SOFTWARE RELEASE NOTICE

1. SRN Number: DECM-SRN- 174A

2. Project Title: PA Analysis in Support of Jefferson Proving Ground Environmental Impact Statement Development	Project No. 20-8801-002

3. SRN Title: Availability of MEPAS 3.2g

4. Originator/Requestor: Patrick LaPlante	Date: 10/20/98

5. Summary of Actions

- ☐ Release of new software
- ■ Release of modified software:
  - ☐ Enhancements made
  - ■ Corrections made
- ☐ Change of access software
- ☐ Software Retirement

6. Persons Authorized Access

Name	Read Only/Read-Write	Addition/Change/Delete
L. Deere	Read Only	Addition
R. Fedors	Read Only	Addition
M. Jarzemba	Read Only	Addition
P. LaPlante	Read Only	Addition
P. Mackin	Read Only	Addition
S. Mohanty	Read Only	Addition
J. Russell	Read Only	Addition
D. Pickett	Read Only	Addition
J. Weldy	Read Only	Addition
G. Wittmeyer	Read Only	Addition
J. Winterle	Read Only	Addition
A. Armstrong	Read Only	Addition
D. Turner	Read Only	Addition

7. Element Manager Approval: John D Russell Date: 10/26/98

8. Remarks: Code was tested for a Uranium and daughter source term plus groundwater and surface water transport and farming receptor exposure scenario over a period of 1000 yrs. Therefore the code is considered acceptable for similar analyses. Since the previous release, installation testing discovered an incorrect unit specification in the user interface resulting in a 12 order of magnitude error in dose results. The current version has been fixed by PNL to correct this error. A bug remains in the user interface that interferes with the selection of the mass partitioning option when the time increment for ~~exposure reporting~~ groundwater modeling (under ~~Exposure Control~~ MASS PARTITION CONTROL Parameters menu) is changed. Upon changing the time increment, the mass partition option is automatically changed to 'yes' and cannot be changed back to 'no' using the interface. Therefore, if a non-mass partitioned run is needed, the time increment for exposure reporting should be changed by editing the input file manually (without interface) to avoid this problem.

BEW 10/23/98 as described by P. LaPlante from the WTSO. BEW.

SOFTWARE SUMMARY FORM

01. Summary Date: 10/20/98	02. Summary prepared by (Name and phone) Patrick A. LaPlante (301) 881-0289	03. Summary Action: REPLACEMENT
04. Software Date: 11/97	05. Short Title: MEPAS 3.2g	
06. Software Title: Multimedia Environmental Pollutant Assessment System 3.2g		07. Internal Software ID: None

08. Software Type: ☐ Automated Data System ■ Computer Program ☐ Subroutine/Module	09. Processing Mode: ☐ Interactive ☐ Batch ■ Combination	10. Application Area a. General: ■ Scientific/Engineering ■ Auxiliary Analyses ■ Total System PA ■ Subsystem PA ☐ Other b. Specific:

11. Submitting Organization and Address: CNWRA/SwRI 6220 Culebra Road San Antonio, TX 78228	12. Technical Contact(s) and Phone: Dr. J.W. Buck Primary Code Developer Pacific Northwest National Laboratory (PNNL) (509) 376-5442

13. Software Application: MEPAS is a pathway/dose calculation code that was designed for assessments of sites contaminated with radioactive materials or chemicals. The code includes modules for source term, vertical vadose zone transport, horizontal saturated zone transport, and exposure from multiple pathways with options for mass balanced partitioning of the source term. The standard array of exposure pathways applicable to an agricultural, industrial, or residential receptor are included (e.g., inhalation, direct exposure, ingestion of drinking water, raised crops, livestock etc.). MEPAS is best used for off-site impacts assessment due to some minimum distance limitations of some of the transport models. Water transport includes both groundwater and surface water models. If source term partitioning is not needed, complexity of the calculation can be reduced by selecting the option not to mass partition the source term. The code developers have admitted that the source term partitioning module was added on to version 3.1 and may present an potential source of error in calculations (because it is a new feature).

14. Computer Platform IBM PS/2 Model 95	15. Computer Operating System: DOS (will run in windows 3.1, 3.11, and 95 but was not tested on these OSs). Groundwater model crashes in NT.	16. Programming Language(s): (source code not available)	17. Number of Source Program Statements: (source code not available)
18. Computer Memory Requirements: < 5 MB disk space for program, 4 MB RAM	19. Tape Drives: N/A	20. Disk Units: N/A	21. Graphics: N/A

22. Other Operational Requirements Version 3.2g is a DOS program that will run in Windows 3.1 or DOS. Groundwater module crashes in Windows NT. See software release notice remarks for a description of a bug in the interface that users should be aware of.	
23. Software Availability: ☐ Available ■ Limited ☐ In-House ONLY	24. Documentation Availability: ■ Available ☐ Preliminary ☐ In-House ONLY
25. Software Developer:	Date:

CNWRA Form TOP-4-1 (05/98)

NOTE That This was provided by Pat LaPlante 10/22/98, but since he is not The software developer, he's opted not To sign in That block. QA accepts his position and will process The paperwork. [illegible] 10/22/98

3.28

MEPAS, INSTALLATION

TESTING UPDATE

RECORDS.

P. La Plata

10/21/98

Date: 10/21/98
Sender: Patrick LaPlante
To: Ray Kotara
cc: Bruce Mabrito
Priority: Normal
Receipt requested
Subject: QA files for Archive

Ray,

I have another batch of QA files that need to be burned onto a CD or other media. It is a zipped file that is about 5mb. Please unzip the attached file (WinZip 6.3) and archive the natural files onto media and pass it to B. Mabrito. The information includes files to support installation testing of MEPAS 3.2g code per Scientific Notebook #178 and #281. Let me know if there are any problems with this request.

Thanks
Pat

notefile.zip

Patrick A. L. Plante
12300 Twinbrook Pkwy, #210
Rockville, MD 20852

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9/15/98

Summary of Additional Problem, resolution, and testing of MEPAS 3.2g.

Subsequently, an additional problem was identified on 8/18/98 while trying to run MEPAS with the site specific input files developed for JPG PA calculations. The groundwater transport module in the code was crashing during execution. This error had been occurring for about a month prior to its identification, but was undetected because the error message was only displayed briefly and the code continued operation despite the error. Contacts with PNL helped identify this problem was the result of running the code in the Windows NT operating environment rather than DOS. During early testing of the code, the MEPAS interface ran with less stability in DOS compared to Windows NT therefore NT was chosen with an understanding that QA testing would identify any problems. None of the QA testing files had problems with the NT environment, but the site specific files were slightly different than the testing files and this difference resulted in the crash of the groundwater transport model.

Initial testing then began on running the site specific JPG files in MEPAS under a DOS environment (to avoid crashing the groundwater model) and an additional problem was identified that suggested the patch provided for the prior 12 order of magnitude error may not have addressed all areas of the code that contained this unit conversion error. On 8/21/98, a note was sent by CNWRA identifying the potential additional 12 order of magnitude problem. PNL responded indicating the part of the code being run was not supposed to be impacted by the original correction to the 12 order of magnitude error and thus they did not expect a problem with the code. CNWRA then ran tests of MEPAS using the site specific JPG input files to confirm the appearance of the additional 12 order of magnitude problem and informed PNL on 8/25/98. PNL responded shortly thereafter indicating they would have the programmers investigate the potential problem. A week later PNL indicated their programmers had been busy but were beginning to investigate the problem. On 9/3/98, CNWRA received a response from PNL clarifying that a problem was identified with the code input interface where the flux was called for in Ci units instead of pCi resulting in a 12 order of magnitude underestimation in the results. A new executable was provided to CNWRA on 9/4/98. The inability to use MEPAS with confidence during this period affected the CNWRA's ability to complete the draft PA report under the planned schedule (by September 25).

9/15/98 Methods:

On 9/1/98, PNL resent files for shell.exe and MEPAS.ATR after the ones sent on 9/4 failed to execute properly. PNL indicated they changed only the graphical user interface (GUI) so that the FLUX input units were in ρC_1 rather than C_1. To confirm that the changes were made correctly and new errors were not introduced, the prior installation test cases were re-run with this version and results compared with PNL output (as before). An additional test using a site-specific input file for JPG was run to see if similar results would be obtained if the same case was run with a user defined FLUX input via the source term module and outside source term module.

~~Results:~~ 10/13/98

10/13/98 Ongoing tests were postponed due to an error in PNL's 1st patch for MEPAS resulting in input problems in the GUI. It took a few attempts by PNL to isolate and correct the source of the problem - which was subsequently found to be the result of corruption of the patch files by PNL's e-mail system. More specifically, a hard return character was being inserted into the MEPAS.ATR file thereby altering the "fixed format" and causing the code to hang on boot. On 10/9/98, the problem was resolved and the QA tests commenced on 10/13/98

10/13/98

Results: Reproduction of MFDS 3.2 installation testing results ~~granulator transport case (CASE7A)~~ following code update to fix errors (see page 92 in this notebook for description).

~~(note the X.1WA comparison will not be done because it is time consuming and is not necessary if the results in the data files agree).~~ 10/16/98

10/17/98

10/13/98 Results . . . (cont)

CASE1A

Final Comparison of CNWRA and PNL MEPAS 3.2g Results: CASE1A.WCF

==========Groundwater Concentration Ouput (PAL 10/13/98)

RADCON VERSION 05/01/1997

WATERBORNE COMPONENT of the Multimedia Environmental
Pollutant Assessment System (MEPAS): Models the
movement of chemicals and radionuclides through vadose
zone, saturated zone, surface water, and wetlands media.

Pacific Northwest National Laboratory
Operated for the U.S Department of Energy
by Battelle Memorial Institute
P.O. Box 999
Richland, Washington 99352

==========

Run Name: CASE1A
Run Performed: 10/7/98 15:55:33 g/mL or pCi/mL

==========

PAL	PNL	Ratio	PAL	PNL	Ratio
			Well Conc.	Well Conc.	
Time (yr)	Time (yr)	PAL/PNL	U238	U238	PAL/PNL
1.60E+02	1.60E+02	1.00	0.00E+00	0.00E+00	#DIV/0!
4.11E+02	4.11E+02	1.00	1.72E-03	1.72E-03	1.00
6.61E+02	6.61E+02	1.00	8.57E-03	8.57E-03	1.00
9.11E+02	9.11E+02	1.00	1.27E-02	1.27E-02	1.00
1.16E+03	1.16E+03	1.00	1.33E-02	1.33E-02	1.00
1.41E+03	1.41E+03	1.00	1.32E-02	1.32E-02	1.00
1.66E+03	1.66E+03	1.00	1.29E-02	1.29E-02	1.00
1.91E+03	1.91E+03	1.00	1.27E-02	1.27E-02	1.00
2.16E+03	2.16E+03	1.00	1.25E-02	1.25E-02	1.00
2.41E+03	2.41E+03	1.00	1.23E-02	1.23E-02	1.00
2.66E+03	2.66E+03	1.00	1.21E-02	1.21E-02	1.00
2.91E+03	2.91E+03	1.00	1.19E-02	1.19E-02	1.00
3.16E+03	3.16E+03	1.00	1.17E-02	1.17E-02	1.00
3.41E+03	3.41E+03	1.00	1.15E-02	1.15E-02	1.00
3.66E+03	3.66E+03	1.00	1.13E-02	1.13E-02	1.00
3.91E+03	3.91E+03	1.00	1.11E-02	1.11E-02	1.00
4.16E+03	4.16E+03	1.00	1.09E-02	1.09E-02	1.00
4.41E+03	4.41E+03	1.00	1.07E-02	1.07E-02	1.00
4.66E+03	4.66E+03	1.00	1.05E-02	1.05E-02	1.00
4.91E+03	4.91E+03	1.00	1.03E-02	1.03E-02	1.00
5.16E+03	5.16E+03	1.00	1.02E-02	1.02E-02	1.00
5.41E+03	5.41E+03	1.00	9.99E-03	9.99E-03	1.00
5.66E+03	5.66E+03	1.00	9.82E-03	9.82E-03	1.00
5.91E+03	5.91E+03	1.00	9.65E-03	9.65E-03	1.00
6.16E+03	6.16E+03	1.00	9.49E-03	9.49E-03	1.00
6.41E+03	6.41E+03	1.00	9.32E-03	9.32E-03	1.00
6.66E+03	6.66E+03	1.00	9.16E-03	9.16E-03	1.00
6.91E+03	6.91E+03	1.00	9.01E-03	9.01E-03	1.00
7.16E+03	7.16E+03	1.00	8.85E-03	8.85E-03	1.00
7.41E+03	7.41E+03	1.00	8.70E-03	8.70E-03	1.00
7.66E+03	7.66E+03	1.00	8.55E-03	8.55E-03	1.00
7.91E+03	7.91E+03	1.00	8.41E-03	8.41E-03	1.00
8.16E+03	8.16E+03	1.00	8.26E-03	8.26E-03	1.00
8.41E+03	8.41E+03	1.00	8.12E-03	8.12E-03	1.00

10/13/98 G Results... (cont)

CASE1A

8.66E+03	8.66E+03	1.00	7.98E-03	7.98E-03	1.00			
8.91E+03	8.91E+03	1.00	7.85E-03	7.85E-03	1.00			
9.16E+03	9.16E+03	1.00	7.71E-03	7.71E-03	1.00			
9.41E+03	9.41E+03	1.00	7.58E-03	7.58E-03	1.00			
9.66E+03	9.66E+03	1.00	7.45E-03	7.45E-03	1.00			
9.91E+03	9.91E+03	1.00	7.33E-03	7.33E-03	1.00			
1.02E+04	1.02E+04	1.00	7.15E-03	7.15E-03	1.00			
TH234	TH234	#VALUE!	TH234	#VALUE!	#VALUE!	41	URANIUM-	U238
9.62E-06	9.62E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	6.44E-04	6.44E-04	1.00			
5.08E+02	5.08E+02	1.00	4.39E-03	4.39E-03	1.00			
7.62E+02	7.62E+02	1.00	1.03E-02	1.03E-02	1.00			
1.02E+03	1.02E+03	1.00	1.30E-02	1.30E-02	1.00			
1.27E+03	1.27E+03	1.00	1.33E-02	1.33E-02	1.00			
1.52E+03	1.52E+03	1.00	1.31E-02	1.31E-02	1.00			
1.78E+03	1.78E+03	1.00	1.28E-02	1.28E-02	1.00			
2.03E+03	2.03E+03	1.00	1.26E-02	1.26E-02	1.00			
2.29E+03	2.29E+03	1.00	1.24E-02	1.24E-02	1.00			
2.54E+03	2.54E+03	1.00	1.22E-02	1.22E-02	1.00			
2.79E+03	2.79E+03	1.00	1.20E-02	1.20E-02	1.00			
3.05E+03	3.05E+03	1.00	1.18E-02	1.18E-02	1.00			
3.30E+03	3.30E+03	1.00	1.15E-02	1.15E-02	1.00			
3.56E+03	3.56E+03	1.00	1.13E-02	1.13E-02	1.00			
3.81E+03	3.81E+03	1.00	1.12E-02	1.12E-02	1.00			
4.06E+03	4.06E+03	1.00	1.10E-02	1.10E-02	1.00			
4.32E+03	4.32E+03	1.00	1.08E-02	1.08E-02	1.00			
4.57E+03	4.57E+03	1.00	1.06E-02	1.06E-02	1.00			
4.83E+03	4.83E+03	1.00	1.04E-02	1.04E-02	1.00			
5.08E+03	5.08E+03	1.00	1.02E-02	1.02E-02	1.00			
5.33E+03	5.33E+03	1.00	1.00E-02	1.00E-02	1.00			
5.59E+03	5.59E+03	1.00	9.87E-03	9.87E-03	1.00			
5.84E+03	5.84E+03	1.00	9.70E-03	9.70E-03	1.00			
6.10E+03	6.10E+03	1.00	9.53E-03	9.53E-03	1.00			
6.35E+03	6.35E+03	1.00	9.36E-03	9.36E-03	1.00			
6.60E+03	6.60E+03	1.00	9.20E-03	9.20E-03	1.00			
6.86E+03	6.86E+03	1.00	9.04E-03	9.04E-03	1.00			
7.11E+03	7.11E+03	1.00	8.88E-03	8.88E-03	1.00			
7.37E+03	7.37E+03	1.00	8.73E-03	8.73E-03	1.00			
7.62E+03	7.62E+03	1.00	8.57E-03	8.57E-03	1.00			
7.88E+03	7.88E+03	1.00	8.43E-03	8.43E-03	1.00			
8.13E+03	8.13E+03	1.00	8.28E-03	8.28E-03	1.00			
8.38E+03	8.38E+03	1.00	8.14E-03	8.14E-03	1.00			
8.64E+03	8.64E+03	1.00	8.00E-03	8.00E-03	1.00			
8.89E+03	8.89E+03	1.00	7.86E-03	7.86E-03	1.00			
9.15E+03	9.15E+03	1.00	7.72E-03	7.72E-03	1.00			
9.40E+03	9.40E+03	1.00	7.59E-03	7.59E-03	1.00			
9.65E+03	9.65E+03	1.00	7.46E-03	7.46E-03	1.00			
9.91E+03	9.91E+03	1.00	7.33E-03	7.33E-03	1.00			
1.02E+04	1.02E+04	1.00	7.15E-03	7.15E-03	1.00			
U234	U234	#VALUE!	U234	#VALUE!	#VALUE!	41	URANIUM-	U238
9.62E-06	9.62E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	7.51E-07	7.51E-07	1.00			
5.08E+02	5.08E+02	1.00	7.50E-06	7.50E-06	1.00			
7.62E+02	7.62E+02	1.00	2.05E-05	2.05E-05	1.00			
1.02E+03	1.02E+03	1.00	2.75E-05	2.75E-05	1.00			
1.27E+03	1.27E+03	1.00	2.81E-05	2.81E-05	1.00			

10/13/98 Results... (cont)

CASE1A

1.52E+03	1.52E+03	1.00	2.77E-05	2.77E-05	1.00			
1.78E+03	1.78E+03	1.00	2.72E-05	2.72E-05	1.00			
2.03E+03	2.03E+03	1.00	2.68E-05	2.68E-05	1.00			
2.29E+03	2.29E+03	1.00	2.64E-05	2.64E-05	1.00			
2.54E+03	2.54E+03	1.00	2.59E-05	2.59E-05	1.00			
2.79E+03	2.79E+03	1.00	2.55E-05	2.55E-05	1.00			
3.05E+03	3.05E+03	1.00	2.51E-05	2.51E-05	1.00			
3.30E+03	3.30E+03	1.00	2.47E-05	2.47E-05	1.00			
3.56E+03	3.56E+03	1.00	2.43E-05	2.43E-05	1.00			
3.81E+03	3.81E+03	1.00	2.39E-05	2.39E-05	1.00			
4.06E+03	4.06E+03	1.00	2.35E-05	2.35E-05	1.00			
4.32E+03	4.32E+03	1.00	2.31E-05	2.31E-05	1.00			
4.57E+03	4.57E+03	1.00	2.27E-05	2.27E-05	1.00			
4.83E+03	4.83E+03	1.00	2.23E-05	2.23E-05	1.00			
5.08E+03	5.08E+03	1.00	2.20E-05	2.20E-05	1.00			
5.33E+03	5.33E+03	1.00	2.16E-05	2.16E-05	1.00			
5.59E+03	5.59E+03	1.00	2.13E-05	2.13E-05	1.00			
5.84E+03	5.84E+03	1.00	2.09E-05	2.09E-05	1.00			
6.10E+03	6.10E+03	1.00	2.06E-05	2.06E-05	1.00			
6.35E+03	6.35E+03	1.00	2.02E-05	2.02E-05	1.00			
6.60E+03	6.60E+03	1.00	1.99E-05	1.99E-05	1.00			
6.86E+03	6.86E+03	1.00	1.96E-05	1.96E-05	1.00			
7.11E+03	7.11E+03	1.00	1.92E-05	1.92E-05	1.00			
7.37E+03	7.37E+03	1.00	1.89E-05	1.89E-05	1.00			
7.62E+03	7.62E+03	1.00	1.86E-05	1.86E-05	1.00			
7.88E+03	7.88E+03	1.00	1.83E-05	1.83E-05	1.00			
8.13E+03	8.13E+03	1.00	1.80E-05	1.80E-05	1.00			
8.38E+03	8.38E+03	1.00	1.77E-05	1.77E-05	1.00			
8.64E+03	8.64E+03	1.00	1.74E-05	1.74E-05	1.00			
8.89E+03	8.89E+03	1.00	1.71E-05	1.71E-05	1.00			
9.15E+03	9.15E+03	1.00	1.69E-05	1.69E-05	1.00			
9.40E+03	9.40E+03	1.00	1.66E-05	1.66E-05	1.00			
9.65E+03	9.65E+03	1.00	1.63E-05	1.63E-05	1.00			
9.91E+03	9.91E+03	1.00	1.60E-05	1.60E-05	1.00			
1.02E+04	1.02E+04	1.00	5.36E-07	5.40E-07	0.99			
TH230	TH230	#VALUE!	TH230	#VALUE!	#VALUE!	41	URANIUM-	U238
9.62E-06	9.62E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	1.39E-09	1.39E-09	1.00			
5.08E+02	5.08E+02	1.00	2.09E-08	2.09E-08	1.00			
7.62E+02	7.62E+02	1.00	6.52E-08	6.52E-08	1.00			
1.02E+03	1.02E+03	1.00	9.24E-08	9.24E-08	1.00			
1.27E+03	1.27E+03	1.00	9.44E-08	9.44E-08	1.00			
1.52E+03	1.52E+03	1.00	9.31E-08	9.31E-08	1.00			
1.78E+03	1.78E+03	1.00	9.17E-08	9.17E-08	1.00			
2.03E+03	2.03E+03	1.00	9.03E-08	9.03E-08	1.00			
2.29E+03	2.29E+03	1.00	8.89E-08	8.89E-08	1.00			
2.54E+03	2.54E+03	1.00	8.75E-08	8.75E-08	1.00			
2.79E+03	2.79E+03	1.00	8.62E-08	8.62E-08	1.00			
3.05E+03	3.05E+03	1.00	8.48E-08	8.48E-08	1.00			
3.30E+03	3.30E+03	1.00	8.35E-08	8.35E-08	1.00			
3.56E+03	3.56E+03	1.00	8.22E-08	8.22E-08	1.00			
3.81E+03	3.81E+03	1.00	8.09E-08	8.09E-08	1.00			
4.06E+03	4.06E+03	1.00	7.97E-08	7.97E-08	1.00			
4.32E+03	4.32E+03	1.00	7.84E-08	7.84E-08	1.00			
4.57E+03	4.57E+03	1.00	7.72E-08	7.72E-08	1.00			
4.83E+03	4.83E+03	1.00	7.60E-08	7.60E-08	1.00			

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Results: ... (cont)

CASE1A

5.08E+03	5.08E+03	1.00	7.49E-08	7.49E-08	1.00			
5.33E+03	5.33E+03	1.00	7.37E-08	7.37E-08	1.00			
5.59E+03	5.59E+03	1.00	7.26E-08	7.26E-08	1.00			
5.84E+03	5.84E+03	1.00	7.14E-08	7.14E-08	1.00			
6.10E+03	6.10E+03	1.00	7.03E-08	7.03E-08	1.00			
6.35E+03	6.35E+03	1.00	6.92E-08	6.92E-08	1.00			
6.60E+03	6.60E+03	1.00	6.81E-08	6.81E-08	1.00			
6.86E+03	6.86E+03	1.00	6.71E-08	6.71E-08	1.00			
7.11E+03	7.11E+03	1.00	6.60E-08	6.60E-08	1.00			
7.37E+03	7.37E+03	1.00	6.50E-08	6.50E-08	1.00			
7.62E+03	7.62E+03	1.00	6.40E-08	6.40E-08	1.00			
7.88E+03	7.88E+03	1.00	6.30E-08	6.30E-08	1.00			
8.13E+03	8.13E+03	1.00	6.20E-08	6.20E-08	1.00			
8.38E+03	8.38E+03	1.00	6.11E-08	6.11E-08	1.00			
8.64E+03	8.64E+03	1.00	6.01E-08	6.01E-08	1.00			
8.89E+03	8.89E+03	1.00	5.92E-08	5.92E-08	1.00			
9.15E+03	9.15E+03	1.00	5.83E-08	5.83E-08	1.00			
9.40E+03	9.40E+03	1.00	5.74E-08	5.74E-08	1.00			
9.65E+03	9.65E+03	1.00	5.65E-08	5.65E-08	1.00			
9.91E+03	9.91E+03	1.00	5.56E-08	5.56E-08	1.00			
1.02E+04	1.02E+04	1.00	3.62E-09	3.65E-09	0.99			
RA226	RA226	#VALUE!	RA226	#VALUE!	#VALUE!	41	URANIUM-	U238
9.62E-06	9.62E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	7.87E-11	7.87E-11	1.00			
5.08E+02	5.08E+02	1.00	1.79E-09	1.79E-09	1.00			
7.62E+02	7.62E+02	1.00	6.19E-09	6.19E-09	1.00			
1.02E+03	1.02E+03	1.00	9.21E-09	9.21E-09	1.00			
1.27E+03	1.27E+03	1.00	9.42E-09	9.42E-09	1.00			
1.52E+03	1.52E+03	1.00	9.30E-09	9.30E-09	1.00			
1.78E+03	1.78E+03	1.00	9.17E-09	9.17E-09	1.00			
2.03E+03	2.03E+03	1.00	9.03E-09	9.03E-09	1.00			
2.29E+03	2.29E+03	1.00	8.90E-09	8.90E-09	1.00			
2.54E+03	2.54E+03	1.00	8.77E-09	8.77E-09	1.00			
2.79E+03	2.79E+03	1.00	8.64E-09	8.64E-09	1.00			
3.05E+03	3.05E+03	1.00	8.51E-09	8.51E-09	1.00			
3.30E+03	3.30E+03	1.00	8.39E-09	8.39E-09	1.00			
3.56E+03	3.56E+03	1.00	8.26E-09	8.26E-09	1.00			
3.81E+03	3.81E+03	1.00	8.14E-09	8.14E-09	1.00			
4.06E+03	4.06E+03	1.00	8.02E-09	8.02E-09	1.00			
4.32E+03	4.32E+03	1.00	7.91E-09	7.91E-09	1.00			
4.57E+03	4.57E+03	1.00	7.79E-09	7.79E-09	1.00			
4.83E+03	4.83E+03	1.00	7.68E-09	7.68E-09	1.00			
5.08E+03	5.08E+03	1.00	7.56E-09	7.56E-09	1.00			
5.33E+03	5.33E+03	1.00	7.45E-09	7.45E-09	1.00			
5.59E+03	5.59E+03	1.00	7.34E-09	7.34E-09	1.00			
5.84E+03	5.84E+03	1.00	7.24E-09	7.24E-09	1.00			
6.10E+03	6.10E+03	1.00	7.13E-09	7.13E-09	1.00			
6.35E+03	6.35E+03	1.00	7.02E-09	7.02E-09	1.00			
6.61E+03	6.61E+03	1.00	6.92E-09	6.92E-09	1.00			
6.86E+03	6.86E+03	1.00	6.82E-09	6.82E-09	1.00			
7.11E+03	7.11E+03	1.00	6.72E-09	6.72E-09	1.00			
7.37E+03	7.37E+03	1.00	6.62E-09	6.62E-09	1.00			
7.62E+03	7.62E+03	1.00	6.52E-09	6.52E-09	1.00			
7.88E+03	7.88E+03	1.00	6.42E-09	6.42E-09	1.00			
8.13E+03	8.13E+03	1.00	6.33E-09	6.33E-09	1.00			
8.38E+03	8.38E+03	1.00	6.24E-09	6.24E-09	1.00			

10/13/98 results: . . . (cont)

CASE1A

8.64E+03	8.64E+03	1.00	6.14E-09	6.14E-09	1.00			
8.89E+03	8.89E+03	1.00	6.05E-09	6.05E-09	1.00			
9.15E+03	9.15E+03	1.00	5.97E-09	5.97E-09	1.00			
9.40E+03	9.40E+03	1.00	5.88E-09	5.88E-09	1.00			
9.65E+03	9.65E+03	1.00	5.79E-09	5.79E-09	1.00			
9.91E+03	9.91E+03	1.00	5.70E-09	5.70E-09	1.00			
1.02E+04	1.02E+04	1.00	9.95E-13	9.95E-13	1.00			
RN222	RN222	#VALUE!	RN222	#VALUE!	#VALUE!	41	URANIUM-	U238
9.60E-06	9.60E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	7.87E-11	7.87E-11	1.00			
5.08E+02	5.08E+02	1.00	1.79E-09	1.79E-09	1.00			
7.62E+02	7.62E+02	1.00	6.19E-09	6.19E-09	1.00			
1.02E+03	1.02E+03	1.00	9.21E-09	9.21E-09	1.00			
1.27E+03	1.27E+03	1.00	9.42E-09	9.42E-09	1.00			
1.52E+03	1.52E+03	1.00	9.30E-09	9.30E-09	1.00			
1.78E+03	1.78E+03	1.00	9.17E-09	9.17E-09	1.00			
2.03E+03	2.03E+03	1.00	9.03E-09	9.03E-09	1.00			
2.29E+03	2.29E+03	1.00	8.90E-09	8.90E-09	1.00			
2.54E+03	2.54E+03	1.00	8.77E-09	8.77E-09	1.00			
2.79E+03	2.79E+03	1.00	8.64E-09	8.64E-09	1.00			
3.05E+03	3.05E+03	1.00	8.51E-09	8.51E-09	1.00			
3.30E+03	3.30E+03	1.00	8.39E-09	8.39E-09	1.00			
3.56E+03	3.56E+03	1.00	8.26E-09	8.26E-09	1.00			
3.81E+03	3.81E+03	1.00	8.14E-09	8.14E-09	1.00			
4.06E+03	4.06E+03	1.00	8.02E-09	8.02E-09	1.00			
4.32E+03	4.32E+03	1.00	7.91E-09	7.91E-09	1.00			
4.57E+03	4.57E+03	1.00	7.79E-09	7.79E-09	1.00			
4.83E+03	4.83E+03	1.00	7.68E-09	7.68E-09	1.00			
5.08E+03	5.08E+03	1.00	7.56E-09	7.56E-09	1.00			
5.33E+03	5.33E+03	1.00	7.45E-09	7.45E-09	1.00			
5.59E+03	5.59E+03	1.00	7.34E-09	7.34E-09	1.00			
5.84E+03	5.84E+03	1.00	7.24E-09	7.24E-09	1.00			
6.10E+03	6.10E+03	1.00	7.13E-09	7.13E-09	1.00			
6.35E+03	6.35E+03	1.00	7.02E-09	7.02E-09	1.00			
6.61E+03	6.61E+03	1.00	6.92E-09	6.92E-09	1.00			
6.86E+03	6.86E+03	1.00	6.82E-09	6.82E-09	1.00			
7.11E+03	7.11E+03	1.00	6.72E-09	6.72E-09	1.00			
7.37E+03	7.37E+03	1.00	6.62E-09	6.62E-09	1.00			
7.62E+03	7.62E+03	1.00	6.52E-09	6.52E-09	1.00			
7.88E+03	7.88E+03	1.00	6.42E-09	6.42E-09	1.00			
8.13E+03	8.13E+03	1.00	6.33E-09	6.33E-09	1.00			
8.38E+03	8.38E+03	1.00	6.24E-09	6.24E-09	1.00			
8.64E+03	8.64E+03	1.00	6.14E-09	6.14E-09	1.00			
8.89E+03	8.89E+03	1.00	6.05E-09	6.05E-09	1.00			
9.15E+03	9.15E+03	1.00	5.96E-09	5.96E-09	1.00			
9.40E+03	9.40E+03	1.00	5.88E-09	5.88E-09	1.00			
9.65E+03	9.65E+03	1.00	5.79E-09	5.79E-09	1.00			
9.91E+03	9.91E+03	1.00	5.70E-09	5.70E-09	1.00			
1.02E+04	1.02E+04	1.00	9.95E-13	9.95E-13	1.00			
PB210	PB210	#VALUE!	PB210	#VALUE!	#VALUE!	41	URANIUM-	U238
9.60E-06	9.60E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	6.30E-11	6.30E-11	1.00			
5.08E+02	5.08E+02	1.00	1.55E-09	1.55E-09	1.00			
7.62E+02	7.62E+02	1.00	5.44E-09	5.44E-09	1.00			
1.02E+03	1.02E+03	1.00	8.14E-09	8.14E-09	1.00			
1.27E+03	1.27E+03	1.00	8.33E-09	8.33E-09	1.00			

10/12/98 Results - - - (cont)

CASE1A

1.52E+03	1.52E+03	1.00	8.22E-09	8.22E-09	1.00			
1.78E+03	1.78E+03	1.00	8.11E-09	8.11E-09	1.00			
2.03E+03	2.03E+03	1.00	7.99E-09	7.99E-09	1.00			
2.29E+03	2.29E+03	1.00	7.87E-09	7.87E-09	1.00			
2.54E+03	2.54E+03	1.00	7.76E-09	7.76E-09	1.00			
2.79E+03	2.79E+03	1.00	7.64E-09	7.64E-09	1.00			
3.05E+03	3.05E+03	1.00	7.53E-09	7.53E-09	1.00			
3.30E+03	3.30E+03	1.00	7.42E-09	7.42E-09	1.00			
3.56E+03	3.56E+03	1.00	7.31E-09	7.31E-09	1.00			
3.81E+03	3.81E+03	1.00	7.21E-09	7.21E-09	1.00			
4.06E+03	4.06E+03	1.00	7.10E-09	7.10E-09	1.00			
4.32E+03	4.32E+03	1.00	7.00E-09	7.00E-09	1.00			
4.57E+03	4.57E+03	1.00	6.90E-09	6.90E-09	1.00			
4.83E+03	4.83E+03	1.00	6.80E-09	6.80E-09	1.00			
5.08E+03	5.08E+03	1.00	6.70E-09	6.70E-09	1.00			
5.33E+03	5.33E+03	1.00	6.60E-09	6.60E-09	1.00			
5.59E+03	5.59E+03	1.00	6.51E-09	6.51E-09	1.00			
5.84E+03	5.84E+03	1.00	6.41E-09	6.41E-09	1.00			
6.10E+03	6.10E+03	1.00	6.32E-09	6.32E-09	1.00			
6.35E+03	6.35E+03	1.00	6.22E-09	6.22E-09	1.00			
6.61E+03	6.61E+03	1.00	6.13E-09	6.13E-09	1.00			
6.86E+03	6.86E+03	1.00	6.04E-09	6.04E-09	1.00			
7.11E+03	7.11E+03	1.00	5.95E-09	5.95E-09	1.00			
7.37E+03	7.37E+03	1.00	5.87E-09	5.87E-09	1.00			
7.62E+03	7.62E+03	1.00	5.78E-09	5.78E-09	1.00			
7.88E+03	7.88E+03	1.00	5.70E-09	5.70E-09	1.00			
8.13E+03	8.13E+03	1.00	5.61E-09	5.61E-09	1.00			
8.38E+03	8.38E+03	1.00	5.53E-09	5.53E-09	1.00			
8.64E+03	8.64E+03	1.00	5.45E-09	5.45E-09	1.00			
8.89E+03	8.89E+03	1.00	5.37E-09	5.37E-09	1.00			
9.15E+03	9.15E+03	1.00	5.29E-09	5.29E-09	1.00			
9.40E+03	9.40E+03	1.00	5.21E-09	5.21E-09	1.00			
9.65E+03	9.65E+03	1.00	5.14E-09	5.14E-09	1.00			
9.91E+03	9.91E+03	1.00	5.06E-09	5.06E-09	1.00			
1.02E+04	1.02E+04	1.00	1.01E-12	1.01E-12	1.00			
BI210	BI210	#VALUE!	BI210	#VALUE!	#VALUE!	41	URANIUM-	U238
9.60E-06	9.60E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	6.30E-11	6.30E-11	1.00			
5.08E+02	5.08E+02	1.00	1.55E-09	1.55E-09	1.00			
7.62E+02	7.62E+02	1.00	5.44E-09	5.44E-09	1.00			
1.02E+03	1.02E+03	1.00	8.14E-09	8.14E-09	1.00			
1.27E+03	1.27E+03	1.00	8.33E-09	8.33E-09	1.00			
1.52E+03	1.52E+03	1.00	8.22E-09	8.22E-09	1.00			
1.78E+03	1.78E+03	1.00	8.10E-09	8.10E-09	1.00			
2.03E+03	2.03E+03	1.00	7.99E-09	7.99E-09	1.00			
2.29E+03	2.29E+03	1.00	7.87E-09	7.87E-09	1.00			
2.54E+03	2.54E+03	1.00	7.76E-09	7.76E-09	1.00			
2.79E+03	2.79E+03	1.00	7.64E-09	7.64E-09	1.00			
3.05E+03	3.05E+03	1.00	7.53E-09	7.53E-09	1.00			
3.30E+03	3.30E+03	1.00	7.42E-09	7.42E-09	1.00			
3.56E+03	3.56E+03	1.00	7.31E-09	7.31E-09	1.00			
3.81E+03	3.81E+03	1.00	7.21E-09	7.21E-09	1.00			
4.06E+03	4.06E+03	1.00	7.10E-09	7.10E-09	1.00			
4.32E+03	4.32E+03	1.00	7.00E-09	7.00E-09	1.00			
4.57E+03	4.57E+03	1.00	6.90E-09	6.90E-09	1.00			
4.83E+03	4.83E+03	1.00	6.80E-09	6.80E-09	1.00			

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10/13/98 Results: ... (cont)

CASE1A

5.08E+03	5.08E+03	1.00	6.70E-09	6.70E-09	1.00			
5.33E+03	5.33E+03	1.00	6.60E-09	6.60E-09	1.00			
5.59E+03	5.59E+03	1.00	6.50E-09	6.50E-09	1.00			
5.84E+03	5.84E+03	1.00	6.41E-09	6.41E-09	1.00			
6.10E+03	6.10E+03	1.00	6.32E-09	6.32E-09	1.00			
6.35E+03	6.35E+03	1.00	6.22E-09	6.22E-09	1.00			
6.61E+03	6.61E+03	1.00	6.13E-09	6.13E-09	1.00			
6.86E+03	6.86E+03	1.00	6.04E-09	6.04E-09	1.00			
7.11E+03	7.11E+03	1.00	5.95E-09	5.95E-09	1.00			
7.37E+03	7.37E+03	1.00	5.87E-09	5.87E-09	1.00			
7.62E+03	7.62E+03	1.00	5.78E-09	5.78E-09	1.00			
7.88E+03	7.88E+03	1.00	5.70E-09	5.70E-09	1.00			
8.13E+03	8.13E+03	1.00	5.61E-09	5.61E-09	1.00			
8.38E+03	8.38E+03	1.00	5.53E-09	5.53E-09	1.00			
8.64E+03	8.64E+03	1.00	5.45E-09	5.45E-09	1.00			
8.89E+03	8.89E+03	1.00	5.37E-09	5.37E-09	1.00			
9.15E+03	9.15E+03	1.00	5.29E-09	5.29E-09	1.00			
9.40E+03	9.40E+03	1.00	5.21E-09	5.21E-09	1.00			
9.65E+03	9.65E+03	1.00	5.14E-09	5.14E-09	1.00			
9.91E+03	9.91E+03	1.00	5.06E-09	5.06E-09	1.00			
1.02E+04	1.02E+04	1.00	1.01E-12	1.01E-12	1.00			
PO210	PO210	#VALUE!	PO210	#VALUE!	#VALUE!	41	URANIUM-	U238
9.60E-06	9.60E-06	1.00	0.00E+00	0.00E+00	#DIV/0!			
2.54E+02	2.54E+02	1.00	6.28E-11	6.28E-11	1.00			
5.08E+02	5.08E+02	1.00	1.54E-09	1.54E-09	1.00			
7.62E+02	7.62E+02	1.00	5.43E-09	5.43E-09	1.00			
1.02E+03	1.02E+03	1.00	8.13E-09	8.13E-09	1.00			
1.27E+03	1.27E+03	1.00	8.31E-09	8.31E-09	1.00			
1.52E+03	1.52E+03	1.00	8.20E-09	8.20E-09	1.00			
1.78E+03	1.78E+03	1.00	8.09E-09	8.09E-09	1.00			
2.03E+03	2.03E+03	1.00	7.97E-09	7.97E-09	1.00			
2.29E+03	2.29E+03	1.00	7.85E-09	7.85E-09	1.00			
2.54E+03	2.54E+03	1.00	7.74E-09	7.74E-09	1.00			
2.79E+03	2.79E+03	1.00	7.63E-09	7.63E-09	1.00			
3.05E+03	3.05E+03	1.00	7.52E-09	7.52E-09	1.00			
3.30E+03	3.30E+03	1.00	7.41E-09	7.41E-09	1.00			
3.56E+03	3.56E+03	1.00	7.30E-09	7.30E-09	1.00			
3.81E+03	3.81E+03	1.00	7.19E-09	7.19E-09	1.00			
4.06E+03	4.06E+03	1.00	7.09E-09	7.09E-09	1.00			
4.32E+03	4.32E+03	1.00	6.98E-09	6.98E-09	1.00			
4.57E+03	4.57E+03	1.00	6.88E-09	6.88E-09	1.00			
4.83E+03	4.83E+03	1.00	6.78E-09	6.78E-09	1.00			
5.08E+03	5.08E+03	1.00	6.68E-09	6.68E-09	1.00			
5.33E+03	5.33E+03	1.00	6.59E-09	6.59E-09	1.00			
5.59E+03	5.59E+03	1.00	6.49E-09	6.49E-09	1.00			
5.84E+03	5.84E+03	1.00	6.40E-09	6.40E-09	1.00			
6.10E+03	6.10E+03	1.00	6.30E-09	6.30E-09	1.00			
6.35E+03	6.35E+03	1.00	6.21E-09	6.21E-09	1.00			
6.61E+03	6.61E+03	1.00	6.12E-09	6.12E-09	1.00			
6.86E+03	6.86E+03	1.00	6.03E-09	6.03E-09	1.00			
7.11E+03	7.11E+03	1.00	5.94E-09	5.94E-09	1.00			
7.37E+03	7.37E+03	1.00	5.85E-09	5.85E-09	1.00			
7.62E+03	7.62E+03	1.00	5.77E-09	5.77E-09	1.00			
7.88E+03	7.88E+03	1.00	5.68E-09	5.68E-09	1.00			
8.13E+03	8.13E+03	1.00	5.60E-09	5.60E-09	1.00			
8.38E+03	8.38E+03	1.00	5.52E-09	5.52E-09	1.00			

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Results: --- (Cont)

CASE1A

8.64E+03	8.64E+03	1.00	5.44E-09	5.44E-09	1.00			
8.89E+03	8.89E+03	1.00	5.36E-09	5.36E-09	1.00			
9.15E+03	9.15E+03	1.00	5.28E-09	5.28E-09	1.00			
9.40E+03	9.40E+03	1.00	5.20E-09	5.20E-09	1.00			
9.65E+03	9.65E+03	1.00	5.13E-09	5.13E-09	1.00			
9.91E+03	9.91E+03	1.00	5.05E-09	5.05E-09	1.00			
1.02E+04	1.02E+04	1.00	1.01E-12	1.01E-12	1.00			

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Results: ... (cont)

CASE1A

Final Comparison of CNWRA and PNL MEPAS 3.2g Results: CASE2A.WCF
==========Surface Water Concentration Ouput (PAL 10/13/98)
RADCON VERSION 05/01/1997

WATERBORNE COMPONENT of the Multimedia Environmental
Pollutant Assessment System (MEPAS): Models the
movement of chemicals and radionuclides through vadose
zone, saturated zone, surface water, and wetlands media.

Pacific Northwest National Laboratory
Operated for the U.S Department of Energy
by Battelle Memorial Institute
P.O. Box 999
Richland, Washington 99352

==========

Run Name: CASE2A
Run Performed: 10/7/98 16:18:01 g/mL or pCi/mL

==========

PAL	PNL		PAL	PNL	
		Ratio	SW Conc.	SW Conc.	Ratio
Time (yr)	Time (yr)	PAL/PNL	U238	U238	PAL/PNL
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!
2.50E+02	2.50E+02	1.00	1.18E-05	1.18E-05	1.00
5.00E+02	5.00E+02	1.00	1.18E-05	1.18E-05	1.00
7.50E+02	7.50E+02	1.00	1.18E-05	1.18E-05	1.00
1.00E+03	1.00E+03	1.00	1.18E-05	1.18E-05	1.00
1.25E+03	1.25E+03	1.00	1.18E-05	1.18E-05	1.00
1.50E+03	1.50E+03	1.00	1.18E-05	1.18E-05	1.00
1.75E+03	1.75E+03	1.00	1.18E-05	1.18E-05	1.00
2.00E+03	2.00E+03	1.00	1.18E-05	1.18E-05	1.00
2.25E+03	2.25E+03	1.00	1.18E-05	1.18E-05	1.00
2.50E+03	2.50E+03	1.00	1.18E-05	1.18E-05	1.00
2.75E+03	2.75E+03	1.00	1.18E-05	1.18E-05	1.00
3.00E+03	3.00E+03	1.00	1.18E-05	1.18E-05	1.00
3.25E+03	3.25E+03	1.00	1.18E-05	1.18E-05	1.00
3.50E+03	3.50E+03	1.00	1.18E-05	1.18E-05	1.00
3.75E+03	3.75E+03	1.00	1.18E-05	1.18E-05	1.00
4.00E+03	4.00E+03	1.00	1.18E-05	1.18E-05	1.00
4.25E+03	4.25E+03	1.00	1.18E-05	1.18E-05	1.00
4.50E+03	4.50E+03	1.00	1.18E-05	1.18E-05	1.00
4.75E+03	4.75E+03	1.00	1.18E-05	1.18E-05	1.00
5.00E+03	5.00E+03	1.00	1.18E-05	1.18E-05	1.00
5.25E+03	5.25E+03	1.00	1.18E-05	1.18E-05	1.00
5.50E+03	5.50E+03	1.00	1.18E-05	1.18E-05	1.00
5.75E+03	5.75E+03	1.00	1.18E-05	1.18E-05	1.00
6.00E+03	6.00E+03	1.00	1.18E-05	1.18E-05	1.00
6.25E+03	6.25E+03	1.00	1.18E-05	1.18E-05	1.00
6.50E+03	6.50E+03	1.00	1.18E-05	1.18E-05	1.00
6.75E+03	6.75E+03	1.00	1.18E-05	1.18E-05	1.00
7.00E+03	7.00E+03	1.00	1.18E-05	1.18E-05	1.00
7.25E+03	7.25E+03	1.00	1.18E-05	1.18E-05	1.00
7.50E+03	7.50E+03	1.00	1.18E-05	1.18E-05	1.00
7.75E+03	7.75E+03	1.00	1.18E-05	1.18E-05	1.00
8.00E+03	8.00E+03	1.00	1.18E-05	1.18E-05	1.00
8.25E+03	8.25E+03	1.00	1.18E-05	1.18E-05	1.00

Results: — (cont)
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8.50E+03	8.50E+03	1.00	1.18E-05	1.18E-05	1.00			
8.75E+03	8.75E+03	1.00	1.18E-05	1.18E-05	1.00			
9.00E+03	9.00E+03	1.00	1.18E-05	1.18E-05	1.00			
9.25E+03	9.25E+03	1.00	1.18E-05	1.18E-05	1.00			
9.50E+03	9.50E+03	1.00	1.18E-05	1.18E-05	1.00			
9.75E+03	9.75E+03	1.00	1.18E-05	1.18E-05	1.00			
1.00E+04	1.00E+04	1.00	4.66E-07	4.66E-07	1.00			
TH234	TH234	#VALUE!	TH234	#VALUE!	#VALUE!	41	URANIUM-	U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!			
2.50E+02	2.50E+02	1.00	1.19E-05	1.19E-05	1.00			
5.00E+02	5.00E+02	1.00	1.19E-05	1.19E-05	1.00			
7.50E+02	7.50E+02	1.00	1.19E-05	1.19E-05	1.00			
1.00E+03	1.00E+03	1.00	1.19E-05	1.19E-05	1.00			
1.25E+03	1.25E+03	1.00	1.19E-05	1.19E-05	1.00			
1.50E+03	1.50E+03	1.00	1.19E-05	1.19E-05	1.00			
1.75E+03	1.75E+03	1.00	1.19E-05	1.19E-05	1.00			
2.00E+03	2.00E+03	1.00	1.19E-05	1.19E-05	1.00			
2.25E+03	2.25E+03	1.00	1.19E-05	1.19E-05	1.00			
2.50E+03	2.50E+03	1.00	1.19E-05	1.19E-05	1.00			
2.75E+03	2.75E+03	1.00	1.19E-05	1.19E-05	1.00			
3.00E+03	3.00E+03	1.00	1.19E-05	1.19E-05	1.00			
3.25E+03	3.25E+03	1.00	1.19E-05	1.19E-05	1.00			
3.50E+03	3.50E+03	1.00	1.19E-05	1.19E-05	1.00			
3.75E+03	3.75E+03	1.00	1.19E-05	1.19E-05	1.00			
4.00E+03	4.00E+03	1.00	1.19E-05	1.19E-05	1.00			
4.25E+03	4.25E+03	1.00	1.19E-05	1.19E-05	1.00			
4.50E+03	4.50E+03	1.00	1.19E-05	1.19E-05	1.00			
4.75E+03	4.75E+03	1.00	1.19E-05	1.19E-05	1.00			
5.00E+03	5.00E+03	1.00	1.19E-05	1.19E-05	1.00			
5.25E+03	5.25E+03	1.00	1.19E-05	1.19E-05	1.00			
5.50E+03	5.50E+03	1.00	1.19E-05	1.19E-05	1.00			
5.75E+03	5.75E+03	1.00	1.19E-05	1.19E-05	1.00			
6.00E+03	6.00E+03	1.00	1.19E-05	1.19E-05	1.00			
6.25E+03	6.25E+03	1.00	1.19E-05	1.19E-05	1.00			
6.50E+03	6.50E+03	1.00	1.19E-05	1.19E-05	1.00			
6.75E+03	6.75E+03	1.00	1.19E-05	1.19E-05	1.00			
7.00E+03	7.00E+03	1.00	1.19E-05	1.19E-05	1.00			
7.25E+03	7.25E+03	1.00	1.19E-05	1.19E-05	1.00			
7.50E+03	7.50E+03	1.00	1.19E-05	1.19E-05	1.00			
7.75E+03	7.75E+03	1.00	1.19E-05	1.19E-05	1.00			
8.00E+03	8.00E+03	1.00	1.19E-05	1.19E-05	1.00			
8.25E+03	8.25E+03	1.00	1.19E-05	1.19E-05	1.00			
8.50E+03	8.50E+03	1.00	1.19E-05	1.19E-05	1.00			
8.75E+03	8.75E+03	1.00	1.19E-05	1.19E-05	1.00			
9.00E+03	9.00E+03	1.00	1.19E-05	1.19E-05	1.00			
9.25E+03	9.25E+03	1.00	1.19E-05	1.19E-05	1.00			
9.50E+03	9.50E+03	1.00	1.19E-05	1.19E-05	1.00			
9.75E+03	9.75E+03	1.00	1.19E-05	1.19E-05	1.00			
1.00E+04	1.00E+04	1.00	4.73E-07	4.73E-07	1.00			
U234	U234	#VALUE!	U234	#VALUE!	#VALUE!	41	URANIUM-	U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!			
2.50E+02	2.50E+02	1.00	1.98E-11	1.98E-11	1.00			
5.00E+02	5.00E+02	1.00	4.30E-11	4.30E-11	1.00			
7.50E+02	7.50E+02	1.00	6.62E-11	6.62E-11	1.00			
1.00E+03	1.00E+03	1.00	8.94E-11	8.94E-11	1.00			
1.25E+03	1.25E+03	1.00	1.13E-10	1.13E-10	1.00			

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Results: ... (cont)

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1.50E+03	1.50E+03	1.00	1.36E-10	1.36E-10	1.00		
1.75E+03	1.75E+03	1.00	1.59E-10	1.59E-10	1.00		
2.00E+03	2.00E+03	1.00	1.82E-10	1.82E-10	1.00		
2.25E+03	2.25E+03	1.00	2.05E-10	2.05E-10	1.00		
2.50E+03	2.50E+03	1.00	2.29E-10	2.29E-10	1.00		
2.75E+03	2.75E+03	1.00	2.52E-10	2.52E-10	1.00		
3.00E+03	3.00E+03	1.00	2.75E-10	2.75E-10	1.00		
3.25E+03	3.25E+03	1.00	2.98E-10	2.98E-10	1.00		
3.50E+03	3.50E+03	1.00	3.21E-10	3.21E-10	1.00		
3.75E+03	3.75E+03	1.00	3.45E-10	3.45E-10	1.00		
4.00E+03	4.00E+03	1.00	3.68E-10	3.68E-10	1.00		
4.25E+03	4.25E+03	1.00	3.91E-10	3.91E-10	1.00		
4.50E+03	4.50E+03	1.00	4.14E-10	4.14E-10	1.00		
4.75E+03	4.75E+03	1.00	4.37E-10	4.37E-10	1.00		
5.00E+03	5.00E+03	1.00	4.60E-10	4.60E-10	1.00		
5.25E+03	5.25E+03	1.00	4.84E-10	4.84E-10	1.00		
5.50E+03	5.50E+03	1.00	5.07E-10	5.07E-10	1.00		
5.75E+03	5.75E+03	1.00	5.30E-10	5.30E-10	1.00		
6.00E+03	6.00E+03	1.00	5.53E-10	5.53E-10	1.00		
6.25E+03	6.25E+03	1.00	5.76E-10	5.76E-10	1.00		
6.50E+03	6.50E+03	1.00	6.00E-10	6.00E-10	1.00		
6.75E+03	6.75E+03	1.00	6.23E-10	6.23E-10	1.00		
7.00E+03	7.00E+03	1.00	6.46E-10	6.46E-10	1.00		
7.25E+03	7.25E+03	1.00	6.69E-10	6.69E-10	1.00		
7.50E+03	7.50E+03	1.00	6.92E-10	6.92E-10	1.00		
7.75E+03	7.75E+03	1.00	7.16E-10	7.16E-10	1.00		
8.00E+03	8.00E+03	1.00	7.39E-10	7.39E-10	1.00		
8.25E+03	8.25E+03	1.00	7.62E-10	7.62E-10	1.00		
8.50E+03	8.50E+03	1.00	7.85E-10	7.85E-10	1.00		
8.75E+03	8.75E+03	1.00	8.08E-10	8.08E-10	1.00		
9.00E+03	9.00E+03	1.00	8.31E-10	8.31E-10	1.00		
9.25E+03	9.25E+03	1.00	8.54E-10	8.54E-10	1.00		
9.50E+03	9.50E+03	1.00	8.78E-10	8.78E-10	1.00		
9.75E+03	9.75E+03	1.00	9.01E-10	9.01E-10	1.00		
1.00E+04	1.00E+04	1.00	3.58E-11	3.58E-11	1.00		
TH230	TH230	#VALUE!	TH230	#VALUE!	#VALUE!	41	URANIUM- U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!		
2.50E+02	2.50E+02	1.00	5.73E-17	5.73E-17	1.00		
5.00E+02	5.00E+02	1.00	2.52E-16	2.52E-16	1.00		
7.50E+02	7.50E+02	1.00	5.97E-16	5.97E-16	1.00		
1.00E+03	1.00E+03	1.00	1.08E-15	1.08E-15	1.00		
1.25E+03	1.25E+03	1.00	1.93E-15	1.93E-15	1.00		
1.50E+03	1.50E+03	1.00	2.79E-15	2.79E-15	1.00		
1.75E+03	1.75E+03	1.00	3.64E-15	3.64E-15	1.00		
2.00E+03	2.00E+03	1.00	4.49E-15	4.49E-15	1.00		
2.25E+03	2.25E+03	1.00	5.92E-15	5.92E-15	1.00		
2.50E+03	2.50E+03	1.00	7.36E-15	7.36E-15	1.00		
2.75E+03	2.75E+03	1.00	8.79E-15	8.79E-15	1.00		
3.00E+03	3.00E+03	1.00	1.02E-14	1.02E-14	1.00		
3.25E+03	3.25E+03	1.00	1.22E-14	1.22E-14	1.00		
3.50E+03	3.50E+03	1.00	1.43E-14	1.43E-14	1.00		
3.75E+03	3.75E+03	1.00	1.63E-14	1.63E-14	1.00		
4.00E+03	4.00E+03	1.00	1.83E-14	1.83E-14	1.00		
4.25E+03	4.25E+03	1.00	2.09E-14	2.09E-14	1.00		
4.50E+03	4.50E+03	1.00	2.35E-14	2.35E-14	1.00		
4.75E+03	4.75E+03	1.00	2.61E-14	2.61E-14	1.00		

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5.00E+03	5.00E+03	1.00	2.87E-14	2.87E-14	1.00	
5.25E+03	5.25E+03	1.00	3.19E-14	3.19E-14	1.00	
5.50E+03	5.50E+03	1.00	3.50E-14	3.50E-14	1.00	
5.75E+03	5.75E+03	1.00	3.82E-14	3.82E-14	1.00	
6.00E+03	6.00E+03	1.00	4.14E-14	4.14E-14	1.00	
6.25E+03	6.25E+03	1.00	4.52E-14	4.52E-14	1.00	
6.50E+03	6.50E+03	1.00	4.89E-14	4.89E-14	1.00	
6.75E+03	6.75E+03	1.00	5.27E-14	5.27E-14	1.00	
7.00E+03	7.00E+03	1.00	5.65E-14	5.65E-14	1.00	
7.25E+03	7.25E+03	1.00	6.08E-14	6.08E-14	1.00	
7.50E+03	7.50E+03	1.00	6.51E-14	6.51E-14	1.00	
7.75E+03	7.75E+03	1.00	6.95E-14	6.95E-14	1.00	
8.00E+03	8.00E+03	1.00	7.39E-14	7.39E-14	1.00	
8.25E+03	8.25E+03	1.00	7.88E-14	7.88E-14	1.00	
8.50E+03	8.50E+03	1.00	8.37E-14	8.37E-14	1.00	
8.75E+03	8.75E+03	1.00	8.86E-14	8.86E-14	1.00	
9.00E+03	9.00E+03	1.00	9.36E-14	9.36E-14	1.00	
9.25E+03	9.25E+03	1.00	9.91E-14	9.91E-14	1.00	
9.50E+03	9.50E+03	1.00	1.05E-13	1.05E-13	1.00	
9.75E+03	9.75E+03	1.00	1.10E-13	1.10E-13	1.00	
1.00E+04	1.00E+04	1.00	4.37E-15	4.37E-15	1.00	
RA226	RA226	#VALUE!	RA226	#VALUE!	#VALUE!	41 URANIUM- U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!	
2.50E+02	2.50E+02	1.00	5.59E-21	1.60E-27	3489082.97	
5.00E+02	5.00E+02	1.00	4.73E-20	3.05E-27	15523465.70	
7.50E+02	7.50E+02	1.00	1.74E-19	4.49E-27	38641425.39	
1.00E+03	1.00E+03	1.00	4.22E-19	4.22E-19	1.00	
1.25E+03	1.25E+03	1.00	1.20E-18	1.20E-18	1.00	
1.50E+03	1.50E+03	1.00	1.98E-18	1.98E-18	1.00	
1.75E+03	1.75E+03	1.00	2.76E-18	2.76E-18	1.00	
2.00E+03	2.00E+03	1.00	3.56E-18	3.56E-18	1.00	
2.25E+03	2.25E+03	1.00	5.71E-18	5.71E-18	1.00	
2.50E+03	2.50E+03	1.00	7.87E-18	7.87E-18	1.00	
2.75E+03	2.75E+03	1.00	1.00E-17	1.00E-17	1.00	
3.00E+03	3.00E+03	1.00	1.22E-17	1.22E-17	1.00	
3.25E+03	3.25E+03	1.00	1.64E-17	1.64E-17	1.00	
3.50E+03	3.50E+03	1.00	2.07E-17	2.07E-17	1.00	
3.75E+03	3.75E+03	1.00	2.49E-17	2.49E-17	1.00	
4.00E+03	4.00E+03	1.00	2.92E-17	2.92E-17	1.00	
4.25E+03	4.25E+03	1.00	3.62E-17	3.62E-17	1.00	
4.50E+03	4.50E+03	1.00	4.32E-17	4.32E-17	1.00	
4.75E+03	4.75E+03	1.00	5.02E-17	5.02E-17	1.00	
5.00E+03	5.00E+03	1.00	5.73E-17	5.73E-17	1.00	
5.25E+03	5.25E+03	1.00	6.77E-17	6.77E-17	1.00	
5.50E+03	5.50E+03	1.00	7.82E-17	7.82E-17	1.00	
5.75E+03	5.75E+03	1.00	8.87E-17	8.87E-17	1.00	
6.00E+03	6.00E+03	1.00	9.93E-17	9.93E-17	1.00	
6.25E+03	6.25E+03	1.00	1.14E-16	1.14E-16	1.00	
6.50E+03	6.50E+03	1.00	1.29E-16	1.29E-16	1.00	
6.75E+03	6.75E+03	1.00	1.43E-16	1.43E-16	1.00	
7.00E+03	7.00E+03	1.00	1.58E-16	1.58E-16	1.00	
7.25E+03	7.25E+03	1.00	1.78E-16	1.78E-16	1.00	
7.50E+03	7.50E+03	1.00	1.97E-16	1.97E-16	1.00	
7.75E+03	7.75E+03	1.00	2.17E-16	2.17E-16	1.00	
8.00E+03	8.00E+03	1.00	2.36E-16	2.36E-16	1.00	
8.25E+03	8.25E+03	1.00	2.61E-16	2.61E-16	1.00	

See pg 27 in notebook 281 for explanation of discrepancies

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10/13/98 Results: ... (cont)

CASE1A

8.50E+03	8.50E+03	1.00	2.86E-16	2.86E-16	1.00		
8.75E+03	8.75E+03	1.00	3.12E-16	3.12E-16	1.00		
9.00E+03	9.00E+03	1.00	3.37E-16	3.37E-16	1.00		
9.25E+03	9.25E+03	1.00	3.68E-16	3.68E-16	1.00		
9.50E+03	9.50E+03	1.00	3.99E-16	3.99E-16	1.00		
9.75E+03	9.75E+03	1.00	4.31E-16	4.31E-16	1.00		
1.00E+04	1.00E+04	1.00	1.71E-17	1.71E-17	1.00		
RN222	RN222	#VALUE!	RN222	#VALUE!	#VALUE!	41	URANIUM- U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!		
2.50E+02	2.50E+02	1.00	4.89E-21	6.53E-22	7.48		
5.00E+02	5.00E+02	1.00	4.67E-20	6.53E-22	71.46		
7.50E+02	7.50E+02	1.00	1.72E-19	6.53E-22	263.09	← see pg 151	
1.00E+03	1.00E+03	1.00	4.20E-19	6.53E-22	642.49		
1.25E+03	1.25E+03	1.00	1.20E-18	1.20E-18	1.00		
1.50E+03	1.50E+03	1.00	1.99E-18	1.99E-18	1.00		
1.75E+03	1.75E+03	1.00	2.77E-18	2.77E-18	1.00		
2.00E+03	2.00E+03	1.00	3.57E-18	3.57E-18	1.00		
2.25E+03	2.25E+03	1.00	5.73E-18	5.73E-18	1.00		
2.50E+03	2.50E+03	1.00	7.90E-18	7.90E-18	1.00		
2.75E+03	2.75E+03	1.00	1.01E-17	1.01E-17	1.00		
3.00E+03	3.00E+03	1.00	1.23E-17	1.23E-17	1.00		
3.25E+03	3.25E+03	1.00	1.65E-17	1.65E-17	1.00		
3.50E+03	3.50E+03	1.00	2.08E-17	2.08E-17	1.00		
3.75E+03	3.75E+03	1.00	2.51E-17	2.51E-17	1.00		
4.00E+03	4.00E+03	1.00	2.94E-17	2.94E-17	1.00		
4.25E+03	4.25E+03	1.00	3.64E-17	3.64E-17	1.00		
4.50E+03	4.50E+03	1.00	4.35E-17	4.35E-17	1.00		
4.75E+03	4.75E+03	1.00	5.06E-17	5.06E-17	1.00		
5.00E+03	5.00E+03	1.00	5.78E-17	5.78E-17	1.00		
5.25E+03	5.25E+03	1.00	6.83E-17	6.83E-17	1.00		
5.50E+03	5.50E+03	1.00	7.89E-17	7.89E-17	1.00		
5.75E+03	5.75E+03	1.00	8.94E-17	8.94E-17	1.00		
6.00E+03	6.00E+03	1.00	1.00E-16	1.00E-16	1.00		
6.25E+03	6.25E+03	1.00	1.15E-16	1.15E-16	1.00		
6.50E+03	6.50E+03	1.00	1.30E-16	1.30E-16	1.00		
6.75E+03	6.75E+03	1.00	1.45E-16	1.45E-16	1.00		
7.00E+03	7.00E+03	1.00	1.59E-16	1.59E-16	1.00		
7.25E+03	7.25E+03	1.00	1.79E-16	1.79E-16	1.00		
7.50E+03	7.50E+03	1.00	1.99E-16	1.99E-16	1.00		
7.75E+03	7.75E+03	1.00	2.19E-16	2.19E-16	1.00		
8.00E+03	8.00E+03	1.00	2.39E-16	2.39E-16	1.00		
8.25E+03	8.25E+03	1.00	2.64E-16	2.64E-16	1.00		
8.50E+03	8.50E+03	1.00	2.89E-16	2.89E-16	1.00		
8.75E+03	8.75E+03	1.00	3.14E-16	3.14E-16	1.00		
9.00E+03	9.00E+03	1.00	3.40E-16	3.40E-16	1.00		
9.25E+03	9.25E+03	1.00	3.72E-16	3.72E-16	1.00		
9.50E+03	9.50E+03	1.00	4.03E-16	4.03E-16	1.00		
9.75E+03	9.75E+03	1.00	4.35E-16	4.35E-16	1.00		
1.00E+04	1.00E+04	1.00	1.73E-17	1.73E-17	1.00		
PB210	PB210	#VALUE!	PB210	#VALUE!	#VALUE!	41	URANIUM- U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!		
2.50E+02	2.50E+02	1.00	2.73E-22	2.61E-22	1.05		
5.00E+02	5.00E+02	1.00	7.14E-22	2.61E-22	2.74		
7.50E+02	7.50E+02	1.00	2.99E-21	2.61E-22	11.49	← see pg 151	
1.00E+03	1.00E+03	1.00	9.25E-21	2.61E-22	35.51		
1.25E+03	1.25E+03	1.00	4.50E-20	2.61E-22	172.52		

10/13/98 Results: ... (cont)

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1.50E+03	1.50E+03	1.00	8.08E-20	2.61E-22	309.98	
1.75E+03	1.75E+03	1.00	1.17E-19	2.61E-22	447.43	
2.00E+03	2.00E+03	1.00	1.54E-19	2.61E-22	589.03	← See
2.25E+03	2.25E+03	1.00	3.09E-19	2.61E-22	1187.26	PG 151
2.50E+03	2.50E+03	1.00	4.66E-19	4.66E-19	1.00	
2.75E+03	2.75E+03	1.00	6.23E-19	6.23E-19	1.00	
3.00E+03	3.00E+03	1.00	7.84E-19	7.84E-19	1.00	
3.25E+03	3.25E+03	1.00	1.20E-18	1.20E-18	1.00	
3.50E+03	3.50E+03	1.00	1.62E-18	1.62E-18	1.00	
3.75E+03	3.75E+03	1.00	2.04E-18	2.04E-18	1.00	
4.00E+03	4.00E+03	1.00	2.47E-18	2.47E-18	1.00	
4.25E+03	4.25E+03	1.00	3.33E-18	3.33E-18	1.00	
4.50E+03	4.50E+03	1.00	4.21E-18	4.21E-18	1.00	
4.75E+03	4.75E+03	1.00	5.08E-18	5.08E-18	1.00	
5.00E+03	5.00E+03	1.00	5.97E-18	5.97E-18	1.00	
5.25E+03	5.25E+03	1.00	7.53E-18	7.53E-18	1.00	
5.50E+03	5.50E+03	1.00	9.09E-18	9.09E-18	1.00	
5.75E+03	5.75E+03	1.00	1.07E-17	1.07E-17	1.00	
6.00E+03	6.00E+03	1.00	1.23E-17	1.23E-17	1.00	
6.25E+03	6.25E+03	1.00	1.48E-17	1.48E-17	1.00	
6.50E+03	6.50E+03	1.00	1.73E-17	1.73E-17	1.00	
6.75E+03	6.75E+03	1.00	1.98E-17	1.98E-17	1.00	
7.00E+03	7.00E+03	1.00	2.24E-17	2.24E-17	1.00	
7.25E+03	7.25E+03	1.00	2.62E-17	2.62E-17	1.00	
7.50E+03	7.50E+03	1.00	3.00E-17	3.00E-17	1.00	
7.75E+03	7.75E+03	1.00	3.39E-17	3.39E-17	1.00	
8.00E+03	8.00E+03	1.00	3.78E-17	3.78E-17	1.00	
8.25E+03	8.25E+03	1.00	4.32E-17	4.32E-17	1.00	
8.50E+03	8.50E+03	1.00	4.86E-17	4.86E-17	1.00	
8.75E+03	8.75E+03	1.00	5.41E-17	5.41E-17	1.00	
9.00E+03	9.00E+03	1.00	5.97E-17	5.97E-17	1.00	
9.25E+03	9.25E+03	1.00	6.71E-17	6.71E-17	1.00	
9.50E+03	9.50E+03	1.00	7.46E-17	7.46E-17	1.00	
9.75E+03	9.75E+03	1.00	8.21E-17	8.21E-17	1.00	
1.00E+04	1.00E+04	1.00	3.27E-18	3.27E-18	1.00	
BI210	BI210	#VALUE!	BI210	#VALUE!	#VALUE!	41 URANIUM- U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!	
2.50E+02	2.50E+02	1.00	1.77E-27	1.77E-27	1.00	
5.00E+02	5.00E+02	1.00	3.63E-27	3.63E-27	1.00	
7.50E+02	7.50E+02	1.00	5.49E-27	5.49E-27	1.00	
1.00E+03	1.00E+03	1.00	8.66E-21	7.35E-27	1178367.35	↙ See PG 151
1.25E+03	1.25E+03	1.00	4.37E-20	9.21E-27	4745357.80	
1.50E+03	1.50E+03	1.00	7.88E-20	1.11E-26	7121951.22	
1.75E+03	1.75E+03	1.00	1.14E-19	1.29E-26	8816705.34	
2.00E+03	2.00E+03	1.00	1.50E-19	1.48E-26	10155510.48	
2.25E+03	2.25E+03	1.00	3.04E-19	1.67E-26	18252252.25	
2.50E+03	2.50E+03	1.00	4.59E-19	4.59E-19	1.00	
2.75E+03	2.75E+03	1.00	6.13E-19	6.13E-19	1.00	
3.00E+03	3.00E+03	1.00	7.71E-19	7.71E-19	1.00	
3.25E+03	3.25E+03	1.00	1.18E-18	1.18E-18	1.00	
3.50E+03	3.50E+03	1.00	1.60E-18	1.60E-18	1.00	
3.75E+03	3.75E+03	1.00	2.01E-18	2.01E-18	1.00	
4.00E+03	4.00E+03	1.00	2.44E-18	2.44E-18	1.00	
4.25E+03	4.25E+03	1.00	3.30E-18	3.30E-18	1.00	
4.50E+03	4.50E+03	1.00	4.16E-18	4.16E-18	1.00	
4.75E+03	4.75E+03	1.00	5.03E-18	5.03E-18	1.00	

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Results... (cont)

CASE1A

5.00E+03	5.00E+03	1.00	5.91E-18	5.91E-18	1.00			
5.25E+03	5.25E+03	1.00	7.45E-18	7.45E-18	1.00			
5.50E+03	5.50E+03	1.00	9.00E-18	9.00E-18	1.00			
5.75E+03	5.75E+03	1.00	1.06E-17	1.06E-17	1.00			
6.00E+03	6.00E+03	1.00	1.21E-17	1.21E-17	1.00			
6.25E+03	6.25E+03	1.00	1.46E-17	1.46E-17	1.00			
6.50E+03	6.50E+03	1.00	1.71E-17	1.71E-17	1.00			
6.75E+03	6.75E+03	1.00	1.97E-17	1.97E-17	1.00			
7.00E+03	7.00E+03	1.00	2.22E-17	2.22E-17	1.00			
7.25E+03	7.25E+03	1.00	2.60E-17	2.60E-17	1.00			
7.50E+03	7.50E+03	1.00	2.98E-17	2.98E-17	1.00			
7.75E+03	7.75E+03	1.00	3.36E-17	3.36E-17	1.00			
8.00E+03	8.00E+03	1.00	3.74E-17	3.74E-17	1.00			
8.25E+03	8.25E+03	1.00	4.28E-17	4.28E-17	1.00			
8.50E+03	8.50E+03	1.00	4.82E-17	4.82E-17	1.00			
8.75E+03	8.75E+03	1.00	5.37E-17	5.37E-17	1.00			
9.00E+03	9.00E+03	1.00	5.92E-17	5.92E-17	1.00			
9.25E+03	9.25E+03	1.00	6.66E-17	6.66E-17	1.00			
9.50E+03	9.50E+03	1.00	7.40E-17	7.40E-17	1.00			
9.75E+03	9.75E+03	1.00	8.14E-17	8.14E-17	1.00			
1.00E+04	1.00E+04	1.00	3.24E-18	3.24E-18	1.00			
PO210	PO210	#VALUE!	PO210	#VALUE!	#VALUE!	41	URANIUM-	U238
0.00E+00	0.00E+00	#DIV/0!	0.00E+00	0.00E+00	#DIV/0!			
2.50E+02	2.50E+02	1.00	1.02E-21	1.02E-21	1.00			
5.00E+02	5.00E+02	1.00	1.02E-21	1.02E-21	1.00			
7.50E+02	7.50E+02	1.00	1.02E-21	1.02E-21	1.00			
1.00E+03	1.00E+03	1.00	2.59E-21	1.02E-21	2.55			
1.25E+03	1.25E+03	1.00	1.52E-20	1.02E-21	14.94			
1.50E+03	1.50E+03	1.00	2.78E-20	1.02E-21	27.35			
1.75E+03	1.75E+03	1.00	4.04E-20	1.02E-21	39.76			
2.00E+03	2.00E+03	1.00	5.32E-20	1.02E-21	52.38			
2.25E+03	2.25E+03	1.00	1.15E-19	1.02E-21	113.39			
2.50E+03	2.50E+03	1.00	1.77E-19	1.02E-21	174.51			
2.75E+03	2.75E+03	1.00	2.39E-19	1.02E-21	235.63			
3.00E+03	3.00E+03	1.00	3.02E-19	1.02E-21	297.44			
3.25E+03	3.25E+03	1.00	4.79E-19	4.79E-19	1.00			
3.50E+03	3.50E+03	1.00	6.56E-19	6.56E-19	1.00			
3.75E+03	3.75E+03	1.00	8.33E-19	8.33E-19	1.00			
4.00E+03	4.00E+03	1.00	1.01E-18	1.01E-18	1.00			
4.25E+03	4.25E+03	1.00	1.39E-18	1.39E-18	1.00			
4.50E+03	4.50E+03	1.00	1.78E-18	1.78E-18	1.00			
4.75E+03	4.75E+03	1.00	2.16E-18	2.16E-18	1.00			
5.00E+03	5.00E+03	1.00	2.55E-18	2.55E-18	1.00			
5.25E+03	5.25E+03	1.00	3.25E-18	3.25E-18	1.00			
5.50E+03	5.50E+03	1.00	3.95E-18	3.95E-18	1.00			
5.75E+03	5.75E+03	1.00	4.65E-18	4.65E-18	1.00			
6.00E+03	6.00E+03	1.00	5.36E-18	5.36E-18	1.00			
6.25E+03	6.25E+03	1.00	6.51E-18	6.51E-18	1.00			
6.50E+03	6.50E+03	1.00	7.67E-18	7.67E-18	1.00			
6.75E+03	6.75E+03	1.00	8.83E-18	8.83E-18	1.00			
7.00E+03	7.00E+03	1.00	1.00E-17	1.00E-17	1.00			
7.25E+03	7.25E+03	1.00	1.18E-17	1.18E-17	1.00			
7.50E+03	7.50E+03	1.00	1.35E-17	1.35E-17	1.00			
7.75E+03	7.75E+03	1.00	1.53E-17	1.53E-17	1.00			
8.00E+03	8.00E+03	1.00	1.71E-17	1.71E-17	1.00			
8.25E+03	8.25E+03	1.00	1.96E-17	1.96E-17	1.00			

see pg 151

10/13/98 Results: ... (cont)

CASE1A

8.50E+03	8.50E+03	1.00	2.22E-17	2.22E-17	1.00
8.75E+03	8.75E+03	1.00	2.47E-17	2.47E-17	1.00
9.00E+03	9.00E+03	1.00	2.73E-17	2.73E-17	1.00
9.25E+03	9.25E+03	1.00	3.08E-17	3.08E-17	1.00
9.50E+03	9.50E+03	1.00	3.43E-17	3.43E-17	1.00
9.75E+03	9.75E+03	1.00	3.78E-17	3.78E-17	1.00
1.00E+04	1.00E+04	1.00	6.75E-19	6.75E-19	1.00

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Results: ... (cont)

Additional results are continued in notebook # 281 due to lack of space in this notebook.

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CNWRA

CC

C. 281

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0115/98

Note to reader:
The following entries are a continuation of installation testing results for MEPAS 3.2 g. The work is described and initially documented in notebook #178 beginning on page 91, the results of testing are continued in this notebook because #178 became full prior to completion of all documentation of test results. Due to numerous code errors detected during installation testing, tests were re-iterated numerous times. The final iteration which is continued below, begins on page 138 of notebook #178.

On 10/16/98 this approach to continuing documentation of this work in from notebook 178 was discussed with the Div 20 QM director and he found it acceptable 10/16/98

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Results: ... (cont)

Casela.hhi

Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 07/01/1997 at 11:04:32
Input file name CASE1A.ina

PNL Results

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	980	1.5E-18	1.8E-18	2.4E-15	1.5E-18	1.8E-18	2.4E-15
Leafy Vegetables	991	4.2E-20	4.8E-20	6.6E-17	4.2E-20	4.8E-20	6.6E-17
Other Vegetables	996	7.5E-20	8.7E-20	1.2E-16	7.5E-20	8.7E-20	1.2E-16
Meat	996	2.4E-21	2.8E-21	3.8E-18	2.4E-21	2.8E-21	3.8E-18
Milk	992	2.9E-20	3.3E-20	4.5E-17	2.9E-20	3.3E-20	4.5E-17
Subtotal		1.7E-18	1.9E-18	2.6E-15	1.7E-18	1.9E-18	2.6E-15
Total		1.7E-18	1.9E-18	2.6E-15	1.7E-18	1.9E-18	2.6E-15

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	983	2.3E-21	2.7E-21	3.7E-18	2.3E-21	2.7E-21	3.7E-18
Leafy Vegetables	993	7.1E-22	8.2E-22	1.1E-18	7.1E-22	8.2E-22	1.1E-18
Other Vegetables	995	8.2E-22	9.5E-22	1.3E-18	8.2E-22	9.5E-22	1.3E-18
Meat	996	8.0E-25	9.3E-25	1.3E-21	8.0E-25	9.3E-25	1.3E-21
Milk	994	3.0E-24	3.4E-24	4.7E-21	3.0E-24	3.4E-24	4.7E-21
Subtotal		3.8E-21	4.5E-21	6.1E-18	3.8E-21	4.5E-21	6.1E-18
Total		3.8E-21	4.5E-21	6.1E-18	3.8E-21	4.5E-21	6.1E-18

File: qa2\casela.hhi for PNL results
File: qa5\Casela\qa\casela.hhi for CNWRA results

10/15/98 Results: ---- (Cont)

Case1a.hhi
Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 10/07/1998 at 15:59:57
Input file name CASE1A.ina

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

CNWRA Results

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	980	1.5E-06	1.8E-06	2.4E-03	1.5E-06	1.8E-06	2.4E-03
Leafy Vegetables	992	4.2E-08	4.8E-08	6.6E-05	4.2E-08	4.8E-08	6.6E-05
Other Vegetables	996	7.5E-08	8.7E-08	1.2E-04	7.5E-08	8.7E-08	1.2E-04
Meat	996	2.4E-09	2.8E-09	3.8E-06	2.4E-09	2.8E-09	3.8E-06
Milk	992	2.9E-08	3.3E-08	4.5E-05	2.9E-08	3.3E-08	4.5E-05
Subtotal		1.7E-06	1.9E-06	2.6E-03	1.7E-06	1.9E-06	2.6E-03
Total		1.7E-06	1.9E-06	2.6E-03	1.7E-06	1.9E-06	2.6E-03

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	984	2.3E-09	2.7E-09	3.7E-06	2.3E-09	2.7E-09	3.7E-06
Leafy Vegetables	994	7.1E-10	8.2E-10	1.1E-06	7.1E-10	8.2E-10	1.1E-06
Other Vegetables	996	8.2E-10	9.5E-10	1.3E-06	8.2E-10	9.5E-10	1.3E-06
Meat	996	8.0E-13	9.3E-13	1.3E-09	8.0E-13	9.3E-13	1.3E-09
Milk	994	3.0E-12	3.5E-12	4.7E-09	3.0E-12	3.5E-12	4.7E-09
Subtotal		3.8E-09	4.5E-09	6.1E-06	3.8E-09	4.5E-09	6.1E-06
Total		3.8E-09	4.5E-09	6.1E-06	3.8E-09	4.5E-09	6.1E-06

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Results... (cont)

Health Impact Detailed Result for: URANIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	984	1.9E-28	2.2E-28	3.0E-25	1.9E-28	2.2E-28	3.0E-25
Leafy Vegetables	996	2.7E-25	3.1E-25	4.3E-22	2.7E-25	3.1E-25	4.3E-22
Other Vegetables	999	3.1E-24	3.5E-24	4.8E-21	3.1E-24	3.5E-24	4.8E-21
Meat	999	5.1E-26	5.9E-26	8.1E-23	5.1E-26	5.9E-26	8.1E-23
Milk	997	2.1E-25	2.4E-25	3.3E-22	2.1E-25	2.4E-25	3.3E-22
Subtotal		3.6E-24	4.2E-24	5.7E-21	3.6E-24	4.2E-24	5.7E-21
Total		3.6E-24	4.2E-24	5.7E-21	3.6E-24	4.2E-24	5.7E-21

Health Impact Detailed Result for: THORIUM-230 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Page 1

Casela.hhi

PNL Results

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	888	9.6E-34	1.1E-33	1.5E-30	9.6E-34	1.1E-33	1.5E-30
Leafy Vegetables	999	2.2E-30	2.5E-30	3.4E-27	2.2E-30	2.5E-30	3.4E-27
Other Vegetables	996	2.5E-29	2.8E-29	3.9E-26	2.5E-29	2.8E-29	3.9E-26
Meat	993	9.8E-31	1.1E-30	1.5E-27	9.8E-31	1.1E-30	1.5E-27
Milk	994	1.2E-30	1.4E-30	1.9E-27	1.2E-30	1.4E-30	1.9E-27
Subtotal		2.9E-29	3.4E-29	4.6E-26	2.9E-29	3.4E-29	4.6E-26
Total		2.9E-29	3.4E-29	4.6E-26	2.9E-29	3.4E-29	4.6E-26

Health Impact Detailed Result for: RADIUM-226 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	893	1.4E-33	1.6E-33	2.2E-30	1.4E-33	1.6E-33	2.2E-30
Leafy Vegetables	998	1.7E-30	1.9E-30	2.7E-27	1.7E-30	1.9E-30	2.7E-27
Other Vegetables	998	1.9E-29	2.2E-29	3.1E-26	1.9E-29	2.2E-29	3.1E-26
Meat	999	1.3E-30	1.5E-30	2.1E-27	1.3E-30	1.5E-30	2.1E-27
Milk	999	3.4E-30	3.9E-30	5.4E-27	3.4E-30	3.9E-30	5.4E-27
Subtotal		2.6E-29	3.0E-29	4.1E-26	2.6E-29	3.0E-29	4.1E-26
Total		2.6E-29	3.0E-29	4.1E-26	2.6E-29	3.0E-29	4.1E-26

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Results: . . . (cont)

Health Impact Detailed Result for: URANIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	984	1.9E-16	2.2E-16	3.0E-13	1.9E-16	2.2E-16	3.0E-13
Leafy Vegetables	996	2.7E-13	3.1E-13	4.3E-10	2.7E-13	3.1E-13	4.3E-10
Other Vegetables	994	3.0E-12	3.5E-12	4.8E-09	3.0E-12	3.5E-12	4.8E-09
Meat	996	5.1E-14	5.9E-14	8.1E-11	5.1E-14	5.9E-14	8.1E-11
Milk	998	2.1E-13	2.4E-13	3.3E-10	2.1E-13	2.4E-13	3.3E-10
Subtotal		3.6E-12	4.1E-12	5.7E-09	3.6E-12	4.1E-12	5.7E-09
Total		3.6E-12	4.1E-12	5.7E-09	3.6E-12	4.1E-12	5.7E-09

Health Impact Detailed Result for: THORIUM-230 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

CNWRA results

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	672	6.3E-22	7.3E-22	1.0E-18	6.3E-22	7.3E-22	1.0E-18
Leafy Vegetables	996	2.1E-18	2.5E-18	3.4E-15	2.1E-18	2.5E-18	3.4E-15
Other Vegetables	996	2.5E-17	2.8E-17	3.9E-14	2.5E-17	2.8E-17	3.9E-14
Meat	994	9.8E-19	1.1E-18	1.5E-15	9.8E-19	1.1E-18	1.5E-15
Milk	994	1.2E-18	1.4E-18	1.9E-15	1.2E-18	1.4E-18	1.9E-15
Subtotal		2.9E-17	3.3E-17	4.6E-14	2.9E-17	3.3E-17	4.6E-14
Total		2.9E-17	3.3E-17	4.6E-14	2.9E-17	3.3E-17	4.6E-14

Health Impact Detailed Result for: RADIUM-226 from URANIUM-238

Transport Pathway: Ground water Usage Location: Groundwater Well

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	900	1.4E-21	1.6E-21	2.2E-18	1.4E-21	1.6E-21	2.2E-18
Leafy Vegetables	998	1.7E-18	1.9E-18	2.7E-15	1.7E-18	1.9E-18	2.7E-15
Other Vegetables	998	1.9E-17	2.2E-17	3.1E-14	1.9E-17	2.2E-17	3.1E-14
Meat	994	1.3E-18	1.5E-18	2.1E-15	1.3E-18	1.5E-18	2.1E-15
Milk	999	3.4E-18	3.9E-18	5.4E-15	3.4E-18	3.9E-18	5.4E-15
Subtotal		2.6E-17	3.0E-17	4.1E-14	2.6E-17	3.0E-17	4.1E-14
Total		2.6E-17	3.0E-17	4.1E-14	2.6E-17	3.0E-17	4.1E-14

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Results: . . . (cont)

Case2a.hhi
Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 05/15/1997 at 09:21:28
Input file name CASE2A.ina

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Surface water Usage Location: Chapman Run upstream

PNL Results

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	270	1.2E-24	1.4E-24	1.9E-21	1.2E-24	1.4E-24	1.9E-21
Milk	270	6.3E-24	7.3E-24	9.9E-21	6.3E-24	7.3E-24	9.9E-21
Finfish	270	9.3E-22	1.1E-21	1.5E-18	9.4E-22	1.1E-21	1.5E-18
Shellfish	270	1.1E-21	1.3E-21	1.8E-18	1.1E-21	1.3E-21	1.8E-18
Subtotal		2.1E-21	2.4E-21	3.3E-18	2.1E-21	2.4E-21	3.3E-18
Total		2.1E-21	2.4E-21	3.3E-18	2.1E-21	2.4E-21	3.3E-18

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Milk	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Finfish	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Shellfish	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Subtotal		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

File: qa2\case2a.hhi for PNL results
File: qa5\case2aqa\case2a.hhi for CNWRA results.

10/15/98

Results ... (cont)

Case2a.hhi
Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 10/07/1998 at 16:21:33
Input file name CASE2A.ina

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Surface water Usage Location: Chapman Run upstream

CNWRA Results

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	260	1.2E-12	1.4E-12	1.9E-09	1.2E-12	1.4E-12	1.9E-09
Milk	260	6.3E-12	7.3E-12	9.9E-09	6.3E-12	7.3E-12	9.9E-09
Finfish	260	9.3E-10	1.1E-09	1.5E-06	9.4E-10	1.1E-09	1.5E-06
Shellfish	260	1.1E-09	1.3E-09	1.8E-06	1.1E-09	1.3E-09	1.8E-06
Subtotal		2.1E-09	2.4E-09	3.3E-06	2.1E-09	2.4E-09	3.3E-06
Total		2.1E-09	2.4E-09	3.3E-06	2.1E-09	2.4E-09	3.3E-06

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Milk	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Finfish	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Shellfish	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Subtotal		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

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10/15/
Results: ... (cont'd)

Health Impact Detailed Result for: THORIUM-234 from THORIUM-234

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	330	1.1E-27	1.3E-27	1.7E-24	1.1E-27	1.3E-27	1.7E-24
Milk	300	2.5E-27	2.9E-27	4.0E-24	2.5E-27	2.9E-27	4.0E-24
Finfish	450	8.2E-23	9.5E-23	1.3E-19	8.3E-23	9.6E-23	1.3E-19
Shellfish	480	4.1E-22	4.8E-22	6.5E-19	4.1E-22	4.8E-22	6.6E-19
Subtotal		4.9E-22	5.7E-22	7.8E-19	5.0E-22	5.8E-22	7.9E-19
Total		4.9E-22	5.7E-22	7.8E-19	5.0E-22	5.8E-22	7.9E-19

Health Impact Detailed Result for: URANIUM-234 from THORIUM-234

Transport Pathway: Surface water Usage Location: Chapman Run upstream

	Individual Result		Population Results		
	Fatal	Total	Fatal	Total	Dose,

Health Impact Detailed Result for: URANIUM-234 from URANIUM-234

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	9750	1.0E-28	1.2E-28	1.6E-25	1.0E-28	1.2E-28	1.6E-25
Milk	9750	5.3E-28	6.2E-28	8.5E-25	5.3E-28	6.2E-28	8.5E-25
Finfish	9750	7.9E-26	9.2E-26	1.3E-22	8.0E-26	9.3E-26	1.3E-22
Shellfish	9720	9.5E-26	1.1E-25	1.5E-22	9.6E-26	1.1E-25	1.5E-22
Subtotal		1.7E-25	2.0E-25	2.8E-22	1.8E-25	2.0E-25	2.8E-22
Total		1.7E-25	2.0E-25	2.8E-22	1.8E-25	2.0E-25	2.8E-22

10/15/98 Results: .... (cont)

Health Impact Detailed Result for: THORIUM-234 from THORIUM-234

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	320	1.1E-15	1.3E-15	1.7E-12	1.1E-15	1.3E-15	1.7E-12
Milk	280	2.5E-15	2.9E-15	4.0E-12	2.5E-15	2.9E-15	4.0E-12
Finfish	440	8.2E-11	9.5E-11	1.3E-07	8.3E-11	9.6E-11	1.3E-07
Shellfish	480	4.1E-10	4.8E-10	6.5E-07	4.1E-10	4.8E-10	6.6E-07
Subtotal		4.9E-10	5.7E-10	7.8E-07	5.0E-10	5.8E-10	7.9E-07
Total		4.9E-10	5.7E-10	7.8E-07	5.0E-10	5.8E-10	7.9E-07

Health Impact Detailed Result for: URANIUM-234 from URANIUM-234

Transport Pathway: Surface water Usage Location: Chapman Run upstream

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Meat	9660	1.0E-16	1.2E-16	1.6E-13	1.0E-16	1.2E-16	1.6E-13
Milk	9740	5.3E-16	6.2E-16	8.4E-13	5.3E-16	6.2E-16	8.4E-13
Finfish	9740	7.9E-14	9.2E-14	1.3E-10	8.0E-14	9.3E-14	1.3E-10
Shellfish	9700	9.5E-14	1.1E-13	1.5E-10	9.6E-14	1.1E-13	1.5E-10
Subtotal		1.7E-13	2.0E-13	2.8E-10	1.8E-13	2.0E-13	2.8E-10
Total		1.7E-13	2.0E-13	2.8E-10	1.8E-13	2.0E-13	2.8E-10

10

10/15/98 [illegible] Results: ... (cont)

Final comparison of *.WCF files for JPG High dose test case that was run
==========using comparable parameter selections under mass partitioning and no
mass partitioning source term options (internal code consistency check) (PAL 10/13/98)

RADCON VERSION 05/01/1997

WATERBORNE COMPONENT of the Multimedia Environmental
Pollutant Assessment System (MEPAS): Models the
movement of chemicals and radionuclides through vadose
zone, saturated zone, surface water, and wetlands media.

Pacific Northwest National Laboratory
Operated for the U.S Department of Energy
by Battelle Memorial Institute
P.O. Box 999
Richland, Washington 99352

==========

Run Name: GWHFDUHI
Run Performed: 10/8/98 10:44:53

==========

mb time	non	[illegible] 10/19/98	mb conc	non	Ratio mb/non [illegible] 10/19/98		
GW Fence		Ratio	Aquifer		mb/non		
URANIUM+		mb/non	U238		g/mL or pC	41	8
1.53E+02	1.53E+02	1.00	0.00E+00	0.00E+00	#DIV/0!		
2.77E+02	2.77E+02	1.00	3.00E-05	2.98E-05	1.01		
4.02E+02	4.01E+02	1.00	2.17E-03	2.16E-03	1.00		
5.26E+02	5.25E+02	1.00	5.40E-03	5.40E-03	1.00		
6.50E+02	6.50E+02	1.00	5.77E-03	5.78E-03	1.00		
7.74E+02	7.74E+02	1.00	5.78E-03	5.78E-03	1.00		
8.98E+02	8.98E+02	1.00	5.78E-03	5.78E-03	1.00		
1.02E+03	1.02E+03	1.00	5.78E-03	5.78E-03	1.00		
1.15E+03	1.15E+03	1.00	5.78E-03	5.78E-03	1.00		
1.27E+03	1.27E+03	1.00	5.78E-03	5.78E-03	1.00		
1.40E+03	1.39E+03	1.00	5.78E-03	5.78E-03	1.00		
1.52E+03	1.52E+03	1.00	5.78E-03	5.78E-03	1.00		
1.64E+03	1.64E+03	1.00	5.78E-03	5.78E-03	1.00		
1.77E+03	1.77E+03	1.00	5.78E-03	5.78E-03	1.00		
1.89E+03	1.89E+03	1.00	5.78E-03	5.78E-03	1.00		
2.02E+03	2.02E+03	1.00	5.78E-03	5.78E-03	1.00		
2.14E+03	2.14E+03	1.00	5.78E-03	5.78E-03	1.00		
2.27E+03	2.26E+03	1.00	5.78E-03	5.78E-03	1.00		
2.39E+03	2.39E+03	1.00	5.78E-03	5.78E-03	1.00		
2.51E+03	2.51E+03	1.00	5.78E-03	5.78E-03	1.00		
2.64E+03	2.64E+03	1.00	5.78E-03	5.78E-03	1.00		
2.76E+03	2.76E+03	1.00	5.78E-03	5.78E-03	1.00		
2.89E+03	2.88E+03	1.00	5.78E-03	5.78E-03	1.00		
3.01E+03	3.01E+03	1.00	5.78E-03	5.78E-03	1.00		
3.13E+03	3.13E+03	1.00	5.78E-03	5.78E-03	1.00		
3.26E+03	3.26E+03	1.00	5.78E-03	5.78E-03	1.00		
3.38E+03	3.38E+03	1.00	5.78E-03	5.78E-03	1.00		

File: \qa5\mbtstwcf.xls

10/15/98 Results: .... (cont)

3.51E+03	3.50E+03	1.00	5.78E-03	5.78E-03	1.00		
3.63E+03	3.63E+03	1.00	5.78E-03	5.78E-03	1.00		
3.76E+03	3.75E+03	1.00	5.78E-03	5.78E-03	1.00		
3.88E+03	3.88E+03	1.00	5.78E-03	5.78E-03	1.00		
4.00E+03	4.00E+03	1.00	5.78E-03	5.78E-03	1.00		
4.13E+03	4.13E+03	1.00	5.78E-03	5.78E-03	1.00		
4.25E+03	4.25E+03	1.00	5.76E-03	5.78E-03	1.00		
4.38E+03	4.37E+03	1.00	5.49E-03	5.78E-03	0.95		
4.50E+03	4.50E+03	1.00	4.74E-03	5.78E-03	0.82		
4.63E+03	4.62E+03	1.00	3.81E-03	5.78E-03	0.66		
4.75E+03	4.75E+03	1.00	2.86E-03	5.78E-03	0.50		
4.87E+03	4.87E+03	1.00	1.92E-03	5.78E-03	0.33		
5.00E+03	4.99E+03	1.00	9.79E-04	5.03E-03	0.19		
5.12E+03	5.12E+03	1.00	1.89E-04	1.20E-03	0.16		
TH234	TH234	#VALUE!	TH234	TH234	#VALUE!	41	URANIUM-U238
0.00E+00	2.76E+01	0.00	0.00E+00	0.00E+00	#DIV/0!		
1.28E+02	1.55E+02	0.83	0.00E+00	4.39E-07	0.00		
2.56E+02	2.82E+02	0.91	2.49E-05	1.15E-04	0.22		
3.84E+02	4.09E+02	0.94	1.87E-03	2.38E-03	0.79		
5.12E+02	5.37E+02	0.95	5.05E-03	5.44E-03	0.93		
6.40E+02	6.64E+02	0.96	5.75E-03	5.78E-03	0.99		
7.68E+02	7.91E+02	0.97	5.78E-03	5.78E-03	1.00		
8.96E+02	9.18E+02	0.98	5.78E-03	5.78E-03	1.00		
1.02E+03	1.05E+03	0.98	5.78E-03	5.78E-03	1.00		
1.15E+03	1.17E+03	0.98	5.78E-03	5.78E-03	1.00		
1.28E+03	1.30E+03	0.98	5.78E-03	5.78E-03	1.00		
1.41E+03	1.43E+03	0.99	5.78E-03	5.78E-03	1.00		
1.54E+03	1.56E+03	0.99	5.78E-03	5.78E-03	1.00		
1.67E+03	1.68E+03	0.99	5.78E-03	5.78E-03	1.00		
1.79E+03	1.81E+03	0.99	5.78E-03	5.78E-03	1.00		
1.92E+03	1.94E+03	0.99	5.78E-03	5.78E-03	1.00		
2.05E+03	2.06E+03	0.99	5.78E-03	5.78E-03	1.00		
2.18E+03	2.19E+03	0.99	5.78E-03	5.78E-03	1.00		
2.31E+03	2.32E+03	0.99	5.78E-03	5.78E-03	1.00		
2.43E+03	2.45E+03	1.00	5.78E-03	5.78E-03	1.00		
2.56E+03	2.57E+03	1.00	5.78E-03	5.78E-03	1.00		
2.69E+03	2.70E+03	1.00	5.78E-03	5.78E-03	1.00		
2.82E+03	2.83E+03	1.00	5.78E-03	5.78E-03	1.00		
2.95E+03	2.95E+03	1.00	5.78E-03	5.78E-03	1.00		
3.07E+03	3.08E+03	1.00	5.78E-03	5.78E-03	1.00		
3.20E+03	3.21E+03	1.00	5.78E-03	5.78E-03	1.00		
3.33E+03	3.34E+03	1.00	5.78E-03	5.78E-03	1.00		
3.46E+03	3.46E+03	1.00	5.78E-03	5.78E-03	1.00		
3.59E+03	3.59E+03	1.00	5.78E-03	5.78E-03	1.00		
3.71E+03	3.72E+03	1.00	5.78E-03	5.78E-03	1.00		
3.84E+03	3.85E+03	1.00	5.78E-03	5.78E-03	1.00		
3.97E+03	3.97E+03	1.00	5.78E-03	5.78E-03	1.00		
4.10E+03	4.10E+03	1.00	5.78E-03	5.78E-03	1.00		
4.23E+03	4.23E+03	1.00	5.77E-03	5.78E-03	1.00		

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Results:..(cont)

4.35E+03	4.35E+03	1.00	5.54E-03	5.78E-03	0.96			
4.48E+03	4.48E+03	1.00	4.86E-03	5.78E-03	0.84			
4.61E+03	4.61E+03	1.00	3.92E-03	5.78E-03	0.68			
4.74E+03	4.74E+03	1.00	2.95E-03	5.78E-03	0.51			
4.87E+03	4.86E+03	1.00	1.98E-03	5.78E-03	0.34			
4.99E+03	4.99E+03	1.00	1.01E-03	5.05E-03	0.20			
5.12E+03	5.12E+03	1.00	1.89E-04	1.20E-03	0.16			
U234	U234	#VALUE!	U234	U234	#VALUE!	41	URANIUM	U238
0.00E+00	2.76E+01	0.00	0.00E+00	0.00E+00	#DIV/0!			
1.28E+02	1.55E+02	0.83	0.00E+00	3.46E-10	0.00			
2.56E+02	2.82E+02	0.91	1.96E-08	1.10E-07	0.18			
3.84E+02	4.09E+02	0.94	1.90E-06	2.41E-06	0.79			
5.12E+02	5.37E+02	0.95	5.13E-06	5.52E-06	0.93			
6.40E+02	6.64E+02	0.96	5.83E-06	5.87E-06	0.99			
7.68E+02	7.91E+02	0.97	5.87E-06	5.87E-06	1.00			
8.96E+02	9.18E+02	0.98	5.87E-06	5.87E-06	1.00			
1.02E+03	1.05E+03	0.98	5.87E-06	5.87E-06	1.00			
1.15E+03	1.17E+03	0.98	5.87E-06	5.87E-06	1.00			
1.28E+03	1.30E+03	0.98	5.87E-06	5.87E-06	1.00			
1.41E+03	1.43E+03	0.99	5.87E-06	5.87E-06	1.00			
1.54E+03	1.56E+03	0.99	5.87E-06	5.87E-06	1.00			
1.67E+03	1.68E+03	0.99	5.87E-06	5.87E-06	1.00			
1.79E+03	1.81E+03	0.99	5.87E-06	5.87E-06	1.00			
1.92E+03	1.94E+03	0.99	5.87E-06	5.87E-06	1.00			
2.05E+03	2.06E+03	0.99	5.87E-06	5.87E-06	1.00			
2.18E+03	2.19E+03	0.99	5.87E-06	5.87E-06	1.00			
2.31E+03	2.32E+03	0.99	5.87E-06	5.87E-06	1.00			
2.43E+03	2.45E+03	1.00	5.87E-06	5.87E-06	1.00			
2.56E+03	2.57E+03	1.00	5.87E-06	5.87E-06	1.00			
2.69E+03	2.70E+03	1.00	5.87E-06	5.87E-06	1.00			
2.82E+03	2.83E+03	1.00	5.87E-06	5.87E-06	1.00			
2.95E+03	2.95E+03	1.00	5.87E-06	5.87E-06	1.00			
3.07E+03	3.08E+03	1.00	5.87E-06	5.87E-06	1.00			
3.20E+03	3.21E+03	1.00	5.87E-06	5.87E-06	1.00			
3.33E+03	3.34E+03	1.00	5.87E-06	5.87E-06	1.00			
3.46E+03	3.46E+03	1.00	5.87E-06	5.87E-06	1.00			
3.59E+03	3.59E+03	1.00	5.87E-06	5.87E-06	1.00			
3.71E+03	3.72E+03	1.00	5.87E-06	5.87E-06	1.00			
3.84E+03	3.85E+03	1.00	5.87E-06	5.87E-06	1.00			
3.97E+03	3.97E+03	1.00	5.87E-06	5.87E-06	1.00			
4.10E+03	4.10E+03	1.00	5.87E-06	5.87E-06	1.00			
4.23E+03	4.23E+03	1.00	5.86E-06	5.87E-06	1.00			
4.35E+03	4.35E+03	1.00	5.62E-06	5.87E-06	0.96			
4.48E+03	4.48E+03	1.00	4.93E-06	5.87E-06	0.84			
4.61E+03	4.61E+03	1.00	3.98E-06	5.87E-06	0.68			
4.74E+03	4.74E+03	1.00	3.00E-06	5.87E-06	0.51			
4.87E+03	4.86E+03	1.00	2.01E-06	5.87E-06	0.34			
4.99E+03	4.99E+03	1.00	1.02E-06	5.13E-06	0.20			
5.12E+03	5.12E+03	1.00	1.92E-07	1.22E-06	0.16			

10/15/98
JG

Results: .... Cont)

TH230	TH230	#VALUE!	TH230	TH230	#VALUE!	41 URANIUM-U238
0.00E+00	2.76E+01	0.00	0.00E+00	0.00E+00	#DIV/0!	
1.28E+02	1.55E+02	0.83	0.00E+00	4.31E-13	0.00	
2.56E+02	2.82E+02	0.91	2.44E-11	1.70E-10	0.14	
3.84E+02	4.09E+02	0.94	3.05E-09	3.88E-09	0.79	
5.12E+02	5.37E+02	0.95	8.26E-09	8.89E-09	0.93	
6.40E+02	6.64E+02	0.96	9.40E-09	9.45E-09	0.99	
7.68E+02	7.91E+02	0.97	9.45E-09	9.46E-09	1.00	
8.96E+02	9.18E+02	0.98	9.45E-09	9.46E-09	1.00	
1.02E+03	1.05E+03	0.98	9.45E-09	9.46E-09	1.00	
1.15E+03	1.17E+03	0.98	9.45E-09	9.46E-09	1.00	
1.28E+03	1.30E+03	0.98	9.45E-09	9.46E-09	1.00	
1.41E+03	1.43E+03	0.99	9.45E-09	9.46E-09	1.00	
1.54E+03	1.56E+03	0.99	9.45E-09	9.46E-09	1.00	
1.67E+03	1.68E+03	0.99	9.45E-09	9.46E-09	1.00	
1.79E+03	1.81E+03	0.99	9.45E-09	9.46E-09	1.00	
1.92E+03	1.94E+03	0.99	9.45E-09	9.46E-09	1.00	
2.05E+03	2.06E+03	0.99	9.45E-09	9.46E-09	1.00	
2.18E+03	2.19E+03	0.99	9.45E-09	9.46E-09	1.00	
2.31E+03	2.32E+03	0.99	9.45E-09	9.46E-09	1.00	
2.43E+03	2.45E+03	1.00	9.45E-09	9.46E-09	1.00	
2.56E+03	2.57E+03	1.00	9.45E-09	9.46E-09	1.00	
2.69E+03	2.70E+03	1.00	9.45E-09	9.46E-09	1.00	
2.82E+03	2.83E+03	1.00	9.45E-09	9.46E-09	1.00	
2.95E+03	2.95E+03	1.00	9.45E-09	9.46E-09	1.00	
3.07E+03	3.08E+03	1.00	9.45E-09	9.46E-09	1.00	
3.20E+03	3.21E+03	1.00	9.45E-09	9.46E-09	1.00	
3.33E+03	3.34E+03	1.00	9.45E-09	9.46E-09	1.00	
3.46E+03	3.46E+03	1.00	9.45E-09	9.46E-09	1.00	
3.59E+03	3.59E+03	1.00	9.45E-09	9.46E-09	1.00	
3.71E+03	3.72E+03	1.00	9.45E-09	9.46E-09	1.00	
3.84E+03	3.85E+03	1.00	9.45E-09	9.46E-09	1.00	
3.97E+03	3.97E+03	1.00	9.45E-09	9.46E-09	1.00	
4.10E+03	4.10E+03	1.00	9.45E-09	9.46E-09	1.00	
4.23E+03	4.23E+03	1.00	9.43E-09	9.46E-09	1.00	
4.35E+03	4.35E+03	1.00	9.06E-09	9.46E-09	0.96	
4.48E+03	4.48E+03	1.00	7.95E-09	9.46E-09	0.84	
4.61E+03	4.61E+03	1.00	6.42E-09	9.46E-09	0.68	
4.74E+03	4.74E+03	1.00	4.83E-09	9.46E-09	0.51	
4.87E+03	4.86E+03	1.00	3.23E-09	9.46E-09	0.34	
4.99E+03	4.99E+03	1.00	1.65E-09	8.26E-09	0.20	
5.12E+03	5.12E+03	1.00	3.09E-10	1.97E-09	0.16	
RA226	RA226	#VALUE!	RA226	RA226	#VALUE!	41 URANIUM-U238
0.00E+00	2.76E+01	0.00	0.00E+00	0.00E+00	#DIV/0!	
1.28E+02	1.55E+02	0.83	0.00E+00	1.68E-14	0.00	
2.56E+02	2.82E+02	0.91	9.49E-13	8.13E-12	0.12	
3.84E+02	4.09E+02	0.94	1.52E-10	1.93E-10	0.79	
5.12E+02	5.37E+02	0.95	4.11E-10	4.42E-10	0.93	
6.40E+02	6.64E+02	0.96	4.67E-10	4.70E-10	0.99	

10/15/98 Results: ... (cont)

7.68E+02	7.91E+02	0.97	4.70E-10	4.70E-10	1.00		
8.96E+02	9.18E+02	0.98	4.70E-10	4.70E-10	1.00		
1.02E+03	1.05E+03	0.98	4.70E-10	4.70E-10	1.00		
1.15E+03	1.17E+03	0.98	4.70E-10	4.70E-10	1.00		
1.28E+03	1.30E+03	0.98	4.70E-10	4.70E-10	1.00		
1.41E+03	1.43E+03	0.99	4.70E-10	4.70E-10	1.00		
1.54E+03	1.56E+03	0.99	4.70E-10	4.70E-10	1.00		
1.67E+03	1.68E+03	0.99	4.70E-10	4.70E-10	1.00		
1.79E+03	1.81E+03	0.99	4.70E-10	4.70E-10	1.00		
1.92E+03	1.94E+03	0.99	4.70E-10	4.70E-10	1.00		
2.05E+03	2.06E+03	0.99	4.70E-10	4.70E-10	1.00		
2.18E+03	2.19E+03	0.99	4.70E-10	4.70E-10	1.00		
2.31E+03	2.32E+03	0.99	4.70E-10	4.70E-10	1.00		
2.43E+03	2.45E+03	1.00	4.70E-10	4.70E-10	1.00		
2.56E+03	2.57E+03	1.00	4.70E-10	4.70E-10	1.00		
2.69E+03	2.70E+03	1.00	4.70E-10	4.70E-10	1.00		
2.82E+03	2.83E+03	1.00	4.70E-10	4.70E-10	1.00		
2.95E+03	2.95E+03	1.00	4.70E-10	4.70E-10	1.00		
3.07E+03	3.08E+03	1.00	4.70E-10	4.70E-10	1.00		
3.20E+03	3.21E+03	1.00	4.70E-10	4.70E-10	1.00		
3.33E+03	3.34E+03	1.00	4.70E-10	4.70E-10	1.00		
3.46E+03	3.46E+03	1.00	4.70E-10	4.70E-10	1.00		
3.59E+03	3.59E+03	1.00	4.70E-10	4.70E-10	1.00		
3.71E+03	3.72E+03	1.00	4.70E-10	4.70E-10	1.00		
3.84E+03	3.85E+03	1.00	4.70E-10	4.70E-10	1.00		
3.97E+03	3.97E+03	1.00	4.70E-10	4.70E-10	1.00		
4.10E+03	4.10E+03	1.00	4.70E-10	4.70E-10	1.00		
4.23E+03	4.23E+03	1.00	4.69E-10	4.70E-10	1.00		
4.35E+03	4.35E+03	1.00	4.50E-10	4.70E-10	0.96		
4.48E+03	4.48E+03	1.00	3.95E-10	4.70E-10	0.84		
4.61E+03	4.61E+03	1.00	3.19E-10	4.70E-10	0.68		
4.74E+03	4.74E+03	1.00	2.40E-10	4.70E-10	0.51		
4.87E+03	4.86E+03	1.00	1.61E-10	4.70E-10	0.34		
4.99E+03	4.99E+03	1.00	8.19E-11	4.11E-10	0.20		
5.12E+03	5.12E+03	1.00	1.54E-11	9.79E-11	0.16		
RN222	RN222	#VALUE!	RN222	RN222	#VALUE!	41	URANIUM-U238
0.00E+00	1.11E+01	0.00	0.00E+00	0.00E+00	#DIV/0!		
1.28E+02	1.39E+02	0.92	0.00E+00	1.46E-14	0.00		
2.56E+02	2.66E+02	0.96	9.49E-13	7.13E-12	0.13		
3.84E+02	3.94E+02	0.97	1.52E-10	1.71E-10	0.89		
5.12E+02	5.22E+02	0.98	4.11E-10	4.13E-10	0.99		
6.40E+02	6.49E+02	0.99	4.67E-10	4.67E-10	1.00		
7.68E+02	7.77E+02	0.99	4.70E-10	4.70E-10	1.00		
8.96E+02	9.05E+02	0.99	4.70E-10	4.70E-10	1.00		
1.02E+03	1.03E+03	0.99	4.70E-10	4.70E-10	1.00		
1.15E+03	1.16E+03	0.99	4.70E-10	4.70E-10	1.00		
1.28E+03	1.29E+03	0.99	4.70E-10	4.70E-10	1.00		
1.41E+03	1.42E+03	1.00	4.70E-10	4.70E-10	1.00		
1.54E+03	1.54E+03	1.00	4.70E-10	4.70E-10	1.00		

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results:..(cont)

1.67E+03	1.67E+03	1.00	4.70E-10	4.70E-10	1.00	
1.79E+03	1.80E+03	1.00	4.70E-10	4.70E-10	1.00	
1.92E+03	1.93E+03	1.00	4.70E-10	4.70E-10	1.00	
2.05E+03	2.05E+03	1.00	4.70E-10	4.70E-10	1.00	
2.18E+03	2.18E+03	1.00	4.70E-10	4.70E-10	1.00	
2.31E+03	2.31E+03	1.00	4.70E-10	4.70E-10	1.00	
2.43E+03	2.44E+03	1.00	4.70E-10	4.70E-10	1.00	
2.56E+03	2.56E+03	1.00	4.70E-10	4.70E-10	1.00	
2.69E+03	2.69E+03	1.00	4.70E-10	4.70E-10	1.00	
2.82E+03	2.82E+03	1.00	4.70E-10	4.70E-10	1.00	
2.95E+03	2.95E+03	1.00	4.70E-10	4.70E-10	1.00	
3.07E+03	3.08E+03	1.00	4.70E-10	4.70E-10	1.00	
3.20E+03	3.20E+03	1.00	4.70E-10	4.70E-10	1.00	
3.33E+03	3.33E+03	1.00	4.70E-10	4.70E-10	1.00	
3.46E+03	3.46E+03	1.00	4.70E-10	4.70E-10	1.00	
3.59E+03	3.59E+03	1.00	4.70E-10	4.70E-10	1.00	
3.71E+03	3.71E+03	1.00	4.70E-10	4.70E-10	1.00	
3.84E+03	3.84E+03	1.00	4.70E-10	4.70E-10	1.00	
3.97E+03	3.97E+03	1.00	4.70E-10	4.70E-10	1.00	
4.10E+03	4.10E+03	1.00	4.70E-10	4.70E-10	1.00	
4.23E+03	4.22E+03	1.00	4.69E-10	4.70E-10	1.00	
4.35E+03	4.35E+03	1.00	4.50E-10	4.70E-10	0.96	
4.48E+03	4.48E+03	1.00	3.95E-10	4.70E-10	0.84	
4.61E+03	4.61E+03	1.00	3.19E-10	4.70E-10	0.68	
4.74E+03	4.74E+03	1.00	2.40E-10	4.70E-10	0.51	
4.87E+03	4.86E+03	1.00	1.61E-10	4.70E-10	0.34	
4.99E+03	4.99E+03	1.00	8.19E-11	4.11E-10	0.20	
5.12E+03	5.12E+03	1.00	1.54E-11	9.79E-11	0.16	
PB210	PB210	#VALUE!	PB210	PB210	#VALUE!	41 URANIUM-U238
0.00E+00	1.11E+01	0.00	0.00E+00	0.00E+00	#DIV/0!	
1.28E+02	1.39E+02	0.92	0.00E+00	1.06E-14	0.00	
2.56E+02	2.66E+02	0.96	6.88E-13	5.48E-12	0.13	
3.84E+02	3.94E+02	0.97	1.18E-10	1.33E-10	0.89	
5.12E+02	5.22E+02	0.98	3.19E-10	3.21E-10	0.99	
6.40E+02	6.49E+02	0.99	3.63E-10	3.62E-10	1.00	
7.68E+02	7.77E+02	0.99	3.65E-10	3.65E-10	1.00	
8.96E+02	9.05E+02	0.99	3.65E-10	3.65E-10	1.00	
1.02E+03	1.03E+03	0.99	3.65E-10	3.65E-10	1.00	
1.15E+03	1.16E+03	0.99	3.65E-10	3.65E-10	1.00	
1.28E+03	1.29E+03	0.99	3.65E-10	3.65E-10	1.00	
1.41E+03	1.42E+03	1.00	3.65E-10	3.65E-10	1.00	
1.54E+03	1.54E+03	1.00	3.65E-10	3.65E-10	1.00	
1.67E+03	1.67E+03	1.00	3.65E-10	3.65E-10	1.00	
1.79E+03	1.80E+03	1.00	3.65E-10	3.65E-10	1.00	
1.92E+03	1.93E+03	1.00	3.65E-10	3.65E-10	1.00	
2.05E+03	2.05E+03	1.00	3.65E-10	3.65E-10	1.00	
2.18E+03	2.18E+03	1.00	3.65E-10	3.65E-10	1.00	
2.31E+03	2.31E+03	1.00	3.65E-10	3.65E-10	1.00	
2.43E+03	2.44E+03	1.00	3.65E-10	3.65E-10	1.00	

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Results: . . . . (cont)

2.56E+03	2.56E+03	1.00	3.65E-10	3.65E-10	1.00		
2.69E+03	2.69E+03	1.00	3.65E-10	3.65E-10	1.00		
2.82E+03	2.82E+03	1.00	3.65E-10	3.65E-10	1.00		
2.95E+03	2.95E+03	1.00	3.65E-10	3.65E-10	1.00		
3.07E+03	3.08E+03	1.00	3.65E-10	3.65E-10	1.00		
3.20E+03	3.20E+03	1.00	3.65E-10	3.65E-10	1.00		
3.33E+03	3.33E+03	1.00	3.65E-10	3.65E-10	1.00		
3.46E+03	3.46E+03	1.00	3.65E-10	3.65E-10	1.00		
3.59E+03	3.59E+03	1.00	3.65E-10	3.65E-10	1.00		
3.71E+03	3.71E+03	1.00	3.65E-10	3.65E-10	1.00		
3.84E+03	3.84E+03	1.00	3.65E-10	3.65E-10	1.00		
3.97E+03	3.97E+03	1.00	3.65E-10	3.65E-10	1.00		
4.10E+03	4.10E+03	1.00	3.65E-10	3.65E-10	1.00		
4.23E+03	4.22E+03	1.00	3.64E-10	3.65E-10	1.00		
4.35E+03	4.35E+03	1.00	3.50E-10	3.65E-10	0.96		
4.48E+03	4.48E+03	1.00	3.07E-10	3.65E-10	0.84		
4.61E+03	4.61E+03	1.00	2.48E-10	3.65E-10	0.68		
4.74E+03	4.74E+03	1.00	1.86E-10	3.65E-10	0.51		
4.87E+03	4.86E+03	1.00	1.25E-10	3.65E-10	0.34		
4.99E+03	4.99E+03	1.00	6.36E-11	3.19E-10	0.20		
5.12E+03	5.12E+03	1.00	1.19E-11	7.60E-11	0.16		
BI210	BI210	#VALUE!	BI210	BI210	#VALUE!	41	URANIUM-U238
0.00E+00	1.11E+01	0.00	0.00E+00	0.00E+00	#DIV/0!		
1.28E+02	1.39E+02	0.92	0.00E+00	1.06E-14	0.00		
2.56E+02	2.66E+02	0.96	6.88E-13	5.48E-12	0.13		
3.84E+02	3.94E+02	0.97	1.18E-10	1.33E-10	0.89		
5.12E+02	5.22E+02	0.98	3.19E-10	3.21E-10	0.99		
6.40E+02	6.49E+02	0.99	3.63E-10	3.62E-10	1.00		
7.68E+02	7.77E+02	0.99	3.65E-10	3.65E-10	1.00		
8.96E+02	9.05E+02	0.99	3.65E-10	3.65E-10	1.00		
1.02E+03	1.03E+03	0.99	3.65E-10	3.65E-10	1.00		
1.15E+03	1.16E+03	0.99	3.65E-10	3.65E-10	1.00		
1.28E+03	1.29E+03	0.99	3.65E-10	3.65E-10	1.00		
1.41E+03	1.42E+03	1.00	3.65E-10	3.65E-10	1.00		
1.54E+03	1.54E+03	1.00	3.65E-10	3.65E-10	1.00		
1.67E+03	1.67E+03	1.00	3.65E-10	3.65E-10	1.00		
1.79E+03	1.80E+03	1.00	3.65E-10	3.65E-10	1.00		
1.92E+03	1.93E+03	1.00	3.65E-10	3.65E-10	1.00		
2.05E+03	2.05E+03	1.00	3.65E-10	3.65E-10	1.00		
2.18E+03	2.18E+03	1.00	3.65E-10	3.65E-10	1.00		
2.31E+03	2.31E+03	1.00	3.65E-10	3.65E-10	1.00		
2.43E+03	2.44E+03	1.00	3.65E-10	3.65E-10	1.00		
2.56E+03	2.56E+03	1.00	3.65E-10	3.65E-10	1.00		
2.69E+03	2.69E+03	1.00	3.65E-10	3.65E-10	1.00		
2.82E+03	2.82E+03	1.00	3.65E-10	3.65E-10	1.00		
2.95E+03	2.95E+03	1.00	3.65E-10	3.65E-10	1.00		
3.07E+03	3.08E+03	1.00	3.65E-10	3.65E-10	1.00		
3.20E+03	3.20E+03	1.00	3.65E-10	3.65E-10	1.00		
3.33E+03	3.33E+03	1.00	3.65E-10	3.65E-10	1.00		

10/15/98 Results: ... (cont)

3.46E+03	3.46E+03	1.00	3.65E-10	3.65E-10	1.00	
3.59E+03	3.59E+03	1.00	3.65E-10	3.65E-10	1.00	
3.71E+03	3.71E+03	1.00	3.65E-10	3.65E-10	1.00	
3.84E+03	3.84E+03	1.00	3.65E-10	3.65E-10	1.00	
3.97E+03	3.97E+03	1.00	3.65E-10	3.65E-10	1.00	
4.10E+03	4.10E+03	1.00	3.65E-10	3.65E-10	1.00	
4.23E+03	4.22E+03	1.00	3.64E-10	3.65E-10	1.00	
4.35E+03	4.35E+03	1.00	3.50E-10	3.65E-10	0.96	
4.48E+03	4.48E+03	1.00	3.07E-10	3.65E-10	0.84	
4.61E+03	4.61E+03	1.00	2.48E-10	3.65E-10	0.68	
4.74E+03	4.74E+03	1.00	1.86E-10	3.65E-10	0.51	
4.87E+03	4.86E+03	1.00	1.25E-10	3.65E-10	0.34	
4.99E+03	4.99E+03	1.00	6.36E-11	3.19E-10	0.20	
5.12E+03	5.12E+03	1.00	1.19E-11	7.60E-11	0.16	
PO210	PO210	#VALUE!	PO210	PO210	#VALUE!	41 URANIUM-U238
0.00E+00	1.11E+01	0.00	0.00E+00	0.00E+00	#DIV/0!	
1.28E+02	1.39E+02	0.92	0.00E+00	1.05E-14	0.00	
2.56E+02	2.66E+02	0.96	6.84E-13	5.45E-12	0.13	
3.84E+02	3.94E+02	0.97	1.17E-10	1.32E-10	0.89	
5.12E+02	5.22E+02	0.98	3.17E-10	3.19E-10	0.99	
6.40E+02	6.49E+02	0.99	3.61E-10	3.60E-10	1.00	
7.68E+02	7.77E+02	0.99	3.63E-10	3.63E-10	1.00	
8.96E+02	9.05E+02	0.99	3.63E-10	3.63E-10	1.00	
1.02E+03	1.03E+03	0.99	3.63E-10	3.63E-10	1.00	
1.15E+03	1.16E+03	0.99	3.63E-10	3.63E-10	1.00	
1.28E+03	1.29E+03	0.99	3.63E-10	3.63E-10	1.00	
1.41E+03	1.42E+03	1.00	3.63E-10	3.63E-10	1.00	
1.54E+03	1.54E+03	1.00	3.63E-10	3.63E-10	1.00	
1.67E+03	1.67E+03	1.00	3.63E-10	3.63E-10	1.00	
1.79E+03	1.80E+03	1.00	3.63E-10	3.63E-10	1.00	
1.92E+03	1.93E+03	1.00	3.63E-10	3.63E-10	1.00	
2.05E+03	2.05E+03	1.00	3.63E-10	3.63E-10	1.00	
2.18E+03	2.18E+03	1.00	3.63E-10	3.63E-10	1.00	
2.31E+03	2.31E+03	1.00	3.63E-10	3.63E-10	1.00	
2.43E+03	2.44E+03	1.00	3.63E-10	3.63E-10	1.00	
2.56E+03	2.56E+03	1.00	3.63E-10	3.63E-10	1.00	
2.69E+03	2.69E+03	1.00	3.63E-10	3.63E-10	1.00	
2.82E+03	2.82E+03	1.00	3.63E-10	3.63E-10	1.00	
2.95E+03	2.95E+03	1.00	3.63E-10	3.63E-10	1.00	
3.07E+03	3.08E+03	1.00	3.63E-10	3.63E-10	1.00	
3.20E+03	3.20E+03	1.00	3.63E-10	3.63E-10	1.00	
3.33E+03	3.33E+03	1.00	3.63E-10	3.63E-10	1.00	
3.46E+03	3.46E+03	1.00	3.63E-10	3.63E-10	1.00	
3.59E+03	3.59E+03	1.00	3.63E-10	3.63E-10	1.00	
3.71E+03	3.71E+03	1.00	3.63E-10	3.63E-10	1.00	
3.84E+03	3.84E+03	1.00	3.63E-10	3.63E-10	1.00	
3.97E+03	3.97E+03	1.00	3.63E-10	3.63E-10	1.00	
4.10E+03	4.10E+03	1.00	3.63E-10	3.63E-10	1.00	
4.23E+03	4.22E+03	1.00	3.62E-10	3.63E-10	1.00	

Results: ... (cont'd)

4.35E+03	4.35E+03	1.00	3.48E-10	3.63E-10	0.96
4.48E+03	4.48E+03	1.00	3.05E-10	3.63E-10	0.84
4.61E+03	4.61E+03	1.00	2.46E-10	3.63E-10	0.68
4.74E+03	4.74E+03	1.00	1.85E-10	3.63E-10	0.51
4.87E+03	4.86E+03	1.00	1.24E-10	3.63E-10	0.34
4.99E+03	4.99E+03	1.00	6.33E-11	3.17E-10	0.20
5.12E+03	5.12E+03	1.00	1.19E-11	7.56E-11	0.16

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Results: ... (cont)

Gwhfduhi.hhi
Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 10/08/1998 at 10:22:22
Input file name GWHFDUHI.ina

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Ground water Usage Location: GW Fence

No mass partitioning of source term

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	649	6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03
Meat	715	4.1E-10	4.8E-10	6.5E-07	4.1E-10	4.8E-10	6.5E-07
Milk	649	2.2E-09	2.5E-09	3.5E-06	2.2E-09	2.6E-09	3.5E-06
Subtotal		6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03
Total		6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Meat	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Milk	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Subtotal		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

File: qa5\nonmb\gwhfduhi.hhi

10/16/98 Results - ... (cont)

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Gwhfduhi.hhi

Multimedia Environmental Pollutant Assessment System (MEPAS)
MEPAS 3.1 Report Generator (REPORT version 10/3/94 KJC)
Run Date and time 10/08/1998 at 10:48:14
Input file name GWHFDUHI.ina

Health Impact Detailed Result for: URANIUM-238 from URANIUM-238

Transport Pathway: Ground water Usage Location: GW Fence

Mass partioning of source term used

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	701	6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03
Meat	647	4.1E-10	4.8E-10	6.5E-07	4.1E-10	4.8E-10	6.5E-07
Milk	701	2.2E-09	2.5E-09	3.5E-06	2.2E-09	2.6E-09	3.5E-06
Subtotal		6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03
Total		6.8E-07	7.9E-07	1.1E-03	6.8E-07	7.9E-07	1.1E-03

Health Impact Detailed Result for: THORIUM-234 from URANIUM-238

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Meat	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Milk	0	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Subtotal		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Total		0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

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22 10/15/98 Results:... (cont)

Health Impact Detailed Result for: THORIUM-234 from THORIUM-234

Transport Pathway: Ground water Usage Location: GW Fence

No mass partioning of source term

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	661	3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05
Meat	663	2.5E-13	2.9E-13	4.0E-10	2.5E-13	2.9E-13	3.9E-10
Milk	779	1.3E-12	1.5E-12	2.1E-09	1.3E-12	1.5E-12	2.1E-09
Subtotal		3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05
Total		3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05

Health Impact Detailed Result for: URANIUM-234 from URANIUM-234

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	679	7.6E-10	8.9E-10	1.2E-06	7.6E-10	8.9E-10	1.2E-06
Meat	663	4.6E-13	5.4E-13	7.4E-10	4.6E-13	5.4E-13	7.3E-10
Milk	661	2.5E-12	2.9E-12	3.9E-09	2.5E-12	2.9E-12	4.0E-09
Subtotal		7.7E-10	8.9E-10	1.2E-06	7.7E-10	8.9E-10	1.2E-06
Total		7.7E-10	8.9E-10	1.2E-06	7.7E-10	8.9E-10	1.2E-06

Health Impact Detailed Result for: THORIUM-230 from THORIUM-230

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	659	2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09
Meat	681	2.9E-17	3.4E-17	4.6E-14	2.9E-17	3.3E-17	4.6E-14
Milk	657	9.7E-17	1.1E-16	1.5E-13	9.8E-17	1.1E-16	1.5E-13
Subtotal		2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09
Total		2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09

10/15/98 Results:... (cont)

Health Impact Detailed Result for: THORIUM-234 from THORIUM-234

Transport Pathway: Ground water Usage Location: GW Fence

N Mass partitioning of source term used

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	733	3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05
Meat	761	2.5E-13	2.9E-13	4.0E-10	2.5E-13	2.9E-13	3.9E-10
Milk	641	1.3E-12	1.5E-12	2.1E-09	1.3E-12	1.5E-12	2.1E-09
Subtotal		3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05
Total		3.6E-08	4.2E-08	5.8E-05	3.6E-08	4.2E-08	5.8E-05

Health Impact Detailed Result for: URANIUM-234 from URANIUM-234

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	763	7.6E-10	8.9E-10	1.2E-06	7.6E-10	8.9E-10	1.2E-06
Meat	745	4.6E-13	5.4E-13	7.4E-10	4.6E-13	5.4E-13	7.3E-10
Milk	733	2.5E-12	2.9E-12	3.9E-09	2.5E-12	2.9E-12	4.0E-09
Subtotal		7.7E-10	8.9E-10	1.2E-06	7.7E-10	8.9E-10	1.2E-06
Total		7.7E-10	8.9E-10	1.2E-06	7.7E-10	8.9E-10	1.2E-06

Health Impact Detailed Result for: THORIUM-230 from THORIUM-230

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	715	2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09
Meat	765	2.9E-17	3.4E-17	4.6E-14	2.9E-17	3.3E-17	4.6E-14
Milk	699	9.7E-17	1.1E-16	1.5E-13	9.8E-17	1.1E-16	1.5E-13
Subtotal		2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09
Total		2.4E-12	2.8E-12	3.8E-09	2.4E-12	2.8E-12	3.8E-09

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Results: ... (cont)

Health Impact Detailed Result for: RADIUM-226 from RADIUM-226

Transport Pathway: Ground water Usage Location: GW Fence

No mass partitioning of source term

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	663	2.9E-13	3.3E-13	4.5E-10	2.9E-13	3.3E-13	4.5E-10
Meat	663	5.2E-16	6.0E-16	8.3E-13	5.2E-16	6.0E-16	8.2E-13
Milk	783	3.0E-15	3.5E-15	4.8E-12	3.0E-15	3.5E-15	4.8E-12
Subtotal		2.9E-13	3.4E-13	4.6E-10	2.9E-13	3.4E-13	4.6E-10
Total		2.9E-13	3.4E-13	4.6E-10	2.9E-13	3.4E-13	4.6E-10

Health Impact Detailed Result for: LEAD-210 from LEAD-210

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	773	9.1E-13	1.1E-12	1.4E-09	9.1E-13	1.1E-12	1.4E-09
Meat	763	7.3E-16	8.5E-16	1.2E-12	7.3E-16	8.4E-16	1.2E-12
Milk	771	1.8E-15	2.1E-15	2.9E-12	1.8E-15	2.1E-15	2.9E-12
Subtotal		9.1E-13	1.1E-12	1.4E-09	9.1E-13	1.1E-12	1.4E-09
Total		9.1E-13	1.1E-12	1.4E-09	9.1E-13	1.1E-12	1.4E-09

10/15/98 Results: ... (cont)
LJ

Health Impact Detailed Result for: RADIUM-226 from RADIUM-226

Transport Pathway: Ground water Usage Location: GW Fence

Mass partitioning of source term used

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	747	2.9E-13	3.3E-13	4.5E-10	2.9E-13	3.3E-13	4.5E-10
Meat	753	5.2E-16	6.0E-16	8.3E-13	5.2E-16	6.0E-16	8.2E-13
Milk	717	3.0E-15	3.5E-15	4.8E-12	3.0E-15	3.5E-15	4.8E-12
Subtotal		2.9E-13	3.4E-13	4.6E-10	2.9E-13	3.4E-13	4.6E-10
Total		2.9E-13	3.4E-13	4.6E-10 ✓	2.9E-13	3.4E-13	4.6E-10

Health Impact Detailed Result for: LEAD-210 from LEAD-210

Transport Pathway: Ground water Usage Location: GW Fence

Exposure Pathway	Time Period	Individual Result: Fatal Effect Risk	Individual Result: Total Incid. Index	Individual Result: Dose, Rem	Population Results: Fatal Effect Risk	Population Results: Total Incid. Index	Population Results: Dose, Person Rem
Ingestion:							
Drinking Water	637	9.0E-13	1.0E-12	1.4E-09	9.0E-13	1.0E-12	1.4E-09
Meat	763	7.3E-16	8.5E-16	1.2E-12	7.3E-16	8.4E-16	1.2E-12
Milk	671	1.8E-15	2.1E-15	2.9E-12	1.8E-15	2.1E-15	2.9E-12
Subtotal		9.0E-13	1.0E-12	1.4E-09 ✓	9.0E-13	1.0E-12	1.4E-09
Total		9.0E-13	1.0E-12	1.4E-09 ✓	9.0E-13	1.0E-12	1.4E-09

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10/16/98

Comparison of Annual Doses from CASE1A.INA MEPAS 3.2g Output:Summed Parents and Daughters for Each 50 yr Interval by Exposure Pathway for Runs
by P. LaPlante (PAL) and the Code Developer (PNL) (Updated 10/16/98 for final code version)

PAL 6/18/98 Year	PAL DW	PNL DW	Ratio PAL/DLS	PNNL Revised DW	New Ratio PAL/PNNL	PAL LEAF	PNL LEAF	Ratio PAL/DLS	PNNL Revised LEAF	New Ratio PAL/PNNL	PAL OTH	PNL OTH	Ratio PAL/DLS	PNNL Revised OTHER	New Ratio PAL/PNNL	PAL MEAT	PNL MEAT	Ratio PAL/DLS	PNNL Revised MEAT	New Ratio PAL/PNNL	PAL MILK	PNL MILK	Ratio PAL/DLS	PNNL Revised MILK	New Ratio PAL/PNNL
50	9.32E-10			9.32E-10	1.00E+00	1.55E-11			1.55E-11	1.00E+00	4.10E-12			4.10E-12	1.00E+00	4.96E-14			4.95E-14	1.00E+00	5.07E-13			5.06E-13	1.00E+00
100	1.86E-09	1.81E-09	1.02	1.86E-09	1.00E+00	3.09E-11	2.97E-11	1.04	3.09E-11	1.00E+00	8.36E-12	6.40E-12	1.31	8.36E-12	1.00E+00	1.02E-13	3.57E-14	2.85	1.02E-13	1.00E+00	1.02E-12	1.95E-13	5.24	1.02E-12	1.00E+00
150	2.78E-09			2.78E-09	1.00E+00	4.62E-11			4.62E-11	1.00E+00	1.26E-11			1.26E-11	1.00E+00	1.55E-13			1.55E-13	1.00E+00	1.54E-12			1.54E-12	1.00E+00
200	4.13E-08	4.12E-08	1.00	4.13E-08	1.00E+00	1.07E-09	1.05E-09	1.02	1.07E-09	1.00E+00	1.47E-09	1.29E-09	1.13	1.46E-09	1.01E+00	5.19E-11	4.91E-11	1.06	5.17E-11	1.00E+00	6.80E-10	6.66E-10	1.02	6.79E-10	1.00E+00
250	8.91E-08			8.91E-08	1.00E+00	2.37E-09			2.37E-09	1.00E+00	3.69E-09			3.69E-09	1.00E+00	1.23E-10			1.23E-10	1.00E+00	1.55E-09			1.55E-09	1.00E+00
300	1.41E-07	1.41E-07	1.00	1.41E-07	1.00E+00	3.75E-09	3.75E-09	1.00	3.75E-09	1.00E+00	6.04E-09	6.02E-09	1.00	6.04E-09	1.00E+00	1.97E-10	1.96E-10	1.00	1.97E-10	1.00E+00	2.44E-09	2.43E-09	1.00	2.44E-09	1.00E+00
350	1.93E-07			1.93E-07	1.00E+00	5.15E-09			5.15E-09	1.00E+00	8.42E-09			8.41E-09	1.00E+00	2.71E-10			2.71E-10	1.00E+00	3.32E-09			3.32E-09	1.00E+00
400	2.46E-07	2.45E-07	1.00	2.46E-07	1.00E+00	6.54E-09	6.52E-09	1.00	6.54E-09	1.00E+00	1.08E-08	1.08E-08	1.00	1.08E-08	1.00E+00	3.45E-10	3.44E-10	1.00	3.45E-10	1.00E+00	4.22E-09	4.20E-09	1.00	4.21E-09	1.00E+00
450	4.10E-07			4.10E-07	1.00E+00	1.09E-08			1.09E-08	1.00E+00	1.75E-08			1.74E-08	1.01E+00	5.73E-10			5.72E-10	1.00E+00	7.11E-09			7.11E-09	1.00E+00
500	6.01E-07	6.00E-07	1.00	6.01E-07	1.00E+00	1.62E-08	1.62E-08	1.00	1.62E-08	1.00E+00	2.65E-08	2.64E-08	1.00	2.65E-08	1.00E+00	8.60E-10	8.58E-10	1.00	8.60E-10	1.00E+00	1.06E-08	1.06E-08	1.00	1.06E-08	1.00E+00
550	7.97E-07			7.97E-07	1.00E+00	2.14E-08			2.14E-08	1.00E+00	3.58E-08			3.58E-08	1.00E+00	1.15E-09			1.15E-09	1.00E+00	1.41E-08			1.41E-08	1.00E+00
600	9.92E-07	9.90E-07	1.00	9.92E-07	1.00E+00	2.67E-08	2.67E-08	1.00	2.67E-08	1.00E+00	4.53E-08	4.52E-08	1.00	4.52E-08	1.00E+00	1.44E-09	1.44E-09	1.00	1.44E-09	1.00E+00	1.76E-08	1.76E-08	1.00	1.76E-08	1.00E+00
650	1.19E-06			1.19E-06	1.00E+00	3.21E-08			3.21E-08	1.00E+00	5.46E-08			5.46E-08	1.00E+00	1.74E-09			1.74E-09	1.00E+00	2.12E-08			2.12E-08	1.00E+00
700	1.33E-06	1.32E-06	1.00	1.33E-06	1.00E+00	3.59E-08	3.58E-08	1.00	3.59E-08	1.00E+00	6.18E-08	6.17E-08	1.00	6.18E-08	1.00E+00	1.96E-09	1.95E-09	1.00	1.96E-09	1.00E+00	2.37E-08	2.36E-08	1.00	2.37E-08	1.00E+00
750	1.45E-06			1.45E-06	1.00E+00	3.92E-08			3.92E-08	1.00E+00	6.78E-08			6.77E-08	1.00E+00	2.14E-09			2.14E-09	1.00E+00	2.58E-08			2.58E-08	1.00E+00
800	1.56E-06	1.56E-06	1.00	1.56E-06	1.00E+00	4.24E-08	4.23E-08	1.00	4.24E-08	1.00E+00	7.35E-08	7.34E-08	1.00	7.35E-08	1.00E+00	2.32E-09	2.31E-09	1.00	2.32E-09	1.00E+00	2.80E-08	2.79E-08	1.00	2.80E-08	1.00E+00
850	1.69E-06			1.69E-06	1.00E+00	4.56E-08			4.56E-08	1.00E+00	7.93E-08			7.93E-08	1.00E+00	2.50E-09			2.50E-09	1.00E+00	3.01E-08			3.01E-08	1.00E+00
900	1.80E-06	1.80E-06	1.00	1.80E-06	1.00E+00	4.89E-08	4.88E-08	1.00	4.89E-08	1.00E+00	8.51E-08	8.49E-08	1.00	8.50E-08	1.00E+00	2.68E-09	2.67E-09	1.00	2.68E-09	1.00E+00	3.22E-08	3.21E-08	1.00	3.22E-08	1.00E+00
950	1.84E-06			1.84E-06	1.00E+00	5.01E-08			5.01E-08	1.00E+00	8.77E-08			8.77E-08	1.00E+00	2.75E-09			2.75E-09	1.00E+00	3.30E-08			3.30E-08	1.00E+00
1000	1.86E-06	1.76E-06	1.05	1.86E-06	1.00E+00	5.05E-08	4.89E-08	1.03	5.05E-08	1.00E+00	8.89E-08	8.84E-08	1.01	8.89E-08	1.00E+00	2.78E-09	2.77E-09	1.00	2.78E-09	1.00E+00	3.33E-08	3.32E-08	1.00	3.33E-08	1.00E+00

Results... (cont)

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10/16/98 Results: .... (cont)

Summary of installation test results; and Discussion

A. Test comparing groundwater concentration output files for CASE2A run (PNL results vs CNWRA test results): (pages 140~147 in Notebook 178).

Results for this test show identical output from PNL and CNWRA runs.

B. Test comparing surface water concentration output files for CASE2A run (PNL results vs CNWRA test results): (pages 148~155 in Notebook 178).

Results for this test show identical output for the majority of results with the following exception. Differences between CNWRA concentrations for daughters below Ra226 in the U chain are noted by circled results. After checking further, the results were found to differ because the PNL results used for comparison were generated by a different version of MEPAS. This discrepancy is discussed on page 115 of notebook 178 and was resolved in a prior submittal by PNL. When the results of that submittal are compared with results of the present testing, all numbers are in agreement. In my compilation of results in pages 148 to 155 in notebook 178, I had inadvertently used the out-of-date PNL numbers for comparison. The corrected spreadsheets are provided in attached Excel 97 File 2aWCF2.XLS along with the erroneous spreadsheet (2aWCF.XLS).

10/16/98

C. Test comparing groundwater peak dose output for CASE2A (PNL results vs CNWRA test) (see pg 2-7)

Results of this test show identical results for the peak dose values between PNL and CNWRA runs. Some discrepancies between the two sets of results for the time of the peak dose are noted but not considered a problem because most differences are only by a few years over a 1,000 year modeling period. One exception is the Th-230 results (pg 5) for drinking water which show about a 200 yr difference between PNL and CNWRA for time of peak. This instability may be the result of very low dose numbers being calculated (1E-18 rem).

10/16/98

D. Test comparing surface water peak dose output for CASE 2A run (PNL results vs CNWRA test) (see page 8 ~ 9)

Results show identical agreement of selected peak dose results of PNL and CNWRA runs. Minor discrepancies are noted in the time of peak dose. These discrepancies may be due to instability of the calculation of very small doses over a very long (10,000 yr) time period. The magnitude of the discrepancies is small and thus not considered a significant problem.

10/16/98

10/19/98

E. Test comparing results of running the same release/exposure scenario through 2 different options of the code (Mass partition or no-mass partition). (see pg 10-25)

This test is an internal consistency check to ensure the different parts of the code will produce similar results when the code is asked to run the same scenario 2 different ways (exercising 2 separate code modules). This test had originally been used to identify the 2nd 12 order of magnitude error and therefore, successful comparison results will confirm the error has been resolved. The results of comparing groundwater concentration output in overtime 10/19/98 X.WCF files (see pages 10 ~ 18 in this notebook) shows general agreement for parent material (U) timesteps and concentrations and agreement for daughters when equilibrium is reached but some differences in conc. 10/19/98 in early and late timesteps for daughters as well as early timestep internal differences. The differences are circled in the reported output. These are thought to be the result of the different ways in which daughters are treated in the mass balanced and non-mass balanced models. The differences do not affect the magnitude of the peak dose and the results indicate the non-mass-partitioned model is the more conservative approach. Considering the peak dose results (pages 20 ~ 25) for this test the peaks are identical for U and the selected daughters and the time of peak is similar within ~100 yr variation. Again the time of peak is thought to be affected by the different approaches to source term and daughter modeling (the non-mass balance reaches groundwater equil concentration earlier than the mass balanced). This delay may also be from inclusion of cont zone layer in MB option and

10/19/98

no cont zone layer in the non-MB option. Once again, because the non-MB approach is reaching the peak dose earlier, it is conservative in that respect using the non-MB model 10/19/ in comparison w/ non MB approach. For the purpose of the 1000 yr peak dose calculation for DPG, the differences in the two approaches are insignificant and do not present any problems.

F. Test comparing cancer risk over time output (*.INA) from PNL and CNWRA CASE1A runs to confirm consistent results. (page 26)

The results for PNL and CNWRA runs of CASE1A in the *.INA files were processed to sum the parent and daughter, cancer risk numbers for each 50th year up to 1000 yrs. Results tabulated on page 26 show 100% agreement in timesteps and risks calculated by each pathway. 10/19/98

Conclusions:

The installation tests conducted show good agreement between CNWRA and PNL test case results. An internal consistency check also showed comparable results indicating that a prior bug in the code has been successfully patched. Some differences noted on the internal consistency check are thought to be due to differences in the models used for the test. These are slight deviations in the time of peak dose calculated and are not considered a problem for estimating 1000 yr peak doses. The tests results as a whole indicate the MEANS 3.2g code, as modified by PNL software "patches", is running as intended and problems identified during prior installation tests have been corrected by PNL.

10/21/98 Referenced Files: Files referenced in this final round of code testing (from page 138 to end of notebook 178 and the beginning to page 29 of this notebook) have been compressed w/ PKZIP for windows software and have been e-mailed to A. Kotara for archiving and subsequent inclusion in the file containing this notebook. The directory structure has been maintained for ease of use.