

NSP

NORTHERN STATES POWER COMPANY

MINNEAPOLIS, MINNESOTA 55401

July 10, 1975

Mr. D. L. Ziemann, Chief
Operating Reactors Branch # 2
Division of Reactor Licensing
U. S. Nuclear Regulatory Commission
Washington, DC 20555

Dear Mr. Ziemann,

MONTICELLO NUCLEAR GENERATING PLANT
Docket No. 50-263 License No. DPR-22

Response to June 3, 1975 GETAB Questions

This letter is in response to your June 3, 1975 letter transmitting two questions concerning our GETAB Technical Specification change request. The questions with their respective answers are included below. The analysis of Cycle 5, which will commence this fall, will be based on the GETAB analysis discussed in our License Amendment Request Dated March 12, 1975. We therefore request that you schedule completion of your review and issuance of these changes accordingly.

Question No. 1. The APRM flux scram trip setting and rod block equations in Technical Specification 2.3 are the same as those used with the Hensch-Levy CHF correlation. Either modify the equations or provide justification for retaining the equations based on critical heat flux rather than using units consistent with the GEXL/GETAB Analysis. The trip setting and rod block equation constants for the 8 x 8 fuel are different from those used by 7 x 7 fuel. Explain the difference.

Response. The present Technical Specification settings referenced are in terms of heat flux; the constants are the heat flux levels corresponding to the maximum peaking factor for 7 x 7 and 8 x 8 fuel respectively. As your question infers, it is appropriate that the settings be expressed in terms of peaking factor directly rather than extending the peaking factor to a heat flux value. We understand that you are also reviewing, on a generic basis, a change in the slope of the flow biased APRM scram and rod block settings. This subject is addressed in Appendix A. Since these changes effect four pages of our Technical Specifications we are including as Appendix B, the appropriate Technical Specification pages modified to reflect these changes, should you wish to effect them at this time. These pages would then serve as replacements and additions to Exhibit B of our License Amendment Request Dated March 12, 1975.

Question No. 2. Does the relative bundle to bundle power distribution used in the GETAB statistical analysis for Monticello remain fixed throughout the series of Monte Carlo simulations? If not, how does it vary, and why? Show that the peak radial power factor used is the worst case that could occur during the cycle.

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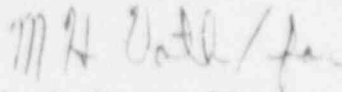
Mr. D. L. Ziemann

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July 10, 1975

Response. A series of questions on GETAB were answered in a January 20, 1975 letter from L. H. Frauenholz of General Electric to A. J. Ignatonis of the Nuclear Regulatory Commission. These answers were specific to Monticello, which was the lead plant GETAB analysis. The bundle to bundle power distribution used in the Monte Carlo simulation to derive the safety limit and operating limit on MCPR is identified and justified in the detail in that document. For your convenience, Pages 1-4 and Figures 3-1 and 4-1, which answer the above question, are attached.

Yours very truly,



L. O. Mayer, PE
Manager, Nuclear Support Services

LOM/MBV/deb

cc: J. G. Keppler
G. Charnoff
MPCA
Attn: J. W. Ferman

FILE: _____

Appendix A- Justification For APEM Rod Block/
SCRAM Setting Change
Appendix B- modified pages for the Appendix A
Tech- Specs
Appendix C- Typical BWR GETAB application
Plant Info Request

PLANT NAME: Monticello

7-16-75 JG:W

LOCAL PC- Minneapolis, Minn

1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 26

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APPENDIX A

MONTICELLO

JUSTIFICATION FOR APRM ROD BLOCK/SCRAM SETTING CHANGE

To improve control rod operability in the core flow range above 20% of drive pump speed and below 50% of rated flow and to provide greater flexibility to accommodate situations such as Xenon compensation during power ascensions with fixed control rod patterns, the APRM flow biased rod block (RB) and scram lines (S) should be redefined as shown below:

$$RB = 0.58 W + 50$$

$$S = 0.58 W + 62$$

Where W is the recirculation loop flow in percent of rated flow.

These revised lines were selected on the following bases:

1. The rod block lines intercept the rated power flow control line at natural circulation, thus raising the rod block set point by about 10% at low flows. This APRM rod block setting will provide a reasonable range for maneuvering during plant startup.
2. As part of the original design requirements, stability calculations were performed on the natural circulation line at 50% and 62% power (the new intercepts of the rod block and scram lines).
3. At the rated flow conditions, the rod block and scram lines remain at 108% and 120% of rated power.

Discussion

Stability calculations for Monticello have been performed and are presented in Section 7.2 of the FSAR (1) and were recalculated in conjunction with the Third Reload Submittal (2). Figure 7-2-10 of the FSAR and Figure 6-12 of the Third Reload Submittal show that the system is stable at the intersection of natural circulation flow and the nominal expected flow control line which is the new limit of the rod block line. The least stable analyzed point is the 62% power-natural circulation flow point which is still extremely stable and bounds the system stability as the least stable point. Thus, while raising the APRM rod block and flow biased scram allows operation in regions of reduced stability margin there is clearly no threat to the ultimate stability limit of 1.0 decay ratio.

Analyses reported in the Third Reload Submittal and the FSAR, Section 7 demonstrate that with the scram trip set at 120% of rated power none of the abnormal operational transients analysed violate the fuel safety limit and there is substantial margin from fuel damage. Credit is not taken in these analyses for the APRM flow-biased scram. Thus, any setting for the APRM flow-biased scram provides additional margin from the Fuel Cladding integrity Safety Limit.

APPENDIX A (CONTINUED)

Because CETAB analyses have not taken credit for the APRM flow biased scram, the derived operating limit MCPR is also valid for any APRM scram less than 120 percent of rated power. As with MCHFR, the worst case MCPR occurs at 100% of rated power so that maintaining the 108% rated power rod block setting assures no decrease in operating margin.

- (1) Monticello Nuclear Generating Plant, Final Safety Analysis Report, DAR-22, Docket 50-263.
- (2) Northern States Power Company, Monticello Nuclear Generating Plant, Third Reload Submittal, December 11, 1974.

APPENDIX B

Appendix B, attached, consists of modified pages for the Appendix A Technical Specifications as listed below. These pages incorporate the changes discussed in the letter.

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