

50-315

NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL

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TO: Mr Rusche

FROM: Indiana & Michigan Pwr Co
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.....trans the following:

PLANT NAME: D C Cook #1

ENCLOSURE

Response to NRC questions concerning
XN-75-27, Suppl #1 "Exxon Nuclear Neutronic
Design Methods for Pressurized Water
Reactors".....

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ACKNOWLEDGED

SAFETY

FOR ACTION/INFORMATION

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EXTERNAL DISTRIBUTION

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INDIANA & MICHIGAN POWER COMPANY

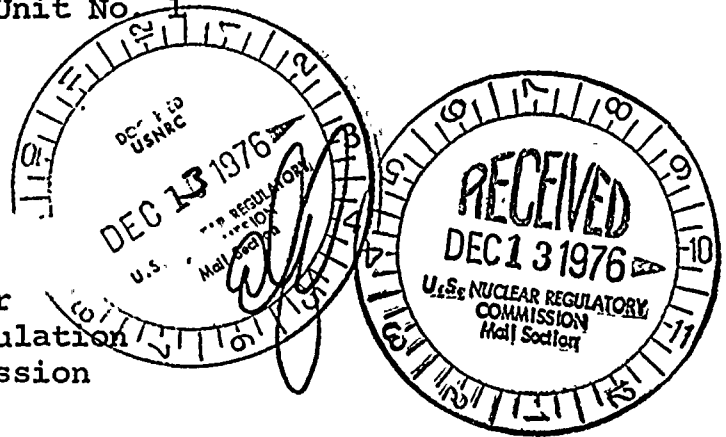
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NEW YORK, N. Y. 10004

Regulatory Docket File
Primary Record File

December 9, 1976

Donald C. Cook Nuclear Plant Unit No. 1
Docket No. 50-315
DPR No. 58

Mr. Benard C. Rusche, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555



Dear Mr. Rusche:

This letter transmits our response to the NRC request for additional information in Mr. D. Ziemann's December 2, 1976 letter regarding Exxon Nuclear Company Report XN-75-27, Supplement 1, "Exxon Nuclear Neutronic Design Methods for Pressurized Water Reactors." Responses to informal questions on single failure criteria and core stored energy are also transmitted by this letter.

With regard to Mr. D. Ziemann's December 2, 1976 letter, the responses to questions A.1 through A.6, B.1, and B.2 were provided to the NRC by Carolina Power and Light in their December 2, 1976 letter from E. E. Utley to R. W. Reid. These responses are applicable to the Donald C. Cook Nuclear Plant, Unit No. 1. The responses to questions A.7 and A.8 are included as Attachment A to this letter.

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1. 凡在本市行政区域内从事经营活动的个体工商户、企业法人、其他经济组织（以下统称“经营者”），均应当遵守本规定。

2. 经营者应当遵循自愿、平等、公平、诚实信用的原则，不得违反法律、法规的规定，不得损害社会公共利益。

3. 经营者应当依法经营，诚实守信，不得有下列行为：

（一）在商品或者服务中掺杂、掺假，以假充真，以次充好；

（二）以不合格商品冒充合格商品；

（三）销售失效、变质、过期商品；

（四）伪造、冒用他人注册商标或者其他知名商品特有的名称、包装、装潢；

（五）擅自使用他人企业名称、姓名，或者其他足以造成混淆的标识；

（六）侵犯他人商业秘密；

（七）违反国家有关价格、计量、质量、标准、安全、卫生、环保等法律法规的规定；

（八）违反国家有关金融、证券、期货、保险、电信、邮政、广播电视、新闻出版、文化、体育、旅游、医疗、教育、卫生、药品、医疗器械、化妆品、食品、农产品、工业产品、消费品、服务、工程等法律法规的规定；

（九）违反国家有关消费者权益保护法律法规的规定；

（十）违反国家有关知识产权保护法律法规的规定；

（十一）违反国家有关环境保护法律法规的规定；

（十二）违反国家有关安全生产法律法规的规定；

（十三）违反国家有关劳动保障法律法规的规定；

（十四）违反国家有关税收法律法规的规定；

（十五）违反国家有关统计法律法规的规定；

（十六）违反国家有关档案法律法规的规定；

（十七）违反国家有关保密法律法规的规定；

（十八）违反国家有关国防法律法规的规定；

（十九）违反国家有关外交法律法规的规定；

（二十）违反国家有关其他法律法规的规定。

4. 经营者应当依法纳税，不得偷税、漏税、欠税。

5. 经营者应当依法履行劳动合同，不得违反国家有关劳动保障法律法规的规定。

6. 经营者应当依法履行消费者权益保护义务，不得违反国家有关消费者权益保护法律法规的规定。

7. 经营者应当依法履行知识产权保护义务，不得违反国家有关知识产权保护法律法规的规定。

8. 经营者应当依法履行环境保护义务，不得违反国家有关环境保护法律法规的规定。

9. 经营者应当依法履行安全生产义务，不得违反国家有关安全生产法律法规的规定。

10. 经营者应当依法履行劳动保障义务，不得违反国家有关劳动保障法律法规的规定。

11. 经营者应当依法履行税收义务，不得违反国家有关税收法律法规的规定。

12. 经营者应当依法履行统计义务，不得违反国家有关统计法律法规的规定。

13. 经营者应当依法履行档案义务，不得违反国家有关档案法律法规的规定。

14. 经营者应当依法履行保密义务，不得违反国家有关保密法律法规的规定。

15. 经营者应当依法履行国防义务，不得违反国家有关国防法律法规的规定。

16. 经营者应当依法履行外交义务，不得违反国家有关外交法律法规的规定。

17. 经营者应当依法履行其他法律法规规定的义务。

18. 经营者违反本规定，应当承担相应的法律责任。

19. 本规定自发布之日起施行。

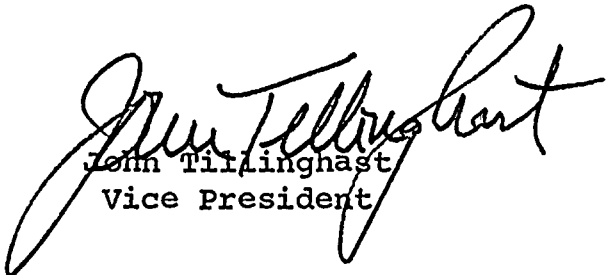
20. 本规定由市人民政府负责解释。

Mr. Benard C. Rusche - 2 -

December 9, 1976

Our responses to the informal NRC staff questions are included as Attachment B to this letter.

Very truly yours,


John Tillinghast
Vice President

JT:mam
Attachment
Sworn and subscribed to before
me this 9 th day of December 1976
in New York County, New York


Notary Public

DAVID G. HUME
NOTARY PUBLIC, State of New York
No. 31-4608113
Qualified in New York County
Commission Expires March 30, 1977.

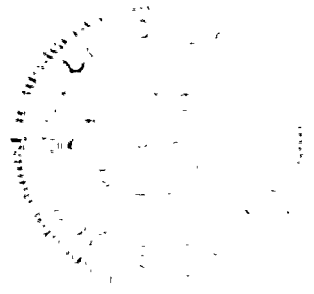
cc: G. Charnoff
R. C. Callen
R. J. Vollen
P. W. Steketee
R. Walsh
R. S. Hunter
R. W. Jurgensen - Bridgman

THE UNITED STATES OF AMERICA
DEPARTMENT OF THE ARMY
WASHINGTON, D. C.

OFFICE OF THE ADJUTANT GENERAL

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Attachment A

Question A.7

Provide a plan to verify the analytical model used for 193 assembly plants beyond cycle 1 to assure that an empirical correction is not required as exposure accumulates.

Response to Question A.7

A power map will be taken at least once for every 31 days* of operation for which comparisons between calculations and measurements of power distribution will be made. Comparison will be made between calculated and measured power distribution during Cycle 2 startup which is scheduled in early 1977. The initial results for Cycle 2 will be reported to the NRC 90 days following the startup.

Question A.8

Asymmetries in the "measured" assembly powers up to -7% (fig. 3-5, assemblies G-11 and E-9) are reported. What is the cause of these variations?

Response to Question A.8

The asymmetries cited were caused by measurement errors due to drift in certain detectors. The results reported on map 30 reflect this fact which was particularly associated with detectors A and B. At the time map 30 was taken, (April 4, 1975), AEP personnel became acutely aware of the problem, and remedial steps were taken to correct this condition. The detector's manufacturer was also notified of this problem.

As a result of these efforts, detectors A, B and F were replaced on April 21, 1975. The improvements from this replacement can be seen in the attached map 34 (taken on April 29, 1976), where detector drift was much smaller. Following this, a constant monitoring of detector behavior has been carried out at the Donald C. Cook Nuclear Plant Unit No. 1. The intent of this program is that if any uncorrectable abnormal detector behavior is observed, the anomalous detectors will be replaced.

*Effective full power days.

6. *Principles of the Law of Evidence*, 2d ed., 1963, 1975, 1978, 1982, 1985, 1988, 1991, 1994, 1997, 2000, 2003, 2006, 2009, 2012, 2015, 2018, 2021, 2024, 2027, 2030, 2033, 2036, 2039, 2042, 2045, 2048, 2051, 2054, 2057, 2060, 2063, 2066, 2069, 2072, 2075, 2078, 2081, 2084, 2087, 2090, 2093, 2096, 2099, 2102, 2105, 2108, 2111, 2114, 2117, 2120, 2123, 2126, 2129, 2132, 2135, 2138, 2141, 2144, 2147, 2150, 2153, 2156, 2159, 2162, 2165, 2168, 2171, 2174, 2177, 2180, 2183, 2186, 2189, 2192, 2195, 2198, 2201, 2204, 2207, 2210, 2213, 2216, 2219, 2222, 2225, 2228, 2231, 2234, 2237, 2240, 2243, 2246, 2249, 2252, 2255, 2258, 2261, 2264, 2267, 2270, 2273, 2276, 2279, 2282, 2285, 2288, 2291, 2294, 2297, 2300, 2303, 2306, 2309, 2312, 2315, 2318, 2321, 2324, 2327, 2330, 2333, 2336, 2339, 2342, 2345, 2348, 2351, 2354, 2357, 2360, 2363, 2366, 2369, 2372, 2375, 2378, 2381, 2384, 2387, 2390, 2393, 2396, 2399, 2402, 2405, 2408, 2411, 2414, 2417, 2420, 2423, 2426, 2429, 2432, 2435, 2438, 2441, 2444, 2447, 2450, 2453, 2456, 2459, 2462, 2465, 2468, 2471, 2474, 2477, 2480, 2483, 2486, 2489, 2492, 2495, 2498, 2501, 2504, 2507, 2510, 2513, 2516, 2519, 2522, 2525, 2528, 2531, 2534, 2537, 2540, 2543, 2546, 2549, 2552, 2555, 2558, 2561, 2564, 2567, 2570, 2573, 2576, 2579, 2582, 2585, 2588, 2591, 2594, 2597, 2600, 2603, 2606, 2609, 2612, 2615, 2618, 2621, 2624, 2627, 2630, 2633, 2636, 2639, 2642, 2645, 2648, 2651, 2654, 2657, 2660, 2663, 2666, 2669, 2672, 2675, 2678, 2681, 2684, 2687, 2690, 2693, 2696, 2699, 2702, 2705, 2708, 2711, 2714, 2717, 2720, 2723, 2726, 2729, 2732, 2735, 2738, 2741, 2744, 2747, 2750, 2753, 2756, 2759, 2762, 2765, 2768, 2771, 2774, 2777, 2780, 2783, 2786, 2789, 2792, 2795, 2798, 2801, 2804, 2807, 2810, 2813, 2816, 2819, 2822, 2825, 2828, 2831, 2834, 2837, 2840, 2843, 2846, 2849, 2852, 2855, 2858, 2861, 2864, 2867, 2870, 2873, 2876, 2879, 2882, 2885, 2888, 2891, 2894, 2897, 2900, 2903, 2906, 2909, 2912, 2915, 2918, 2921, 2924, 2927, 2930, 2933, 2936, 2939, 2942, 2945, 2948, 2951, 2954, 2957, 2960, 2963, 2966, 2969, 2972, 2975, 2978, 2981, 2984, 2987, 2990, 2993, 2996, 2999, 3002, 3005, 3008, 3011, 3014, 3017, 3020, 3023, 3026, 3029, 3032, 3035, 3038, 3041, 3044, 3047, 3050, 3053, 3056, 3059, 3062, 3065, 3068, 3071, 3074, 3077, 3080, 3083, 3086, 3089, 3092, 3095, 3098, 3101, 3104, 3107, 3110, 3113, 3116, 3119, 3122, 3125, 3128, 3131, 3134, 3137, 3140, 3143, 3146, 3149, 3152, 3155, 3158, 3161, 3164, 3167, 3170, 3173, 3176, 3179, 3182, 3185, 3188, 3191, 3194, 3197, 3200, 3203, 3206, 3209, 3212, 3215, 3218, 3221, 3224, 3227, 3230, 3233, 3236, 3239, 3242, 3245, 3248, 3251, 3254, 3257, 3260, 3263, 3266, 3269, 3272, 3275, 3278, 3281, 3284, 3287, 3290, 3293, 3296, 3299, 3302, 3305, 3308, 3311, 3314, 3317, 3320, 3323, 3326, 3329, 3332, 3335, 3338, 3341, 3344, 3347, 3350, 3353, 3356, 3359, 3362, 3365, 3368, 3371, 3374, 3377, 3380, 3383, 3386, 3389, 3392, 3395, 3398, 3401, 3404, 3407, 3410, 3413, 3416, 3419, 3422, 3425, 3428, 3431, 3434, 3437, 3440, 3443, 3446, 3449, 3452, 3455, 3458, 3461, 3464, 3467, 3470, 3473, 3476, 3479, 3482, 3485, 3488, 3491, 3494, 3497, 3500, 3503, 3506, 3509, 3512, 3515, 3518, 3521, 3524, 3527, 3530, 3533, 3536, 3539, 3542, 3545, 3548, 3551, 3554, 3557, 3560, 3563, 3566, 3569, 3572, 3575, 3578, 3581, 3584, 3587, 3590, 3593, 3596, 3599, 3602, 3605, 3608, 3611, 3614, 3617, 3620, 3623, 3626, 3629, 3632, 3635, 3638, 3641, 3644, 3647, 3650, 3653, 3656, 3659, 3662, 3665, 3668, 3671, 3674, 3677, 3680, 3683, 3686, 3689, 3692, 3695, 3698, 3701, 3704, 3707, 3710, 3713, 3716, 3719, 3722, 3725, 3728, 3731, 3734, 3737, 3740, 3743, 3746, 3749, 3752, 3755, 3758, 3761, 3764, 3767, 3770, 3773, 3776, 3779, 3782, 3785, 3788, 3791, 3794, 3797, 3800, 3803, 3806, 3809, 3812, 3815, 3818, 3821, 3824, 3827, 3830, 3833, 3836, 3839, 3842, 3845, 3848, 3851, 3854, 3857, 3860, 3863, 3866, 3869, 3872, 3875, 3878, 3881, 3884, 3887, 3890, 3893, 3896, 3899, 3902, 3905, 3908, 3911, 3914, 3917, 3920, 3923, 3926, 3929, 3932, 3935, 3938, 3941, 3944, 3947, 3950, 3953, 3956, 3959, 3962, 3965, 3968, 3971, 3974, 3977, 3980, 3983, 3986, 3989, 3992, 3995, 3998, 4001, 4004, 4

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Attachment B

ADDITIONAL QUESTIONS ASKED BY NRC STAFF

Question 1.

Describe the single failure assumed in the ECCS accident analysis as reported in XN-76-51.

Response to Question 1.

The single failure assumption in XN-76-51 is consistent with the single failure assumptions used for the Cycle 1 analysis of the Donald C. Cook Nuclear Plant. Specifically, this failure was the failure of a single low pressure ECCS pump.

Question 2.

With regard to containment pressure response, what is the difference between core stored energy of the original (Cycle 1) core and Cycle 2 core?

Response to Question 2.

A conservative comparison was made of the stored energy difference between the Westinghouse supplied fuel and the ENC supplied fuel in the Donald C. Cook Unit I Nuclear Plant. There is no difference in the energy in the coolant and in the non-core related parts of the reactor system between the ENC fueled core and the Westinghouse fueled core; the only difference is in the variation in the core design. Approximately 6.5% of the total energy in the reactor system, including the coolant, is contained in the reactor fuel. The only significant difference between the Westinghouse supplied and the ENC supplied fuel is the thicker clad in the ENC fuel. This results in less than a 20°F increase in the average temperature of the ENC fuel over the Westinghouse fuel, which is equivalent to about a 1-1/2% increase in energy. Thus, the total system stored energy is increased less than $0.065 \times 0.015 = .001$ or 0.1%. This increase is insignificant in respect to containment pressure during a LOCA.

THE UNITED STATES OF AMERICA
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

WASH. D. C. 20250

TO: THE SECRETARY OF THE INTERIOR
FROM: THE DIRECTOR OF THE BUREAU OF LAND MANAGEMENT
SUBJECT: [Illegible]

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E	0.594	0.980	1.087	0.999	1.167	1.100	1.215	1.121	1.170	1.085	1.156	0.994	1.104	0.991	0.598
F	0.689	1.025	1.171	1.146	1.092	1.159	1.020	1.185	1.004	1.134	1.090	1.186	1.158	1.031	0.689
G	0.831	0.997	1.219	1.131	1.184	1.011	1.147	1.090	1.172	1.033	1.237	1.114	1.207	1.001	0.834
H	0.744	1.068	1.216	1.254	1.123	1.164	1.093	1.184	1.099	1.187	1.136	1.224	1.186	1.074	0.748
I	0.831	0.997	1.219	1.158	1.193	1.006	1.155	1.090	1.164	1.018	1.195	1.140	1.194	0.999	0.836
J	0.665	0.995	1.191	1.201	1.093	1.150	1.010	1.155	1.013	1.169	1.103	1.217	1.143	1.036	0.693
K	0.577	0.950	1.096	0.997	1.143	1.088	1.192	1.106	1.184	1.093	1.100	0.955	1.071	1.027	0.624
L		0.829	0.858	1.213	0.989	1.195	1.142	1.254	1.148	1.176	0.955	1.184	0.855	0.677	
M		0.471	0.979	0.857	1.095	1.159	1.192	1.171	1.208	1.161	1.080	0.837	0.985	0.488	
N			0.471	0.845	0.989	1.019	0.979	1.056	1.002	1.041	0.979	0.824	0.468		
					0.600	0.676	0.821	0.740	0.831	0.696	0.594				

MAP 34

COOK UNIT I, BOL, HZP, ARO, D IN, D+C IN, D+C+B IN, SET 1

AEP - THIMBLE DATA

NUCLEAR PEAKING FACTORS FOR ENTHALPY RISE FOR ASSEMBLAGES IN THE POWER NORMALIZATION