zone Stoich	Exit Zone Stoich	OFA	Carbon In-Ash (% , As Rcvd)
LNB	11/13/92	166	155	4.41	0.00	1.259	1.259	1.259	0%	3.54
LNB	11/13/92	162	151	4.18	0.00	1.182	1.184	1.242	5%	7.47
LNB	11/13/92	162	151	3.75	0.00	1.098	1.100	1.212	9%	11.43
GR-LNB	11/17/92	162	150	3.52	20.86	1.201	0.965	1.194	20%	4.18
GR-LNB	11/17/92	161	150	3.57	21.08	1.162	0.932	1.197	23%	2.71
GR-LNB	11/18/92	162	151	3.67	20.94	1.161	0.933	1.204	24%	2.85
GR-LNB	11/18/92	161	149	3.79	15.96	1.117	0.953	1.213	23%	3.27
GR-LNB	11/19/92	160	149	3.12	5.27	1.074	1.025	1.170	13%	10.24
GR-LNB	11/19/92	163	152	2.64	10.33	1.071	0.969	1.139	15%	7.82
GR-LNB	11/19/92	161	150	2.83	23.41	1.127	0.879	1.150	24%	2.77
GR-LNB	11/20/92	161	150	2.66	18.61	1.091	0.897	1.140	22%	4.34
GR-LNB	11/20/92	161	150	3.60	20.51	1.156	0.933	1.199	24%	4.93
GR-LNB	12/1/92	129	120	4.07	21.03	1.165	0.937	1.231	25%	2.75
GR-LNB	12/1/92	126	116	5.26	8.24	1.129	1.052	1.324	22%	6.77
GR-LNB	12/7/92	130	119	4.12	11.40	1.110	0.999	1.236	20%	3.95
GR-LNB	12/7/92	129	119	4.03	15.70	1.100	0.942	1.229	24%	2.47
GR-LNB	12/7/92	130	119	3.90	20.85	1.119	0.903	1.219	27%	1.62
GR-LNB	12/8/92	100	90	3.87	21.01	1.227	0.990	1.217	20%	3.98
GR-LNB	12/8/92	98	88	5.10	21.24	1.164	0.941	1.308	30%	1.22
GR-LNB	12/8/92	101	91	4.17	11.13	1.128	1.021	1.240	19%	3.84
GR-LNB	12/9/92	99	89	4.68	20.87	1.097	0.891	1.275	32%	1.77
GR-LNB	12/9/92	102	92	4.19	20.99	1.106	0.896	1.239	29%	10.29
GR-LNB	12/14/92	159	150	3.87	5.42	1.085	1.035	1.219	16%	8.75
GR-LNB	12/16/92	161	152	3.75	10.38	1.096	0.994	1.210	19%	6.68
GR-LNB	1/15/93	163	152	3.38	21.76	1.155	0.920	1.184	23%	4.69
GR-LNB	1/21/93	163	152	3.15	22.48	1.137	0.896	1.168	24%	3.51
GR-LNB	2/2/93	163	152	2.44	19.32	1.067	0.872	1.125	23%	11.47
LNB	3/8/93	126	117	3.92	0.00	1.223	1.225	1.223	0%	11.23
LNB	3/8/93	126	118	3.75	0.00	1.212	1.214	1.212	0%	8.63
LNB	3/9/93	161	151	4.11	0.00	1.238	1.239	1.238	0%	4.87
LNB	3/9/93	157	147	3.58	0.00	1.201	1.202	1.201	0%	6.09
LNB	3/10/93	97	89	5.04	0.00	1.308	1.308	1.308	0%	4.13
LNB	3/10/93	98	90	4.61	0.00	1.274	1.274	1.274	0%	4.81
LNB	3/11/93	159	149	3.75	0.00	1.212	1.212	1.212	0%	5.99
LNB	3/11/93	160	150	3.36	0.00	1.186	1.186	1.186	0%	7.20
LNB	4/23/93	160	149	3.58	0.00	1.201	1.203	1.201	0%	9.81
LNB	4/23/93	157	147	2.93	0.00	1.158	1.160	1.158	0%	8.00



TABLE 7. AQUEOUS DISCHARGE LIMITS AND MONITORING FREQUENCY

Effluent Parameter	Discharge Limitations		Sampling Frequency	Sample Type
	30-Day Avg.	Daily Maximum		
Flow	5.6 MGD	N/A	Daily	Instantaneous or Continuous
Total Suspended Solids	30 mg/l	100 mg/l	Weekly	Composite
Oil and Grease	15 mg/l	20 mg/l	Contingent	Grab (5 x Weekly - Visual)
Temperature	N/A	86 F	5 x Weekly	In Situ
Total Residual Chlorine	0.007 mg/l	0.015 mg/l	Weekly	Grab
Total Chromium	0.11 mg/l	0.11 mg/l	Monthly	Composite
Total Recoverable Copper	Report	Report	Monthly	Composite
Total Recoverable Zinc	0.23 mg/l	0.46 mg/l	Monthly	Composite
pH	6.5 Minimum	9.0 Maximum	5 x Weekly	Grab or Continuous

**APPENDIX A**

**DISCHARGE MONITORING REPORTS**

DISCHARGE MONITORING REPORT (17-19)

FINAL

001A  
DISCHARGE NUMBER

C0-0001104  
PERMIT NUMBER

NAME PUBLIC SERVICE COMPANY OF COLORADO  
ADDRESS P. O. BOX 840  
DENVER, COLORADO 80204

MONITORING PERIOD					
YEAR	MO	DAY	YEAR	MO	DAY
92	10	01	92	10	31

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	(f Card Only) QUANTITY OR CONCENTRATION (46-53)			(g Card Only) QUANTITY OR CONCENTRATION (54-61)			NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
TEMPERATURE							0	24/31	
WATER DEG FAHRENHEIT									
00011 1 0 0									
EFFLUENT GROSS VALUE									
PH				6.890			0	24/31	INST
00400 1 0 0				6.500					
EFFLUENT GROSS VALUE				Minimum					
SOLIDS, TOTAL TSS							0	5/31	GR
SUSPENDED									
00530 1 0 0									
EFFLUENT GROSS VALUE									
OIL AND GREASE									
NEON EXTR-GRAV METH									
00556 1 0 0									
EFFLUENT GROSS VALUE									
IRONIUM, TOTAL									
(AS CR)									
01034 1 0 0									
EFFLUENT GROSS VALUE									
INC.									
TOTAL RECOVERABLE									
01094 1 0 0									
EFFLUENT GROSS VALUE									
COPPER									
TOTAL RECOVERABLE									
01110 1 0 0									
EFFLUENT GROSS VALUE									
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER	I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY WITH THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 U.S.C. 1001 AND 33 U.S.C. 1319 (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)			SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT			AREA NUMBER	DATE	
MCOTTER, JAMES R.							3074050500	92	11-23
MR. VICE PRESIDENT									
TYPED OR PRINTED									
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)									

FINAL

WASTEWATER MONITORING REPORT (WWR) (17-19)  
001A  
DISCHARGE NUMBER

CD-0001104  
PERMIT NUMBER

NAME FUELS SERVICE COMPANY OF COLORADO  
ADDRESS P O BOX 840  
DENVER COLORADO 80204

AGILITY CHEROKEE  
LOCATION

NOTE: Read instructions before completing this form.

MONITORING PERIOD

YEAR	MO	DAY	YEAR	MO	DAY
92	10	01	92	10	31

(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

PARAMETER (32-37)	(1 Card Only) QUANTITY OR LOADING (34-61)				(4 Card Only) QUANTITY OR CONCENTRATION (34-61)				NO. OF EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM	UNITS	MINIMUM			
	(46-53)	(54-61)	(34-61)	(38-45)	(46-53)	(34-61)	(34-61)	(38-45)			
FLOW IN CONDUIT OR THROUGH TREATMENT PLANT	2.143	3.320	(03) MGD						0	32/31	
30050 1 0 0	30-day avg.				0.05	0.05	(19) MGD		0	5/31	INST
CHLORINE TOTAL RESIDUAL					0.007	0.015	Daily Max.		0	1/7	GR
30060 1 0 0									0	24/31	VIS
EFFLUENT GROSS VALUE OIL AND GREASE VISUAL		Inst. Max.	YES						0	5/7	VIS
34066 1 0 0			NO								
EFFLUENT GROSS VALUE											

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE OF THESE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 U.S.C. § 1001 AND 18 U.S.C. § 1319. Penalties under these statutes may include fines up to \$10,000 and/or imprisonment of between 6 months and 5 years.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
SCOTTIE, JAMES R.  
VP. VICE PRESIDENT  
TYPED OR PRINTED  
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

*James R. Scottie*  
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT  
101-058500  
AREA NUMBER  
92-11-23  
YEAR  
MO  
DAY

PERMITTEE NAME/ADDRESS (Include Facility Name/location if different)  
NAME PUBLIC UTILITIES COMPANY  
ADDRESS P.O. BOX 849  
MILWAUKEE, WISCONSIN 53201

10-0001104  
PERMIT NUMBER

0018  
DISCHARGE NUMBER

MONITORING PERIOD

YEAR	MO	DAY	YEAR	MO	DAY
72	11	01	72	11	31

NOTE: Read instructions before completing this form.

PARAMETER (12-12)	QUANTITY OR LOADING (46-51)			QUALITY OR CONCENTRATION (34-61)			NO. EX. (62-69)	FREQUENCY OF ANALYSIS (69-88)	SAMPLE TYPE (69-70)
	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
TEMPERATURE							0	20/30	
WEIGHT PER FIBER (LBS)									
0004 1 0 0						DEGF		5/7	TRST
WEIGHT PER GROSS VALUE							0	20/30	
0040 1 0 0				6.250		PU		5/7	TRST
SOLIDS, TOTAL TSS							0	4/30	
SUSPENDED									
0050 1 0 0				3.500				5/7	GR
WEIGHT PER GROSS VALUE									
0050 1 0 0				100.000		MG/L		1/7	GR C
WEIGHT PER GROSS VALUE				30-day avg.					
0050 1 0 0				30-day avg.					
WEIGHT PER GROSS VALUE									
0050 1 0 0				15.000		MG/L		1/7	GR
WEIGHT PER GROSS VALUE				30-day avg.					
0050 1 0 0				0.031				1/30	COMP
WEIGHT PER GROSS VALUE				0.110		MG/L		1/30	COMP
0050 1 0 0				30-day avg.				1/30	COMP
WEIGHT PER GROSS VALUE				0.030					
0050 1 0 0				0.230		MG/L		1/30	COMP
WEIGHT PER GROSS VALUE				30-day avg.					
0050 1 0 0				0.026				1/30	COMP
WEIGHT PER GROSS VALUE									
0050 1 0 0									

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER (Signature)

OFFICE OR AUTHORIZED AGENT

TELEPHONE

DATE

1972 12 15

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

PERMITTEE CERTIFICATE UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE OF THE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE INFORMATION SUBMITTED IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING A FINE AND IMPRISONMENT UP TO \$5000 AND 1 YEAR AND A MAXIMUM IMPRISONMENT OF 6 MONTHS AND 3 YEARS.

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE OF THE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE INFORMATION SUBMITTED IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING A FINE AND IMPRISONMENT UP TO \$5000 AND 1 YEAR AND A MAXIMUM IMPRISONMENT OF 6 MONTHS AND 3 YEARS.

NAME PUBLIC SERVICE COMPANY OF COLORADO  
ADDRESS P. O. BOX 840  
DENVER, COLORADO 80201

PERMIT NUMBER  
DISCHARGE NUMBER

FACILITY CHELCOKE  
LOCATION  
MONITORING PERIOD  
FROM YEAR 1972 MO 11 DAY 11 TO YEAR 1973 MO 11 DAY 31

NOTE: Read instructions before completing this form.

Table with columns: PARAMETER (32-37), QUANTITY OR LOADING (54-61), QUALITY OR CONCENTRATION (54-61), NO. EX (62-63), FREQUENCY OF ANALYSIS (64-68), SAMPLE TYPE (69-70). Rows include parameters like FLOW, TR TREATMENT PLANT, EFFLUENT TOGS, etc.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
MCCUTCHER, JAMES R.  
VICE PRESIDENT  
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT  
J. A. W. [Signature]

FINAL

(1719)

CO-0001104  
PERMIT NUMBER

001A  
DISCHARGE NUMBER

MONITORING PERIOD

YEAR	MO	DAY	YEAR	MO	DAY
72	1	1	72	1	1

FROM (20-21) (22-23) (24-25) TO (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	(J Card Only) QUANTITY OR LOADING (54-61)			(K Card Only) QUANTITY OR CONCENTRATION (54-61)			NO. EX. ANALYSIS (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE	MAXIMUM	UNITS	MINIMUM	AVERAGE	MAXIMUM			
TEMPERATURE							0	25/31	
WATER DEG FAHRENHEIT									
00011 1 0 0									
EFFLUENT GROSS VALUE									
PH									
00100 1 0 0									
EFFLUENT GROSS VALUE									
SOLIDS, TOTAL TSS									
SUSPENDED									
00530 1 0 0									
EFFLUENT GROSS VALUE									
OIL AND GREASE									
TRICHLOROETHYLENE									
00556 1 0 0									
EFFLUENT GROSS VALUE									
CHLORIDES, TOTAL									
(AS CR)									
01034 1 0 0									
EFFLUENT GROSS VALUE									
ZINC									
TOTAL RECOVERABLE									
01074 1 0 0									
EFFLUENT GROSS VALUE									
COPPER									
TOTAL RECOVERABLE									
01114 1 0 0									
EFFLUENT GROSS VALUE									
<p>I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE AND BELIEF, I BELIEVE THE INFORMATION IS TRUE AND ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC 1101 AND 33 USC 1319 (Penalties under these statutes may vary from year to year) and for maximum imprisonment of between 6 months and 5 years.</p>									
<p>NAME/TITLE PRINCIPAL EXECUTIVE OFFICER: <b>ROBERT P. JAMES P. JR. VICE PRESIDENT</b></p>									
<p>TYPED OR PRINTED: <b>ROBERT P. JAMES P. JR. VICE PRESIDENT</b></p>									
<p>COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)</p>									
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT							TELEPHONE: _____ DATE: _____ AREA NUMBER: 303 255 5000 NUMBER: 93 01 18		

NAME \_\_\_\_\_  
 ADDRESS P. O. BOX 340  
 DENVER, COLORADO 80201

(2-18) \_\_\_\_\_  
 (17-19) \_\_\_\_\_  
 OGLA  
 DISCHARGE NUMBER

UMD NO. 24000A  
 Expires 3-31-88

FINAL

MONITORING PERIOD  
 FROM \_\_\_\_\_ TO \_\_\_\_\_  
 YEAR MO DAY YEAR MO DAY  
 (20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (22-27)	(J Card Only) QUANTITY OR LOADING (34-43)			(K Card Only) QUALITY OR CONCENTRATION (54-63)			NO. EX (62-64)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (66-53)	MAXIMUM (64-43)	UNITS (68-53)	AVERAGE (54-63)	MAXIMUM (54-63)	UNITS (54-63)			
SAMPLE MEASUREMENT	3.021	4.770	(08)				0	31/31	
PERMIT REQUIREMENT	5.600 30-Day Avg.		HCO					7/7	INST
SAMPLE MEASUREMENT				<0.05	(0.05)	(19)	0	5/31	
PERMIT REQUIREMENT				0.007 30-Day Avg.	0.015 Daily Max.	MG/L		1/7	GR
SAMPLE MEASUREMENT		Inst. Max.	YES			(24)	0	25/31	
PERMIT REQUIREMENT			NO			VIS		5/7	VIS
SAMPLE MEASUREMENT									
PERMIT REQUIREMENT									
SAMPLE MEASUREMENT									
PERMIT REQUIREMENT									
SAMPLE MEASUREMENT									
PERMIT REQUIREMENT									

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY KNOWLEDGE OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 U.S.C. 1001 AND 33 U.S.C. 1319 (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
 GUYTON JAMES P.  
 VP, VICE PRESIDENT

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT  
*J. A. Smith*

TELEPHONE \_\_\_\_\_  
 DATE \_\_\_\_\_  
 AREA NUMBER 303 958500  
 YEAR 93 MO 01 DAY 10

TYPED OR PRINTED

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)



NATIONAL POLLUTION CONTROL ACT  
DISCHARGE MONITORING REPORT (DMR)  
(12-19)

FINAL

CO-0001104  
PERMIT NUMBER

001A  
DISCHARGE NUMBER

PERMITTEE NAME/ADDRESS (Include Facility Name/Location if different)  
NAME PUBLIC SERVICE COMPANY OF COLORADO  
ADDRESS P. O. BOX 840  
DENVER, COLORADO 80291

MONITORING PERIOD  
FROM YEAR 93 MO 01 DAY 01 TO YEAR 93 MO 01 DAY 31  
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	(3 Card Only) QUANTITY OR LOADING (34-41)			QUALITY OR CONCENTRATION (54-61)			NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (46-53)	MAXIMUM (47-54)	UNITS (48-55)	MINIMUM (58-65)	AVERAGE (46-53)	MAXIMUM (54-61)			
TEMPERATURE							0	20/31	
WATER DEG FAHRENHEIT						(15)			
00011 1 0 0						DEGF			
EFFLUENT GROSS VALUE									
PH				7.070			0	20/31	INSIT
00400 1 0 0						(12)			
EFFLUENT GROSS VALUE						SU			
SOLIDS, TOTAL TSS							0	4/31	
SUSPENDED									
00530 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			BHR
OTL AND GREASE							0	4/31	
FREON EXTR-GRAV METH									
00556 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			
CHROMIUM, TOTAL (AS CR)							0	1/31	
01034 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			COMP
ZINC							0	1/31	
TOTAL RECOVERABLE									
01094 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			
COPPER							0	1/31	
TOTAL RECOVERABLE									
01119 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			COMP
COPPER							0	1/31	
TOTAL RECOVERABLE									
01119 1 0 0						(19)			
EFFLUENT GROSS VALUE						MG/L			COMP

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 18 USC § 1339. Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
MCCOTTER, JAMES R.  
DR. VICE PRESIDENT  
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT  
3032958500  
AREA CODE NUMBER  
TELEPHONE  
DATE  
93 02 22  
YEAR MO DAY

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

TYPED OR PRINTED



00011104  
PERMIT NUMBER

0001A  
DISCHARGE NUMBER

ADDRESS: P.O. BOX 840  
DENVER, COLORADO 80201

MONITORING PERIOD

YEAR	MO	DAY	YEAR	MO	DAY
73	02	01	73	02	28

NOTE: Read instructions before completing this form.

PARAMETER (32-17)	QUANTITY OR LOADING (34-61)			QUALITY OR CONCENTRATION (34-61)			NO. EX (62-61)	FREQUENCY OF ANALYSIS (64-61)	SAMPLE TYPE (69-71)
	AVERAGE (46-51)	MAXIMUM (46-51)	UNITS (46-51)	MINIMUM (38-45)	AVERAGE (46-51)	MAXIMUM (34-61)			
TEMPERATURE							0	29/28	
WATER DEG FAHRENHEIT									
00011 1 0 0									
EFFLUENT GROSS VALUE									
PH									
00400 1 0 0				7.060			0	29/28	
EFFLUENT GROSS VALUE									
SOLIDS, TOTAL TSS									
SUSPENDED									
00530 1 0 0				6.500			0	5/7	GR
EFFLUENT GROSS VALUE				Minimum					
OIL AND GREASE									
FREON EXTR-GRAV METH									
00556 1 0 0							0	5/28	
EFFLUENT GROSS VALUE									
CHROMIUM, TOTAL (AS CR)									
01034 1 0 0							0	1/28	
EFFLUENT GROSS VALUE									
ZINC									
TOTAL RECOVERABLE									
01094 1 0 0							0	1/30	COMP
EFFLUENT GROSS VALUE									
COPPER									
TOTAL RECOVERABLE									
01119 1 0 0							0	1/28	
EFFLUENT GROSS VALUE									

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER: MCCOTTER, JAMES R. CSR. VICE PRESIDENT

TYPED OR PRINTED

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION, I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC § 1001 AND 33 USC § 1319. Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 3 years.

SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER: [Signature]

OFFICER OR AUTHORIZED AGENT: [Signature]

TELEPHONE: [Number]

DATE: [Month/Day/Year]

AREA CODE: 303

NUMBER: 2958500

YEAR: 93

MO: 03

DAY: 15



NAME SERVICE COMPANY OF COLORADO  
 ADDRESS P. O. BOX 840  
 DENVER, COLORADO 80201

00001104 PERMIT NUMBER  
 001A DISCHARGE NUMBER

FINAL

MONITORING PERIOD

YEAR	MO	DAY	YEAR	MO	DAY
75	03	01	75	03	31

FROM (20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

FACILITY CHEROKEE  
 LOCATION

NOTE: Read instructions before completing this form.

PARAMETER (22-27)	(3 Card Only) QUANTITY OR LOADING (34-61)		(4 Card Only) QUANTITY OR CONCENTRATION (34-61)		NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (46-53)	MAXIMUM (34-61)	AVERAGE (46-53)	MAXIMUM (34-61)			
TEMPERATURE					0	20/31	
WATER DEG FAHRENHEIT							
00011 1 0 0							DEGF (15)
EFFLUENT GROSS VALUE							
PH							
00400 1 0 0							
EFFLUENT GROSS VALUE							
00530 1 0 0							
SOLIDS, TOTAL TSS							
SUSPENDED							
00530 1 0 0							
EFFLUENT GROSS VALUE							
OIL AND GREASE							
FREDON EXTR--GRAY METH							
00556 1 0 0							
EFFLUENT GROSS VALUE							
CHROMIUM, TOTAL (AS CR)							
01034 1 0 0							
EFFLUENT GROSS VALUE							
ZINC							
TOTAL RECOVERABLE							
01094 1 0 0							
EFFLUENT GROSS VALUE							
COPPER							
TOTAL RECOVERABLE							
01119 1 0 0							
EFFLUENT GROSS VALUE							

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER WEXELS, JAMES R. HDR, GOVT & ENV AFFRS	SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT	303	942808	DATE 93 04 1
		AREA CODE	NUMBER	
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)		TYPED OR PRINTED		

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC 1001 AND 33 USC 1319 (Penalties and these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 3 years)

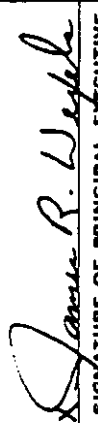
FINAL

(1/19) 001A  
DISCHARGE NUMBER

CO-0001104  
PERMIT NUMBER

MONITORING PERIOD  
FROM YEAR 89 MONTH 01 DAY 01 TO YEAR 89 MONTH 01 DAY 31  
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (22-37)	QUANTITY OR LOADING (34-41)		QUALITY OR CONCENTRATION (34-41)		NO. EX (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (46-53)	MAXIMUM (46-53)	MINIMUM (46-53)	MAXIMUM (46-53)			
FLOW, IN CONDUIT OR THRU TREATMENT PLANT	SAMPLE MEASUREMENT	2.745	3.018	(03)	0	31/31	INST
	PERMIT REQUIREMENT	5.600		MGD		7/7	
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT	30-Day Avg.	< 0.05	< 0.05	0	4/31	GR
	PERMIT REQUIREMENT	30-Day Avg.	0.007	0.015		1/7	
CHLORINE TOTAL RESIDUAL	SAMPLE MEASUREMENT	0	Inst. Max.	(24) VIS	0	19/31	VIS
	PERMIT REQUIREMENT	0				5/7	
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
OIL AND GREASE VISUAL	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
BOD5 GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
EFFLUENT GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
TSS GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
SILICA GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
SULPHATE GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
NITRATE GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
NITRITE GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
AMMONIA GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
PHOSPHORUS GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
COPPER GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
ZINC GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
CADMIUM GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
LEAD GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
COPPER GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
ZINC GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
CADMIUM GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
LEAD GROSS VALUE	SAMPLE MEASUREMENT						
	PERMIT REQUIREMENT						
I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 U.S.C. 1001 AND 33 U.S.C. 1319. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of 5 years and 5 years.)							
NAME/TITLE PRINCIPAL EXECUTIVE OFFICER		SIGNATURE OF PRINCIPAL EXECUTIVE 			TELEPHONE		DATE
WEXELS, JAMES R.					303942808		93 04 13
MGR, GOVT & ENV AFFRS		OFFICER OR AUTHORIZED AGENT			AREA NUMBER		YEAR MO DAY
					303942808		93 04 13
TYPED OR PRINTED							
COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)							

NAME: WEXELS, JAMES R.  
 ADDRESS: P. O. BOX 840  
 DENVER, COLORADO 80201  
 FACILITY: CHEROKEE  
 LOCATION:

FINAL

001A  
DISCHARGE NUMBER

CO-0001104  
PERMIT NUMBER

00201

ADDRESS P.O. BOX 840  
DENVER, COLORADO

MONITORING PERIOD  
YEAR MO DAY YEAR MO DAY  
73 04 01 TO 73 04 30  
(20-21) (22-23) (24-25) (26-27) (28-29) (30-31)

NOTE: Read instructions before completing this form.

PARAMETER (32-37)	QUANTITY OR LOADING (34-41)			QUALITY OR CONCENTRATION (34-41)			NO. EX ANALYSIS (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (46-53)	MAXIMUM (46-53)	UNITS (46-53)	AVERAGE (46-53)	MAXIMUM (46-53)	UNITS (46-53)			
TEMPERATURE							0	25/30	
WATER DEG FAHRENHEIT									
0011 1 0 0								5/7	INSIT
EFFLUENT GROSS VALUE									
PH				7.350			0	25/30	
00400 1 0 0				6.500	9.000	SU		5/7	GR
EFFLUENT GROSS VALUE				Minimum	Maximum				
SOLIDS, TOTAL TSS							0	5 /30	
SUSPENDED				12.200	18.200				
00530 1 0 0									
EFFLUENT GROSS VALUE				30,000	100,000	MG/L		1/7	8HR C
Oil and Grease				30-Day Avg.	Daily Max.				
IRON EXTR-GRAV METI				CONTINGENT			0	5 /30	
00556 1 0 0									
EFFLUENT GROSS VALUE				15,000	20,000	MG/L		1/7	GR
CHROMIUM, TOTAL				30-Day Avg.	Daily Max.				
(AS CR)				<0.005	<0.005		0	1 /30	
01034 1 0 0									
EFFLUENT GROSS VALUE				0.110	0.110	MG/L		1/30	COMP
ZINC,				30-Day Avg.	Daily Max.				
TOTAL RECOVERABLE				0.018	0.018		0	1 /30	
01094 1 0 0									
EFFLUENT GROSS VALUE				0.230	0.460	MG/L		1/30	COMP
COPPER				30-Day Avg.	Daily Max.				
TOTAL RECOVERABLE				0.038	0.038		0	1 /30	
01119 1 0 0									
EFFLUENT GROSS VALUE								1/30	COMP

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE ACCURATE AND COMPLETE I AM AWARE THAT THERE ARE NO UNLAWFUL ACTIVITIES OR SUBMITTING FALSE INFORMATION INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT SEE 18 USC 1001 AND 33 USC 1319. (Practitioner under these criteria may include firms up to 200/88) and no maximum imprisonment for more than 6 months and 3 years.)

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
JAMES R. JEFFERS, JR.  
MGR. COUT & ENV AFFRS  
SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT  
3037942808  
AREA NUMBER  
TELEPHONE  
DATE  
YEAR MO DAY  
83 05 11

COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)

U.S. ENVIRONMENTAL PROTECTION AGENCY

DISCHARGE NUMBER

PERMIT NUMBER

U.S. ENVIRONMENTAL PROTECTION AGENCY

PERMIT NUMBER

**MONITORING PERIOD**  
 FROM YEAR 93 MO 04 DAY 01 TO YEAR 93 MO 04 DAY 30  
 (20-23) (22-23) (24-29) (26-27) (28-29) (30-31)

**NOTE: Read instructions before completing this form.**

PARAMETER (32-37)	QUANTITY OR LOADING (34-35)		QUALITY OR CONCENTRATION (34-61)			NO. EX ANALYSIS (62-63)	FREQUENCY OF ANALYSIS (64-68)	SAMPLE TYPE (69-70)
	AVERAGE (46-53)	MAXIMUM (54-61)	MINIMUM (38-45)	AVERAGE (46-53)	MAXIMUM (54-61)			
FLOW, IN CONDUIT OR THROUGH TREATMENT PLANT	1.981	3.420	(03)			0	30/30	
EFFLUENT GROSS VALUE	5.600		1MGD				7/7	INST
CHLORINE TOTAL RESIDUAL	30-Day Avg.			0.05	(0.05)	0	5/30	
EFFLUENT GROSS VALUE				0.007	0.015		1/7	GR
OIL AND GREASE VISUAL		0	YES	30-Day Avg. Daily Max.		0	25/30	
EFFLUENT GROSS VALUE		Inst. Max.	NO				5/7	VIS

I CERTIFY UNDER PENALTY OF LAW THAT I HAVE PERSONALLY EXAMINED AND AM FAMILIAR WITH THE INFORMATION SUBMITTED HEREIN AND BASED ON MY INQUIRY OF THOSE INDIVIDUALS IMMEDIATELY RESPONSIBLE FOR OBTAINING THE INFORMATION I BELIEVE THE SUBMITTED INFORMATION IS TRUE, ACCURATE AND COMPLETE. I AM AWARE THAT THERE ARE SIGNIFICANT PENALTIES FOR SUBMITTING FALSE INFORMATION, INCLUDING THE POSSIBILITY OF FINE AND IMPRISONMENT. SEE 18 USC 1001 AND 33 USC 1319. (Penalties under these statutes may include fines up to \$10,000 and/or maximum imprisonment of between 6 months and 5 years.)

DATE: 93 05 11

TELEPHONE: 303 428 08

AREA CODE: 303

NUMBER: 942808

**SIGNATURE OF PRINCIPAL EXECUTIVE OFFICER OR AUTHORIZED AGENT**

*James R. Weis*

NAME/TITLE PRINCIPAL EXECUTIVE OFFICER  
 JAMES R. WEIS  
 MGR. GOVT & ENV AFFRS

TYPED OR PRINTED  
 COMMENT AND EXPLANATION OF ANY VIOLATIONS (Reference all attachments here)



**APPENDIX B**

**EXCESS EMISSIONS AND OPACITY REPORTS**



Public Service  
Company of Colorado  
P.O. Box 840  
Denver, CO 80201-0840

January 29, 1993

Mr. Roy Doyle  
Air Pollution Control Division  
Colorado Department of Health  
4300 Cherry Creek Drive South  
Denver, CO 80222-1530

RE: Fourth Quarter, 1992 Excess Emissions Report, Cherokee S.E.G.S., Units #1-4

Dear Roy:

Attached is the fourth quarter, 1992 excess emissions report for the Public Service Company of Colorado Cherokee Station Units #1-4.

Unit #1 operated 2,144 hours, Unit #2 operated 1,727 hours, Unit #3 operated 2,066 hours and Unit #4 operated 1,809 hours.

Feel free to contact me at 294-2810 with any questions in this regard.

Sincerely,

A handwritten signature in cursive script that reads "Peter J. Cohlma".

Peter J. Cohlma  
Chief Environmental Scientist

PJC:tc

Attachment

QUARTERLY EXCESS EMISSIONS REPORT (EER)

for

Fossil Fuel-Fired Steam Generators, Subpart D

Suggested Format for Sources in Region VIII\*

Minimum Requirements Under Section 60.7 (See instructions)

Part 1. This report includes all the required information under section 60.7 for:

a. Quarterly emission reporting period ending: (circle one)

March 31                      June 30                      Sept. 30                      Dec. 31

b. Reporting year: 1992

c. Reporting date: January 12, 1993

d. Person completing report: Thomas M. Kennedy

e. Station name: Cherokee SEGS Units 1-4

f. Plant location: Denver, CO 80216

g. Person responsible for review and integrity of report: Peter J. Cohlma

h. Mailing address for person in 1-g above:

Public Service Company of Colorado P.O. Box 840  
Denver CO 80201-0840

i. Phone number for 1-g above: 294-2810

Part 2. Instrument Information, complete for each instrument.

a. Opacity Monitor:	Unit 1	Unit 2	Unit 3	Unit 4
	Lear	Lear	Lear	Lear
b. Manufacturer:	<u>Siegler</u>	<u>Siegler</u>	<u>Siegler</u>	<u>Siegler</u>
c. Model No.:	<u>RM-41</u>	<u>RM-41</u>	<u>RM-41</u>	<u>RM-41</u>
d. Serial No.:	<u>985</u>	<u>989</u>	<u>982</u>	<u>14824993</u>
e. Installation date:	<u>10/27/78</u>	<u>10/27/78</u>	<u>10/27/78</u>	<u>06/07/85</u>

f. SO2 Monitor:	Unit 1	Unit 2	Unit 3	Unit 4
g. Manufacturer:	<u>Rosemount</u>	<u>Rosemount</u>	<u>Rosemount</u>	<u>Altech</u>
h. Model No.:	<u>EC960</u>	<u>EC960</u>	<u>EC960</u>	<u>MCS100</u>
i. Serial No.:	<u>133</u>	<u>130</u>	<u>129</u>	<u>ACS132</u>
j. Installation date:	<u>12/19/88</u>	<u>04/25/88</u>	<u>04/28/88</u>	<u>06/09/91</u>

Part 3. Excess emissions (by pollutant)

Use Table I: attach separate narrative per instructions.

Part 4. Conversion factors (not for diluent monitor report)

a. Diluent measured: O<sub>2</sub>/CO<sub>2</sub>(UNIT 4)

b. F-Factor value used:

    i. Published or developed \_\_\_\_\_

    ii. F, Fc, or Fw 10640

c. Basis for gas measurement data:(wet or dry) wet/dry(unit 4)

d. Zero and Cal values used, by instrument:

	Unit 1		Unit 2	
	Opacity(%)	SO <sub>2</sub> (ppm)	Opacity(%)	SO <sub>2</sub> (ppm)
Zero	<u>0.0</u>	<u>300</u>	<u>0.0</u>	<u>300</u>
Cal	<u>57.0</u>	<u>750</u>	<u>60.0</u>	<u>750</u>

	Unit 3		Unit 4	
	Opacity(%)	SO <sub>2</sub> (ppm)	Opacity(%)	SO <sub>2</sub> (ppm)
Zero	<u>0.0</u>	<u>300</u>	<u>0.0</u>	<u>0</u>
Cal	<u>66.0</u>	<u>750</u>	<u>45.0</u>	<u>450</u>

Part 5. Continuous Monitoring System operation failures

See Table II: Complete one sheet for each monitor;  
attach separate narrative per instructions.

Part 6. Certification of report integrity by person in 1-g above:

THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THE INFORMATION  
PROVIDED IN THE ABOVE REPORT IS COMPLETE AND ACCURATE.

NAME	<u>Peter J. Cohlma</u>
SIGNATURE	<u><i>Peter J. Cohlma</i></u>
TITLE	<u>Chief Environmental Scientist</u>
DATE	<u>1/29/93</u>

\* Suggested Format for Subpart D sources in: Colorado, Montana,  
North Dakota, South  
Dakota, Utah, Wyoming

TABLE I

EXCESS EMISSIONS (SULFUR DIOXIDE)

<u>DATE</u>	<u>POLLUTANT</u>	<u>MAGNITUDE*</u> <u>LB./10<sup>6</sup> BTU</u>
-------------	------------------	--

There were no excess SO<sub>2</sub> emissions

Narrative of Maximum Theoretical SO<sub>2</sub> Emissions:

Calculated maximum hypothetical SO<sub>2</sub> emissions from the sample with the highest sulfur content taken on 10/19/92 was 3.20 lbs. SO<sub>2</sub>/MMBtu. This value was obtained using modified procedures specified in the "Coal Sampling and Analysis Certification Protocol". This sample analysis shows significant deviation from the monthly average for the analyses on Cherokee coal and is considered atypical. Because the CSA Protocol has no provision to compensate for SO<sub>2</sub> removal by processes within the power plant system, this value represents maximum hypothetical SO<sub>2</sub> emissions. Actual stack emissions would be lower than those calculated from coal samples. The average maximum theoretical SO<sub>2</sub> emissions for the quarter was 0.97 lbs. SO<sub>2</sub>/MMBtu, which is below the 1.2 lbs. SO<sub>2</sub>/MMBtu standard.

\* Narrative of causes attached.

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #4

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
10/11/92	Unspecified	2
11/22/92	Baghouse bypassed, unit off line	10
11/24/92	Unspecified	6
11/27/92	Unspecified	7
12/05/92	Unspecified	1
12/28/92	Unspecified	1
12/31/92	Baghouse bypassed, unit off line	27

NARRATIVE OF OPACITY EXCESSES

UNIT #3

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
10/15/92	Calibration & audit	3
10/16/92	Unspecified	1
10/29/92	Unspecified	1
10/30/92	Unspecified	1
11/01/92	Baghouse bypassed, unit on 100% gas	36
12/06/92	Unspecified	1
12/13/92	Unspecified	1
12/22/92	Routine preventative maintenance	5
12/24/92	Unspecified	1
12/30/92	Baghouse bypassed, unit on 100% gas	7
12/31/92	Same as above	37



NARRATIVE OF OPACITY EXCESSES

UNIT #2

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
11/12/92	Calibration & audit	4
11/14/92	Unspecified	1

NARRATIVE OF OPACITY EXCESSES

UNIT #1

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
11/14/92	Calibration & audit	2
11/23/92	Unspecified	1
11/29/92	Unspecified	1
12/01/92	Baghouse bypassed, unit on 100% gas	3
12/06/92	Unspecified	1
12/10/92	Calibration & audit	2
12/11/92	Unspecified	1
12/23/92	Calibration & audit	3
12/30/92	Unspecified	4
12/31/92	Unspecified	5

TABLE II

SO<sub>2</sub> Continuous Monitoring System Operation Failures

<u>Date</u>	<u>Time From - To</u>	<u>Unit</u>	<u>Instrument</u>	<u>Effect on Instrument Output</u>
10/29	02:56 - 06:00	4	MCS100	Data held at last good reading
11/01 11/02	07:58 - 06:00	4	MCS100	Data held at last good reading
11/19	06:34 - 13:16	4	MCS100	Data held at last good reading
11/19 11/20	22:45 - 12:27	4	MCS100	Data held at last good reading
11/25	01:36 - 12:44	4	MCS100	Data held at last good reading
12/06 12/07	06:22 - 09:10	4	MCS100	Data held at last good reading
12/16	06:21 - 07:18	4	MCS100	Data held at last good reading
12/23	06:21 - 08:58	4	MCS100	Data held at last good reading
12/25 12/26	06:21 - 16:51	4	MCS100	Data held at last good reading

**TABLE II****Continuous Monitoring System Operation Failures**

<u>Date</u>	<u>Time*</u> <u>From - To</u>	<u>Unit</u>	<u>Instrument</u>	<u>Effect on</u> <u>Instrument Output</u>
10/02/92 10/15/92	02:25 - 19:10	3	RM41	No Output - Monitor out of service due to asbestos abatement on ductwork
10/18/92	00:22-09:13	3	RM41	Incorrect Output
10/19/92	01:14-09:39	3	RM41	Incorrect Output
10/20/92	04:20-07:36	3	RM41	Incorrect Output
10/29/92 11/01/92	14:17 - 14:26	1	RM41	No Output
11/02/92 11/04/92	14:28 - 08:49	1	RM41	No Output
11/04/92 11/05/92	14:34 - 11:13	1	RM41	No Output
11/06/92 11/07/92	11:13 - 11:16	1	RM41	No Output
11/08/92 11/13/92	11:19 - 15:18	1	RM41	No Output
11/09/92 11/11/92	08:47 - 12:52	2	RM41	Incorrect Output
11/12/92	07:26-21:22	2	RM41	Incorrect Output
11/13/92 11/14/92	13:07 - 16:52	2	RM41	Incorrect Output
11/14/92	06:42-11:09	1	RM41	Incorrect Output
12/10/92	09:14-16:22	1	RM41	No Output
12/18/92	11:04-15:28	2	RM41	No Output
12/20/92 12/22/92	07:40 - 07:46	3	RM41	No Output
12/22/92	11:24-13:49	1	RM41	No Output
12/23/92	07:19-12:26	1	RM41	Incorrect Output



Public Service  
Company of Colorado

Governmental and  
Environmental Affairs  
P. O. Box 840  
Denver, CO 80201 - 0840

April 29, 1993

Mr. Roy Doyle  
Air Pollution Control Division  
Colorado Department of Health  
4300 Cherry Creek Drive South  
Denver, CO 80222-1530

RE: First Quarter, 1993 Excess Emissions Report, Cherokee S.E.G.S., Units #1-4

Dear Roy:

Attached is the first quarter, 1993 excess emissions report for the Public Service Company of Colorado Cherokee Station Units #1-4.

Unit #1 operated 2,057 hours, Unit #2 operated 1,816 hours, Unit #3 operated 1,499 hours and Unit #4 operated 1,870 hours.

Feel free to contact me at 294-2810 with any questions in this regard.

Sincerely,

A handwritten signature in cursive script that reads "Peter J. Cohlma".

Peter J. Cohlma  
Chief Environmental Scientist

PJC:tc

Attachment

QUARTERLY EXCESS EMISSIONS REPORT (EER)

for

Fossil Fuel-Fired Steam Generators, Subpart D

Suggested Format for Sources in Region VIII\*

Minimum Requirements Under Section 60.7 (See instructions)

Part 1. This report includes all the required information under section 60.7 for:

a. Quarterly emission reporting period ending: (circle one)

March 31                  June 30                  Sept. 30                  Dec. 31

b. Reporting year: 1993

c. Reporting date: April 7, 1993

d. Person completing report: Thomas M. Kennedy

e. Station name: Cherokee SEGS Units 1-4

f. Plant location: Denver, CO 80216

g. Person responsible for review  
and integrity of report: Peter J. Cohlma

h. Mailing address for person in 1-g above:

Public Service Company of Colorado P.O. Box 840  
Denver CO 80201-0840

i. Phone number for 1-g above: 294-2810

Part 2. Instrument Information, complete for each instrument.

a. Opacity Monitor:	Unit 1	Unit 2	Unit 3	Unit 4
	Lear	Lear	Lear	Lear
b. Manufacturer:	<u>Siegler</u>	<u>Siegler</u>	<u>Siegler</u>	<u>Siegler</u>
c. Model No.:	<u>RM-41</u>	<u>RM-41</u>	<u>RM-41</u>	<u>RM-41</u>
d. Serial No.:	<u>985</u>	<u>989</u>	<u>982</u>	<u>14824993</u>
e. Installation date:	<u>10/27/78</u>	<u>10/27/78</u>	<u>10/27/78</u>	<u>06/07/85</u>

f. SO2 Monitor:	Unit 1	Unit 2	Unit 3	Unit 4
g. Manufacturer:	<u>Rosemount</u>	<u>Rosemount</u>	<u>Rosemount</u>	<u>Altech</u>
h. Model No.:	<u>EC960</u>	<u>EC960</u>	<u>EC960</u>	<u>MCS100</u>
i. Serial No.:	<u>133</u>	<u>130</u>	<u>129</u>	<u>ACS132</u>
j. Installation date:	<u>12/19/88</u>	<u>04/25/88</u>	<u>04/28/88</u>	<u>06/09/91</u>

Part 3. Excess emissions (by pollutant)

Use Table I: attach separate narrative per instructions.

Part 4. Conversion factors (not for diluent monitor report)

a. Diluent measured: O<sub>2</sub>/CO<sub>2</sub>(UNIT 4)

b. F-Factor value used: \_\_\_\_\_

    i. Published or developed \_\_\_\_\_

    ii. F, Fc, or Fw 10640

c. Basis for gas measurement data:(wet or dry) wet/dry(unit 4)

d. Zero and Cal values used, by instrument:

	Unit 1		Unit 2	
	Opacity(%)	SO <sub>2</sub> (ppm)	Opacity(%)	SO <sub>2</sub> (ppm)
Zero	<u>0.0</u>	<u>300</u>	<u>0.0</u>	<u>300</u>
Cal	<u>57.0</u>	<u>750</u>	<u>60.0</u>	<u>750</u>

	Unit 3		Unit 4	
	Opacity(%)	SO <sub>2</sub> (ppm)	Opacity(%)	SO <sub>2</sub> (ppm)
Zero	<u>0.0</u>	<u>300</u>	<u>0.0</u>	<u>0</u>
Cal	<u>64.0</u>	<u>750</u>	<u>47.5</u>	<u>450</u>

Part 5. Continuous Monitoring System operation failures

See Table II: Complete one sheet for each monitor;  
attach separate narrative per instructions.

Part 6. Certification of report integrity by person in 1-g above:

THIS IS TO CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THE INFORMATION  
PROVIDED IN THE ABOVE REPORT IS COMPLETE AND ACCURATE.

NAME	<u>Peter J. Cohlma</u>
SIGNATURE	<u>Peter J. Cohlma</u>
TITLE	<u>Chief Environmental Scientist</u>
DATE	<u>4/29/93</u>

\* Suggested Format for Subpart D sources in: Colorado, Montana,  
North Dakota, South  
Dakota, Utah, Wyoming



TABLE I

EXCESS EMISSIONS (SULFUR DIOXIDE)

<u>DATE</u>	<u>POLLUTANT</u>	<u>MAGNITUDE*</u> <u>LB./10<sup>6</sup> BTU</u>
-------------	------------------	--

There were no excess SO<sub>2</sub> emissions for the first quarter, 1993.

Narrative of Maximum Theoretical SO<sub>2</sub> Emissions:

Calculated maximum hypothetical SO<sub>2</sub> emissions from the sample with the highest sulfur content taken on 3/14/93 was 0.612 lb/MMBtu. This value was obtained using modified procedures specified in the "Coal Sampling and Analysis Certification Protocol". Because the CSA Protocol has no provision to compensate for SO<sub>2</sub> removal by processes within the power plant system, this value represents maximum hypothetical SO<sub>2</sub> emissions. Actual stack emissions would be lower than those calculated from coal samples. The average maximum theoretical SO<sub>2</sub> emissions for the quarter was 0.71 lb/MMBtu, which is well below the 1.2 lb/MMBtu standard.

\* Narrative of causes attached.

TABLE II

SO<sub>2</sub> Continuous Monitoring System Operation Failures

<u>Date</u>	<u>Time From - To</u>	<u>Unit</u>	<u>Instrument</u>	<u>Effect on Instrument Output</u>
1/4	08:09 - 08:22	4	MCS100	Data held at last good reading
1/9 1/10	17:43 - 13:23	4	MCS100	Data held at last good reading
1/13	04:48 - 06:51	4	MCS100	Data held at last good reading
1/31	05:17 - 05:19	4	MCS100	Data held at last good reading
1/31	05:36 - 05:41	4	MCS100	Data held at last good reading
2/15 2/16	16:23 - 07:14	4	MCS100	Data held at last good reading
2/17	18:43 - 18:47	4	MCS100	Data held at last good reading
2/17	19:31 - 23:35	4	MCS100	Data held at last good reading
3/7 3/8	14:20 - 05:54	4	MCS100	Data held at last good reading
3/8	13:39 - 15:33	4	MCS100	Data held at last good reading

**TABLE II****Continuous Monitoring System Operation Failures**

<u>Date</u>	<u>Time*</u> <u>From - To</u>	<u>Unit</u>	<u>Instrument</u>	<u>Effect on</u> <u>Instrument Output</u>
01/01/93	09:06-09:51	4	RM41	No Output
01/03/93	12:36-13:00	4	RM41	No Output
01/07/93	08:03-08:25	4	RM41	No Output
01/15/93	12:24-14:54	4	RM41	No Output
01/20/93	00:51-07:49	4	RM41	No Output
01/23/93	06:50-06:58	4	RM41	No Output
01/23/93	08:23-08:50	4	RM41	No Output
01/23/93	10:37-23:59	4	RM41	No Output
01/24/93	00:00-23:59	4	RM41	No Output
01/27/93	13:12-15:49	4	RM41	No Output
02/01/93	07:36-11:54	3	RM41	No Output
02/01/93	13:04-13:24	3	RM41	Incorrect Output
02/01/93	14:26-14:41	3	RM41	Incorrect Output
02/12/93	02:00-04:32	4	RM41	No Output
02/13/93	10:21-11:40	4	RM41	Incorrect Output
02/13/93	10:48-12:50	1	RM41	No Output
02/13/93	10:48-12:50	2	RM41	No Output
02/13/93	10:48-12:50	3	RM41	No Output
03/03/93	11:43-12:07	4	RM41	No Output
03/11/93	07:37-14:41	4	RM41	No Output
03/23/93	07:42-11:16	2	RM41	No Output
03/24/93	13:10-14:06	2	RM41	No Output

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #1

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
01/05/93	Cleaned optics	2
01/07/93	Unspecified	2
01/08/93	Baghouse problems	1
01/24/93	Unspecified	2
01/29/93	Unspecified	1
02/05/93	Unspecified	1
02/28/93	Unspecified	1
03/21/93	Unspecified	1
03/27/93	Unit off line	5

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #2

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
01/05/93	Unit off line	2
03/24/93	Calibration & audit	1

TABLE I  
NARRATIVE OF OPACITY EXCESSES

UNIT #3

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
01/01/93	Unspecified	2
02/01/93	Unit off line	10
02/11/93	Baghouse out of service, unit on 100% gas	76
02/12/93	Unit off line	11
02/14/93	Unit off line	45
02/16/93	Unit off line	1
02/22/93	Unit off line	8
02/27/93	Unit startup	8
02/28/93	Unspecified	2
03/01/93	Unit off line	67
03/02/93	Unit off line	33
03/05/93	Unit startup	10
03/26/93	Unit startup	11
03/13/93	Unit off line	1
03/14/93	Unit startup	30
03/16/93	Unit startup	5
03/17/93	Unit startup	6
03/22/93	Unspecified	4
03/23/93	Unspecified	12
03/25/93	Unit off line	27
03/26/93	Unspecified	4

TABLE I  
NARRATIVE OF OPACITY EXCESSES

UNIT #4

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
01/01/93	Unspecified	1
01/07/93	Unspecified	6
02/11/93	Unspecified	11
02/12/93	Unspecified	3
02/27/93	Unit off line	2
02/28/93	Unspecified	2
03/03/93	Unspecified	6

TABLE I

EXCESS EMISSIONS (SULFUR DIOXIDE)

<u>DATE</u>	<u>POLLUTANT</u>	<u>MAGNITUDE*</u> <u>LB./10<sup>6</sup> BTU</u>
-------------	------------------	--

There were no excess SO<sub>2</sub> emissions for the second quarter, 1993.

Narrative of Maximum Theoretical SO<sub>2</sub> Emissions:

Calculated maximum possible SO<sub>2</sub> emissions from the sample with the highest sulfur content taken on 5/3/93 was 1.004 lb/MMBtu. This value was obtained using modified procedures specified in the "Coal Sampling and Analysis Certification Protocol". Because the CSA Protocol has no provision to compensate for SO<sub>2</sub> removal by processes within the power plant system, this value represents maximum hypothetical SO<sub>2</sub> emissions. Actual stack emissions would be lower than those calculated from coal samples. The average maximum theoretical SO<sub>2</sub> emissions for the quarter was 0.90 lb/MMBtu, which is well below the 1.2 lb/MMBtu standard.

\* Narrative of causes attached.



TABLE I  
NARRATIVE OF OPACITY EXCESSES

UNIT #1

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
04/02/93	Unspecified	1
04/22/93	Unspecified	1
04/24/93	Unspecified	1
04/29/93	Black start - Lear Seiglers powered down	18
04/30/93	Unit off line	6
05/03/93	Unspecified	1
05/05/93	Unit off line	11
05/21/93	Unspecified	5
06/04/93	Unspecified	1
06/26/92	Unit off line	22
06/29/93	Unit startup	22

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #2

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
05/06/93	Unspecified	1
05/21/93	Unspecified	1

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #3

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
04/03/93	Unit startup	15
04/18/93	Unspecified	1
04/22/93	Unspecified	2
04/29/93	Unspecified	1
04/30/93	Unit startup	24
05/05/93	Unit startup	12
05/06/93	Unspecified	2
05/09/93	Unit startup	44
05/10/93	Unit startup	14
05/31/93	Unspecified	1
06/05/93	Unspecified	1
06/17/93	Unit startup	52
06/21/93	Unspecified	21

TABLE II

SO<sub>2</sub> Continuous Emissions Monitor FailuresUnit 4  
Altech MCS 100

<u>From</u> <u>Date Time</u>	<u>To</u> <u>Date Time</u>	<u>Reason</u>	<u>Corrective Action</u>
05/13 18:22	05/14 11:26	Pump failure	Replaced diaphragms
06/11 22:00	06/12 23:14	Inlet sample line plug	Self-corrected

TABLE II

Continuous Monitoring System Operation Failures

<u>Date</u>	<u>From Time</u>	<u>Date</u>	<u>To Time</u>	<u>Unit</u>	<u>Instrument</u>	<u>Effect on Instrument Output</u>
04/17/93	10:02	04/17/93	21:16	4	RM41	Incorrect Output
04/29/93	11:25	04/29/93	15:10	3	RM41	No Output
04/29/93	11:25	04/29/93	15:10	4	RM41	No Output
04/29/93	11:25	04/29/93	15:36	1	RM41	No Output
04/29/93	11:25	04/29/93	16:14	2	RM41	No Output
05/07/93	16:44	05/07/93	17:46	1	RM41	No Output
05/07/93	16:44	05/07/93	17:46	2	RM41	No Output
05/12/93	17:59	05/19/93	15:09	1	RM41	No Output
06/17/93	23:05	06/18/93	00:22	2	RM41	No Output
06/28/93	12:39	06/28/93	13:14	4	RM41	No Output

TABLE I

NARRATIVE OF OPACITY EXCESSES

UNIT #4

<u>DATE</u>	<u>NARRATIVE</u>	<u>NUMBER OF SIX MIN. EXCESSES</u>
04/25/93	Unspecified	1
04/26/93	Unspecified	3
06/10/93	Unspecified	5