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UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSIONOctober 21, 1983  
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BEFORE THE ATOMIC SAFETY AND LICENSING BOARDGlenn O. Bright  
Dr. James H. Carpenter  
James L. Kelley, ChairmanOFFICE OF SECRETARY  
DOCKETING & SERVICE  
BRANCH

In the Matter of

CAROLINA POWER AND LIGHT CO. et al.  
(Shearon Harris Nuclear Power Plant,  
Units 1 and 2)Dockets 50-400 OL  
50-401 OLWells Eddleman's Response to Applicants' Interrogatories  
on Eddleman 65 (Sixth Set)

This response is filed under an extension of time negotiated with Applicants' counsel O'Neill. I think it would be more constructive to answer these after I get the information resulting from my motion to compel on my first set of interrogatories on this contention (which he says will be filed October 28 or thereabouts), but Applicants decline to grant any extension for these responses beyond October 21.

## RESPONSE TO GENERAL INTERROGATORIES

G1(a) and (b): Answers will appear with specific interrogatories. OBJECTION: I have previously objected to identifying nonwitness experts and renew those objections here. (c) See (a) and (b) above and previous objections. This interrogatory is improper in that given Applicants' answer to my interrogatory G-5 (that they do have information and experts available on the subject matter of Eddleman 65) Applicants cannot make the threshold showing of 10 CFR 2.740(b)(2) that they have substantial need of the information requested, and cannot obtain the equivalent of the requested info without undue hardship. Applicants have yet to make any such showing.

See previous objections which I renew here.

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G2(a) and (b) See specific responses. Where documents would identify a nonwitness expert, a version deleting information which would identify such expert will be provided. Your responses to interrogatories, where cited, you possess.

G3(a) and (b): See specific interrogatory responses.

Specific Interrogatories:

65-14(a) The description is so sketchy (and sometimes conclusory, e.g. "closely controlled", "any defects which may exist are repaired") that it is impossible to tell. The site work procedures, technical procedures, and administrative procedures referred to therein are not identified or specified; the criteria for purchase and testing of materials are not given, the qualifications required of inspectors are not given, the acceptance/rejection criteria for batches of concrete as mixed are not given, the mix proportions are not given, nor are homogeneity criteria given.

The qualifications of placement inspectors are not given. and of  
The method of verification of placing, consolidation and of finishing are not given. The acceptance criteria for these are not given. The frequency of molding cylinders are not given for any operation of concrete pouring for the Harris base mat or containment. The applicable NRC and other standards are not even cited in the response to 65-1(a). The frequency of monitoring, measurement of temperature and moisture conditions and criteria for post-placement check (including when and how it is done, and accept/reject criteria) are not given. No means of detecting "any defects which may exist" is given in response to 65-1(a). Which of the information given on page 30 (in response to 65-1(a)) must be in the "pour package" ~~identified~~ mentioned on page 31 (of 5-12-83 response) is not specified or characterized. QA and QC procedures for verifying that the things described have been done, are not given. No verification of

inspection procedures, activities, or results is described at all.

In addition, I have been able to see the conditions under which cylinder samples are concrete ~~is~~ cured at Harris, which have no relation to site conditions or the curing of concrete on-site, according to concrete expert Yenta Yoe, who also observed the curing procedure and facilities used. (I and "YY" saw this years ago; I have no information that the curing procedures have been changed). Reserve cylinders are not, so far as I know, cured under conditions matched to those experienced by the actual concrete emplaced, and the retention period given ("several months") for such reserve cylinders appears to mean that after some months, the cylinders are discarded and no further tests can thus be done. In sum, I know the above defects; response to 65-1(a) reads like a lawyer wrote it and conveys virtually no specific info.

(b) See (a); Since question (a) and the response to 65-1(a) do not mention any NRC regulations or industry codes, this part of (b) appears to be irrelevant or poorly worded. No claim of (or verification of) compliance with any specific NRC or industry code re concrete placement at Harris is even alleged in broad terms such as "we rigorously strive to comply with all applicable codes", much less identifying any specific codes or regulations which Applicants claim to comply with.

(c) N/A, see (a) and (b) above.

65-15(a) No specific methods of detecting voids or honeycombing are identified. Once I get the discovery information on the actual voids and honeycombing so far detected in the containment, I will be able to comment in more detail. One problem with the response to 65-1(c) is that it describes actions as if they automatically achieve the required results. The answer as to the "nature and extent of all inspections" simply states (I quote) "After each placement is completed, a Post Placement Inspection is conducted

by Construction Inspection personnel who examine the exposed concrete surfaces for honeycombing and voids". That's the entire direct answer to the question. It may be a lousy answer, but you made it, and from it I certainly cannot infer any adequacy of inspection. Together with your response to 65-1(d), it seems to say that only the surface of concrete as Harris has been inspected, though of course honeycombing and voids occurring inside the concrete are of concern as to the strength and integrity of the containment and base mat. If you don't look for internal voids and honeycombing (it certainly appears from discovery so far that you don't), you can't find them. Please consider the preceding an amended answer to your interrogatory 65-3(b) also.

Too few specifics are given about vibration, design of concrete mixes, who watches the placement from where (can they see it all? If it's one person, I doubt seriously that person never takes her/his eyes off the concrete), and so on are given to evaluate the adequacy of the prevention measures for voiding and/or honeycombing.

No criteria for what is "sound concrete" around/behind an area of voiding and/or honeycombing are given in your answer to 65-1<sup>c</sup>(a). No methods of curing or repairing are given. No criteria for the repair or curing are given. No procedures therefor are mentioned or cited. How can I judge the adequacy of the methods, criteria and procedures without knowing them?

(b) See (a) above, though the answer to (a) is basically that insufficient information has been provided to assure that any methods are adequate, and no efforts to detect voids or honeycombing other than at the surface of the concrete appear to exist, a clear

You identify no NRC rules or industry codes or procedures in 65-1(c). inadequacy. (c) See (b) and (a) above.



65-16(a) I don't know. Some method of detecting voids and honeycombing which occur other than at the surface of containment and base mat concrete at Harris is clearly necessary. Ultrasonic testing may not be applicable in many instances because the return of sound pulses along the rebar may give a false "good concrete" signal in terms of the speed of sound found.

65-16(b) CP&L has not met General Design Criterion 1 of 10 CFR 50 Appendix A in that for codes used, it does not give an <sup>accurate</sup> evaluation of their adequacy and sufficiency; GDC 16 on leak-tightness cannot be maintained if there are undetected voids and honeycombing in the base mat or containment which have not been repaired. A void in a basemat area under the reactor could provide a pathway for a melted core to more easily escape containment. If the containment is not properly constructed to meet its design basis (GDC 50) it cannot carry out its function under GDC 1: voids do not have strength; honeycombed concrete has less than the required strength and resistance to penetration (from inside and outside) under normal and accident conditions. Voids and honeycombing can serve as loci for fracturing (violating GDC 51); in addition, they can contain moisture which can weaken adjacent parts of the reinforcement and concrete. Voided and honeycombed concrete clearly has less ability to resist residual, steady-state and transient stresses on the containment (violation of GDC 51).

Finally, without some method of detecting voids inside the concrete, there is no assurance the Harris containment and base mat AS BUILT actually meet GDC 1, 16, 50, 51, or other applicable requirements. More information should be provided 10-28-83 to me on discovery from my first round. I have not evaluated the adequacy of the codes

mentioned in the FSAR in your response to my interrogatory 65-7. These appear to be the only codes you have cited so far.

65-16(c) See (a). Not Applicable.

65-17(a) Per your statements, the repairs would be no more adequate than the original work even if everything you allege is done is done perfectly. I have not inspected the work/repairs nor had it inspected at this time; the inadequate explanations and failure to provide procedures discussed under 65-14, 65-15 and 65-16 above make it difficult to give a more detailed answer.

The work procedures mentioned in response to 65-1(j) are not given, means of assuring the adhesion of the patching to the concrete are not given, and it appears that these methods are only applied to surface defects (see response to 65-15(a) above). Your responses contain unsupported assertions like "procedures are adequate to insure that the patched area is acceptable" -- but how do you know (or figure out) that the "acceptable" patch (according to criteria never specified) is really as strong, if you haven't calculated it or tested it. Your answer seems to say you didn't calculate it, and it does say you never have tested the strength of the repairs. How do I know what "the design engineer desires" as to quality of work. You don't explain how concrete is tested during repairplacements or what tests are made on it. Answers like these seem almost to be designed to appear to contain information while containing little or no useful facts or basis for checking. Under such circumstances, it is very hard to give a definitive answer to whether what you "describe" (sketchily and conclusorily, without support) in your answer is "adequate" -- I'm not sure what it really says about the actual concrete at Harris. It is the actual concrete in place (with rebar) that is of concern here.

65-17(b) I haven't seen the information on their corrective actions that would enable me to verify adequacy. It seems silly to demand that I answer a question before you give me the information on the actual repairs, but you did. I can't specify corrective actions in any detail (though it surely would help if you had tried to detect internal voids and honeycombing) without seeing what you did. As discussed under (a) above and other places above, your "answers" don't give enough information to tell much about what actually was done. You have claimed no compliance with specific NRC regulations or industry codes in your response to 65-1(i) and (j). The answers given are vague and general and often phrased so that they give a conclusion without any information to support it.

65-18(a) Any rebar tends to increase the possibility that voids or honeycombing can occur. It appears that the Harris base mat was put in mostly in a large monolithic pour. If so, it probably would not have been possible to vibrate all of it thoroughly enough to minimize internal voids or honeycombing; at any rate, no attempts appear to have been made to find them, so we don't know how many are there. A test of the results is required, regardless of the rebar placement, pouring procedures, vibration, concrete characteristics, etc. Obviously, the rebar doesn't act in isolation -- the viscosity and slump of the concrete, the rate and method of pouring, and other factors enter into it.

(b) see (a) above.

65-19 (1)-(v) I cannot readily locate detailed info on any of this. I understand that Daniel is the prime contractor and as such would be in charge of erecting the containment and pouring its wall and base mat.

65-20(a) Asked and answered in previous general interrogatory re witnesses. When I identify witnesses I will let you know.

(b) N/A

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CERTIFICATE OF SERVICE

I hereby certify that copies of WE Interrogatories to NRC Staff (2d set)  
& WE Response to Applicants'  
WE Interrogatories to Applicants (6th set) Ints on E-65 (sixth set)

HAVE been served this 21st day of October 1983, by deposit in  
the US Mail, first-class postage prepaid, upon all parties whose  
names are listed below, except those whose names are marked with  
an asterisk, for whom service was accomplished by \_\_\_\_\_

\*Interrogatories/responses to Judge Kelley and CA Barth only

per oral order, among the parties asterisked.

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