



**Commonwealth Edison**  
Quad-Cities Nuclear Power Station  
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BBS-73-21

February 9, 1973



Mr. A. Giambusso  
Deputy Director for Reactor Projects  
Directorate of Licensing  
U. S. Atomic Energy Commission  
Washington, D. C. 20545

Reference: Quad-Cities Nuclear Power Station  
Docket Nos. 50-254 and 50-265  
DPR-29 & 30, Appendix B, Section 1.1 & 3.1.A

Dear Mr. Giambusso:

The purpose of this letter is to report chlorine residual concentrations in the discharge bay in excess of the Limiting Conditions for Operation in the Non-Radiological Technical Specifications. The limit of .1 ppm free and combined chlorine in the discharge bay was exceeded on several occasions during the past 30 days due to the normal operation of the chlorination system.

On January 9, 1973 chlorination of the Unit 2 condenser was scheduled. Due to a low confidence in the accuracy of residual chlorine measurements, representatives from Industrial Bio-Test Laboratories were requested to obtain samples in the discharge bay in an attempt to confirm residual levels determined by station personnel. 308 gallons of sodium hypochlorite were injected at a rate of 12 to 15 gpm during the 22 minute cycle. The center water box residual analyzer was inoperable at the time. Total chlorine residual measurements of discharge bay samples analyzed by Bio-Test ranged from .04 to .36 ppm during the cycle. These values were obtained with a Wallace & Tiernan titrator and confirmed using a Fisher & Porter titrator. The results of all Edison samples during this period were 0 ppm using the station's Wallace & Tiernan titrator.

A new cell was obtained for the station's titrator and chlorination of the Unit 2 condenser was again conducted on January 18, 1973. 348 gallons of hypochlorite were injected into the circulating water system and realistic

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results were obtained on discharge bay residual samples for the first time.

<u>TIME</u>	<u>FLOW RATE</u>	<u>TOTAL RESIDUAL</u>
1525	12 gpm	0 ppm
1528	11	0
1532	14	.1
1535	16	.1
1538	18	.1
1542	20	.6
1546*	20	1.0
1551	--	1.0
1556	--	.3

\* Injection stopped at 1545

On January 23, 1973 another chlorination was scheduled with Bio-Test. Samples were also taken during this run from the intake to determine the affect of the ice-melt recirculation flow which is currently diverting about 25% of the discharge flow back to the intake. The following measurements were made which show a reasonably good correlation between Edison and Bio-Test results with the residuals determined by station personnel being slightly higher.

TIME	FLOW	CECO DISCHARGE TOTAL RESIDUAL PPM	BIO TEST DISCHARGE RESIDUAL PPM TOTAL - FREE	BIO TEST INTAKE RESIDUAL PPM TOTAL - FREE
0831	10 gpm	--	<.01    <.01	<.01    <.01
0835	13	--	--    --	--    --
0837	15	<.1	--    --	--    --
0840	16	--	<.01    <.01	.04    .04
0843	17	.7	--    --	--    --
0847	14	1.3	--    --	--    --
0850	16	--	.84    .35	.06    .06
0853	15	1.3	--    --	--    --
0856	Hypochlorite system off			
0900	0	1.4	1.23    .01	.02    .02
0907	0	.2	--    --	--    --
0910	0	--	.2    .04	<.01    <.01

A total of 356 gallons of sodium hypochlorite was injected during this run. At 1400 on the 23rd another chlorination was conducted with the injection flow rate being manually controlled at a constant 10 gpm. Measurements made by Bio-Test during this injection were as follows:

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TIME	DISHCARGE BAY TOTAL - FREE		INTAKE TOTAL - FREE	
1400	<.01	<.01	<.01	<.01
1410	.12	.03	<.01	<.01
1420	.68	.01	<.01	<.01
1430	.76	.35	<.01	<.01
1440	.07	.01	<.01	<.01
1450	<.01	<.01	<.01	<.01

A total of 232 gallons were injected with the system being shutdown at 1425.

During both of these runs Bio-Test obtained samples in the Mississippi River downstream of the diffuser pipes. Significantly, no residual free or combined chlorine was detected in the river during either of the chlorination periods. Condenser chlorination was also conducted on January 31, 1973 with total residual chlorine in the discharge bay ranging from .2 to 1.5 ppm.

During the startup of both units at Quad-Cities numerous hardware problems have been encountered with the Hypochlorite System. As discussed above, chlorine residual analysis has also been questionable in the past. On February 2, 1973, however, the circulating water systems of both units were chlorinated with the system functioning as designed. As can be seen in the following table of results, the automatic feed rate controller properly regulated the flow rate to obtain a residual of about .3 ppm free chlorine in the center water box sample. 212 gallons of hypochlorite were injected into Unit 1 from 1300 to 1323 and 148 gallons were injected into Unit 2 between 1323 and 1346.

	TIME	FLOW GPM	WATERBOX ANALYZER PPM FREE CHLORINE	DISCHARGE BAY RESIDUAL PPM FREE - TOTAL
Unit 1	1300	6	>1.00	<.05 <.1
	1301	3	>1.00	
	1302	4	.50	
	1303	7	.02	
	1304	8	.02	
	1305	9	.02	
	1306	11	.02	<.05 .15
	1307	11	.02	
	1308	11	.20	
	1309	10	>1.00	
	1310	10	>1.00	

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TIME	FLOW GPM	WATERBOX ANALYZER PPM FREE CHLORINE	DISCHARGE BAY RESIDUAL PPM FREE - TOTAL	
1311	9	>1.00		
1312	8	.04		
1313	10	.06	.05	.25
1314	10	.06		
1315	10	.06		
1316	10	.12		
1317	10	.12	.1	.6
1318	10	.12	.1	.6
1319	10	.30		
1320	10	.30		
1321	8	.30		
1322	9	.25		
1323	9	.30		
Unit 2				
1323	9	0		
1324	8	>1.0		
1325	8	>1.0	.1	.9
1326	8	>1.0		
1327	6	.70		
1328	6	.60		
1329	6	.30		
1330	4	.30		
1331	4	.1		
1332	5	.04	.2	1.1
1333	6	.04		
1334	6	.04		
1335	6	.04		
1336	6	.04		
1337	7	.02		
1338	7	.02		
1339	8	.02		
1340	8	.02	.15	.6
1341	10	.02		
1342	10	.02		
1343	10	.15		
1344	10	.20		
1345	10	.25		
1346	10	.28	.05	.75

It can be seen from these results that effective chlorination cannot be accomplished and still maintain less than .1 ppm total residual in the discharge bay. With the system now

Mr. A. Giambusso

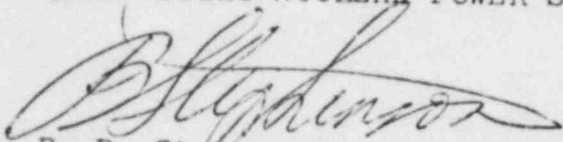
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fully operational, each unit is being chlorinated daily for 20 minutes in the automatic mode. It is fully expected that the Limiting Condition for Operation will be exceeded with each cycle. The LCO originally proposed and accepted for the Non-Radiological Specifications by Commonwealth Edison of .5 ppm free chlorine, however, has never been exceeded to our knowledge and should not be exceeded now. We still believe this to be a more realistic limit and is in accordance with the original system design capability.

Very truly yours,

COMMONWEALTH EDISON COMPANY  
QUAD-CITIES NUCLEAR POWER STATION



B. B. Stephenson  
Superintendent

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