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Docket No. 50-508

MEMORANDUM FOR: George Knighton, Chief
Licensing Branch No. 3, DL

FROM: Ronald L. Ballard, Chief
Environmental & Hydrologic Engineering Branch, DE

SUBJECT: HYDROLOGIC ENGINEERING ENVIRONMENTAL QUESTION

Plant Name: Washington Public Power Supply System Nuclear Project No. 3 (WNP-3)
Licensing Stage: OL
Responsible Branch: Licensing Branch No. 3, A. Vietti, PM

The applicant in responding to one of our previous environmental questions concerning the consequences of a liquid release from a postulated core-melt accident, did not address the effects of the plant's permanent dewatering system. Since the dewatering system is a passive one without pumps or valves that can be used to deactivate the system, it is likely that contaminated groundwater will be intercepted by the dewatering system and released to the surface in a much shorter time and at greater concentrations than estimated by the applicant.

In order for us to address this concern, we need additional information. The attached question, for your transmittal to the applicant, was prepared by R. Gonzales who can be reached on extension 28018.

Original Signed By Ronald L. Ballard

Ronald L. Ballard, Chief
Environmental & Hydrologic
Engineering Branch
Division of Engineering

Attachment: As stated

cc: See next page

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SURNAME	RGonzales:ws	RCodell	MFliegel	RLBallard			
DATE	7/8/83	7/11/83	7/11/83	7/11/83			

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY

cc: w/o attachment
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w/enclosure
W. Johnston
L. Hulman
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R. Codell
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Hydrologic Engineering Environmental Question
WNP-3

240.14 (ER) In response to our previous question 240.13, you provided an analysis of the radiological consequences of a liquid pathway release from a postulated core-melt accident. In that analysis you assumed that, following base mat penetration there would be contamination of the groundwater whose gradient and movement is northward toward the Chehalis River.

Because WNP-3 has a passive (gravity flow) dewatering system, we conclude that it is likely that contaminated groundwater would be intercepted by the dewatering system and carried southward to Workman Creek instead of northward as you have assumed. Interception by the dewatering system would result in contaminants entering the Chehalis River much more rapidly and in greater concentrations than you have calculated. You should therefore provide a detailed discussion and analysis of the effects of the dewatering system on the liquid pathway release from a core-melt accident.

If, based on your reanalysis, you still conclude that contaminated groundwater will move northward to the Chehalis River and will not be intercepted by the dewatering system, you should provide the basis for your conclusion, including all pertinent assumptions. If you conclude that a core-melt accident will destroy the dewatering system to the extent that it doesn't function even partially, you should describe how the core-melt will affect each portion of the dewatering system, i.e., the collector and half-round pipes, the perforated underdrains, the manholes and the drainage tunnels including the corrugated metal pipes inside the drainage tunnels. You should also address the potential for the core-melt to open new pathways to the dewatering system and/or to Workman Creek. In addition, you should provide the following information:

a) The value of permeability that you selected, 2.08×10^{-5} cm/sec, is the highest value determined using a Packer test in boring A-35 which is located in sandstone to the west of RAB-3. Since a spill to groundwater would move toward the north-northwest (if not intercepted by the dewatering system), it is questionable whether this permeability value would be applicable. Borings to the north-northwest of RAB-3 (Borings A-2, A-17 and A-45) show that groundwater movement would be mostly through sands and silty sands and not through sandstone as you assumed. Since the permeability of sands and silty-sands is generally several orders of

magnitude greater than the permeability of sandstone, the movement of contaminated groundwater could be much more rapid than the 1938 years you calculated. You should therefore recompute travel time using the appropriate permeability for the soils located north-northwest of the plant unless you can show that 2.08×10^{-5} cm/sec is a conservative estimate of that permeability.

b) Explain how you determined a porosity of 0.35. In computing travel time, you should use effective porosity rather than total porosity. Generally the effective porosity of sandstone ranges from about .10 to .20. For sand and silty sand such as found to the north-northwest of RAB-3, a value of 0.35 appears to be a reasonable estimate.