

## LSNReviews

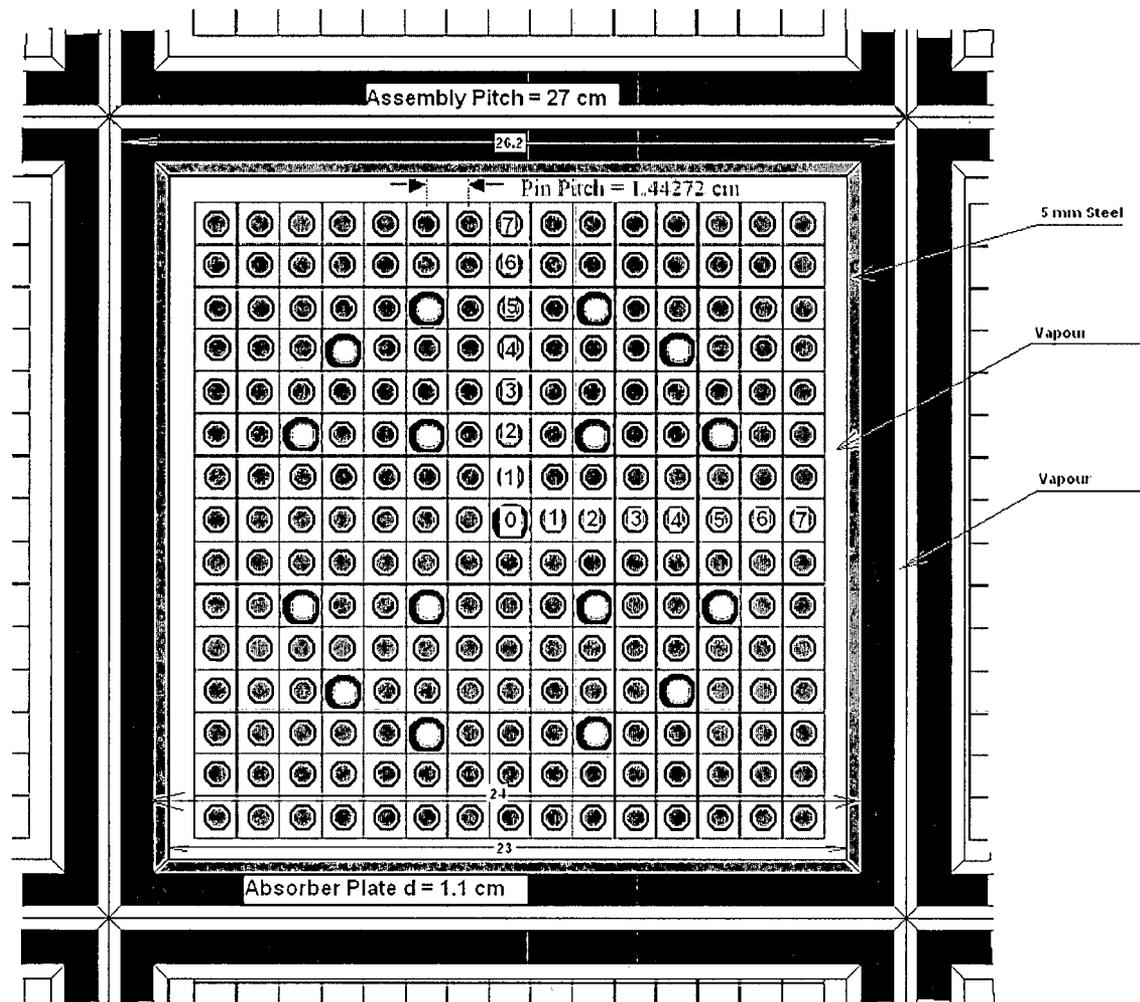
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**From:** Oleg Povetko [opovetko@cnwra.swri.edu]  
**Sent:** Saturday, April 05, 2008 7:01 PM  
**To:** natalex  
**Subject:** summary s temperaturoj  
**Attachments:** Radiolytic generation of peroxide in TAD 040508.doc

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# Radiolytic Generation of Peroxide (H<sub>2</sub>O<sub>2</sub>) in Gas/Vapor Space Between CSNF Assembly Rods of the Central PWR Assembly in 21-PWR TAD Canister.

## GEOMETRY



## ASSUMPTIONS:

### 1. MAIN ASSEMBLY CHARACTERISTICS

- Maximum PWR assembly:
  - 5.0%
  - 80 GWd/MTU
  - 5 years

This assumption is bounding

2. Only photons are considered

This assumption is not bounding

3. DENSITY OF WATER VAPOR =  $3.8176 \times 10^{-6}$  g/cc

This density corresponds to P=4 torr

(according to NUREG-1536, P < 3 torr)

(according to NUREG-1567, P < 3+1=4 torr)

This assumption is realistic, based on current  
NRC practice

CAVITY =  $2.3 \times 10^6$  cc (this is a portion of the total cavity volume)

4. TOTAL  
RADIOLYTICALLY ACTIVE  
VOLUME OF TAD  
CANISTER INTERNAL GAS

This assumption is realistic, not bounding

5. NO PEROXIDE REMOVAL MECHANISMS EXIST

This assumption is bounding

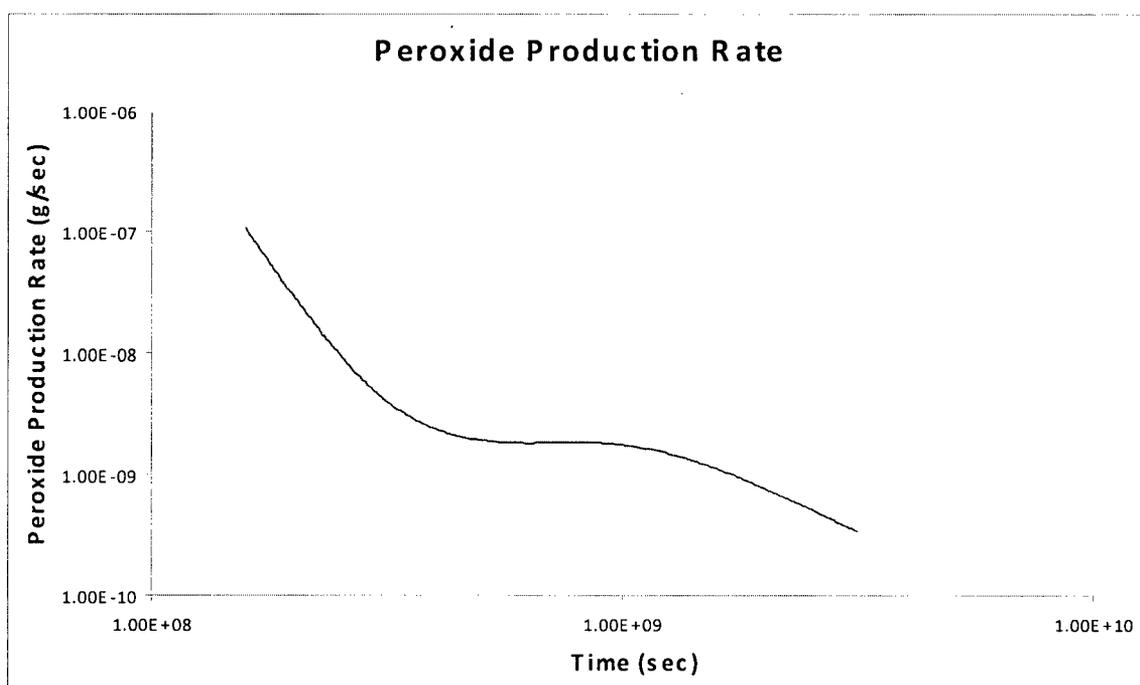
6. GAS TEMPERATURE = 300°K

It's not clear whether this assumption is bounding or not

RESULTS FOR THE ASSUMED VOLUME AND ASSUMED VAPOR DENSITY:

**Peroxide Production Rate & Accumulation in TAD Canister Cavity:**

Years	sec	molecules/sec	moles/sec	Peroxide Accumulation (Moles)
5	1.57788E+08	1.51630E+14	2.51788E-10	0.00000E+00
10	3.15576E+08	5.69027E+12	9.44892E-12	8.70765E-03
30	9.46728E+08	2.57865E+12	4.28195E-12	1.17537E-02
100	3.15576E+09	4.82459E+11	8.01141E-13	1.63482E-02



NOTES:

1. Peroxide production rate is linearly proportional to the assumed water vapor density. Therefore, peroxide production rate for different vapor density can be adjusted by multiplying the peroxide production rate value from the table by the RATIO,

where RATIO=actual water vapor density/ 3.8176E-06 g/cc