

WASTE MANAGEMENT GROUP, inc.

January 5, 1983

WM-12
PDR

(Return to WM, 623-SS)

Mr. R. Rawl
Materials Transportation Bureau
DMT 223
Department of Transportation
Washington D. C. 20590

Subject: Shipping Paper Nuclide Identification - RADMAN®

Dear Mr. Rawl,

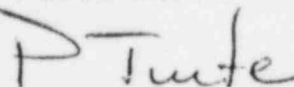
As discussed on January 4, 1983, we have developed a computer code to support radwaste management activities at nuclear power plants. This code is described in the enclosed Volume I of our NRC Topical Report. As described, RADMAN® performs many functions including the preparation of shipping papers.

At present, the code operates on a waste specific data base which is periodically updated. The package record produced by the code includes all the nuclides in the data base (See Exhibit C in Report) and these nuclides are also printed on shipping papers (See Exhibit N in Report). The NRC's draft BTP on classification (enclosed) will define significant nuclides for the purposes of classification under 10CFR61 as those with concentrations less than 1% of the Class A limits. This criteria will reduce the number of nuclides that have to be listed on 10CFR61 manifests and we assume the same criteria can be applied to shipping papers prepared to meet DOT regulations. Please advise if this assumption is correct.

The NRC criteria will not, however, eliminate the identification of all nuclides with relatively small fractional abundances for some radwaste forms. Enclosed is some printout of the RADMAN® data bases for different waste types in three different plants. The listed number of nuclides varies from 6 to 22. As shown, the fractional abundance of certain nuclides is relatively small. Yet without some guidance from DOT, RADMAN® will reproduce all these nuclides on shipping papers. Thus, we request that you consider a reasonable cutoff for listing nuclides when using RADMAN®. The code can incorporate a cutoff based on either, concentration, Transport Group, fractional abundance, curie level or any combination of these variables.

Thank you for consideration of this request and if you need additional information let me know.

Sincerely yours,
WASTE MANAGEMENT GROUP, INC.



Peter T. Tuite
Principal

cc: w/o enclosure
C. Mac Donald NRC
✓ T. Johnson NRC

PTT/ct
enclosure
B301180490 B30105
PDR WASTE
WM-12 PDR

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ORIGINAL NOT REC'D

***** DATA BASE SUMMARY FOR WASTE TYPE 1 *****
 AS OF 1 4 83.....

***** WASTE CHARACTERISTIC FILE (WASDAT.DAT) SUMMARY *****

| RSR INFORMATION | CALCULATION INFORMATION |
|---------------------------|--------------------------|
| WASTE:CONCENT. WASTE | WASTE VOLUME(FT3): 6.8 |
| PHYSICAL FORM:SOLID | DENSITY(LBS/FT3): 110.0 |
| CHEMICAL FORM:CEMENT | WASTE WEIGHT(LBS): 750.0 |
| PACKAGE TYPE: 55 GAL DRUM | LIMIT FACTOR: 1 |
| PACKAGE VOL(FT3): 7.5 | SHIELD FACTOR: 20.6 |
| PACKAGE WT(LBS): 800.0 | |

***** SUMMARY OF WASTE SAMPLE DATA FILE *****

| NUCLIDE | SAMPLE DATA | ABUNDANCE (PERCENT) | MEV/D1S GAMMA | DOSE (PERCENT) |
|----------|-------------|---------------------|---------------|----------------|
| CR-51 | 2.10E-03 | 1.70 | 4.93E-04 | .04 |
| MN-54 | 6.24E-03 | 5.05 | 4.24E-02 | 3.47 |
| CO-58 | 7.59E-05 | .06 | 4.91E-04 | .04 |
| CO-60 | 4.46E-02 | 36.10 | 9.03E-01 | 73.75 |
| FE-59 | 3.14E-04 | .25 | 1.55E-03 | .13 |
| SB-124 | 1.85E-04 | .15 | 2.10E-03 | .17 |
| SB-125 | 5.93E-05 | .05 | 1.34E-04 | .01 |
| ZN-65 | 2.30E-04 | .19 | 1.02E-03 | .08 |
| AG-110m | 9.04E-05 | .08 | 1.03E-03 | .08 |
| SR-90 | 1.76E-03 | 1.42 | 0.00E+00 | 0.00 |
| NB-95 | 1.15E-04 | .09 | 7.07E-04 | .06 |
| RU-106 | 6.69E-05 | .05 | 8.66E-05 | .01 |
| CS-134 | 7.25E-03 | 5.87 | 8.22E-02 | 6.72 |
| CS-137 | 4.16E-02 | 33.70 | 1.89E-01 | 15.42 |
| CE-141 | 2.78E-04 | .22 | 1.55E-04 | .01 |
| CE-144 | 4.01E-04 | .32 | 4.86E-05 | .00 |
| RES | 1.82E-02 | 14.70 | 0.00E+00 | 0.00 |
| PU-238 | 1.59E-05 | .01 | 0.00E+00 | 0.00 |
| PU239/40 | 6.39E-06 | .01 | 0.00E+00 | 0.00 |
| AM-241 | 2.06E-06 | .00 | 3.67E-07 | .00 |
| CM-243 | 4.50E-06 | .00 | 2.69E-06 | .00 |
| CM-244 | 3.42E-06 | .00 | 0.00E+00 | 0.00 |

AVERAGE GAMMA MEV:1.2236

***** DATA BASE SUMMARY FOR WASTE TYPE 2 *****
..... AS OF 1 4 83.....

***** WASTE CHARACTERISTIC FILE (WASDAT.DAT) SUMMARY *****

RSR INFORMATION

CALCULATION INFORMATION

WASTE:DAW-COMPACT.
PHYSICAL FORM:SOLID
CHEMICAL FORM:DEP.MET.OXIDES
PACKAGE TYPE: 55 GAL DRUM
PACKAGE VOL(FT3): 7.5
PACKAGE WT(LBS): 260.0

WASTE VOLUME(FT3): 7.0
DENSITY(LBS/FT3): 30.0
WASTE WEIGHT(LBS): 210.0
LIMIT FACTOR: 1
SHIELD FACTOR: 2.0

***** SUMMARY OF WASTE SAMPLE DATA FILE *****

| NUCLIDE | SAMPLE DATA | ABUNDANCE (PERCENT) | MEV/DIS GAMMA | DOSE (PERCENT) |
|---------|-------------|---------------------|---------------|----------------|
| CO-60 | 2.60E-04 | .28 | 6.90E-03 | 1.00 |
| SB-124 | 1.10E-02 | 11.70 | 1.64E-01 | 23.77 |
| RU-106 | 1.10E-02 | 11.70 | 1.87E-02 | 2.72 |
| CS-134 | 1.20E-02 | 12.70 | 1.78E-01 | 25.80 |
| CS-137 | 5.40E-02 | 57.30 | 5.21E-01 | 46.57 |
| CE-144 | 6.00E-03 | 6.37 | 9.55E-04 | .14 |

AVERAGE GAMMA MEV: .6891

***** DATA BASE SUMMARY FOR WASTE TYPE 7 *****
 AS OF 1 4 83.....

***** WASTE CHARACTERISTIC FILE (WASDAT.DAT) SUMMARY *****

RSR INFORMATION

WASTE:CONCENT.BORATE
 PHYSICAL FORM:SOLID
 CHEMICAL FORM:CEMENT
 PACKAGE TYPE: 55 GAL DRUM
 PACKAGE VOL(FT3): 7.5
 PACKAGE WT(LBS): 820.0

CALCULATION INFORMATION

WASTE VOLUME(FT3): 7.0
 DENSITY(LBS/FT3): 110.0
 WASTE WEIGHT(LBS): 770.0
 LIMIT FACTOR: 1
 SHIELD FACTOR: 17.0

***** SUMMARY OF WASTE SAMPLE DATA FILE *****

| NUCLIDE | SAMPLE DATA | ABUNDANCE (PERCENT) | MEV/DIS GAMMA | DOSE (PERCENT) |
|---------|-------------|---------------------|---------------|----------------|
| CR-51 | 3.60E-01 | 27.90 | 8.09E-03 | 1.47 |
| MN-54 | 3.10E-02 | 2.40 | 2.02E-02 | 3.65 |
| FE-55 | 1.30E-01 | 10.10 | 0.00E+00 | 1.00 |
| CO-57 | 2.70E-04 | .02 | 2.09E-05 | .00 |
| CO-58 | 1.90E-01 | 14.70 | 1.18E-01 | 2.32 |
| CO-60 | 3.50E-02 | 2.71 | 6.77E-02 | 12.28 |
| FE-59 | 3.00E-03 | .23 | 1.42E-03 | .26 |
| NI-63 | 1.90E-02 | 1.47 | 0.00E+00 | 0.00 |
| H-3 | 2.70E-02 | 2.09 | 0.00E+00 | 0.00 |
| C-14 | 2.00E-05 | .00 | 0.00E+00 | 0.00 |
| SR-90 | 7.00E-05 | .01 | 0.00E+00 | 0.00 |
| TC-99 | 2.00E-05 | .00 | 0.00E+00 | 0.00 |
| RU-106 | 7.00E-03 | .54 | 8.67E-04 | .16 |
| I-129 | 2.00E-05 | .00 | 5.58E-08 | .00 |
| CS-134 | 1.90E-01 | 14.70 | 2.06E-01 | 37.31 |
| CS-137 | 3.00E-01 | 23.20 | 1.30E-01 | 23.55 |

AVERAGE GAMMA MEV: .5516