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SUBJECT: Forwards addl data from recent Catawba integrated leak rate tests which further supports util 890203 request for exemption from 10CFR50, App J requirements for plants that containment leakage can be determined in less than 24 h.

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SUBJECT: Forwards addl info as suppl to 890203 request for exemption from 10CFR50 App J.

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DUKE POWER

April 3, 1989

U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Attention: Document Control Desk

Subject: Oconee Nuclear Station
Docket Numbers 50-269, -270, and -288¹
McGuire Nuclear Station
Docket Numbers 50-369 and -370
Catawba Nuclear Station
Docket Numbers 50-413 and -414
Request For Exemption to Certain
Appendix J Requirements; Supplemental Information

By letter dated February 3, 1989, I submitted a request for exemption from the 10 CFR50 Appendix J Requirement that Integrated Leak Rate Tests (ILRTs) which are performed using the Mass-Point Analysis Method have a test duration of at least 24 hours. Our request is based on our historically-proven ability to measure containment leakage in less than 24 hours, and on a set of test termination criteria which we feel are appropriate to determine a sufficient test duration. These criteria were originally submitted in September, 1987. The February 3, 1989 letter provided additional (more recent) data as a supplement to the original submittal, and responded to the criteria of 10 CFR50.12, which must be satisfied in order to justify the granting of an exemption request. The need to process an exemption resulted from the November 15, 1988 rule which codified the 24-hour requirement. This submittal provides additional data, from a recent ILRT at Catawba Unit 2, which further supports our request for exemption. The test data show that the test termination criteria are all met (with the exception of the 24-hour test duration requirement) in 11.2 hours.

The test data, along with a discussion of their significance, are attached. We feel that these data further support our position that containment leakage can be determined in less than 24 hours, with a 95 percent confidence in the accuracy of the measurement. In addition to the recent Catawba 2 test, two other CILRT's were conducted since the September 17, 1987 submittal. These tests were performed at Catawba 1 in November 1987 and Oconee 2 in March 1988. The Catawba 1 test data satisfied all termination criteria in 8.0 hours. The Oconee 2 test data satisfied all termination criteria in 15.8 hours. These test data were included in the February 3, 1989 submittal. The requirement that the test duration in each of these tests be 24 hours has resulted in 35 hours of unnecessary critical path time. That translates to approximately \$400,000 in replacement power and labor costs.

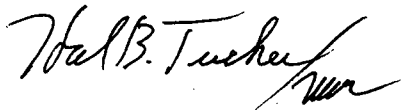
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U. S. Nuclear Regulatory Commission
April 3, 1989
Page Two

If we may be of further assistance in your review of this issue, please call Scott Gewehr at (704) 373-7581. Please note that an ILRT is scheduled for McGuire Unit 2 in the upcoming outage, which is scheduled for July. We request that this issue be resolved by that time.

Very truly yours,



H. B. Tucker

SAG157/lcs

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ATTACHMENT

Following are the preliminary results from the Catawba Unit 2 Containment Integrated Leak Rate Test (CILRT), conducted on March 16-18, 1989. These data will be formally transmitted, pursuant to Appendix J, about June 16, 1989. This test was performed at the front end of the refueling outage. The results reflect the "As Found" condition of containment following completion of cycle 2. With the exception of one containment purge penetration, no repairs or modifications were made to any other penetrations prior to performing this CILRT.

The 24 hour leakage rate reported at the 95 percent upper confidence limit, using the mass point methodology described by ANSI/ANS-56.8-1987, is 0.0239 weight percent per day. A small penalty will be added to this value to account for those penetrations that were not challenged by accident pressure due to system operability requirements. Both 10CFR50 Appendix J and Technical Specifications require that the leakage shall be less than 0.75 La or 0.225 weight percent per day. The 24 hour leakage result is approximately one-tenth of the Technical Specification requirement.

On September 17, 1987, a set of termination criteria that must be satisfied in order to conduct a mass point CILRT in less than 24 hours was submitted to the NRC staff for their review. These criteria were augmented with more recent test information and resubmitted on February 3, 1989 as an exemption request to the November 1988 revision to Appendix J. In summary, the proposed criteria were as follows:

1. ANSI/ANS-56.8-1987 Criteria
 - a. The mass point 95 percent upper confidence limit leak (UCL) leak rate shall be less than 75 percent of the maximum allowable leakage (La).
 - b. The test duration shall be a minimum of eight hours.
 - c. The test shall be of sufficient duration to satisfy the Instrumentation Selection Guide as described in Section 4.0 of ANSI/ANS 56.8.
2. The "Limit on Data Scatter" (inequality 2.1) presented in draft Regulatory Guide MS 021-5 shall be satisfied. This condition is satisfied when the calculated ratio is greater than 1.0. This statistical test provides a quality check on the mass point data by ensuring a tight fit of the data about the linear least squares fit regression line.
3. The "Predictor Criterion" as outlined in T. M. Brown's and L. F. Estenssoro's paper, "Suggested Criteria for a Short Duration ILRT," shall be less than 25 percent. The predictor equation combines the uncertainties associated with the measured leakage rate with the rate of change of the measured leakage over the last four hours.

This criterion ensures that the measured leakage rate (L_m) and the 95 percent upper confidence limit leakage rate are converging. It also provides reasonable assurance that the measured leakage reported following test termination will result in the verification test meeting its acceptance criteria.

4. One-Half Maximum Window Leakage Criterion - The measured leakage rate (L_m) for all time intervals equal to one-half of the test duration shall be less than $0.75 L_a$. This criterion provides a check against non-linear intervals of test data.

The Catawba 2 CILRT satisfied all proposed mass point termination criteria in 11.2 hours. The predictor criteria was the limiting condition. Based on engineering judgment, the test would have been terminated after approximately 13 hours, when the leak rate trend plot showed stability with a negligible positive or negative slope. The 13 hour mass point leak rate at the 95 percent upper confidence limit was 0.0412 weight percent per day. A Critical path time savings of 11 hours would have been realized had the proposed termination criteria been approved by the NRC staff. The test results and applicable plots are attached.

Mass Point Termination Criteria

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Catawba Nuclear Station
Unit 2

RDG	TIME	Mass lbm	MP Leak %/day	MP UCL %/day	Max Wind %/day	Scatter	Predictor %
50	0.00	175775.4347	0.0000	0.0000	0.0000	0.0000	-
51	15.02	175777.3750	-0.1059	0.0000	0.0000	1.0000	-
52	30.17	175796.8972	-0.5836	1.7623	-0.1059	0.8327	-
53	45.32	175778.6699	-0.1582	0.6471	0.8749	0.1885	-
54	60.32	175764.6995	0.1093	0.6305	0.8749	0.1327	-
55	75.33	175760.6826	0.2016	0.5311	0.6677	0.3710	-
56	90.35	175795.3345	0.0115	0.3241	0.6677	0.0873	-
57	105.35	175777.2905	0.0129	0.2377	0.6677	0.1352	-
58	120.22	175779.7330	0.0039	0.1741	0.3559	0.1937	-
59	135.37	175763.7356	0.0465	0.1876	0.3559	0.2760	-
60	150.37	175764.4302	0.0660	0.1814	0.2016	0.3900	-
61	165.38	175744.9046	0.1156	0.2238	0.2394	0.5040	-
62	180.38	175782.5631	0.0742	0.1745	0.2394	0.4243	-
63	195.40	175754.9353	0.0890	0.1756	0.2340	0.5339	-
64	210.42	175765.1554	0.0825	0.1573	0.2340	0.6087	-
65	225.42	175776.3856	0.0628	0.1309	0.1828	0.6205	-
66	240.43	175727.5861	0.1003	0.1710	0.1828	0.6246	233.6306
67	255.43	175777.1750	0.0773	0.1441	0.1765	0.5952	222.8501
68	271.45	175766.7793	0.0685	0.1286	0.1765	0.6510	211.8275
69	286.47	175744.8101	0.0783	0.1331	0.1913	0.7345	98.3124
70	301.47	175741.7340	0.0867	0.1368	0.1913	0.8123	59.3002
71	316.48	175755.3990	0.0831	0.1286	0.1349	0.8838	60.3863
72	331.48	175763.6106	0.0747	0.1169	0.1349	0.9343	62.0170
73	346.50	175759.4726	0.0697	0.1086	0.1081	1.0074	53.5377
74	361.50	175752.3088	0.0687	0.1045	0.1081	1.0950	43.6195
75	376.52	175751.6200	0.0677	0.1007	0.1026	1.1842	31.7188
76	391.52	175754.0714	0.0653	0.0959	0.1141	1.2749	33.3305
77	406.53	175752.8206	0.0634	0.0918	0.1244	1.3697	34.0347
78	421.53	175737.3648	0.0673	0.0939	0.1254	1.4236	28.3687
79	436.55	175751.4972	0.0650	0.0900	0.1254	1.5164	28.1934
80	451.57	175766.6345	0.0578	0.0821	0.1137	1.5732	27.9221
81	466.57	175775.6853	0.0487	0.0732	0.1137	1.5835	29.6407
82	481.58	175756.0453	0.0466	0.0697	0.1003	1.6970	31.0549
83	496.58	175748.1422	0.0468	0.0685	0.0947	1.8048	28.5206
84	511.60	175802.9865	0.0325	0.0573	0.0904	1.5144	33.2270
85	526.60	175749.8014	0.0334	0.0568	0.0904	1.6200	34.1832
86	541.62	175738.7186	0.0366	0.0589	0.0993	1.6851	33.9799
87	556.63	175760.1155	0.0344	0.0557	0.0993	1.7989	32.7085
88	571.63	175758.4595	0.0328	0.0530	0.0937	1.9208	31.3756
89	586.65	175753.6667	0.0322	0.0514	0.0937	2.0472	30.5117
90	599.35	175762.1679	0.0300	0.0484	0.0890	2.1611	29.8629
91	614.53	175756.4425	0.0291	0.0466	0.0890	2.3021	29.1429
92	629.50	175764.1668	0.0268	0.0437	0.0831	2.4399	28.3680
93	644.67	175756.4314	0.0261	0.0421	0.0831	2.5940	27.4009
94	659.67	175766.3870	0.0237	0.0393	0.0749	2.7397	26.4556
95	674.67	175735.1311	0.0264	0.0414	0.0749	2.7684	24.1462
96	689.68	175750.6545	0.0263	0.0408	0.0725	2.9177	21.1024
97	704.68	175739.6009	0.0278	0.0417	0.0725	3.0025	18.4494
98	719.53	175736.7015	0.0294	0.0428	0.0707	3.0654	16.7147
99	734.68	175766.1363	0.0270	0.0401	0.0707	3.2091	15.0792

All criteria
satisfied

Mass Point Termination Criteria

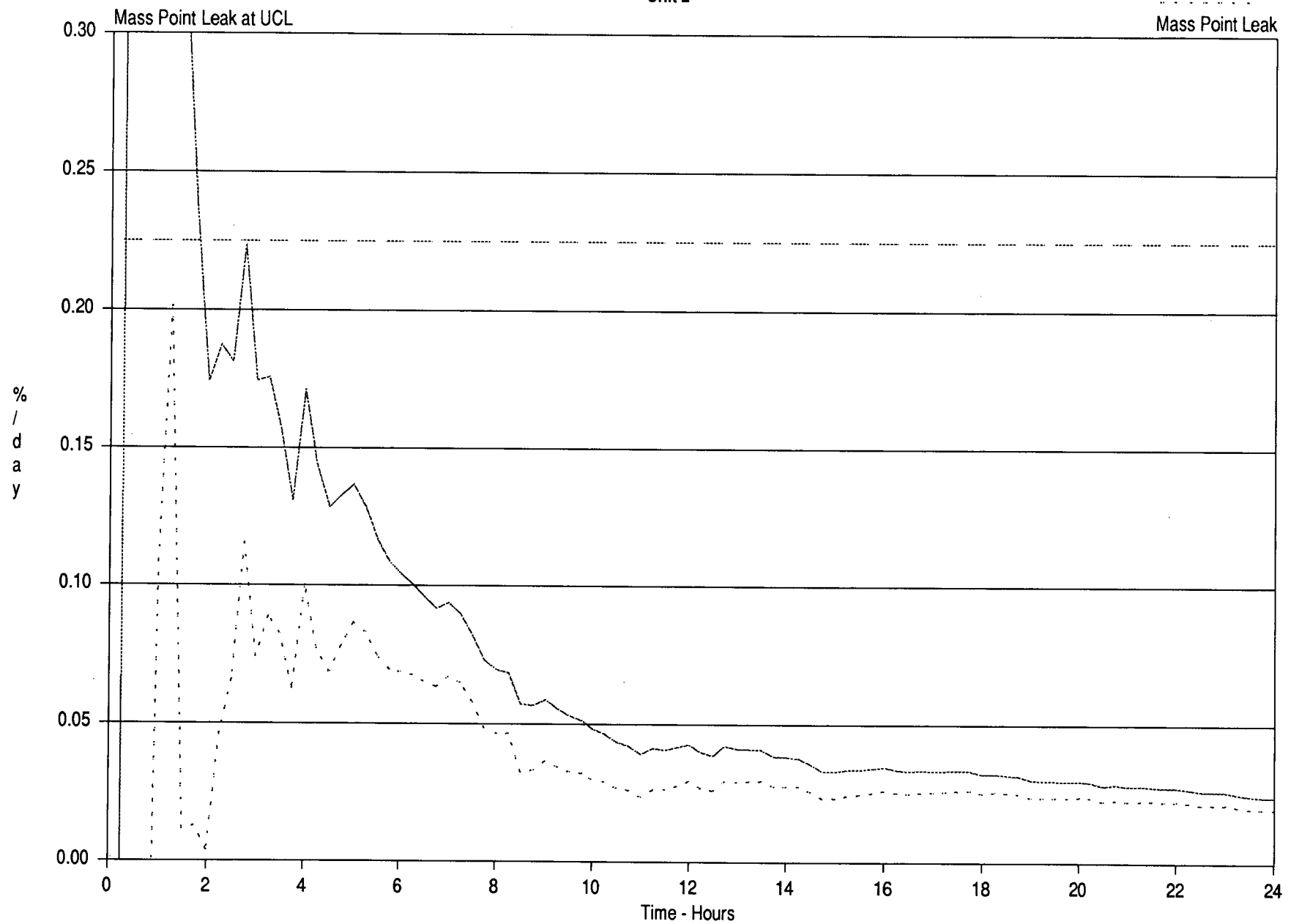
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Catawba Nuclear Station
Unit 2

	RDG	TIME	Mass lbm	MP Leak %/day	MP UCL %/day	Max Wind %/day	Scatter	Predictor %
Negligible + or - slope →	100	749.70	175755.4940	0.0261	0.0387	0.0679	3.3803	12.6528
	101	764.70	175717.6906	0.0297	0.0423	0.0679	3.1887	12.4197
	102	779.98	175751.1204	0.0291	0.0412	0.0710	3.3464	11.7324
	103	795.03	175741.9056	0.0294	0.0411	0.0710	3.4689	10.4004
	104	810.20	175742.9853	0.0296	0.0409	0.0696	3.6020	9.2195
	105	825.20	175764.2703	0.0275	0.0386	0.0696	3.7526	8.4967
	106	840.22	175743.8085	0.0276	0.0383	0.0673	3.8957	8.4718
	107	855.22	175744.8804	0.0275	0.0378	0.0673	4.0482	8.3714
	108	870.23	175763.6415	0.0257	0.0358	0.0650	4.2141	8.2316
	109	885.23	175772.0396	0.0233	0.0333	0.0650	4.3328	7.9097
	110	900.25	175745.5148	0.0233	0.0330	0.0578	4.4987	8.0083
	111	915.27	175733.1900	0.0243	0.0338	0.0578	4.5571	8.3522
	112	930.27	175740.0519	0.0247	0.0338	0.0487	4.6910	8.4243
	113	945.28	175735.3614	0.0253	0.0342	0.0487	4.7849	8.4058
	114	960.28	175731.7307	0.0261	0.0348	0.0473	4.8433	8.2313
	115	975.30	175752.1296	0.0254	0.0338	0.0473	5.0402	7.9359
	116	990.30	175745.6548	0.0251	0.0332	0.0468	5.2233	7.8490
	117	1005.32	175734.4182	0.0256	0.0335	0.0468	5.3215	7.7702
	118	1020.32	175740.9980	0.0255	0.0332	0.0386	5.4831	7.3437
	119	1035.33	175734.6885	0.0259	0.0334	0.0365	5.5922	6.9170
	120	1050.33	175734.2108	0.0262	0.0335	0.0365	5.7004	6.3302
	121	1065.35	175738.0916	0.0262	0.0333	0.0372	5.8496	5.5879
	122	1080.37	175755.0329	0.0252	0.0322	0.0372	6.0630	5.3087
	123	1095.37	175730.7410	0.0257	0.0325	0.0368	6.1394	5.3731
	124	1110.38	175744.0921	0.0253	0.0319	0.0368	6.3384	5.3520
	125	1125.40	175742.7626	0.0250	0.0315	0.0352	6.5347	5.2555
	126	1140.40	175760.8537	0.0237	0.0301	0.0352	6.7417	4.9039
	127	1155.42	175739.3294	0.0237	0.0299	0.0358	6.9211	4.7568
	128	1170.43	175734.8977	0.0238	0.0299	0.0358	7.0608	4.8820
	129	1185.43	175739.2783	0.0237	0.0296	0.0364	7.2467	4.9609
	130	1200.45	175729.1159	0.0241	0.0299	0.0364	7.3199	4.9384
	131	1215.47	175744.3135	0.0237	0.0293	0.0362	7.5445	4.8715
	132	1230.47	175762.2836	0.0224	0.0281	0.0362	7.7545	5.0801
	133	1245.48	175724.1958	0.0230	0.0285	0.0339	7.7535	5.1013
	134	1260.48	175746.7961	0.0225	0.0279	0.0339	7.9957	5.1138
	135	1275.50	175731.1283	0.0227	0.0280	0.0339	8.1124	5.0624
	136	1290.50	175737.1708	0.0226	0.0278	0.0339	8.3015	4.9693
	137	1305.52	175743.4074	0.0223	0.0274	0.0326	8.5401	4.8380
	138	1320.52	175729.7399	0.0225	0.0275	0.0326	8.6477	4.6218
	139	1335.53	175747.3517	0.0220	0.0269	0.0316	8.9072	4.5554
	140	1350.53	175750.6294	0.0213	0.0261	0.0316	9.1765	4.4539
	141	1365.55	175735.4428	0.0213	0.0260	0.0299	9.3658	4.3174
	142	1380.55	175730.2700	0.0215	0.0261	0.0299	9.4921	4.1464
	143	1395.57	175758.6172	0.0205	0.0251	0.0291	9.7461	4.2603
	144	1410.57	175752.4213	0.0199	0.0244	0.0291	10.0298	4.3925
	145	1425.58	175742.1103	0.0196	0.0241	0.0294	10.2928	4.4566
	146	1440.58	175737.0503	0.0196	0.0239	0.0294	10.5164	4.4716

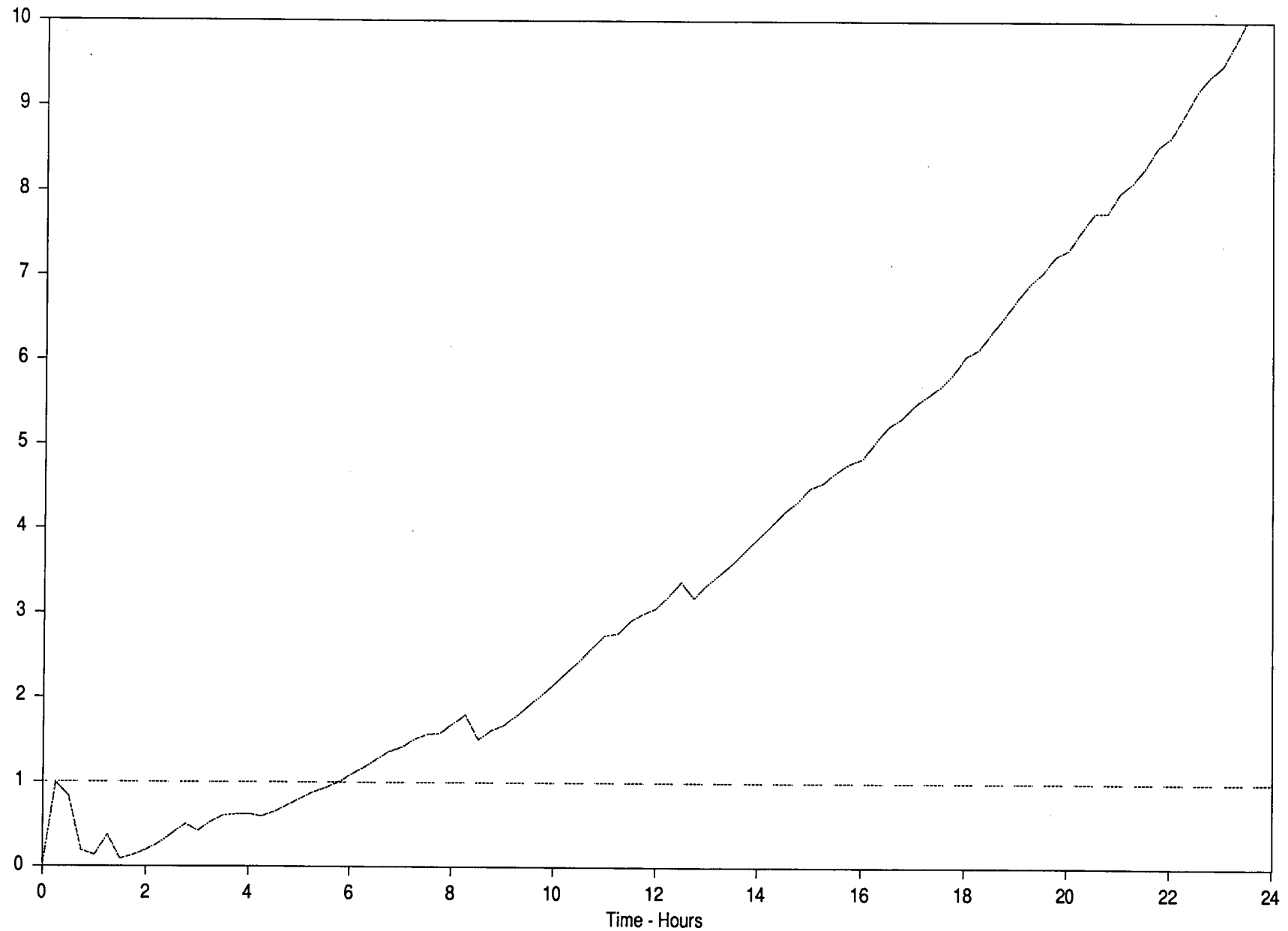
Mass Point Leak at UCL & Mass Point Leak

Catawba Nuclear Station
Unit 2



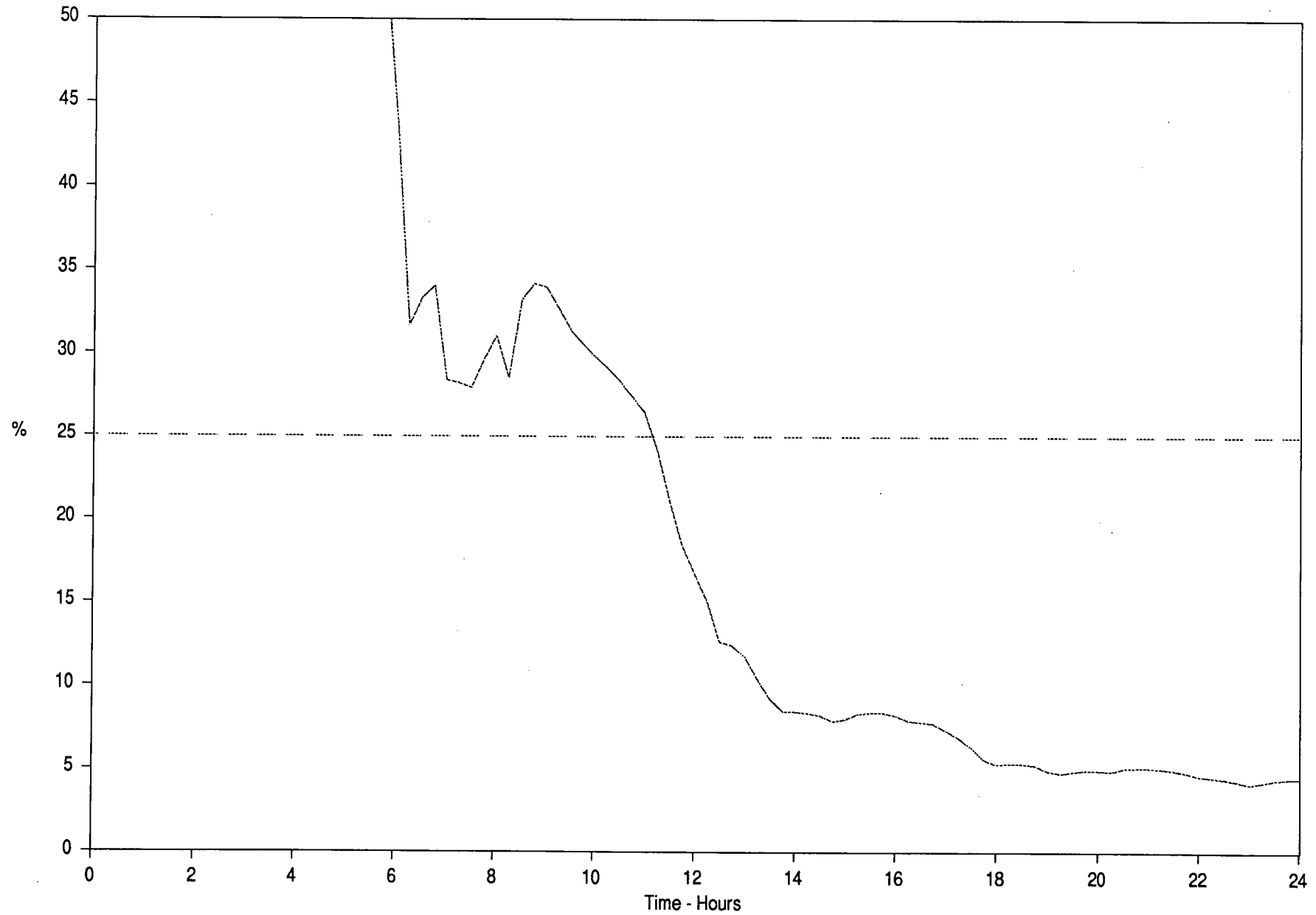
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Predictor Criteria

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Unit 2



Maximum Window Calculation

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