

EFFLUENT AND WASTE DISPOSAL SEMIANNUAL REPORT

Supplemental Information

Facility Quad Cities Nuclear Power Station

Licensee Commonwealth Edison Company

1. Regulatory Limits

a. For Noble Gases:

Dose rate

1. Less than 500 mrem/year to the whole body.
2. Less than 3000 mrem/year to the skin.

Dose Gamma Radiation

1. Less than or equal to 5 mrad/quarter.
2. Less than or equal to 10 mrad/year.

Beta Radiation

1. Less than or equal to 10 mrad/quarter.
2. Less than or equal to 20 mrad/year.

b.,c. For Iodine-131, for Iodine-133, and for all radionuclides in particulate form with half-lives greater than 8 days.

Dose Rate

1. Less than 1500 mrem/year

Dose

1. Less than or equal to 7.5 mrem/quarter
2. Less than or equal to 15 mrem/year.

d. For Liquid

Less than or equal to 3 mrem to the whole body during any calendar year.

Less than or equal to 10 mrem to any organ during any calendar quarter.

Less than or equal to 6 mrem to the whole body during any calendar year.

Less than or equal to 20 mrem to any organ during any calendar year.

## 2. Maximum Permissible Concentration

- a., b., c., For fission and activation gases, iodines, and particulates with half-lives greater than 8 days, allowable release limits are calculated by solving equations 10.1 and 10.2 from the Offsite Dose Calculation Manual. The alarm setpoint is one half of the most conservative value from the two equations.
- d. For liquid effluents allowable release limits are calculated by solving equation 10.3 from the Offsite Dose Calculation manual. The MPC values used for the monitors were as follows:

radwaste discharge 4.46 E-05 uCi/ml  
service water 2.0E-05 uCi/ml

## 3. Average Energy

The average gamma energy used to calculate the alarm setpoints for the noble gas monitor was 0.586 Mev for the Third quarter and 0.570 Mev for the Fourth quarter.

## 4. Measurements and Approximations of Total Radioactivity

- a. Fission and Activation Gases:
- b. Iodines:
- c. Particulates:

The main chimney and reactor building ventilation exhaust systems are continually monitored for iodines and particulates. These samples are pulled every 7 days and analyzed by gamma isotopic. The particulate papers are composited every 31 days and sent to a vendor for Sr 89-90 and gross alpha analysis. Noble gas grab samples are pulled and analyzed by gamma isotopic weekly. Tritium samples are pulled and analyzed every month.

The continuous strip chart recorders for the monitors on the release points are reviewed monthly for spikes and the activity released is calculated. An additional calculated activity for noble gases is added to the Main chimney release each month. This calculation is done because most of the grab samples show less than the lower limit of detection due to the low amount of activity and the large dilution flow at the sample point. The calculation takes into account the normal offgas train and the gland steam contribution to the release.

The average flow at the release points are used to calculate the curies released.

d. Liquid Effluents

The river discharge tanks are analyzed before discharge by gamma isotopic. A composite sample is taken during discharge. This is composited with other discharges that occurred every 31 days and is analyzed for tritium and gross alpha. The batch composites are composited quarterly and sent to a vendor for Sr 89-90 and Fe 55. The discharge bay is sampled every 31 days and analyzed by gamma isotopic, for tritium and gross alpha. It is sampled quarterly and sent to a vendor for Sr 89-90 and Fe 55 analysis.

The tank volumes and activities are used to calculate the curies released for the river discharge tank. The total water released during the quarter and the activity is used to calculate the curies released for the discharge bay.

e. Estimated Total Error Percent

The estimated total error percents were calculated by taking the square root of the sum of the squares of errors for sampling and measurement parameters. The estimated total error percent for the solid radwaste curies is 11.7%.

f. Less than the lower limit of detection (<LLD).

Samples are analyzed such that the Technical Specification LLD requirements are met. When a nuclide is not detected during the quarter then <LLD is reported.

5. Batch Releases

a. Liquid

1. number of releases 2
2. total time 1081 minutes
3. maximum time 546 minutes
4. average time 541 minutes
5. minimum time 535 minutes
6. average stream flow, discharge 63.7 gpm, dilution 3.75 E+05 gpm

b. Gaseous

NONE

6. Abnormal Releases

a. Liquid

On August 9, 1991 a leak developed on the Unit One "B" Residual Heat Removal Heat Exchanger. Unit one was at full power at this time. A total of 3.58 E+04 uCi was released between August 9, 1991 and December 31, 1991. This release was added to the monthly liquid release summary for each of the months August thru December, 1991.

In October 1991, approximately 6,000 gallons of EDTA boiler cleaning solution was shipped to a facility in Oak Ridge, Tennessee for incineration. The total activity shipped offsite was calculated to be  $6.37E+01$  uCi.

b. Gaseous

On December 31, 1991 the Unit One Charcoal Adsorbers were bypassed from 1445 to 1812. The cause was high offgas flow thus causing a high DP on the Adsorbers. The cause of the high flow was identified and corrected by 1812. A total of  $1.00 E+06$  uCi of activity was released during the time the charcoal Adsorbers were bypassed. This release was added to the Noble Gas release summary for the month of December, 1991.

QCP 100-S25  
Revision 5  
March 1989

EFFLUENT AND WASTE DISPOSAL  
SEMI-ANNUAL REPORT July - December 1991  
GASEOUS EFFLUENTS - SUMMATION OF ALL RELEASES

PROCEDURE: QCP 100-7

	Unit	Quarter Third	Quarter Fourth	Est. Total Error, %
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A. FISSION & ACTIVATION GASES

1. Total Release	CI	1.17E+01	1.32E+01	8.7
2. Average release rate for period	µCi/sec	1.47E00	1.66E00	
3. Percent of Tech Spec limit * Chimney & stack	%	1.13E-02 1.10E-03	1.35E-02 1.47E-03	

B. IODINE

1. Total Iodine-131	CI	5.05E-04	4.13E-04	31.8
2. Average release rate for period	µCi/sec	6.35E-05	5.20E-05	

C. PARTICULATES

1. Particulates with half-lives > 8 days	CI	3.68E-03	4.62E-03	17.7
2. Average release rate for period	µCi/sec	4.64E-04	5.81E-04	
3. Gross alpha radioactivity	CI	<LLD	<LLD**	

D. TRITIUM

1. Total Release	CI	2.97E01	3.96E01	6.2
2. Average release rate for period	µCi/sec	3.74E00	4.98E00	

E. Iodine 131 & 133, Tritium and Particulates

Percent of Tech spec Limit Chimney & stack	%	9.56E-01	5.13E-01	
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\*NOBLE GAS GAMMA/NOBLE GAS BETA DOSE LIMITS

\*\*Projected value based on previous six months available data.

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Q.C.O.S.R.

MAIN CHIMNEY  
GASEOUS EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter Third	Quarter Fourth	Quarter	Quarter
1. Fission gases					
Kr-85	CI	<LLD	<LLD		
Kr-85m	CI	2.98E-01	3.28E-01		
Kr-87	CI	5.82E-01	5.87E-01		
Kr-88	CI	2.82E-01	4.72E-01		
Xe-133	CI	4.87E-01	7.04E-01		
Xe-135	CI	3.45E-01	7.85E-01		
Xe-135m	CI	1.61E00	1.91E00		
Xe-138	CI	7.97E00	8.16E00		
Ar-41	CI	1.84E-01	2.65E-01		
Xe-131M	CI	<LLD	8.96E-03		
	CI				
	CI				
Total for Period	CI	1.17E+01	1.32E+01		

2. Iodines

I-131	CI	4.73E-04	2.76E-04		
I-133	CI	2.60E-03	1.41E-03		
I-135	CI	1.06E-03	<LLD		
Total for Period	CI	4.13E-03	1.69E-03		

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MAIN CHIMNEY  
GASEOUS EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter Third	Quarter Fourth	Quarter	Quarter
3. Particulates					
Sr-89	C1	9.81E-05	1.61E-04		
Sr-90	C1	<LLD	<LLD		
Cs-134	C1	<LLD	<LLD		
Cs-137	C1	<LLD	<LLD		
Ba-140	C1	8.73E-05	4.06E-05		
La-140	C1	4.06E-04	1.42E-04		
Cr-51	C1	<LLD	<LLD		
Mn-54	C1	<LLD	1.03E-05		
Co-58	C1	<LLD	<LLD		
Co-60	C1	2.73E-04	1.85E-04		
I-131	C1	1.03E-05	2.79E-05		
Ag-110m	C1	<LLD	<LLD		
I-133	C1	1.21E-04	5.97E-04		
Mo-99	C1	3.88E-05	1.69E-04		
	C1				
	C1				
	C1				
Total for Period	C1	1.03E-03	1.33E-03		

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REACTOR VENTILATION  
GASEOUS EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter Third	Quarter Fourth	Quarter	Quarter
1. Fission gases					
Kr-85	Ci	<LLD	<LLD		
Kr-85m	Ci	<LLD	<LLD		
Kr-87	Ci	<LLD	<LLD		
Kr-88	Ci	<LLD	<LLD		
Xe-133	Ci	<LLD	<LLD		
Xe-135	Ci	<LLD	<LLD		
Xe-135m	Ci	<LLD	<LLD		
Xe-138	Ci	<LLD	<LLD		
	Ci				
	Ci				
Total for Period	Ci	<LLD	<LLD		
2. Iodines					
I-131	Ci	2.12E-05	1.74E-05		
I-133	Ci	1.59E-04	1.45E-04		
I-135	Ci	<LLD	<LLD		
Total for Period	Ci	1.80E-04	1.62E-04		

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REACTOR VENTILATION  
GASEOUS EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter Third	Quarter Fourth	Quarter	Quarter
3. Particulates					
Sr-89	CI	<LLD	7.02E-07		
Sr-90	CI	<LLD	<LLD		
Cs-134	CI	<LLD	<LLD		
Cs-137	CI	3.46E-04	9.36E-07		
Ba-140	CI	<LLD	<LLD		
La-140	CI	<LLD	<LLD		
Cr-51	CI	<LLD	6.28E-04		
Mn-54	CI	2.69E-05	9.00E-05		
Co-58	CI	5.43E-06	6.91E-05		
Co-60	CI	6.57E-04	7.45E-04		
I-131	CI	<LLD	9.19E-05		
Ag-110m	CI	<LLD	<LLD		
Mo-99	CI	1.57E-03	1.47E-03		
I-133	CI	4.34E-05	1.85E-04		
Nb-95	CI	<LLD	4.71E-06		
	CI				
	CI				
Total for Period	CI	2.65E-03	3.29E-03		

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LIQUID EFFLUENTS - SUMMATION OF ALL RELEASES

	Unit	Quarter Third	Quarter Fourth	Est. Total Error, %
<b>A. FISSION &amp; ACTIVATION PRODUCTS</b>				
1. Total release (not including tritium, gases, alpha)	CI **	2.56E-03	9.61E-03	7.2
2. Average diluted concentration during batch discharges period	µCi/ml	1.94E-09	5.35E-09	
		9.17E-03	3.74E-02	
3. Percent of applicable limit *	%	3.70E-03	1.69E-02	
4. Maximum diluted concentration during batch discharges	µCi/ml	1.94E-09	5.35E-09	
**Note: A1, A3 and B1 for both quarters include activity from U-1 RHR Hx leak. All other values are for normal batch release.				
<b>B. TRITIUM</b>				
1. Total release	CI **	2.20E-01	4.04E-01	6.1
2. Average diluted concentration during batch discharges	µCi/ml	2.16E-07	7.50E-07	
3. Percent of applicable limit	%	7.19E-05	2.50E-02	
<b>C. DISSOLVED AND ENTRAINED GASES</b>				
1. Total release	CI	<LLD	<LLD	N/A
2. Average diluted concentration during batch discharges	µCi/ml	<LLD	<LLD	
3. Percent of applicable limit	%	Ø	Ø	
<b>D. GROSS ALPHA RADIOACTIVITY</b>				
1. Total Release	CI	<LLD	<LLD	N/A
2. Average concentration released during batch discharges	µCi/ml	<LLD	<LLD	
<b>E. VOLUME OF WASTE RELEASED (prior to dilution)</b>				
	Liters	1.28E05	1.33E05	
<b>F. VOLUME OF DILUTION WATER USED DURING BATCH DISCHARGES</b>				
	Liters	1.02E09	5.05E08	
<b>G. TOTAL VOLUME OF DILUTION WATER DURING PERIOD (QUARTER)</b>				
	Liters	4.90E11	6.70E11	

\*WHOLE BODY/ORGAN

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C.C.O.S.R.

LIQUID EFFLUENTS

Nuclides Released	Unit	Continuous Mode		Batch Mode	
		Quarter Third	Quarter Fourth	Quarter Third	Quarter Fourth
Sr-89	C1	<LLD	<LLD	2.20E-05	1.38E-04
Sr-90	C1	<LLD	<LLD	2.47E-06	1.09E-05
Cs-134	C1	<LLD	<LLD	1.11E-05	<LLD
Cs-137	C1	<LLD	<LLD	1.69E-04	7.72E-04
I-131	C1	<LLD	<LLD	<LLD	<LLD
Co-58	C1	<LLD	<LLD	2.43E-05	3.08E-04
Co-60	C1	<LLD	<LLD	2.00E-03	6.92E-03
Fe-59	C1	<LLD	<LLD	<LLD	<LLD
Zn-65	C1	<LLD	<LLD	6.01E-05	3.65E-05
Mn-54	C1	<LLD	<LLD	1.06E-04	7.58E-04
Cr-51	C1	<LLD	<LLD	<LLD	1.87E-04
Zr-95	C1	<LLD	<LLD	<LLD	<LLD
Nb-95	C1	<LLD	<LLD	<LLD	<LLD
Mo-99	C1	<LLD	<LLD	<LLD	<LLD
Ag-110m	C1	<LLD	<LLD	<LLD	<LLD
Ba-140	C1	<LLD	<LLD	<LLD	<LLD
Cs-136	C1	<LLD	<LLD	<LLD	<LLD
La-140	C1	<LLD	<LLD	<LLD	<LLD
Fe-55	C1	<LLD	<LLD	1.70E-04	4.78E-04
Unidentified	C1	<LLD	<LLD	<LLD	<LLD
Total for Period (above)	C1	<LLD	<LLD	2.56E-03	9.61E-03
Xe-133	C1	<LLD	<LLD	<LLD	<LLD
Xe-135	C1	<LLD	<LLD	<LLD	<LLD

Prepared by [Signature] 2/20/92 Approved by Paul A. Behrens  
Chemistry Supervisor

(final)  
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JUN 12 1989

OCOSP







CECQ QUAD CITIES STATION  
256 Ft. WIND SPEED and WIND DIRECTION

July-September 1981  
296-33 Ft. DIFFERENTIAL TEMPERATURE

SPEED CLASS	WIND DIRECTION CLASSES																STABILITY CLASSES								
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.14	.00	.50	.14	.00	.91	.91								
1 MU	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.09	.18	.05	.00	.00	.36		.36							
9 SU	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.09	.05	.18	.00	.00	.36			.36						
2 N	.00	.00	.05	.09	.00	.00	.05	.18	.09	.23	.05	.00	.09	.43	.00	1.31				1.31					
2 SS	.05	.00	.05	.00	.05	.00	.00	.05	.14	.32	.00	.05	.00	.09	.27	.00	1.04				1.04				
4 MS	.00	.00	.00	.00	.00	.00	.00	.05	.05	.27	.00	.00	.09	.09	.00	.00	.54					.54			
ES	.00	.00	.00	.00	.00	.00	.00	.09	.00	.09	.00	.00	.00	.00	.00	.18							.18		
																								4.71	
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							
0 MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05		.05							
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00		.00						
N	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.00	.00	.09	.00	.14				.14					
2 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00				.00					
4 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00					.00				
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00							.00		
																								.18	
TOT	8.02	4.89	5.43	3.67	4.48	6.70	6.39	6.79	7.03	14.63	6.97	3.76	4.94	7.07	6.07	4.26	100.00	12.50	7.97	6.75	22.60	25.95	16.49	7.74	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
1.00	.50	.82	.45	.96	.27	.32	.32	.86	1.77	1.49	.80	.54	1.36	1.00	.80	12.50	Extremely Unstable
.54	.54	.77	.32	.27	.27	.23	.36	.77	.91	.59	.54	.50	.68	.36	.32	7.97	Moderately Unstable
.27	.41	.34	.18	.36	.68	.54	.27	.63	.82	.27	.50	.45	.68	.26	.18	6.75	Slightly Unstable
1.09	1.40	.86	.54	1.13	1.86	1.77	1.86	1.13	2.04	2.36	.77	1.18	1.18	1.95	1.49	22.60	Neutral
1.36	.95	1.81	1.45	1.31	1.45	1.72	1.72	1.84	4.12	1.86	.77	1.36	1.90	1.81	.82	25.95	Slightly Stable
1.22	.77	.68	.54	.72	1.63	1.13	1.18	1.86	3.08	.32	.27	.77	1.18	.50	.63	16.49	Moderately Stable
.54	.32	.36	.18	.32	.54	.68	1.09	1.13	1.90	.09	.09	.14	.09	.09	.18	7.74	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	CALM
.32	.00	.27	.18	.18	.18	.09	.14	.09	.14	.32	.27	.18	.18	.18	.18	2.90	0.4 - 3.5 mph
1.00	1.56	1.09	.86	1.00	1.09	.72	1.04	.86	1.68	1.54	.95	1.00	1.31	.63	.68	16.80	3.6 - 7.5 mph
3.22	1.99	2.40	1.40	1.77	3.45	2.45	3.13	3.03	4.89	3.76	1.13	1.68	1.63	1.00	1.77	37.68	7.6 - 12.5 mph
1.45	1.54	1.59	1.13	1.49	2.89	3.03	3.13	3.55	7.02	1.21	1.00	1.63	2.94	3.31	1.63	37.73	12.6 - 18.5 mph
.05	.00	.09	.01	.05	.00	.09	.32	.41	.91	.05	.36	.45	1.00	.86	.00	4.71	18.6 - 24.5 mph
.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05	.00	.00	.09	.00	.18	> 24.5 mph

260c QUAD CITIES STATION  
2nd FL. WIND SPEED and WIND DIRECTION

October-December 1991  
06-33 FL. DIFFERENTIAL TEMPERATURES

SPEED CLASS	WIND DIRECTION CLASSES																STABILITY CLASSES								
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MC	ES	TOTAL
EU	.00	.09	.00	.00	.00	.00	.00	.00	.47	.00	.00	.00	.09	.05	.09	.84	.84								
1 MU	.00	.00	.00	.00	.00	.00	.00	.14	.00	.14	.00	.00	.23	.09	.00	.00	.81	.81							
3 SU	.00	.09	.00	.00	.00	.00	.00	.14	.09	.14	.00	.09	.09	.47	.05	.05	1.17		1.17						
N	.33	.33	.00	.09	.14	.56	.51	.51	.75	.75	.28	1.07	1.31	2.85	.47	.59	10.14			10.14					
2 SS	.14	.00	.09	.00	.05	.19	.28	.65	1.12	1.82	.14	.00	.05	.15	.23	.00	4.95				4.95				
4 WS	.00	.00	.00	.00	.00	.05	.00	.00	.14	.23	.00	.00	.05	.00	.00	.00	.47						.47		
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.00	.00	.00	.05						.05		16.22
TOT	6.12	2.85	4.25	3.55	3.48	3.27	4.44	6.35	8.45	12.45	8.78	6.17	9.93	10.84	8.64	4.39	100.00	2.76	2.71	4.83	53.18	24.21	9.16	3.36	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.14	.14	.00	.00	.00	.00	.00	.05	.19	1.12	.23	.14	.19	.47	.05	.09	2.76	Extremely Unstable
.14	.09	.00	.00	.00	.00	.00	.28	.14	.51	.57	.14	.51	.23	.09	.19	2.71	Moderately Unstable
.47	.14	.05	.00	.00	.09	.09	.23	.19	.61	.33	.58	.70	.65	.19	.33	4.63	Slightly Unstable
3.93	1.59	3.60	2.71	2.52	1.78	2.74	2.62	2.24	3.08	2.43	4.39	5.93	7.01	4.16	2.52	53.18	Neutral
.89	.61	.42	.51	.56	.51	.79	1.92	3.36	4.63	2.65	.75	2.15	1.96	1.54	.93	24.21	Slightly Stable
.47	.23	.14	.28	.33	.75	.56	.75	2.24	1.54	.37	.09	.28	.37	.51	.23	9.16	Moderately Stable
.09	.05	.05	.05	.05	.14	.23	.21	.09	.28	.37	.19	.19	.19	.00	.05	3.36	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	CALM
.14	.28	.19	.23	.14	.00	.19	.19	.05	.09	.19	.23	.33	.33	.19	.19	2.85	0.0 - 3.5 mph
.98	.37	.75	.56	.51	.56	.79	.79	.33	.70	.89	1.07	.33	.70	.70	.61	10.56	3.6 - 7.5 mph
1.92	1.07	2.01	1.82	.93	.93	.93	.61	2.66	3.22	.21	1.78	1.68	2.24	1.73	25.79	7.6 - 12.5 mph	
2.52	.61	1.21	.84	1.68	.56	.84	2.43	4.58	4.81	1.87	1.21	3.79	3.46	2.43	1.59	34.44	12.6 - 18.5 mph
.47	.51	.09	.09	.19	.79	.79	1.50	2.10	3.55	.42	1.17	1.78	3.64	.79	.33	18.22	18.6 - 24.5 mph
.09	.00	.00	.00	.00	.47	.89	.51	.79	.65	.19	1.17	2.06	1.03	.28	.05	8.12	> 24.5 mph





CEC QUAD CITIES STATION  
296 Ft. WIND SPEED and WIND DIRECTION

October-December 1951  
296-33 Ft. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS : 3140  
VALUES ARE PERCENT OCCURRENCE

SPEED CLASS	WIND DIRECTION CLASSES																STABILITY CLASSES								
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	MS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
- N	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2 MS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
																									.00
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
- N	.05	.14	.09	.05	.05	.00	.00	.09	.05	.05	.05	.09	.14	.14	.09	.14	1.21				1.21				
3 SS	.05	.09	.05	.14	.05	.00	.05	.05	.00	.00	.05	.05	.05	.14	.05	.05	.84				.84				
MS	.00	.05	.05	.05	.05	.00	.05	.00	.00	.00	.05	.00	.00	.05	.05	.00	.33				.33				
ES	.05	.00	.00	.00	.00	.00	.14	.00	.00	.05	.05	.09	.05	.05	.00	.00	.47							.47	
																									.00
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.05	.05	.00	.00	.00	.00	.09				.09				.00
4 SU	.23	.05	.05	.00	.00	.09	.05	.00	.00	.05	.05	.05	.05	.09	.05	.14	.93				.93				.00
- N	.38	.19	.47	.33	.28	.23	.51	.70	.09	.28	.47	.84	.19	.37	.33	.59	5.70				5.70				.00
7 SS	.33	.09	.19	.09	.14	.00	.05	.00	.19	.23	.23	.14	.09	.19	.14	.09	2.20				2.20				.00
MS	.09	.05	.05	.09	.05	.19	.14	.00	.05	.09	.05	.00	.00	.00	.19	.00	1.03				1.03				.00
ES	.05	.00	.05	.05	.05	.05	.09	.00	.05	.05	.00	.00	.05	.00	.09	.61								.61	.00
																									.00
																									.00
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.28	.14	.14	.05	.00	.00	.00	.61	.61							.00
MU	.09	.05	.00	.00	.00	.00	.00	.00	.05	.09	.33	.05	.05	.09	.00	.05	.84				.84				.00
8 SU	.19	.00	.00	.00	.00	.00	.00	.05	.00	.14	.28	.19	.28	.14	.05	.14	1.45				1.45				.00
- N	1.36	.61	1.87	1.30	.75	.47	.84	.19	.09	.79	.98	.61	.89	.79	1.45	.98	14.21				14.21				.00
1 SS	.09	.23	.09	.19	.05	.05	.09	.28	.28	.33	1.07	.23	.37	.37	.51	.47	4.67				4.67				.00
2 MS	.19	.09	.05	.14	.14	.37	.00	.28	.19	.58	.14	.09	.09	.23	.19	.14	2.90				2.90				.00
ES	.00	.05	.00	.00	.00	.05	.00	.14	.00	.47	.28	.00	.05	.05	.05	.00	1.12							1.12	.00
																									.00
																									.00
EU	.14	.05	.00	.00	.00	.00	.00	.00	.19	.37	.09	.00	.14	.33	.00	.00	1.31	1.31							.00
1 MU	.05	.05	.00	.00	.00	.00	.00	.14	.05	.38	.00	.05	.14	.05	.09	.09	.98				.98				.00
3 SU	.05	.00	.00	.00	.00	.05	.05	.05	.05	.38	.00	.14	.09	.00	.05	.00	.75				.75				.00
- N	1.82	.28	1.21	.75	1.31	.14	.14	.89	.89	.93	.47	.61	1.84	1.82	1.54	1.03	15.47				15.47				.00
1 SS	.28	.19	.00	.09	.28	.23	.19	.65	1.45	1.92	1.17	.33	1.58	1.07	.61	.37	10.42				10.42				.00
8 MS	.19	.05	.00	.00	.09	.14	.42	.42	1.87	.61	.14	.00	.14	.14	.09	.09	4.38				4.38				.00
ES	.00	.00	.00	.00	.00	.05	.05	.28	.09	.42	.00	.09	.05	.05	.05	.00	1.12							1.12	.00
																									.00
																									.00





CEC: QUAD CITIES STATION  
296 FT. WIND SPEED and WIND DIRECTION

January-December 1997  
296-33 FT. DIFFERENTIAL TEMPERATURE

SPEED CLASS	WIND DIRECTION CLASSES																STABILITY CLASSES					TOTAL			
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N		CS	MS	SS
EU	.01	.03	.00	.00	.04	.07	.01	.01	.01	.16	.01	.04	.05	.22	.06	.03	.18	.28							
1 MU	.01	.00	.00	.01	.03	.01	.02	.06	.02	.09	.00	.02	.18	.03	.07	.00	.47		.47						
3 SU	.00	.02	.00	.00	.05	.00	.02	.06	.09	.05	.07	.07	.05	.27	.07	.02	.83			.83					
N	.18	.16	.23	.39	.49	.25	.24	.25	.31	.39	.14	.35	.67	1.52	.64	.10	6.33				6.33				
2 SS	.06	.02	.13	.03	.15	.29	.16	.35	.49	1.01	.09	.15	.13	.16	.14	.01	3.40					3.40			
4 MS	.00	.01	.00	.00	.01	.05	.05	.01	.05	.28	.00	.00	.03	.03	.00	.01	.53						.53		
ES	.00	.00	.00	.00	.00	.00	.01	.02	.01	.03	.00	.00	.01	.00	.00	.00	.08							.08	12.44
TOT	5.22	3.84	4.81	4.81	5.41	5.85	5.26	5.83	7.46	12.25	7.53	5.07	7.15	6.95	6.70	4.08	100.00	6.30	6.50	6.43	35.98	25.95	11.63	4.21	100.00

Wind Direction by Stability

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-STABILITY CLASSES-
.38	.19	.25	.20	.34	.19	.22	.21	.35	1.10	.65	.36	.36	.72	.50	.34	6.30	Extremely Unstable
.29	.21	.31	.22	.24	.22	.21	.35	.42	.75	.53	.34	.43	.40	.34	.24	5.30	Moderately Unstable
.36	.19	.13	.17	.25	.29	.34	.27	.49	.76	.62	.50	.61	.65	.45	.36	6.43	Slightly Unstable
2.28	1.57	2.44	2.32	2.31	2.12	1.98	1.87	1.63	2.59	2.63	2.33	3.70	4.60	3.62	1.89	29.98	Neutral
1.13	1.03	.89	1.32	1.40	1.70	1.28	1.57	2.32	4.21	2.29	1.12	1.52	1.72	1.33	.82	25.95	Slightly Stable
.60	.56	.36	.52	.51	1.09	.86	.87	1.30	2.05	.60	.27	.43	.66	.40	.36	11.63	Moderately Stable
.20	.10	.19	.16	.16	.25	.40	.69	.56	1.19	.21	.16	.10	.09	.06	.08	4.21	Extremely Stable

Wind Direction by Wind Speed

N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	-WIND SPEED CLASSES-
.00	.00	.01	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.02	CALM
.14	.13	.20	.16	.10	.10	.15	.09	.09	.18	.20	.14	.17	.20	.17	.17	2.33	0.9 - 3.5 mph
.94	.82	.79	.69	.69	.69	.64	.79	.74	1.12	1.54	.88	.79	.93	.71	.62	13.27	3.6 - 7.5 mph
2.34	1.49	1.90	1.80	1.09	1.79	1.99	1.83	1.75	3.47	3.04	1.40	1.79	1.94	1.82	1.63	31.79	7.6 - 12.5 mph
1.58	1.17	1.40	1.63	1.93	2.14	1.70	2.01	3.56	5.11	2.20	1.35	2.30	2.96	2.86	1.45	35.16	12.6 - 18.5 mph
.25	.24	.36	.44	.79	.67	.52	.78	.98	2.11	.27	.65	1.06	2.22	.93	.19	12.44	18.6 - 24.5 mph
.06	.00	.02	.08	.30	.45	.29	.29	.32	.35	.13	.59	1.06	.64	.39	.07	5.00	> 24.5 mph

CECQ QUAD CITIES STATION  
296 FT. WIND SPEED AND WIND DIRECTION

January-December 1961  
296-33 FT. DIFFERENTIAL TEMPERATURE

NUMBER OF OBSERVATIONS = 8644  
VALUES ARE PERCENT OCCURRENCE

SPEED CLASS	WIND DIRECTION CLASSES																STABILITY CLASSES								
	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	TOTAL	EU	MU	SU	N	SS	WS	ES	TOTAL
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2 N	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SS	.00	.00	.01	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
2 WS	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
ES	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
																									.01
EU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.01	.01	.00	.00	.00	.00	.00	.00	.00
MU	.00	.00	.00	.00	.00	.00	.00	.00	.00	.00	.01	.00	.00	.00	.00	.00	.01	.01	.00	.00	.00	.00	.00	.00	.00
1 SU	.00	.01	.00	.00	.00	.01	.00	.00	.00	.01	.01	.02	.01	.01	.02	.05	.16	.00	.00	.00	.00	.00	.00	.00	.00
2 N	.03	.05	.08	.05	.06	.03	.03	.06	.07	.02	.08	.08	.10	.10	.07	.09	.00	.00	.00	.00	.00	.00	.00	.00	.00
1 SS	.03	.05	.05	.06	.01	.03	.03	.06	.01	.02	.01	.05	.01	.03	.03	.05	.04	.00	.00	.00	.00	.00	.00	.00	.00
2 WS	.02	.01	.02	.02	.02	.02	.01	.03	.01	.00	.05	.01	.00	.00	.02	.01	.08	.00	.00	.00	.00	.00	.00	.00	.00
ES	.05	.00	.03	.03	.01	.00	.05	.00	.00	.03	.02	.03	.03	.01	.01	.00	.02	.00	.00	.00	.00	.00	.00	.00	.00
																									.01
EU	.01	.01	.01	.06	.02	.00	.01	.01	.00	.06	.08	.05	.05	.05	.05	.00	.46	.46	.00	.00	.00	.00	.00	.00	.00
MU	.08	.05	.06	.09	.02	.02	.03	.07	.03	.10	.19	.10	.08	.14	.14	.08	1.31	1.31	.00	.00	.00	.00	.00	.00	.00
4 SU	.15	.05	.06	.06	.06	.10	.09	.07	.12	.23	.17	.17	.12	.12	.08	.09	1.74	1.74	.00	.00	.00	.00	.00	.00	.00
5 N	.22	.29	.27	.27	.27	.23	.23	.36	.24	.38	.54	.36	.34	.38	.27	.25	5.00	5.00	.00	.00	.00	.00	.00	.00	.00
1 SS	.20	.34	.21	.12	.10	.14	.10	.10	.17	.19	.34	.12	.12	.12	.09	.12	2.48	2.48	.00	.00	.00	.00	.00	.00	.00
2 WS	.08	.13	.07	.06	.07	.13	.10	.07	.10	.08	.15	.03	.07	.09	.07	.06	1.35	1.35	.00	.00	.00	.00	.00	.00	.00
ES	.09	.06	.12	.05	.05	.07	.06	.10	.08	.08	.07	.05	.02	.01	.01	.03	.05	.00	.00	.00	.00	.00	.00	.00	.00
																									.01
EU	.23	.09	.17	.03	.17	.03	.02	.12	.08	.51	.39	.19	.16	.20	.17	.17	2.75	2.75	.00	.00	.00	.00	.00	.00	.00
MU	.17	.13	.17	.07	.12	.09	.08	.15	.20	.35	.16	.10	.10	.12	.03	.05	2.09	2.09	.00	.00	.00	.00	.00	.00	.00
8 SU	.15	.09	.05	.07	.12	.12	.10	.06	.15	.20	.27	.10	.16	.14	.15	.14	2.06	2.06	.00	.00	.00	.00	.00	.00	.00
9 N	.23	.44	.33	.26	.27	.21	.24	.50	.28	.72	1.08	.50	.74	.72	.89	.75	11.46	11.46	.00	.00	.00	.00	.00	.00	.00
1 SS	.47	.44	.37	.26	.39	.32	.46	.32	.47	.82	1.01	.39	.43	.42	.35	.36	7.41	7.41	.00	.00	.00	.00	.00	.00	.00
2 WS	.35	.25	.19	.21	.14	.42	.27	.43	.39	.58	.24	.16	.16	.30	.20	.15	4.43	4.43	.00	.00	.00	.00	.00	.00	.00
ES	.23	.26	.22	.21	.29	.10	.20	.25	.19	.30	.29	.06	.02	.06	.07	.07	1.92	1.92	.00	.00	.00	.00	.00	.00	.00
																									.01
EU	.10	.06	.07	.09	.08	.07	.15	.07	.25	.38	.16	.07	.17	.24	.22	.13	2.21	2.21	.00	.00	.00	.00	.00	.00	.00
1 MU	.02	.03	.02	.05	.06	.06	.06	.07	.16	.20	.17	.08	.05	.09	.10	.10	1.42	1.42	.00	.00	.00	.00	.00	.00	.00
3 SU	.06	.01	.02	.05	.03	.05	.12	.08	.12	.23	.15	.08	.05	.09	.06	.06	1.40	1.40	.00	.00	.00	.00	.00	.00	.00
4 N	.25	.64	.50	.39	.28	.39	.43	.57	.59	.93	.69	.54	.91	1.37	1.39	.69	12.37	12.37	.00	.00	.00	.00	.00	.00	.00
1 SS	.37	.28	.23	.24	.21	.25	.43	.29	1.21	1.94	.83	.50	.83	1.01	.72	.29	11.35	11.35	.00	.00	.00	.00	.00	.00	.00
8 WS	.15	.15	.08	.22	.27	.47	.43	.52	.65	1.10	.18	.06	.16	.23	.12	.14	5.02	5.02	.00	.00	.00	.00	.00	.00	.00
ES	.03	.00	.01	.07	.01	.09	.08	.31	.28	.34	.02	.02	.01	.01	.01	.03	1.93	1.93	.00	.00	.00	.00	.00	.00	.00
																									.01



SOLID RADWASTE SEMI-ANNUAL REPORT

JULY 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
07/09/91	KINDRICK TRUCKING	QUADREX	1290.10	181.80
07/15/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	1850.00
07/22/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	15.00
07/29/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	91.50
07/31/91	HITTMAN	WESTINGHOUSE, PA	1040.00	3.69
			-----	-----
			2947.50	43280.49



SOLID RADWASTE SEMI-ANNUAL REPORT

AUGUST 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
08/05/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	11030.00
08/07/91	HITTMAN	SCIENTIFIC ECOLOGY	1290.10	87.66
08/13/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	37670.00
08/19/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	29620.00
08/21/91	KINDRICK TRUCKING	QUADREX	1290.10	27.69
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			3197.60	78435.35

SOLID RADWASTE SEMI-ANNUAL REPORT

SEPTEMBER 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
*****	*****	*****	*****	*****
09/05/91	RAY-TECH	CHANNAHAN	22.50	7.18
09/05/91	RAY-TECH	CHANNAHAN	570.00	281.72
09/10/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	16700.00
09/23/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	8992.00
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			1004.10	25980.90
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SOLID RADWASTE SEMI-ANNUAL REPORT

OCTOBER 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
10/07/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	10310.00
10/21/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	18750.00
10/24/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	563.90
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			617.40	29623.90

SOLID RADWASTE SEMI-ANNUAL REPORT

NOVEMBER 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
*****	*****	*****	*****	*****
11/04/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	18230.00
11/12/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	11770.00
11/17/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	170.80	483.30
11/18/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	9252.00
11/21/91	KINDRICK TRUCKING	QUADREX	981.50	57.76
11/25/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	14810.00
11/27/91	RAY-TECH	CHANNAHAN	622.50	344.10
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			2598.00	54947.16

SOLID RADWASTE SEMI-ANNUAL REPORT

DECEMBER 1991

Shipping Date	Carrier	Site	Volume	MilliCuries
12/03/91	CHEM NUCLEAR SYSTEMS	U.S. ECOLOGY, WA	105.00	1053.50
12/09/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	16880.00
12/11/91	CHEM NUCLEAR SYSTEMS	U.S. ECOLOGY, WA	345.00	8.15
12/13/91	CHEM NUCLEAR SYSTEMS	U.S. ECOLOGY, WA	105.00	812.17
12/16/91	CHEM NUCLEAR SYSTEMS	BARNWELL, SC	205.80	21310.00
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			966.60	40063.82
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		TOTALS:	11331.20	272331.62
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