From: Oleg Povetko [opovetko@cnwra.swri.edu]
Sent: Wednesday, February 13, 2008 12:42 PM
To: natalex
Subject: WP cavity volume

Natknkulsya na ob'em polosti v DOE In-Package Chemistry Abstraction Appendix B, page B-5:
void volume waste package = 4,144,461 cm3. No eto - dlya starogo designa, ne TADa. Cifra gde-to mezhdu ob'emom Cell #1 i moej ocenkoj

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From: Oleg Povetko [mailto:opovetko@cnwra.swri.edu]
Sent: Tuesday, February 12, 2008 6:07 PM
To: 'natalex'
Subject: RE:

Надо-то надо, только вот кто это профинансирует?

У ДОЕ источник другой и спектр другой

Напиши просто, что, если допустить такой уровень производства азотной кислоты в любой точке объёма полости, то график и таблица будут вот такие...

From: natalex [mailto:natalex@telus.net]
Sent: Tuesday, February 12, 2008 5:55 PM
To: 'Oleg Povetko'
Subject: RE:

Для межстержневого надо считать отдельно.

Можно использовать DOE данные, они эдорово дополняют мои расчеты и проведены как раз для межстержневого пространства.

Алексей.

From: Oleg Povetko [mailto:opovetko@cnwra.swri.edu]
Sent: Tuesday, February 12, 2008 1:57 PM
To: 'natalex'
Subject: RE:

Ya imel v vidu polnyj ob'em vodo-vozdushnoj smesi vnutri TADa, to est' Cell #1 plyus vse ostal'noe prostranstvo, vklyuchaya mezhsterzhnevoe i.t.d.

From: natalex [mailto:natalex@telus.net]
Sent: Tuesday, February 12, 2008 2:01 PM
To: 'Oleg Povetko'
Subject: RE:

From: Oleg Povetko [mailto:opovetko@cnwra.swri.edu]
Sent: Tuesday, February 12, 2008 9:59 AM
To: 'natalex'
Subject: RE:

Normal'no. To, chto nuzhno. Vklyuchi nitric acid production rate per cell and per entire TAD canister cavity otdel'no. Kak ya ponyal, v Tablice V.4 tvoego otcheta g/Year - eto production rate of nitric acid v Cell #1, tak?

Да

V(Cell #1) =

2.06878E+06 cm^3
= (Pi* 79.455* 79.455 – 21 * 27 * 27) * (228.75 – (-228.75))

79.455 – TAD Radius
21 – Assemblies Count
27 – Assemblies Pitch
(228.75 – (-228.75)) - Assembly & TAD Heights

>>Nam nuzhno takzhe ocenit' production rate vo vsej polosti TAD canister. Ya kak-to ocenival davno ob'em etoj polosti:

Cavity volume

$$V := (h - 12) \cdot \frac{(d-3)^2}{4} \cdot \pi$$

(Approximate MPC-68 chicknesses from FSAR Appendix 5.C)

$V = 1.14 \times 10^7$ cm^3

Approximate net free volume inside cavity

$$Vfree := V \cdot \frac{237.5}{367.9}$$

(Ratio from HI-STAR MPC-24 FSAR, Rev.01, DOCKET 72-1008, Table 4.4.13)

$Vfree = 7.35 \times 10^6$ cm^3 +

>>Mozhesh' prosto umnozhit' na etu Vfree, a esli vremya est', to poschitaj real'nyj ob'em polosti v MCNP modeli.
???

Alexei

From: natalex [mailto:natalex@telus.net]
Sent: Monday, February 11, 2008 9:05 PM
To: 'Oleg Povetko'
Cc: 'Oleg Povetko'; 'SWRI'
Subject:

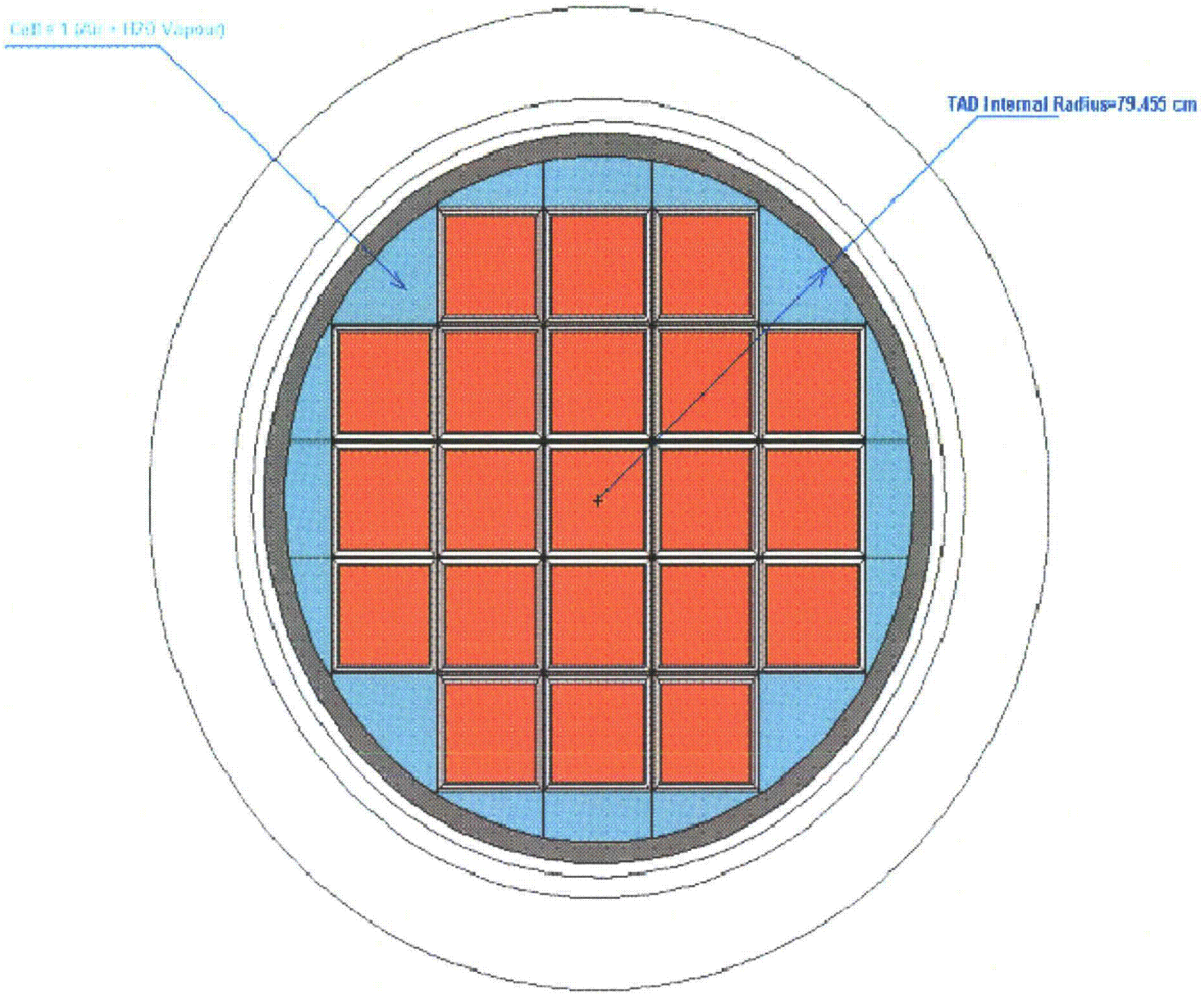
Take a look at these five slides …

I'll send you them if they are right.

Alexei

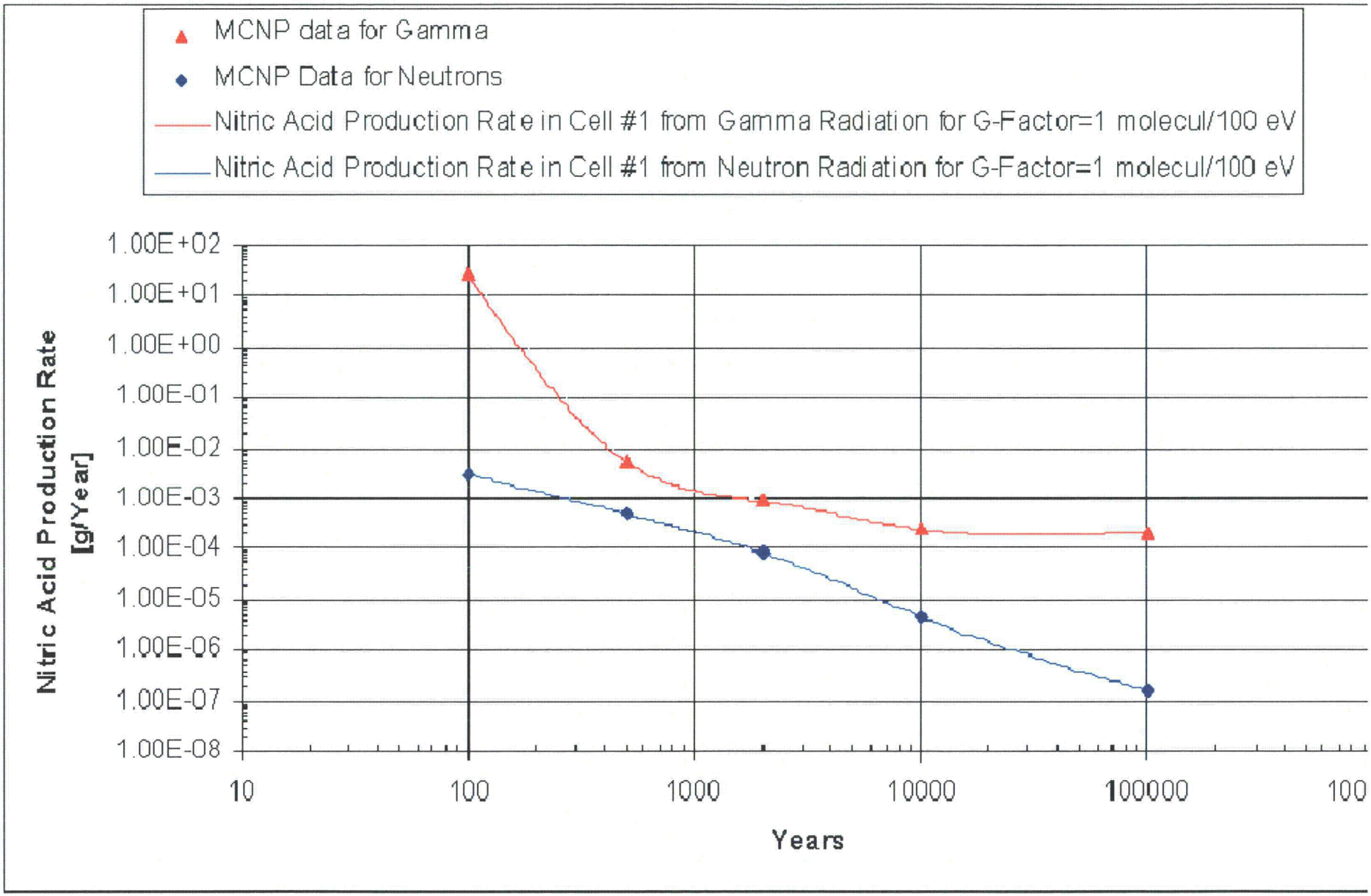
My MCNP Calculations:

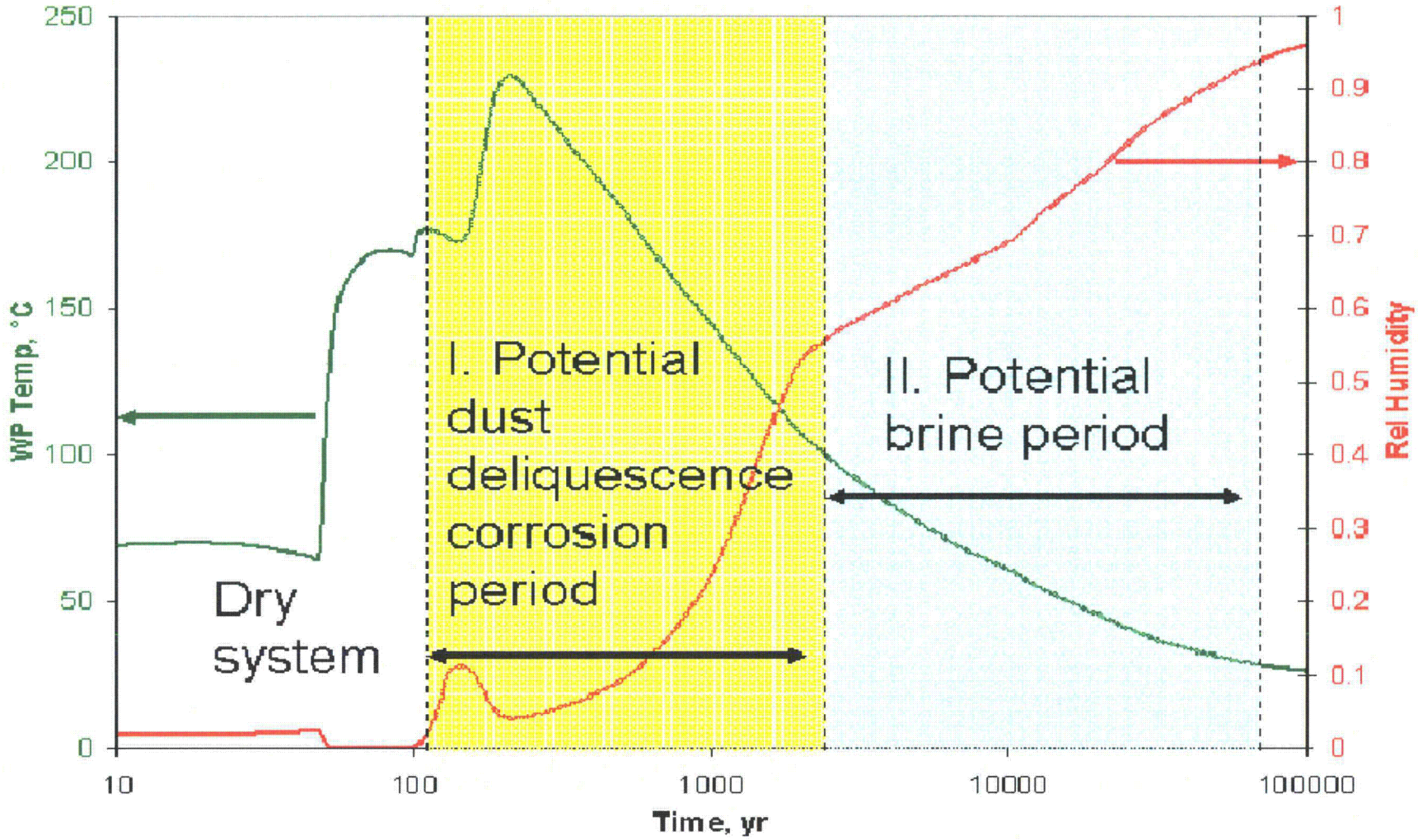
I.



PWR-21 Radial Geometry for my MCNP Calculations

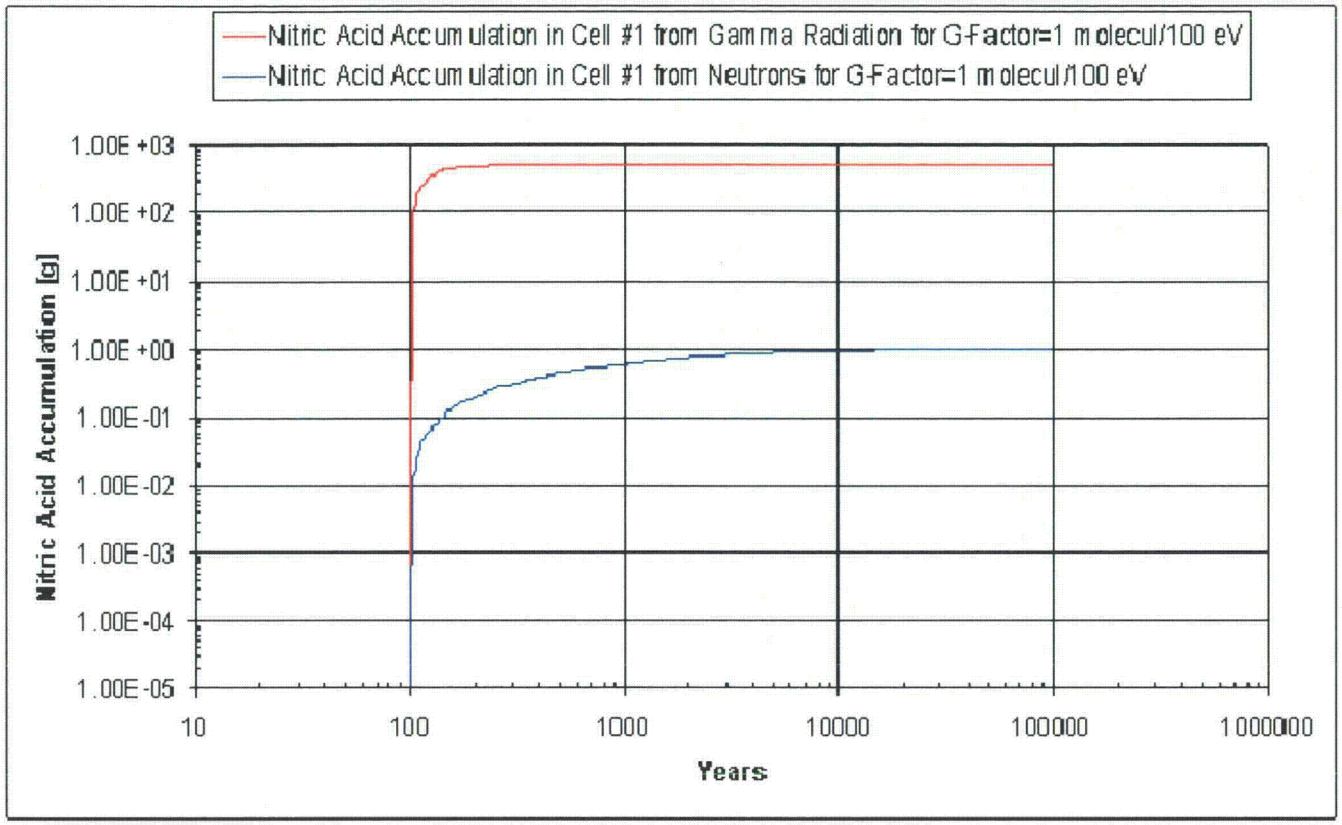
II.


MCNP data for Gamma
MCNP Data for Neutrons
Nitric Acid Production Rate in Cell #1 from Gamma Radiation for G-Factor=1 molecul/100 eV
Nitric Acid Production Rate in Cell #1 from Neutron Radiation for G-Factor=1 molecul/100 eV
Nitric Acid Production Rate [g/Year]
1.00E+02
1.00E+01
1.00E+00
1.00E-01
1.00E-02
1.00E-03
1.00E-04
1.00E-05
1.00E-06
1.00E-07
1.00E-08
10
100
1000
10000
100000
100
Years



(After Pensado, 2006)

III.

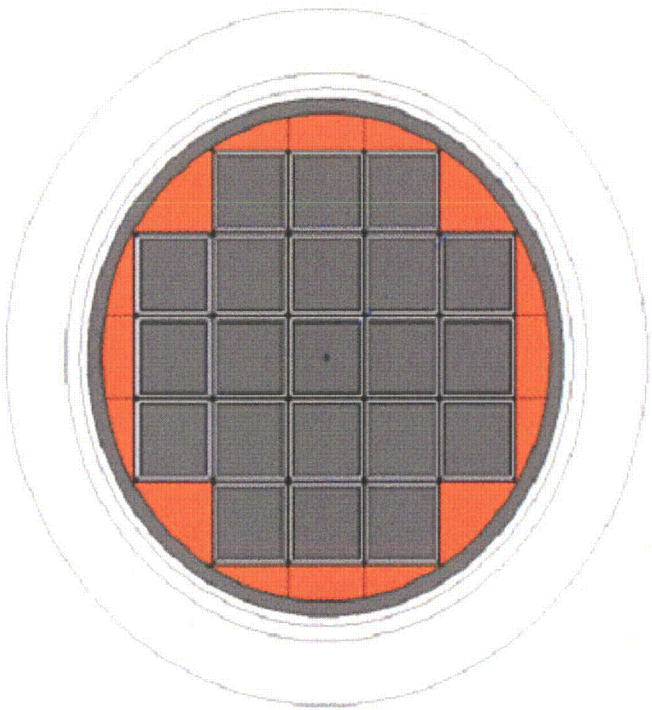


Nitric Acid Accumulation under assumption that no acid removal mechanisms present

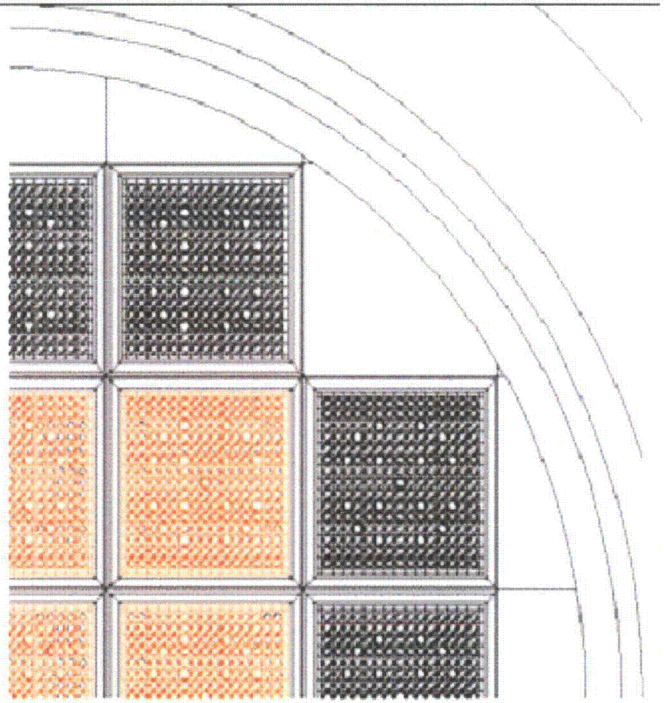
Comparing My Calculation Results with DOE Report

IV.

Present MCNP Calculations*	DOE Report**
1. Assembly Type:	
Babcock & Wilcox (B&W) 15 × 15 PWR SNF Assembly	
2. Enrichment:	
5.0-wt% initial 235U	**4.0-wt% initial 235U**
3. Burnup:	
78.26 GWd/MTU	**48 GWd/MTU**
4. Doses Calculation Volume Geometry:	



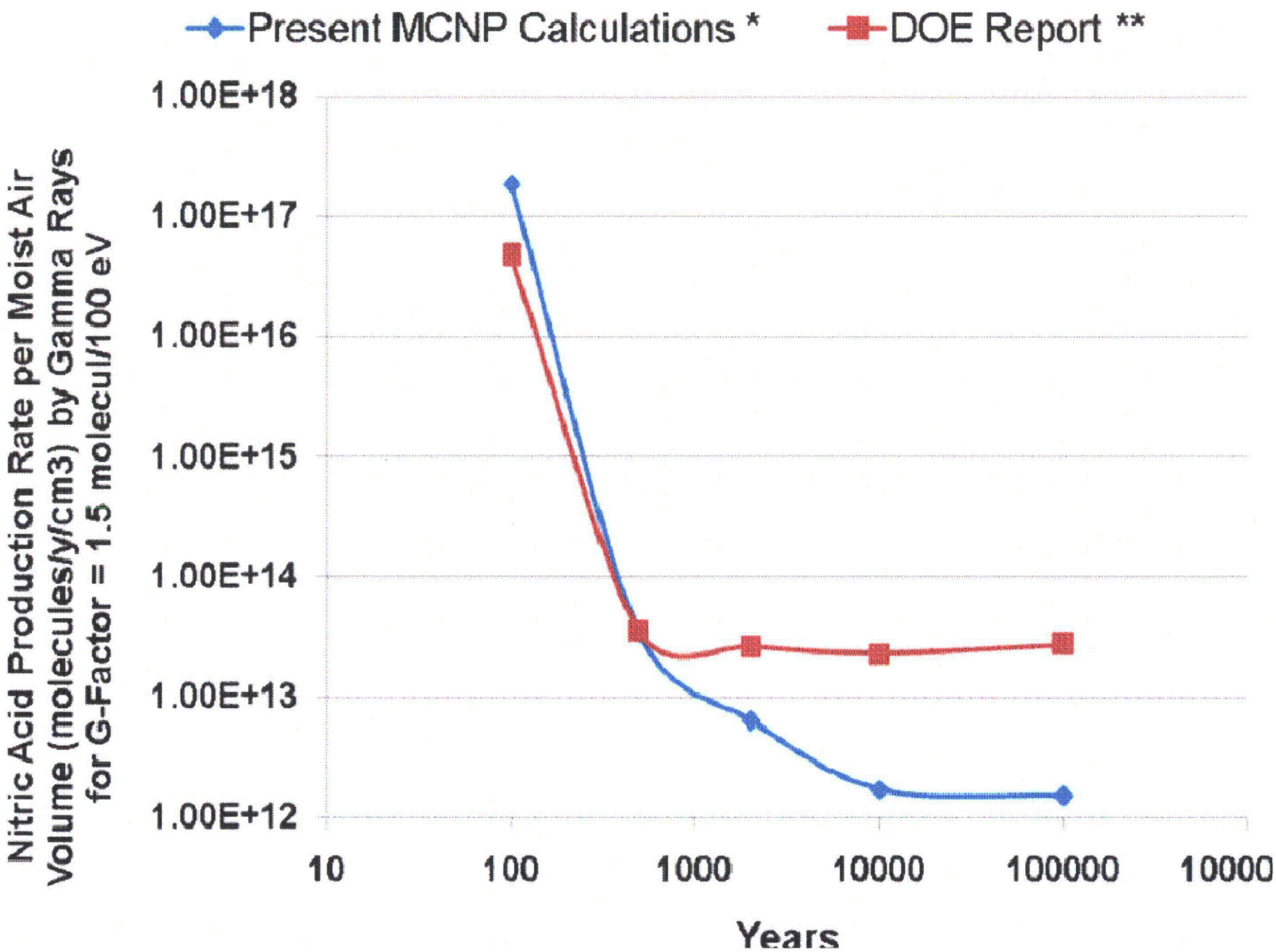
TAD Internal Space Excluding Assemblies



Unit Cells Outside the Fuel Rods in the Central Nine SNF Assemblies of the 21-
WD

Table of Differences in Calculation Geometry of DOE and Present

V.


Present MCNP Calculations *
DOE Report **
Nitric Acid Production Rate per Moist Air Volume (molecules/y/cm3) by Gamma Rays for G-Factor = 1.5 molecul/100 eV
1.00E+18
1.00E+17
1.00E+16
1.00E+15
1.00E+14
1.00E+13
1.00E+12
10
100
1000
10000
100000
10000
Years

Nitric Acid Production Rate Graphs