FROM: Wisconsin Public Service Corporation
Green Bay, Wisconsin 54305
E. W. James

DATE OF DOCUMENT: 4-10-72

DATE RECEIVED: 4-13-72

NO:

LTR: X MEMO: REPORT: OTHER:

TO:

ORIG.: CC: OTHER:

Mr. DeYoung

1 signed

ACTION NECESSARY ☐ NO ACTION NECESSARY ☐

CONCURRENCE ☐ COMMENT ☐

DATE ANSWERED: BY:

CLASSIF: U

POST OFFICE REG. NO:

FILE CODE: 50-305 (ENVIRO FILE)

DESCRIPTION: (Must Be Unclassified)

Ltr re their ltr dtd 2-29-72, trans the following:

ENCLOSURES:

Addl info to answers to questions regarding Basic Data for a Source term Calculation & info concerning estimate of fuel leakage

(40 cys rec'd)

REMARKS:

1- Local PDR (Kewaunee, Wis)
5- ORNL/T. H. Rowe
Holding (16) cys for ACRS

REFERRED TO	DATE	RECEIVED BY	DATE
Benaroya W/4 cys for ACTION	4-13-72		
DISTRIBUTION			
Reg File AEC PDR		Gemertsfelder	
Compliance (2) Muntzing & Staff			
Denton Collins			
Kniel Kenas		DO NOT REMOVE ACKNOWLEDGED	
Regan DeYoung			
Muller Kastner Morris/Dube/Wilson		2087	AB

U.S. ATOMIC ENERGY COMMISSION

MAIL CONTROL FORM FORM AEC-326S (8-60)

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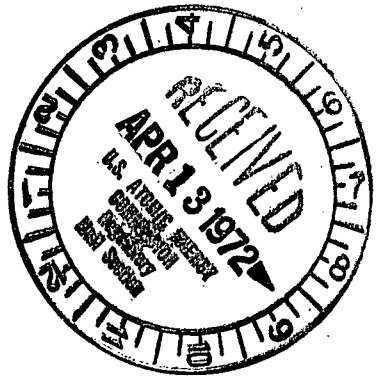
WISCONSIN PUBLIC SERVICE CORPORATION

P.O. Box 1200, Green Bay, Wisconsin 54305

Docket No. 50-305

April 10, 1972



Mr. R. C. DeYoung, Assistant Director
for Pressurized Water Reactors
Division of Reactor Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

50 - 305

Dear Mr. DeYoung:

Our letter to you of February 29 transmitted answers to questions raised by ORNL in connection with calculation of source terms.

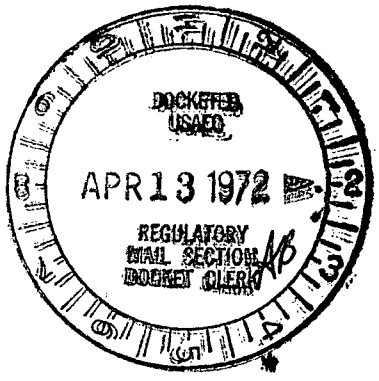
Enclosed are 40 copies of the revised data sheets. These revised data lists take into account a more realistic estimate of fuel leakage as discussed with your ORNL people.

Very truly yours,

E. W. James, Senior Vice-President
Power Generation & Engineering

EWJ:sna

Enclosures: (40)



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PARAMETERS FOR AEC ENVIRONMENTAL STATEMENT

KEWAUNEE NUCLEAR POWER PLANT

1. The license application power rating is 1650 MWt and the parameters listed in the following items pertain to this power level. The ultimate output of the plant is 1721.4 MWt. Reference: FSAR page 1-1.

2. The weight of fuel (as UO_2) is 119, 311 lbs. Reference: FSAR Table 1.4-1.

3. The first loading isotopic ratios are:

Region 1	2.27%
Region 2	3.03%
Region 3	3.40%

The equilibrium isotopic ratio is 3.40%. Reference: FSAR Table 1.4-1.

4. The design basis for the reactor assumes that there are small cladding defects in the fuel rods generating 1% of the reactor power. Reference: FSAR, Appendix D, Page D.4-1. The environmental report assumes a value of 0.2%.

5. The fission product escape rates are:

Noble gases	6.5×10^{-8} sec $^{-1}$
Halogens, Rb and Cs	1.3×10^{-8} sec $^{-1}$
Y, Zr, Nb, Ce, La, & Pr	1.6×10^{-12} sec $^{-1}$
Sr & Ba	1.0×10^{-11} sec $^{-1}$
Mo	2.0×10^{-9} sec $^{-1}$
Te	1.0×10^{-9} sec $^{-1}$

Reference: FSAR, Appendix D, Page D.4-1.

6. The plant factor is 80%.

7. There are two steam generators. Reference: FSAR Table 4.1-4.

8. The steam generators are recirculating, vertical U-tube type, with an integral moisture separator. Reference: FSAR page 4.2-6.

9. The total mass of primary system coolant is 2.77×10^5 lbs, and the mass of coolant in the reactor is 1.11×10^5 lbs. Reference: FSAR Tables 4.1-1 and 4.1-2.

10. The flow rate is $68.2 \times 10^6 \frac{\text{lb}}{\text{hr}}$. Reference: FSAR Table 4.1-1.

11. At the 1650 MWt power level, each steam generator has a liquid mass of 8.3×10^4 lbs and a steam mass of 4.7×10^3 lbs. Reference: FSAR Table 4.1-4.

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12. The mass of secondary coolant is 1.02×10^6 lbs.

13. Generator operating conditions (temperature and pressure). Full load secondary side conditions for the steam generator are 510.8°F and 750 psia. Reference: FSAR Table 4.1-4.

14. Total steam flow rate for two steam generators is 7.08×10^6 lb/hr. Reference: FSAR Table 14.1-4.

15. Containment volume is 1.32×10^6 ft^3, and the annulus volume is 3.74×10^5 ft^3. Reference: FSAR page 5.2-1, 5.2-32.

16. Expected leak rate of primary coolant to the containment is 1.25 lbs/hr. Reference: FSAR Question 11.4.3 Amendment 10 (9-15-71).

17. The anticipated purge schedule (1% fuel defects) for the containment is a weekly 40 min. purge using a 33,000 cfm exhaust fan. A HEPA filter is used but no charcoal filter is used. For 0.2% fuel defects one purge per year will be sufficient for anticipated weekly and annual maintenance inside containment.

    An alternate purge mode is available if necessary. It consists of a 4000 cfm exhaust fan with charcoal filters in the exhaust ducts. The design basis efficiency for the filters is 90%.

    Reference: FSAR page 5.4-2 and Question 11.4.3 Amendment 10,(9-15-71).

18. The containment air cleanup system operates 32 hours a week. There are two 4000 cfm recirculation fans and there are charcoal and HEPA filters in the recirculations ducts. The design basis efficiency for the filters is 90%. If containment purge is necessary (i.e. 1% fuel defects) it is done immediately after the cleanup period.

    For the cleanup and purge schedule described for 1% fuel defects, the XE-133 concentration at the beginning of the purge is 9.2×10^{-5} uCi/cc. After 40 minutes of purging the Xe-133 concentration is 4.0×10^{-5} uCi/cc and at this level a two hour containment entry time is permissible under 10CFR20 guidelines. Reference: FSAR Question 11.4-3 (Amendment 10, 9-15-71).

19. The normal continuous letdown rate is 2×10^4 lb/hr. Reference: FSAR Table 9.2-3.

    a. All (100%) of the letdown is normally returned through the demineralizer to the reactor coolant system. The demineralizer is designed for a removal efficiency of 90% except for noble gases, Cs, Y and Mo. Reference: FSAR page 9.2-5 and Figure 9.2-2.

    b. The boron recovery system is designed for 60 coolant volumes/year for load follow. In the boron recovery system this coolant is demineralized, filtered, and then evaporated. Reference: FSAR Section 9.2.

    c. The system includes a separate cation demineralizer in the letdown return line to the reactor coolant system and three flushable ion exchangers to remove cations and anions in the boric acid evaporator feed lines. Reference: FSAR Section 9.2.

20. Stripping fractions in the volume control tank (closed system) are:

a.	Kr-85	2.3×10^{-5}
b.	Kr-85m	2.7×10^{-1}
c.	Kr-87	6.0×10^{-1}
d.	Kr-88	4.3×10^{-1}
e.	Xe-133	1.6×10^{-2}
f.	Xe-133m	3.7×10^{-2}
g.	Xe-135	1.8×10^{-1}
h.	Xe-135m	8.0×10^{-1}
i.	Xe-138	1.0

In addition, 90% of the iodines are removed by demineralization. The gases are held in the volume control tank indefinitely. No releases are made from the volume control tank. Volume control tank releases are directed to the gas decay tanks during degassing. Reference: FSAR Table D.4-1 and Section 9.2.

21. Essentially 100% of the nobles gases and 99% of the iodines are stripped. The gases are collected in decay tanks and are held for a minimum of 45 days.

Reference: FSAR Figure 11.1-2.

23. Two cold shutdowns per year are expected requiring two reactor coolant volumes to be degassed per year. Greater than 99% of the gases are removed. Other principle nuclides are removed by demineralization. Demineralizer efficiency is specified in item 19 above. A minimum 45 day holdup is provided in the gas decay tanks. Reference: FSAR page D.4-1.

24. None

25. Not applicable.

26. A long term average of 20 gal/day or less leakage from the reactor coolant system to the secondary system is assumed.

27. The design blowdown rate from both generators averages 500 gpd or 135.0 $\frac{lb}{hr}$. The design basis for blowdown per generator is 50 gpm for 2.5 min. twice a day. The gases are discharged to the atmosphere from a vent on the auxiliary building roof. Approximately 30 - 35% of the blowdown flashes. There is no filter on the blowdown tank vent.

28. The expected leak rate of steam to the turbine building is less than 1 cfh.

The turbine building is kept at slight positive pressure. Air intake is 150,000 cfm. Air is exhausted from turbine building at flow rate of 148,000 cfm using:

a.	6 exhausters @ 23,000 cfm/exhauster	-	138,000 cfm
b.	1 exhauster @ 8000 cfm	-	8,000 cfm
c.	2 battery room fans @ 1000 cfm	-	2,000 cfm
d.	Total from a, b, c	-	148,000 cfm

28. Continued

Air is discharged directly to atmosphere through turbine building roof. Reference: FSAR Figure 9.6-3

29. The flow rate of gaseous effluent through the air ejectors is 40 scfm (180 lb/hr). The air is released to the turbine building unless its activity exceeds 1 x 10^{-5} uCi/cc. When this activity level is reached the air flow is diverted to the auxiliary building vent. The release is monitored by the auxiliary building vent monitors but only passes through HEPA filters. Reference: FSAR page 10.2-8.

30. The source of steam used for the gland seals is the main steam line. The effluent steam from the gland seals is routed to the gland steam condensor. The non-condensible gases are then exhausted to atmosphere through an 8" vent header in the turbine building. The condensed liquid is returned to the main condenser. Reference: FSAR Figure 10.2-2.

31. The design leak rate of primary coolant to the auxiliary building is 0.453 lb/hr. The ventilation flow through the auxiliary building includes flow through spent fuel pool area. The fans exhaust to the auxiliary building vent. During normal operation air passes through a HEPA filter to remove all particulates before release to the atmosphere via the auxiliary building vent. No credit is assumed for iodine or noble gas removal.

Special provisions are also included to exhaust air through activated charcoal beds and high efficiency filters from areas subject to possible radioactive contamination, through the use of the Auxiliary Building Special Ventilation System. This System is actuated by either a Safety Injection Signal, or a high radiation signal from the Auxiliary Building Vent Monitor.

The Spent Fuel Pool is ventilated by a locally controlled air sweep system which maintains a continuous air sweep across the pool. In normal operation, exhaust air from the system passes through HEPA filters before being discharged to atmosphere through the monitored Auxiliary Building Vent. Charcoal filters are also provided, which are bypassed during normal operation. Administrative procedures will assure that this bypass is closed during fuel handling operations. Also, the monitor in the Auxiliary Building vent will close bypass dampers if they are open, in event of high radiation.

32. See following page.

32. LIQUID WASTES

	High Level Wastes	Low Level Wastes	Recirculated Liquid
	Equipment drains leakage = 212 gpd Laundry, Shower, Handwashes = 176 gpd Decontamination = 48 gpd Laboratories = 43 gpd Total 478 gpd	Steam Generator Blowdown Liquid = 500 gpd	Primary Coolant Letdown = 57,600 gpd
Average flowrate, gpd	478	500	57,600
Activity, $\frac{uc}{cc}$			
FSAR	12.80	1.20	
ER	2.56	0.24	
Processing information			
Collection tanks, No.	1		
Capacity, gal.	24,490		
Decontamination Factor	3,200		
Waste concentrate Handling	Mixed with cement and spent resin.		
Annual Volume, gal.	357,340		
Annual Activity release Curies (excluding tritium) FSAR	2.17		
ER	0.44		

Reference: FSAR, Tables 11.1-4 and 11.1-5.

33. The dilution flow rate is 410,000 gpm.