



W. R. McCollum, Jr.
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November 22, 1999

U. S. Nuclear Regulatory Commission
Washington D. C. 20555-0001

ATTENTION: Document Control Desk

Subject: Duke Energy Corporation
Oconee Nuclear Station, Units 1, 2, and 3
Docket Numbers 50-269, 50-270, and 50-287
Supplement # 4 to License Amendment Request
Regarding Unit 2 Cycle 18 Reload Report,
(TSC 99-06)

On April 5, 1999, Duke Energy Corporation (Duke) submitted a license amendment request (LAR) for Facility Operating License Nos. DPR-38, DPR-47, and DPR-55 for Oconee Nuclear Station Units 1, 2, and 3, respectively, pursuant to 10 CFR 50.90. The LAR proposed changes to the Technical Specifications, Bases, Updated Final Safety Analysis Report (UFSAR), and Core Operating Limits Report (COLR) to incorporate Topical Report DPC-NE-3005-P, "UFSAR Chapter 15 Transient Analysis Methodology." This LAR supports the future operation of Oconee Unit 2 during Cycle 18 (O2C18) and the current and future Unit 1 and 3 cycles utilizing the methodology provided in Topical Report DPC-NE-3005-PA. Note that Duke previously supplemented this submittal on May 27, July 6, and October 7, 1999.

NRC has requested steam generator post-accident steaming rates from the Duke dose analysis calculation to support their review of this LAR. Attachment 1 of this supplement provides that information. Duke is also providing a revision to Table 15-16 "Summary of Transient and Accident Doses Including the Effects of High Burnup Reload Cores" that was originally submitted in Attachment 1 of the May 27, 1999 supplement to the LAR. The revised table corrects (1) the whole body (WB) doses for both cases of the Steam Generator Tube Rupture Accident, (2) the WB and thyroid doses for the Steam Line Break Accidents, and (3) the WB

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and thyroid doses for the Maximum Hypothetical Accident. Attachment 2 of this submittal provides a revision to page 1 of Table 15-16.

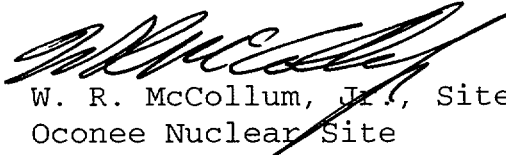
As part of the original submittal dated April 5, 1999, Duke included proposed UFSAR markups, COLR and Design information specific to the O2C18 reload. The NRC declined to review and approve this SAR related information. The NRC also subsequently stated that the aforementioned documents would be used for "information only" and, as such, do not require retraction or updating. Therefore, Duke does not intend to update or revise the UFSAR, COLR, and Design information provided in the original submittal for O2C18 for this or any future supplements to this submittal. This logic applies for all subsequent changes that have occurred in the reload design for Unit 2. Additionally, Duke previously amended this submittal in Supplement 3 dated October 7, 1999, to cover all three Oconee Units.

This supplement does not affect the No Significant Hazards Consideration and Environmental Assessment/Impact Statement for the LAR.

Pursuant to 10CFR50.91, a copy of this supplement is being sent to the State of South Carolina.

Inquiries on this matter should be directed to Edwin D. Price Jr. at (864) 885-4388.

Very truly yours,



W. R. McCollum, Jr., Site Vice President
Oconee Nuclear Site

Attachments

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xc w/attachments:

L. A. Reyes, Regional Administrator
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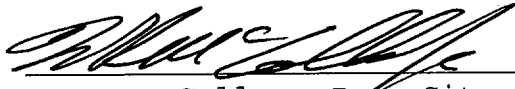
D. E. Labarge, NRC Senior Project Manager (ONS)
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M. C. Shannon
NRC Senior Resident Inspector (ONS)

V. R. Autry, Director
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AFFIDAVIT

W. R. McCollum, being duly sworn, states that he is Site Vice President of Duke Energy Corporation; that he is authorized on the part of said Corporation to sign and file with the Nuclear Regulatory Commission revisions to the Oconee Nuclear Station Facility Operating Licenses No. DPR-38, DPR-47, and DPR-55; and that all the statements and matters set forth herein are true and correct to the best of his knowledge.



W. R. McCollum, Jr., Site Vice President

Subscribed and sworn to before me this 22nd day of
November, 1999



Notary Public

My Commission Expires:

August 13, 1999

SEAL

Attachment 1

Break Flow Rates

Event	Time (sec)	SG A Break Flow (lbm/sec)	SG B Break Flow (lbm/sec)	Totals (lbm/sec)
	0	0.104	0.0000	0.104
SGTR Occurs	0.1	0.104063846	37.6653	37.7693393
	60	0.104	37.6422	37.7461667
	120	0.103954643	37.6258	37.7297046
	240	0.103924482	37.6148	37.7187578
	360	0.103921949	37.6139	37.7178386
	480	0.103920568	37.6134	37.7173372
	600	0.103918956	37.6128	37.7167523
	720	0.103918956	37.6128	37.7167523
	840	0.103919186	37.6129	37.7168359
	960	0.103919647	37.6131	37.717003
	1080	0.103920107	37.6133	37.7171701
Reactor Trip, Turbine Trip, TDEFWP Steam Supply Begins	1200.0	0.09904297	35.8480	35.947043
MS-A, MS-B MSSVs Begin to Lift	1201.9	0.09904297	35.8480	35.947043
MFW Flow is Zero	1205	0.089582941	32.4240	32.5135829
	1240	0.08980397	32.5040	32.593804
MS-A MSSVs reseated	1243.7	0.08980397	32.5040	32.593804
	1245	0.090400747	32.7200	32.8104007
MS-B MSSVs reseated	1246.1	0.090400747	32.7200	32.8104007
	1250	0.091848486	33.2440	33.3358485
	1270.0	0.096347801	34.8725	34.9688478
MS-B MSSV Bank 1 lifts	1276.8	0.096347801	34.8725	34.9688478
	1290	0.100458936	36.3605	36.4609589
	1310.0	0.100884416	36.5145	36.6153844
MS-A MSSV Bank 1 lifts	1322.7	0.100884416	36.5145	36.6153844
	1330	0.101112352	36.5970	36.6981124
	1370.0	0.101700841	36.8100	36.9117008
EFW Begins to SG-B	1380	0.101700841	36.8100	36.9117008
	1390	0.10042661	36.3488	36.4492266
	1590	0.102517266	37.1055	37.2080173
MS-A MSSV Bank 1 Reseats	1604.9	0.102517266	37.1055	37.2080173
	1610	0.089192117	32.2825	32.3717356
	2530.0	0.098233913	35.5552	35.6534006
3 pump EFW to both SGs	2580	0.098233913	35.5552	35.6534006
	2590.0	0.100744201	36.4638	36.5644942
	2710	0.101280426	36.6578	36.7591138
MS-B MSSV Bank 1 reseats	2722.9	0.101280426	36.6578	36.7591138
	2770	0.100077661	36.2225	36.3225777
	2830	0.099008435	35.8355	35.9345084

MS-A MSSV Bank 1 lifts	2848.5	0.099008435	35.8355	35.9345084
MS-B MSSV Bank 1 lifts	2856.9	0.099008435	35.8355	35.9345084
	2890	0.100918583	36.5269	36.6277852
1 hour	3600	0.100918583	36.5269	36.6277852
	3790	0.103486569	37.4563	37.5598199
MS-A MSSV Bank 1 reseats	3848.4	0.103486569	37.4563	37.5598199
	3850	0.101165583	36.6163	36.7174322
	4000	0.091762561	33.2129	33.3046626
MS-A MSSV Bank 1 lifts	4139.9	0.091762561	33.2129	33.3046626
	4200	0.067224612	24.3315	24.3987635
	6000	0.055488294	20.0837	20.1391383
MS-B MSSV Bank 1 reseats	6090	0.055488294	20.0836	20.1391383
MS-A MSSV Bank 1 reseats	6130.5	0.055488294	20.0837	20.1391383
	6200	0.05375826	19.4575	19.5112333
	6600	0.052170376	18.8828	18.9349204
RCS cooled to 532oF; EFW isolated from SG-B	6689	0.052170376	18.8828	18.9349204
	6800	0.052207179	19.9294	19.9816322
2 hours	7200	0.052210809	21.0347	21.0869108
Isolate TDEFWP steam supply from SG-B; trip 1 RCP per loop; close ADV on SG-B	7289	0.052212258	21.0347	21.0869123
	7400	0.052214066	17.7364	17.7886258
UST Water Supply Depleted; Align EFW Suction to Hotwells	10161.5	0.052252369	17.7364	17.7886641
3 hours	10800	0.052261225	17.4891	17.5413112
	11000	0.052261053	17.6539	17.7061611
Open MS-B ADV to lower SG-B water level	11112.4	0.052274129	17.6539	17.7061741
Begin cooldown to 450oF	11189.2	0.052283064	17.6539	17.7061831
	11200	0.052284321	19.5068	19.5590531
4 hours	14400	0.05493229	20.3287	20.3836208
	17000	0.056713461	20.0503	20.1069635
RCS cooled to 450oF	17080	0.056747175	20.0502	20.1069972
	17200	0.056797746	19.2457	19.3024977
5 hours	18000	0.056776469	18.5973	18.6541098
6 hours	21600	0.05678073	18.5634	18.6201772
	24400	0.056783487	18.5641	18.6208835
Begin cooldown to DHR conditions	24580	0.056786165	18.5641	18.6208862
	24600	0.056786463	18.7395	18.7962865
7 hours	25200	0.057139358	19.5356	19.5927199
8 hours	28800	0.059236231	20.8076	20.8668112
9 hours	32400	0.061291303	22.2735	22.3347469
10 hours	36000	0.063110134	23.3704	23.4335212
11 hours	39600	0.064263644	23.7634	23.8276494
	41000	0.064653823	23.8450	23.9096038
RCS cooled to 246oF	41123	0.06468082	23.8449	23.9096308
	41200	0.064697721	23.8647	23.9293477

12 hours	43200	0.064745414	23.8663	23.9310954
Begin cooldown to 212oF	43800	0.064747632	23.8989	23.9636743
13 hours	46800	0.065575866	23.7716	23.8372202
RCS cooled to 212°F; SG steaming ends	48366.46	0.065721332	0.0000	0.06572133
End Transient	48367	0.065721332	0	0.06572133

Releases to the Atmosphere

Time (seconds)	SG "A" MSSV/ADV	SG "A" "Leaks"	SG "A" Steam	SG "A" Steam	SG "B" MSSV/ADV	SG "B" "Leaks"	SG "B" Steam	SG "B" Steam	Totals (lbm/sec)
	Relief Rate m-msrv,SGA(t) (lbm/sec)	Flow Rate m-mslb,SGA(t) (lbm/sec)	Flow Rate to TDEFWP m-tdefwp,SGA(t) (lbm/sec)	Flow Rate to Condenser m-cond,SGA(t) (lbm/sec)	Relief Rate m-msrv,SGB(t) (lbm/sec)	Flow Rate m-mslb,SGB(t) (lbm/sec)	Flow Rate to TDEFWP m-tdefwp,SGB(t) (lbm/sec)	Flow Rate to Condenser m-cond,SGB(t) (lbm/sec)	
0	0	0	0	841.2657	0	1.563098	0	841.2085	1684.037298
0.1	0	0	0	841.4663	0	1.563098	0	845.5831302	1688.712562
60	0	0	0	841.3737	0	1.568462	0	844.5077667	1747.449912
120	0	0	0	841.3542	0	1.567166	0	844.7714	1807.692791
240	0	0	0	841.2860	0	1.566464	0	844.8782833	1927.730756
360	0	0	0	841.2700	0	1.566122	0	844.9094958	2047.745629
480	0	0	0	841.2661	0	1.56605	0	844.9187083	2167.750873
600	0	0	0	841.2646	0	1.56605	0	844.9211375	2287.751789
720	0	0	0	841.2641	0	1.56605	0	844.9219167	2407.752064
840	0	0	0	841.2641	0	1.566032	0	844.9222375	2527.752321
960	0	0	0	841.2640	0	1.56605	0	844.9222833	2647.752339
1080	0	0	0	841.2640	0	1.56605	0	844.9223292	2767.752339
1200	0	0	0	0	0	1.595228	7.6	995.826	2205.021228
1201.9	801.8032258	0	0	0	787.316129	1.820168	7.6	0	2800.439523
1205	754.8002857	0	0	0	698.3834286	1.856508	7.6	0	2667.640222
1240	229.0594595	0	0	0	226.49	1.6637	7.6	0	1704.813159
1243.7	0	0	0	0	226.49	1.6463174	7.6	0	1479.436317
1245	0	0	0	0	229.6454545	1.64021	7.6	0	1483.885665
1246.1	0	0	0	0	0	1.63526	7.6	0	1255.33526
1250	0	0	0	0	0	1.687802	7.6	0	1259.287802
1270	0	0	0	0	0	1.7969104	7.6	0	1279.39691
1276.8	0	0	0	0	36.6719697	1.820168	7.6	0	1322.892138
1290	0	0	0	0	54.655	1.8204624	7.6	0	1354.075462
1310	0	0	0	0	63.055	1.820628	7.6	0	1382.475628
1322.7	12.2	0	0	0	63.055	1.819856856	7.6	0	1407.374857
1330	12.78775	0	0	0	64.102	1.8194136	7.6	0	1416.309164
1370	12.8255	0	0	0	62.794	1.7879312	10.8205	0	1458.227931
1380	12.8255	0	0	0	62.794	1.7601012	10.8205	0	1468.200101

1390	16.50415	0	0	0	63.17655	1.732874	9.3784	0	1480.791974
1590	15.42147651	0	0	0	62.485	1.75964	9.1805	0	1678.846617
1604.9	0	0	0	0	62.485	1.75108442	9.1805	0	1678.316584
1610	0	0	0	0	62.75565217	1.748156	9.538902174	0	1684.04271
2530	0	0	0	0	60.34783333	1.69925	10.01916667	0	2602.06625
2580	0	0	0	0	60.34783333	1.689845	10.01916667	0	2652.056845
2590	0	0	0	0	58.83333333	1.687964	10.46266667	0	2660.983964
2710	0	0	0	0	59.2255814	1.636016	8.228666667	0	2779.090264
2722.9	0	0	0	0	0	1.63526	8.228666667	0	2732.763927
2770	0	0	0	0	0	1.730966	7.6	0	2779.330966
2830	0	0	0	0	0	1.7934144	7.996166667	0	2839.789581
2848.5	31.56578313	0	0	0	0	1.811813716	7.996166667	0	2889.873764
2856.9	31.56578313	0	0	0	22.57824773	1.820168	7.996166667	0	2920.860366
2890	30.32457778	0	0	0	22.23473333	1.816304	9.088622222	0	2953.464237
3600	30.32457778	0	0	0	22.23473333	1.7033544	9.088622222	0	3663.351288
3790	29.17123288	0	0	0	21.32116667	1.673456	9.013166667	0	3851.179022
3848.4	0	0	0	0	21.32116667	1.66467848	9.013166667	0	3880.399012
3850	0	0	0	0	21.59906667	1.664438	7.835533333	0	3881.099038
4000	0	0	0	0	22.6709	1.731308	7.941	0	4032.343208
4139.9	16.08552413	0	0	0	22.6709	1.787095987	7.941	0	4188.38452
4200	17.29165556	0	0	0	29.66928333	1.811336	8.862977778	0	4257.635253
6000	34.49731801	0	0	0	24.52885	1.65263	9.2896	0	6069.968398
6090	34.49731801	0	0	0	24.52885	1.63526	9.2896	0	6159.951028
6130.5	0	0	0	0	24.52885	1.633994191	9.2896	0	6165.952444
6200	24.5176	0	0	0	24.484575	1.631822	9.388975	0	6260.022972
6600	23.40925	0	0	0	23.40725	1.556654	9.0253	0	6657.398454
6689	23.40925	0	0	0	23.40725	1.54959719	9.0253	0	6746.391397
6800	23.018925	0	0	0	21.66525	1.540796	8.7743	0	6854.999271
7200	18.2349	0	0	0	15.60325843	1.317675	3.78655	0	7238.942383
7289	18.2349	0	0	0	0	1.41867725	3.78655	0	7312.440127
7400	27.83524118	0	0	0	0	1.5458	0	0	7429.381041
10161.5	27.83524118	0	0	0	0	1.578021832	0	0	10190.91326
10800	26.9278	0	0	0	0	1.585472	0	0	10828.51327
11000	0	0	0	0	0	1.585454	0	0	11001.58545
11112.4	56.80525114	0	0	0	12.39121005	1.569308864	0	0	11183.16577
11189.2	56.80525114	0	0	0	12.39121005	1.558277312	0	0	11259.95474
11200	26.53609688	0	0	0	17.25560625	1.556726	0	0	11245.34843

Attachment 2

Table 15-16 Summary of Transient and Accident Doses Including the Effects of High Burnup Reload Cores			
			Doses (rem)
Fuel Handling Accident			
	Thyroid at EAB	5.25E+1	
	Whole body at EAB	1.85E-1	
Steam Generator Tube Rupture			
		Case 1	Case 2
	Thyroid at EAB	3.95E+1	2.62E+2
	Whole body at EAB	7.36E-2	4.39E-1
	Thyroid at LPZ	1.13E+1	6.61E+1
	Whole body at LPZ	1.52E-2	7.65E-2
Waste Gas Tank Failure			
	Thyroid at EAB	2.70E-1	
	Whole body at EAB	1.70E-1	
Rod Ejection			
	Thyroid at EAB	8.46E+1	
	Whole body at EAB	3.51E-1	
	Thyroid at LPZ	1.15E+1	
	Whole body at LPZ	4.00E-2	
Large Main Steam Line Break			
		Case 1	Case 2
	Thyroid at EAB	9.80E+0	1.14E+1
	Whole body at EAB	2.39E-3	1.50E-2
	Thyroid at LPZ	1.33E+0	1.92E+0
	Whole body at LPZ	4.62E-4	4.07E-3
Small Main Steam Line Break			
		Case 1	Case 2
	Thyroid at EAB	4.97E+0	6.69E+0
	Whole body at EAB	2.32E-3	1.53E-2
	Thyroid at LPZ	8.70E-1	1.52E+0
	Whole body at LPZ	7.07E-4	4.33E-3
LOCA			
	Thyroid at EAB	5.00E+0	
	Whole body at EAB	1.00E-2	
	Thyroid at LPZ	5.50E+0	
	Whole body at LPZ	1.40E-2	
Maximum Hypothetical Accident			
	Thyroid at EAB	2.83E+2	
	Whole body at EAB	1.91E+0	
	Thyroid at LPZ	2.15E+2	
	Whole body at LPZ	5.32E-1	