

UNION ELECTRIC COMPANY

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ST. LOUIS, MISSOURI

DONALD F. SCHNELL  
VICE PRESIDENT

December 30, 1983

MAILING ADDRESS:  
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Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Dear Mr. Denton:

ULNRC-711

DOCKET NUMBER 50-483  
CALLAWAY PLANT, UNIT 1  
OFFSITE DOSE CALCULATION MANUAL

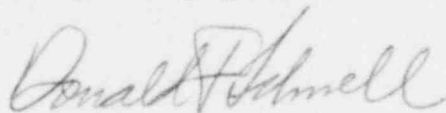
- References: 1) NRC Letter dated October 26, 1983,  
from B. J. Youngblood  
2) ULNRC-688, dated November 22, 1983

- Attachments: 1) NEO-54 dated January 5, 1983  
2) Edinger Report, dated December 1, 1982  
3) Benedict Report, dated April 4, 1974

In Reference 1 NRC provided comments on the Callaway Offsite Dose Calculation Manual (ODCM). Union Electric responded with Revision 1 to the ODCM, which was transmitted by Reference 2. In addition, Reference 1, item 2(j) requested a copy of the references which document the site specific applicable factor for the mixing effect of the discharge structure. Attachments 1, 2 and 3 provide these references.

If there are any questions, please contact us.

Very truly yours,



Donald F. Schnell

DS/lw

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STATE OF MISSOURI )  
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CITY OF ST. LOUIS )

Donald F. Schnell, of lawful age, being first duly sworn upon oath says that he is Vice President-Nuclear and an officer of Union Electric Company; that he has read the foregoing document and knows the content thereof; that he has executed the same for and on behalf of said company with full power and authority to do so; and that the facts therein stated are true and correct to the best of his knowledge, information and belief.

By Donald F. Schnell  
Donald F. Schnell  
Vice President  
Nuclear

SUBSCRIBED and sworn to before me this 30th day of December, 1983.

Barbara J. Pfaff  
BARBARA J. PFAFF  
NOTARY PUBLIC, STATE OF MISSOURI  
MY COMMISSION EXPIRES APRIL 22, 1985  
ST. LOUIS COUNTY

cc: Glenn L. Koester  
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Mr. Harold R. Denton, Director  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

January 5, 1983

Mr. S. E. Miltenberger:

NEO-54

OFF-SITE DOSE CALCULATION MANUAL  
NEAR FIELD DILUTION FACTOR  
Ref: UOTH 82-238 dated 12/13/82

In response to the referenced letter, a near field dilution factor ( $F_d$ ) of  $1.38 \times 10^{-4}$  should be used for liquid releases. FSAR Table 11.2-2 does not apply since those dilution factors relate to a dilution of the discharge structure exit flow by the river flow.  $F_d$  (NUREG-0133) relates to a dilution of the radwaste building exit flow by the blowdown dilution flow and the river flow. In addition, the methodology used to calculate the values given in FSAR Table 11.2-2 is restricted to those portions of the river removed from influences of the discharge and therefore does not apply to the "near field".

As defined in NUREG-0133:

$$F_d = \frac{\text{liquid radioactive waste flow per unit}}{\text{discharge structure exit flow per unit} \times \text{Applicable Factor}}$$

where:

liquid radioactive waste flow =  $0.0893 \times 10^6$  gpd  
(0.138 cfs) (as limited by our requested NPDES revision)

discharge structure exit flow = 5000 gpm (11.14 cfs)

The Applicable Factor (initial plume dilution in river) was calculated by J. E. Edinger (1982) in support of testimony on suspended sediment discharge. Dr. Edinger's values vary from a low of 6:1 in January, 1977 at the lowest monthly flow of 22,000 cfs to a high of 774:1 in April, 1973 at the highest monthly flow of 333,000 cfs. The annual average from 1970 to 1980 is approximately 101:1. Benedict (1974 thermal plume dilution) estimated a plume dilution of 10:1 within a 30 foot by 100 foot region of the discharge of low flow, hence the two-dimensional hydrodynamic computations used by Dr. Edinger slightly underestimate (conservative) initial discharge dilution.

From the above discussion:

Applicable Factor = 101.

However, since the discharge structure exit flow x Applicable Factor is limited to 1000 by NUREG-0133, then

Applicable Factor = 89.77

It follows:

$$F_l = \frac{0.138}{11.14 \times 89.77} = \frac{0.138}{1000}$$

$$F_l = 1.38 \times 10^{-4}$$

  
D. W. Capone

NSG/lw

cc: 3456-0545.11  
A. C. Passwater  
N. G. Slaten  
J. P. Head  
→ J. R. Peevy

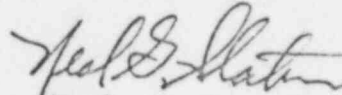
March 31, 1983

Mr. J. R. Peevy:

ODCM NEAR FIELD DILUTION FACTOR

Ref.: UOTH 83-86 dated March 15, 1983

Per your request in the referenced letter, attached is a copy of the Edinger report. The thermal plume study done by Dr. Benedict can be found in Appendix 5A of the Environmental Report - Construction Permit Stage. The Calculation methodology for the near field dilution factor is as described in NEO-54 dated January 5, 1983.

  
Neal G. Slaten

NGS/msc

cc: 3456-8561 w/a  
D. W. Capone  
A. C. Passwater

<p>COMMENTS:</p> <p>Please make distribution as follows:</p> <p>1 copy - RRR, TEC, JRPe, PAW</p> <p>1 copy &amp; orig - CCG</p> <p>Thanks Chris</p> <p>FORM 3703 *</p>
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