Initial Entry: **Nathan Franklin**
Date: **December 12, 2005**

Authors: **Nathan Franklin**
Title: **Creation of a lookup table of tephra and waste depositions for multiple eruptions using TEPHRA in Support of Redistribution of Radionuclides in Soil (RRS) or Dose2**

Personnel: Nathan Franklin executed the TEPHRA code and created the lookup table. Don Hooper and Roland Benke assisted and directed the work. Brit Hill and Brandi Winfrey had validated the Tephra software. They also had created TEPHRA inputs, defined the eloian and fluvial areas, and constructed an earlier lookup table.

Project: This notebook document procedures, codes, data, and results used to support by the creation of a look up table which contains the amount of tephra and high-level waste deposited at a receptor location, the amount deposited at a location where redistribution occurs by fluvial processes, and the amount deposited at locations where redistribution can occur by eolian processes. This text and supporting files are provided herein to meet the CNWRA requirements of QAP-001 and QAP-014.

Data: CNWRA data contained in this report meet quality assurance requirements described in the CNWRA Quality Assurance Manual.

Codes: Tephra 1.0, ArcGIS 9, lutFromTephra (main.cpp, lutFromTephra.cpp, lutFromTephra.h, and createLutFromTephra.pro)

Entry 1: **Nathan Franklin**
Date: **December 12, 2005**

Objective: The objective is to (1) determine the ash and high-level waste distribution for 1024 eruptions on 1000-meter grid using TEPHRA, (2) create a look up table by using lutFromTephra code on the results from TEPHRA , (3) and verify the look up table calculations using ArcMap.

Section 1: Determination of Ash and High-Level Waste Distribution for 1024 Eruptions a 1000-meter grid

The TEPHRA software calculates the distribution of ash and high-level waste over a set of points for different volcanic eruptions. We calculated the dispersion of ash and waste for 1024 different eruptions. The file *1024erupts.in* contains the parameters for each of 1024 eruptions (Table 1).

The following commands were used to calculate the distribution of ash and waste:
/usr/bin/mpirun -np 4 /opt/TEPHRA/tephra thsnd_nobeta.conf 1024erupts.in grid.in random_uad.in 1024_all.out > 1024_cum.out

The following command reformats the output file:
awk -f parse.awk 1024_all.out > 1024_all_pars

Table 1: Eruption parameters for three different eruptions (#1, #621, #1024) in file *1024erupts.in*.

Eruption Number	Volcano Location Northing (m)	Volcano Location Easting (m)	Amount of Tephra Erupted (kg)	Maximum Particle Diameter (phi)	Minimum Particle Diameter (phi)	Mean Particle Diameter (phi)	Standard Particle Diameter (phi)	Shape Factor for Particle Grains	Elevation of Volcano Vent (m)
#1	4079000	548000	1242647510	-3.33	3.33	0.01	1	0.5	610
#621	4079000	548000	16387000749	-3.33	3.33	0.01	1	0.5	610
#1024	4079000	548000	4507605736	-3.33	3.33	0.01	1	0.5	610

Eruption Number	Eruption Column Height (m)	Particle Size Distribution in column	Amount of Fuel Erupted (kg)	Maximum Fuel Diameter log10(cm)	Minimum Fuel Diameter log10(cm)	Mean Fuel Diameter log10(cm)	Incorporation Ratio	Eruption Exit Velocity m/s
#1	2855.76	10	1000	-2	-4	-3	0.1	100
#621	3920.32	10	1000	-2	-4	-3	0.1	100
#1024	2152.98	10	1000	-2	-4	-3	0.1	100

Section 2: Creation of the Lookup Table by Using lutFromTephra

The results from TEPHRA are used to create a lookup table for TPA calculations. The lookup table contains the amount of mass of ash and waste in the eolian and fluvial regions as well as the amount of area in these where ash and hlw-waste was deposited. Code (lutFromTephra.h, lutFromTephra.cpp, main.cpp, createLUTfromTephra.pro) was developed in C++ to create the lookup table. In constructing the lookup table, no ash or waste was considered to be deposited at locations where TEPHRA had calculated ash deposition less than 0.12 kg/m².

The following command was used to create the lookup table (Table 2) from the TEPHRA results:
./createLUTfromTephra 1024_all_pars grid.in grid.in grid.in 549000 4058000

Table 2: Lookup table entries for three different eruptions (#1, #621, #1024) in file *sum_1024_all_pars.out*.

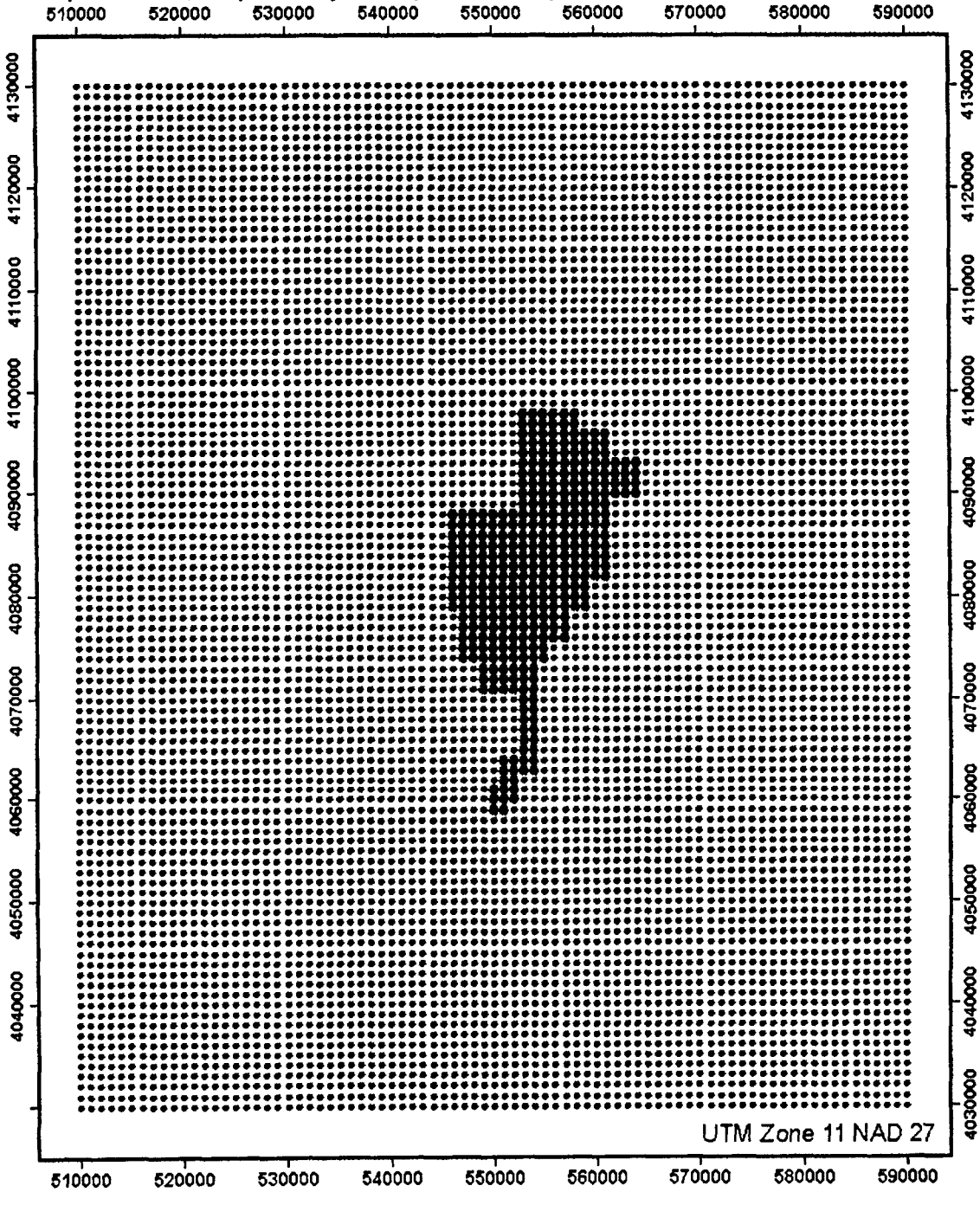
Eruption Number	HLW receptor (g/m²)	Ash receptor (g/m²)	HLW fluvial (g)	Ash fluvial (g)	Area fluvial (m²)	HLW eolian (g)	Ash eolian (g)	Area eolian (m²)
#1	0.000E+00	0.000E+00	1.038E+06	1.241E+12	1.200E+08	6.051E+03	7.229E+09	2.600E+07
#621	5.616E-04	8.847E+03	6.637E+05	1.046E+13	1.520E+08	3.443E+05	5.424E+12	5.660E+08
#1024	0.000E+00	0.000E+00	9.881E+05	4.284E+12	4.100E+07	1.030E+05	4.465E+11	4.200E+07

Section 3: Verification of Lookup Table Using Calculations Performed with ArcMap

We evaluated the creation of the Lookup Table by comparing it to calculations performed with ArcMap for the 1st, 621st and 1024th eruption. In ArcMap, two point feature classes (eolian.shp and fluvial.shp) were created that contain the grid points located in the eolian and fluvial regions (Figure 1).

Using the *1024_all_pars* file, three text files (*eruption1.csv*, *eruption621.csv* and *eruption1024.csv*) were created. They contain data for the 1st, 621st and 1024th eruptions. These text files were converted into shapefiles (*eruption1.shp*, *eruption621.shp* and *eruption1024.shp*).

Figure 1: Point locations were deposition of hlw-waste and ash are calculated. Points in blue and yellow are locations where redistribution occurs by fluvial processes and by eolian processes, respectively. The points are spaced 1000 meters apart.



Using the selection tool, eolian and fluvial point feature classes (*eruption1_eolian.shp*, *eruption1_fluvial.shp*, *eruption621_eolian.shp*, *eruption621_fluvial.shp*, *eruption1024_eolian.shp*, and *eruption1024_fluvial.shp*) were created by selecting grid points for each eruption that intersected points in the eolian and fluvial regions.

By browsing the attribute file for each of the eolian and fluvial feature classes, we could determine the statistics of the ash and hlw-waste deposited as well as how many points had a deposition amount greater than 0.12 kg/m² (Table 3, 4).

Table 3: Sum of the HLW and ash in the fluvial and eolian regions for three different eruptions (#1, #621, #1024) using ArcMap.

Eruption Number	Sum of the HLW at the points in the fluvial region (kg/m²)	Sum of the ash at the points in the fluvial region (kg/m²)	Number of points with ash greater than 0.12 kg/m² in the fluvial region	Sum of the HLW at the points in the eolian region (kg/m²)	Sum of the ash at the points in the eolian region (kg/m²)	Number of points with ash greater than 0.12 kg/m² in the eolian region
#1	0.001041	1244.11	120	0.000011	12.695	26
#621	0.000664	10462.32	152	0.000345	5439.15	566
#1024	0.000988	4284.91	41	0.000104	450.12	42

Table 4: Sum of the HLW and ash in the fluvial and eolian regions for three different eruptions (#1, #621, #1024) using ArcMap with units comparable to Table 2.

Eruption Number	Mass of HLW in the fluvial region (g)	Mass of ash in the fluvial region (g)	Area with >0.12 kg/m² in the fluvial region	Mass of HLW in the eolian region (g)	Mass of ash in the eolian region (g)	Area with >0.12 kg/m² in the eolian region
#1	1.041E+06	1.244E+12	1.200E+08	1.100E+04	1.270E+10	2.600E+07
#621	6.640E+05	1.046E+13	1.520E+08	3.450E+05	5.439E+12	5.660E+08
#1024	9.880E+05	4.285E+12	4.100E+07	1.040E+05	4.501E+11	4.200E+07

To verify the deposition, we compared the calculations using ArcMap (Table 4) and those contained in the lookup table (Table 2) for the 1st, 621st, and 1024th eruption. The fluvial region and eolian region calculations do not significantly differ from the values calculated using the createLUTfromTephra program. Notably, the values calculated in ArcMap are always higher than values in the lookup table. This is because we are using the sum of all HLW and ash deposition in this approach instead of ignoring all deposition where ash is less than 0.12 kg/m². This is most prominent when there is less deposition (e.g. the HLW deposited in the eolian region during the 1st and 1024th eruption).

To verify the deposition at the receptor, the values at the receptor location (549000, 4058000)

could be compared. For the 1st and 1024th eruption, the lookup table contains no HLW or ash deposition at the receptor location. This agrees with the values at the receptor location which are far less than 0.12 kg/m2 amount of ash deposited for these two eruptions. The 8.8465 kg/ m^2 of ash and 5.6158e-07 kg/m^2 of HLW at the receptor location for the 621st eruption match the values given in the lookup table (Table 2).

Entry 2: **Nathan Franklin**
Date: **March 08, 2005**

Objective: To create a lookup table using results from Tephra on a 500-meter grid. The objective is to (1) determine the ash and high-level waste distribution for 1024 eruptions on 500-meter grid using TEPHRA, (2) create a look up table by using lutFromTephra code on the results from TEPHRA , (3) and verify the look up table calculations using ArcMap for a subset of eruptions.

Section 1: Determination of Ash and High-Level Waste Distribution for 1024 Eruptions on a 500-meter grid

The TEPHRA software calculates the distribution of ash and high-level waste over a set of points for different volcanic eruptions. We calculated the dispersion of ash and waste for 1024 different eruptions on a 500-meter grid. The file *1024erupts.in* contains the parameters for each of 1024 eruptions (Table 5).

The following commands were used to calculate the distribution of ash and waste:
/usr/bin/mpirun -np 4 /opt/TEPHRA/tephra thsnd_nobeta.conf 1024erupts.in grid500m.in random_uad.in 1024_all_500m.out > 1024_cum_500m.out

The following command reformats the output file:
awk -f parse.awk 1024_all_500m.out > 1024_all_500m.pars

Table 5: Eruption parameters for four different eruptions (#252, #407, #705, #999) in file *1024erupts.in*.

Eruption Number	Volcano Location Northing (m)	Volcano Location Easting (m)	Amount of Tephra Erupted (kg)	Maximum Particle Diameter (phi)	Minimum Particle Diameter (phi)	Mean Particle Diameter (phi)	Standard Particle Diameter (phi)	Shape Factor for Particle Grain	Eruption Column Height (m)
#252	4079000	548000	11221692526	-3.33	3.33	0.01	1	0.5	610
#407	4079000	548000	25817594724	-3.33	3.33	0.01	1	0.5	610
#705	4079000	548000	52392115858	-3.33	3.33	0.01	1	0.5	610
#999	4079000	548000	98255802641	-3.33	3.33	0.01	1	0.5	610

Eruption Number	Eruption Column Height (m)	Particle Size Distribution in column	Amount of Fuel Erupted (kg)	Maximum Fuel Diameter log10(cm)	Minimum Fuel Diameter log10(cm)	Mean Fuel Diameter log10(cm)	Incorporation Ratio	Eruption Exit Velocity m/s

#252	4141.6787	10	1000	-2	-4	-3	0.1	100
#407	2029.4362	10	1000	-2	-4	-3	0.1	100
#705	3799.2383	10	1000	-2	-4	-3	0.1	100
#999	3793.6538	10	1000	-2	-4	-3	0.1	100

Section 2: Creation of the Lookup Table by using lutFromTephra

The results from TEPHRA are used to create a lookup table for TPA calculations. The lookup table contains the amount of mass of ash and waste in the eolian and fluvial regions as well as the amount of area in these where ash and hlw-waste was deposited. Code (lutFromTephra.h, lutFromTephra.cpp, main.cpp, createLUTfromTephra.pro) was developed in C++ to create the lookup table. In constructing the lookup table, no ash or waste was considered to be deposited at locations where TEPHRA had calculated ash deposition less than 0.12 kg/m².

The following command was used to create the lookup table (Table 2) from the TEPHRA results:
./createLUTfromTephra500m 1024_all_pars grid500.in grid500.in grid500.in 549000 4058000

Table 6: Lookup table entries for four different eruptions (#252, #407, #705, #999) in file *remob_lut_500m_4sig.dat*.

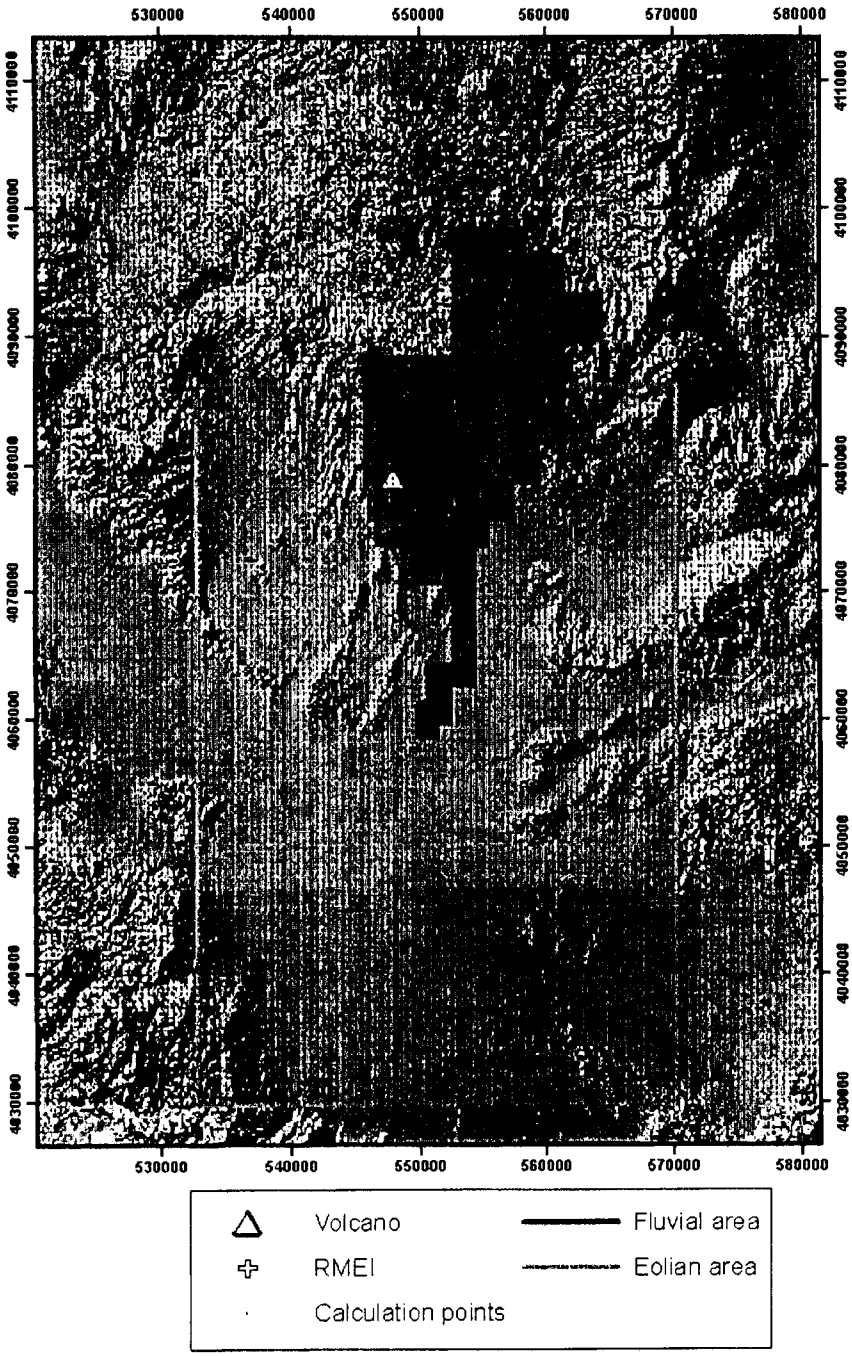
Eruption Number	HLW receptor (g/m²)	Ash receptor (g/m²)	HLW fluvial (g)	Ash fluvial (g)	Area fluvial (m²)	HLW eolian (g)	Ash eolian (g)	Area eolian (m²)
#252	0.000E+00	0.000E+00	1.741E+04	1.880E+11	9.250E+06	9.944E+05	1.073E+13	3.240E+08
#407	0.000E+00	0.000E+00	1.039E+06	2.580E+13	1.175E+08	0.000E+00	0.000E+00	0.000E+00
#705	1.889E-03	9.515E+04	5.111E+05	2.576E+13	6.325E+07	5.250E+05	2.645E+13	7.613E+08
#999	9.668E-04	9.133E+04	3.667E+05	3.465E+13	7.250E+07	6.670E+05	6.302E+13	1.001E+09

Section 3: Verification of Lookup Table Using Calculations Performed with ArcMap

We evaluated the creation of the Lookup Table by comparing it to calculations performed with ArcMap for the 252nd, 407th, 705th, and 999th eruption. In ArcMap, two point feature classes (eolian.shp and fluvial.shp) were created that contain the grid points located in the eolian and fluvial regions (Figure 1).

Using the *1024_all_500m.pars* file, four text files (*e_252.csv*, *e_407.csv*, *e_705.csv* and *e_999.csv*) were created. They contain data for the 252nd, 407th, 705th, and 999th eruptions. These text files were converted into shapefiles (*eruption_252.shp*, *eruption_407.shp*, *eruption_705* and *eruption_999.shp*).

Figure 2: Point locations were deposition of hlw-waste and ash are calculated. Points in blue and tan regions are locations where redistribution occurs by fluvial processes and by eolian processes, respectively. The points are spaced 500 meters apart.



Using the selection tool, eolian and fluvial point feature classes (*eruption_252_eolian.shp, eruption_252_fluvial.shp eruption_407_eolian.shp, eruptin_407_fluvial.shp, eruption_705_eolian.shp, eruption_705_fluvial.shp, eruption_999_eolian.shp* and *eruption_999_fluvial.shp*) were created by selecting grid points for each eruption that intersected points in the eolian and fluvial regions.

By browsing the attribute file for each of the eolian and fluvial feature classes in Excel, we could determine the statistics of the ash and hlw-waste deposited as well as how many points had a deposition amount greater than 0.12 kg/m² (Table 7, 8).

Table 7: Sum of the HLW and ash in the fluvial and eolian regions for four different eruptions (#252, #407, #705, #999) using ArcMap and Excel.

Eruption Number	Sum of the HLW density at the points in the fluvial region (kg/m²)	Sum of the ash density at the points in the fluvial region (kg/m²)	Number of points with ash greater than 0.12 kg/m² in the fluvial region	Sum of the HLW density at the points in the eolian region (kg/m²)	Sum of the ash density at the points in the eolian region (kg/m²)	Number of points with ash greater than 0.12 kg/m² in the eolian region
#252	6.96E-05	752.02	37	0.003978	42919.58	1296
#407	0.004156	103186.1	470	0	0	0
#705	0.002044	103019.4	253	0.002099891	105771.52	3046
#999	0.0014667	138618.55	290	0.0026681	252079.3	4002

Table 8: Sum of the HLW and ash in the fluvial and eolian regions for four different eruptions (#252, #407, #705, #999) using ArcMap and Excel with units comparable to Table 6.

Eruption Number	Mass of HLW in the fluvial region (g)	Mass of ash in the fluvial region (g)	Area of the fluvial region with >0.12 kg/m² deposition	Mass of HLW in the eolian region (g)	Mass of ash in the eolian region (g)	Area of the eolian region with >0.12 kg/m² deposition
#252	1.741E+04	1.880E+11	9.250E+06	9.945E+05	1.073E+13	3.240E+08
#407	1.039E+06	2.580E+13	1.175E+08	0.000E+00	0.000E+00	0.000E+00
#705	5.110E+05	2.575E+13	6.325E+07	5.250E+05	2.644E+13	7.615E+08
#999	3.667E+05	3.465E+13	7.250E+07	6.670E+05	6.302E+13	1.001E+09

To verify the deposition, we compared the calculations using ArcMap (Table 8) and those contained in the lookup table (Table 6) for the 252nd, 407th, 705th, and 999th eruption. The fluvial region and eolian region calculations do not significantly differ from the values calculated using the createLUTfromTephra program.

To verify the deposition at the receptor, the values at the receptor location (549000, 4058000) could be compared. For the 252nd and 407th eruptions, the lookup table contains no HLW or ash deposition at the receptor location. This agrees with the values at the receptor location

which are far less than 0.12 kg/m2 amount of ash deposited for these two eruptions. The amount of deposition at the receptor location for the 705th eruption (95.154 kg/ m^2 of ash and .000002 kg/m^2 of HLW) and the 999th eruption (91.334 kg/ m^2 of ash and .000001 kg/m^2 of HLW) match the values given in the lookup table (Table 6).

Figure 3: High-level waste distribution for eruption #252 occurs primarily in the eolian region.

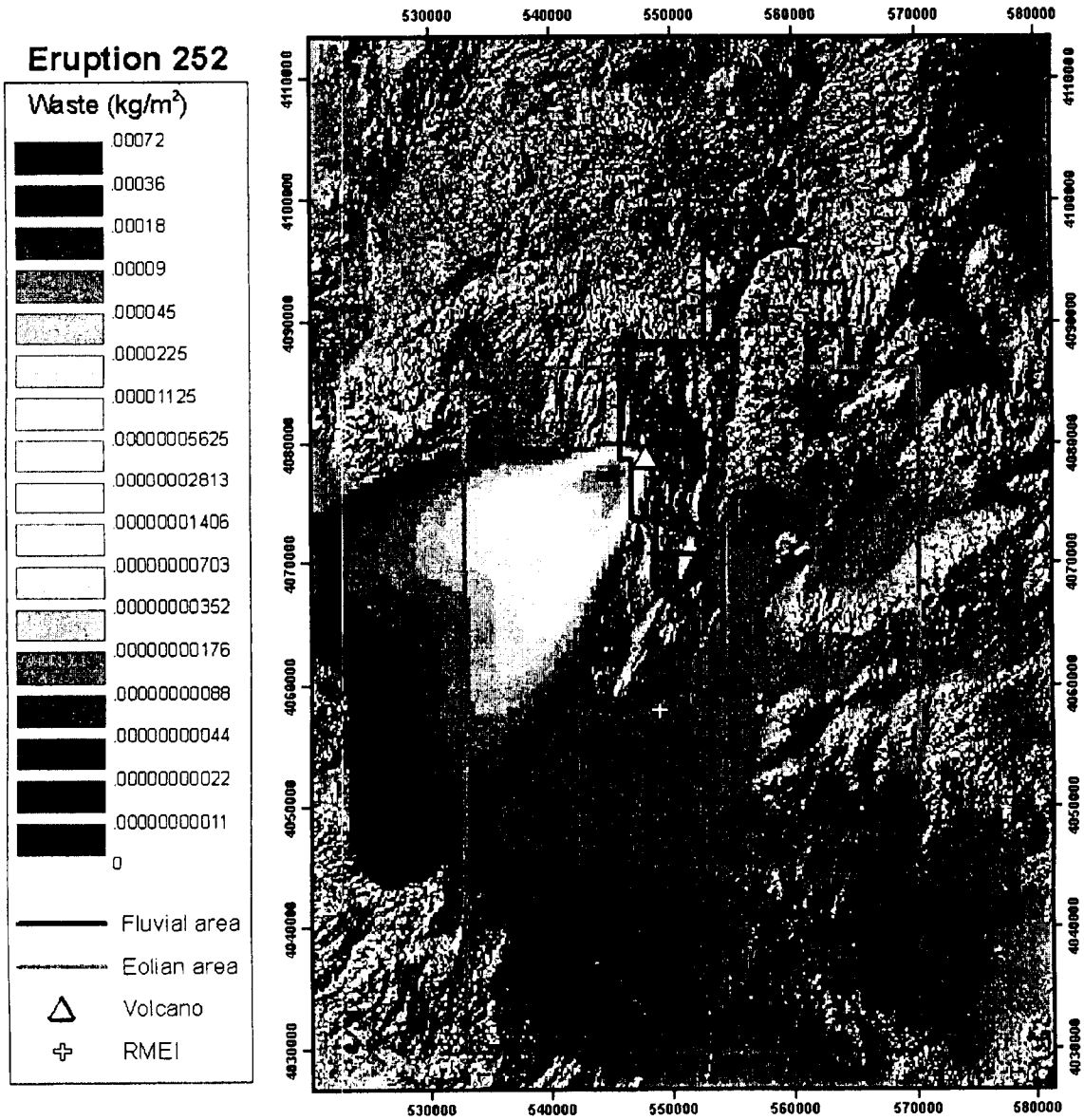


Figure 4: Eruption #705 deposits waste at the receptor location.

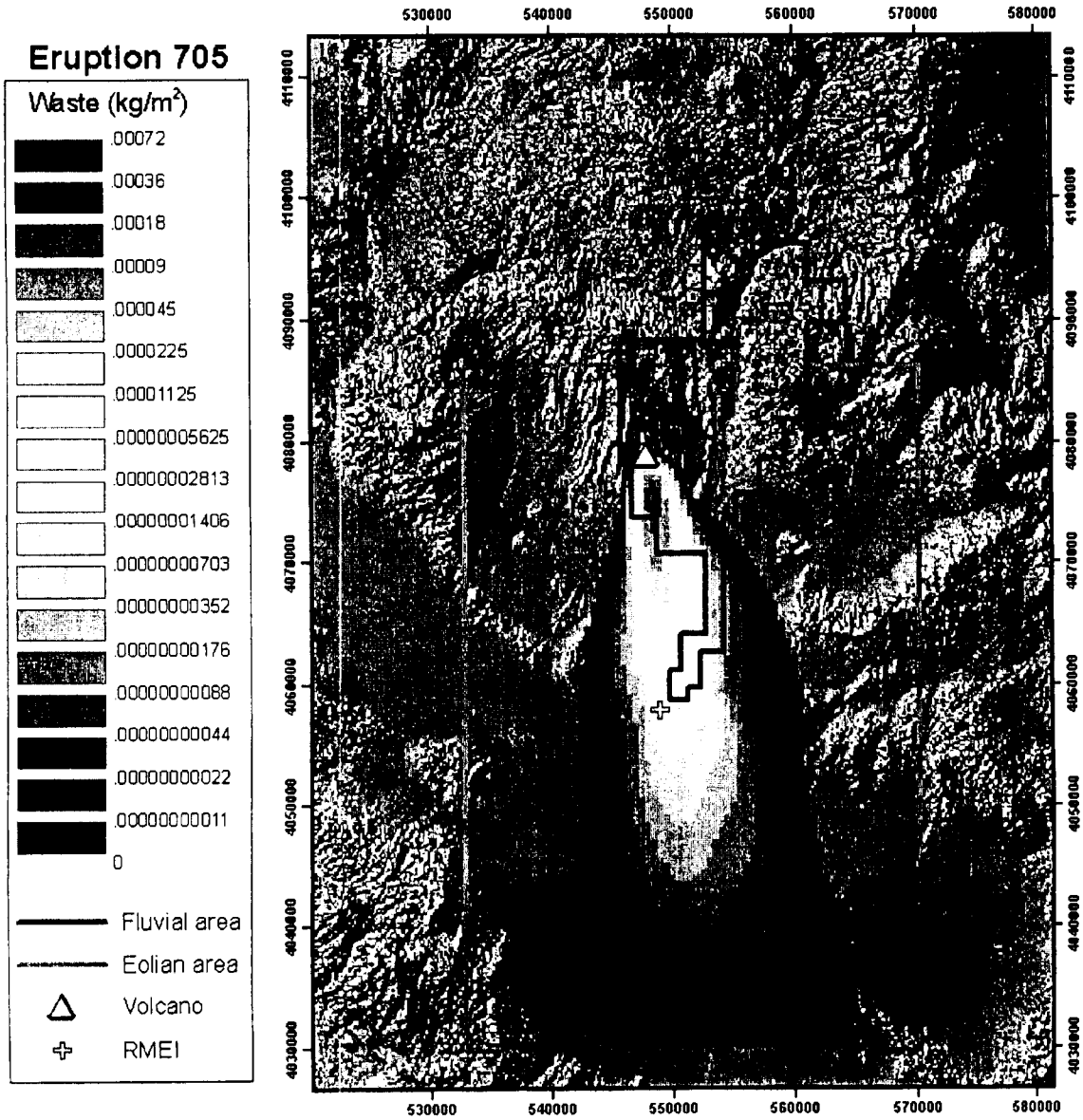


Figure 5: High-level waste distribution for eruption #407 occurs primarily in the eolian region.

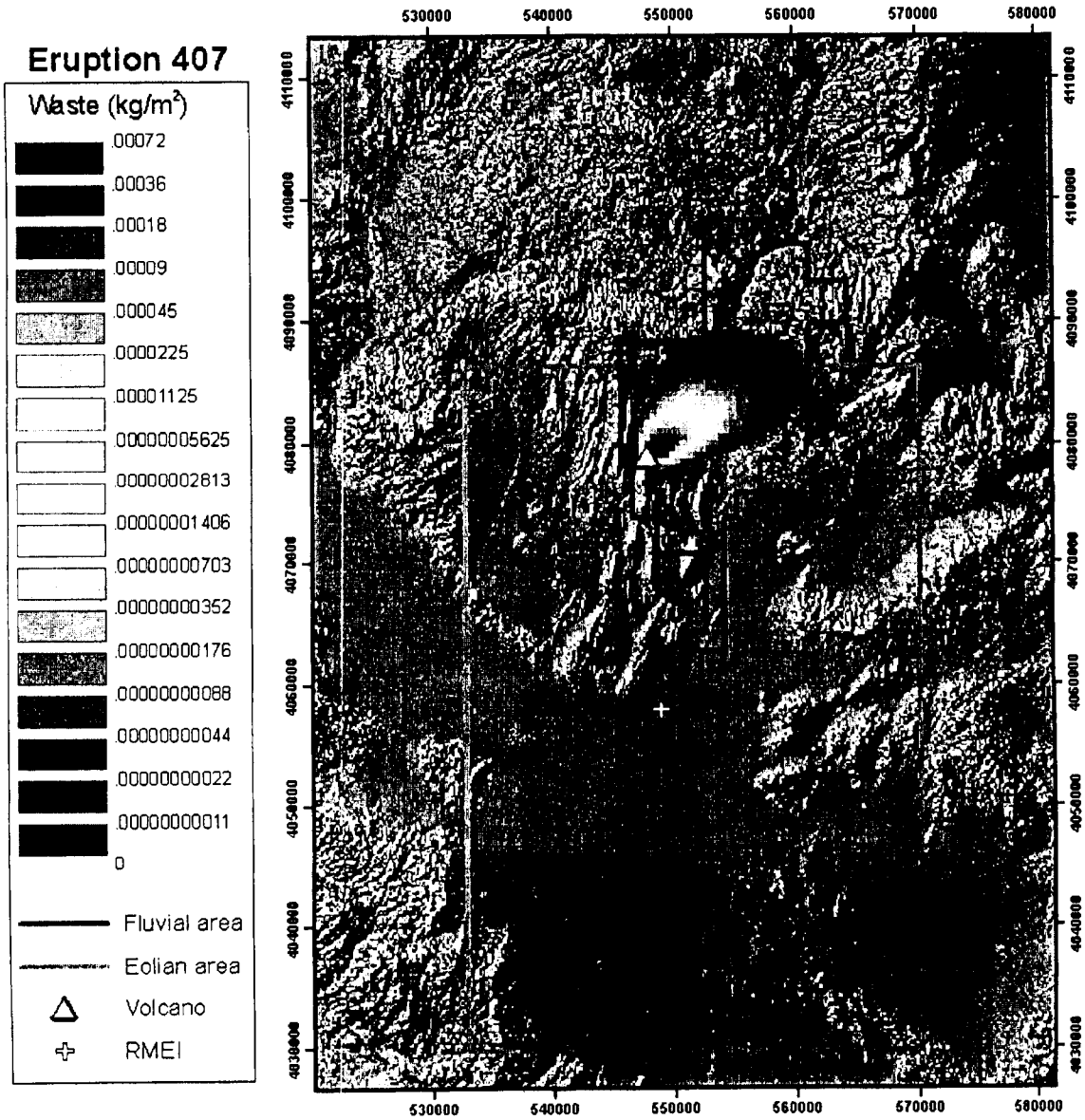
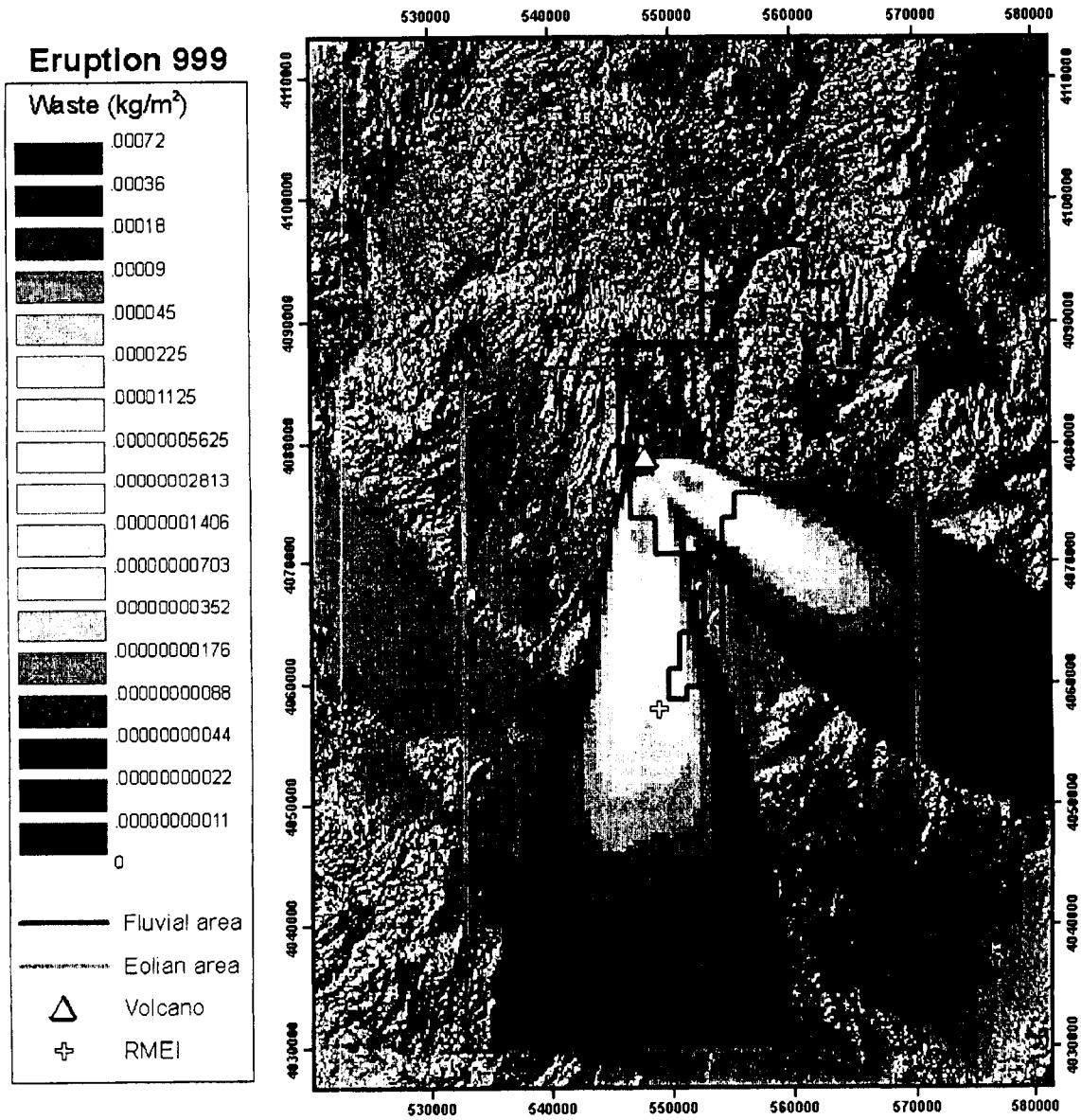


Figure 6: High-level waste distribution for eruption #999.



Entry 3: **Nathan Franklin**
Date: **March 20, 2005**

Objective: To record the lookup table.

The following is the lookup table (remob_lut_500m_4sig.dat):

```
c_HLW_l,C_ash_l,m_HLW_f,m_ash_f,area_f,m_HLW_e,m_ash_e,area_e,,,,,
g/m2,g/m2,g,g,m2,g,g,m2 (HLW masses are based on 1MTU of HLW erupted),,,,,
0.000E+00,0.000E+00,1.024E+06,1.224E+12,1.170E+08,7.807E+03,9.325E+09,3.125E+07,,,,,
5.275E-05,3.413E+03,1.648E+05,1.067E+13,3.850E+07,8.024E+05,5.195E+13,9.208E+08,,,,,
0.000E+00,0.000E+00,1.017E+06,8.888E+13,1.198E+08,2.297E+04,2.007E+12,1.403E+08,,,,,
0.000E+00,0.000E+00,1.031E+06,2.774E+13,1.088E+08,8.377E+03,2.253E+11,9.025E+07,,,,,
0.000E+00,0.000E+00,1.019E+06,5.133E+13,1.843E+08,2.044E+04,1.029E+12,3.770E+08,,,,,
0.000E+00,0.000E+00,8.823E+05,3.118E+13,2.250E+07,1.566E+05,5.534E+12,1.108E+08,,,,,
0.000E+00,0.000E+00,1.040E+06,2.583E+13,6.350E+07,2.188E+02,5.432E+09,8.750E+06,,,,,
0.000E+00,0.000E+00,2.475E+04,9.330E+11,6.750E+06,1.000E+06,3.769E+13,1.703E+08,,,,,
0.000E+00,0.000E+00,1.037E+06,1.821E+12,3.800E+07,9.310E+02,1.634E+09,4.000E+06,,,,,
2.496E-04,7.510E+03,1.471E+05,4.431E+12,6.025E+07,8.053E+05,2.425E+13,9.358E+08,,,,,
0.000E+00,0.000E+00,9.167E+05,2.480E+13,8.000E+07,1.210E+05,3.274E+12,2.273E+08,,,,,
0.000E+00,0.000E+00,1.005E+06,3.023E+12,4.550E+07,3.305E+04,9.942E+10,7.425E+07,,,,,
0.000E+00,0.000E+00,1.024E+06,1.011E+13,1.788E+08,1.456E+04,1.438E+11,1.263E+08,,,,,
0.000E+00,0.000E+00,3.154E+05,7.156E+12,9.275E+07,6.987E+05,1.585E+13,5.640E+08,,,,,
1.139E-05,9.452E+02,3.308E+05,2.746E+13,7.250E+07,6.987E+05,5.799E+13,6.003E+08,,,,,
0.000E+00,0.000E+00,9.597E+05,1.402E+13,2.228E+08,6.834E+04,9.981E+11,9.650E+07,,,,,
0.000E+00,0.000E+00,5.936E+05,5.875E+12,8.625E+07,3.751E+05,3.711E+12,3.178E+08,,,,,
0.000E+00,0.000E+00,8.712E+05,4.134E+13,2.008E+08,1.033E+05,4.901E+12,2.858E+08,,,,,
0.000E+00,0.000E+00,9.852E+05,3.039E+12,5.675E+07,5.126E+04,1.580E+11,1.248E+08,,,,,
0.000E+00,0.000E+00,9.796E+05,2.240E+13,2.983E+08,5.208E+04,1.190E+12,4.538E+08,,,,,
0.000E+00,0.000E+00,8.302E+05,1.308E+13,1.560E+08,1.355E+05,2.134E+12,5.350E+07,,,,,
7.598E-06,1.240E+02,5.790E+05,9.457E+12,1.490E+08,4.568E+05,7.459E+12,3.280E+08,,,,,
0.000E+00,0.000E+00,9.393E+05,8.367E+13,2.030E+08,4.392E+03,3.914E+11,2.275E+07,,,,,
1.070E-05,1.970E+02,8.003E+05,1.474E+13,9.825E+07,2.361E+05,4.349E+12,6.815E+08,,,,,
0.000E+00,0.000E+00,1.037E+06,1.355E+13,8.500E+07,2.445E+03,3.193E+10,5.500E+07,,,,,
0.000E+00,0.000E+00,4.324E+05,4.800E+12,5.000E+07,5.599E+05,6.212E+12,4.530E+08,,,,,
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0.000E+00,0.000E+00,7.815E+05,3.297E+13,2.128E+08,1.632E+05,6.881E+12,1.285E+08
0.000E+00,0.000E+00,9.999E+05,2.620E+13,1.500E+08,3.902E+04,1.022E+12,3.013E+08
0.000E+00,0.000E+00,8.843E+05,3.682E+12,5.025E+07,1.536E+05,6.394E+11,8.650E+07
0.000E+00,0.000E+00,9.976E+05,1.403E+12,9.800E+07,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,1.032E+06,3.583E+13,1.348E+08,7.170E+03,2.488E+11,1.210E+08
0.000E+00,0.000E+00,1.027E+06,2.067E+13,2.408E+08,8.750E+03,1.759E+11,1.285E+08
0.000E+00,0.000E+00,6.845E+05,2.544E+12,5.000E+07,3.466E+05,1.288E+12,1.003E+08
0.000E+00,0.000E+00,9.760E+05,9.293E+13,2.863E+08,4.578E+04,4.357E+12,2.430E+08
0.000E+00,0.000E+00,6.345E+05,2.019E+13,1.533E+08,4.047E+05,1.287E+13,2.020E+08
0.000E+00,0.000E+00,1.378E+05,4.960E+12,4.425E+07,7.543E+05,2.715E+13,1.933E+08
1.211E-04,9.496E+03,7.756E+05,6.086E+13,9.325E+07,2.631E+05,2.064E+13,1.026E+09
0.000E+00,0.000E+00,7.285E+05,1.318E+12,1.318E+08,6.033E+04,1.091E+11,2.075E+07
0.000E+00,0.000E+00,8.963E+05,2.297E+12,1.898E+08,1.252E+05,3.207E+11,1.430E+08
0.000E+00,0.000E+00,9.239E+05,1.190E+12,2.403E+08,8.318E+04,1.071E+11,1.555E+08

0.000E+00,0.000E+00,2.132E+03,1.765E+10,3.000E+06,8.601E+05,7.104E+12,1.003E+08
0.000E+00,0.000E+00,5.533E+05,2.406E+13,1.245E+08,4.776E+05,2.076E+13,2.898E+08
0.000E+00,0.000E+00,1.038E+06,2.751E+13,1.470E+08,9.494E+02,2.515E+10,5.000E+07
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0.000E+00,0.000E+00,5.966E+05,1.396E+12,4.150E+07,4.285E+05,1.002E+12,1.418E+08
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0.000E+00,0.000E+00,1.030E+06,2.499E+13,2.295E+08,7.951E+03,1.928E+11,1.433E+08
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0.000E+00,0.000E+00,1.578E+05,1.761E+13,9.750E+07,8.072E+05,9.005E+13,3.595E+08
0.000E+00,0.000E+00,1.016E+06,1.714E+12,5.825E+07,1.816E+04,3.064E+10,1.350E+07
6.898E-05,3.553E+02,2.138E+05,1.102E+12,3.000E+07,8.192E+05,4.220E+12,4.668E+08
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3.096E-04,2.887E+04,7.298E+05,6.811E+13,1.095E+08,3.088E+05,2.881E+13,1.311E+09
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0.000E+00,0.000E+00,1.015E+06,3.547E+12,1.218E+08,0.000E+00,0.000E+00,0.000E+00
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0.000E+00,0.000E+00,1.038E+06,4.501E+12,6.250E+07,0.000E+00,0.000E+00,0.000E+00
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9.242E-05,5.981E+03,8.740E+05,5.659E+13,1.973E+08,1.630E+05,1.055E+13,7.950E+08
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7.043E-06,1.597E+02,2.385E+05,5.411E+12,7.450E+07,7.380E+05,1.674E+13,7.963E+08
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7.049E-05,7.819E+02,6.415E+05,7.120E+12,8.275E+07,3.934E+05,4.365E+12,7.933E+08
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8.802E-05,3.325E+02,8.130E+05,3.073E+12,7.950E+07,2.211E+05,8.356E+11,2.815E+08
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9.123E-06,1.503E+02,2.867E+05,4.728E+12,6.800E+07,5.881E+05,9.698E+12,3.123E+08
0.000E+00,0.000E+00,6.678E+05,2.202E+12,7.300E+07,0.000E+00,0.000E+00,0.000E+00

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0.000E+00,0.000E+00,3.860E+05,6.073E+11,1.173E+08,6.062E+05,9.533E+11,2.188E+08
0.000E+00,0.000E+00,9.201E+05,9.819E+12,2.043E+08,4.458E+04,4.757E+11,7.275E+07
0.000E+00,0.000E+00,1.008E+06,1.566E+12,9.350E+07,2.509E+04,3.895E+10,3.750E+07
0.000E+00,0.000E+00,6.853E+05,8.718E+12,1.660E+08,3.039E+05,3.865E+12,2.433E+08
0.000E+00,0.000E+00,1.741E+04,1.880E+11,9.250E+06,9.944E+05,1.073E+13,3.240E+08
0.000E+00,0.000E+00,6.317E+05,2.616E+13,6.250E+07,4.015E+05,1.662E+13,8.750E+07
0.000E+00,0.000E+00,2.093E+05,8.935E+12,8.000E+06,8.211E+05,3.503E+13,1.178E+08
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0.000E+00,0.000E+00,1.014E+06,1.548E+13,2.345E+08,2.328E+04,3.552E+11,3.235E+08
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2.944E-04,1.803E+04,7.544E+05,4.624E+13,1.455E+08,2.216E+05,1.358E+13,5.940E+08
3.467E-04,1.933E+03,6.008E+05,3.353E+12,1.275E+08,4.320E+05,2.410E+12,5.100E+08
0.000E+00,0.000E+00,1.039E+06,6.782E+13,1.813E+08,4.274E+02,2.790E+10,6.050E+07
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2.521E-05,2.357E+03,5.046E+05,4.721E+13,1.825E+08,5.143E+05,4.810E+13,9.208E+08
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1.669E-05,7.034E+02,8.317E+05,3.508E+13,2.443E+08,1.883E+05,7.942E+12,6.850E+08
0.000E+00,0.000E+00,2.508E+05,6.573E+12,4.825E+07,6.587E+05,1.726E+13,3.825E+08
0.000E+00,0.000E+00,1.035E+06,4.312E+12,1.478E+08,0.000E+00,0.000E+00,0.000E+00
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9.658E-06,6.250E+02,5.114E+05,3.312E+13,1.175E+08,4.611E+05,2.985E+13,6.628E+08
0.000E+00,0.000E+00,9.328E+05,8.154E+13,8.300E+07,1.062E+05,9.278E+12,1.283E+08
0.000E+00,0.000E+00,1.035E+06,2.785E+13,1.363E+08,4.041E+03,1.087E+11,1.098E+08
0.000E+00,0.000E+00,8.949E+05,4.509E+13,1.840E+08,1.297E+05,6.530E+12,2.730E+08
0.000E+00,0.000E+00,1.039E+06,3.671E+13,6.125E+07,1.350E+01,4.769E+08,2.000E+06
0.000E+00,0.000E+00,9.222E+05,2.290E+13,5.600E+07,1.174E+05,2.913E+12,8.600E+07
0.000E+00,0.000E+00,8.647E+05,3.258E+13,1.490E+08,1.745E+05,6.573E+12,3.185E+08

0.000E+00,0.000E+00,1.037E+06,1.822E+12,7.250E+07,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,5.985E+05,1.803E+13,2.180E+08,3.689E+05,1.111E+13,2.230E+08
0.000E+00,0.000E+00,4.440E+05,1.201E+13,5.000E+07,5.911E+05,1.599E+13,3.268E+08
0.000E+00,0.000E+00,1.036E+06,3.117E+12,7.750E+07,1.085E+03,3.263E+09,7.500E+06
0.000E+00,0.000E+00,6.886E+05,6.803E+12,2.015E+08,2.617E+05,2.585E+12,1.598E+08
1.805E-05,4.092E+02,9.440E+05,2.141E+13,1.505E+08,9.396E+04,2.130E+12,6.083E+08
0.000E+00,0.000E+00,6.862E+04,5.699E+12,2.075E+07,7.435E+05,6.173E+13,3.035E+08
1.002E-05,1.463E+02,5.790E+05,8.460E+12,1.385E+08,3.900E+05,5.697E+12,6.245E+08
5.112E-05,5.056E+02,5.194E+05,5.140E+12,1.165E+08,4.667E+05,4.618E+12,6.743E+08
0.000E+00,0.000E+00,7.846E+05,3.723E+13,1.623E+08,2.537E+05,1.204E+13,7.193E+08
0.000E+00,0.000E+00,1.030E+06,3.177E+12,5.675E+07,8.469E+03,2.611E+10,1.350E+07
0.000E+00,0.000E+00,9.983E+05,2.283E+13,2.090E+08,3.412E+02,7.795E+09,9.500E+06
0.000E+00,0.000E+00,9.618E+05,1.516E+13,1.895E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.478E+05,1.548E+13,1.803E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.370E+05,8.346E+13,1.328E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.401E+05,1.732E+13,1.670E+08,9.829E+04,1.810E+12,3.000E+08
0.000E+00,0.000E+00,8.160E+05,1.067E+13,7.625E+07,2.226E+05,2.909E+12,2.208E+08
0.000E+00,0.000E+00,6.116E+05,6.788E+12,9.075E+07,3.475E+05,3.856E+12,1.713E+08
0.000E+00,0.000E+00,3.322E+05,5.120E+11,5.475E+07,6.245E+05,9.625E+11,2.545E+08
0.000E+00,0.000E+00,9.074E+05,6.367E+13,1.103E+08,1.223E+05,8.581E+12,1.045E+08
5.130E-06,4.980E+02,5.872E+05,5.705E+13,3.000E+08,4.378E+05,4.252E+13,6.095E+08
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5.771E-06,2.326E+02,9.896E+05,3.991E+13,1.325E+08,4.923E+04,1.985E+12,4.423E+08
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0.000E+00,0.000E+00,7.071E+05,9.620E+12,4.550E+07,3.272E+05,4.449E+12,3.670E+08
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0.000E+00,0.000E+00,3.472E+05,2.575E+13,9.000E+06,6.795E+05,5.038E+13,1.020E+08
0.000E+00,0.000E+00,6.908E+05,2.583E+12,3.950E+07,1.497E+04,5.601E+10,2.750E+07
0.000E+00,0.000E+00,9.858E+05,2.272E+12,8.425E+07,1.082E+03,2.493E+09,4.250E+06
0.000E+00,0.000E+00,8.744E+05,4.133E+12,1.900E+08,2.683E+01,1.267E+08,5.000E+05
0.000E+00,0.000E+00,1.014E+06,3.763E+12,1.368E+08,2.114E+04,7.842E+10,1.283E+08
0.000E+00,0.000E+00,9.937E+05,5.830E+12,7.575E+07,4.386E+04,2.572E+11,1.608E+08
0.000E+00,0.000E+00,2.066E+05,5.136E+12,5.675E+07,7.177E+05,1.784E+13,3.988E+08
0.000E+00,0.000E+00,8.007E+05,1.320E+13,8.225E+07,2.327E+05,3.836E+12,4.980E+08
0.000E+00,0.000E+00,5.945E+05,1.960E+12,1.000E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,3.399E+05,1.675E+12,4.600E+07,6.460E+05,3.182E+12,3.695E+08
0.000E+00,0.000E+00,6.165E+05,4.010E+12,8.225E+07,4.006E+05,2.606E+12,1.923E+08
0.000E+00,0.000E+00,9.440E+05,7.398E+13,2.213E+08,5.201E+04,4.074E+12,1.610E+08
0.000E+00,0.000E+00,2.112E+05,3.322E+11,1.850E+07,8.084E+05,1.271E+12,2.350E+08
0.000E+00,0.000E+00,3.000E+05,3.202E+12,4.525E+07,7.342E+05,7.834E+12,3.063E+08
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0.000E+00,0.000E+00,9.159E+05,3.793E+13,6.025E+07,1.234E+05,5.109E+12,1.995E+08
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6.872E-05,3.218E+03,3.323E+05,1.558E+13,1.488E+08,5.053E+05,2.368E+13,8.635E+08
0.000E+00,0.000E+00,8.787E+05,1.341E+13,1.808E+08,1.543E+05,2.354E+12,4.903E+08
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0.000E+00,0.000E+00,1.037E+06,6.767E+13,1.925E+08,1.856E+03,1.210E+11,8.400E+07
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3.888E-06,3.637E+02,7.037E+05,6.583E+13,1.530E+08,3.273E+05,3.062E+13,6.543E+08
0.000E+00,0.000E+00,9.992E+05,2.272E+13,1.618E+08,3.914E+04,8.898E+11,3.468E+08
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0.000E+00,0.000E+00,7.251E+05,1.900E+13,1.900E+08,5.490E+04,1.437E+12,2.800E+07
0.000E+00,0.000E+00,4.797E+05,1.997E+12,1.078E+08,4.870E+05,2.028E+12,1.003E+08
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0.000E+00,0.000E+00,9.157E+05,3.179E+13,1.280E+08,1.202E+05,4.171E+12,1.368E+08
0.000E+00,0.000E+00,6.615E+05,1.331E+13,1.145E+08,3.770E+05,7.582E+12,3.278E+08

0.000E+00,0.000E+00,1.028E+06,3.820E+12,1.745E+08,5.672E+03,2.107E+10,5.400E+07
0.000E+00,0.000E+00,9.667E+05,9.205E+13,2.865E+08,6.096E+04,5.803E+12,4.018E+08
0.000E+00,0.000E+00,1.037E+06,3.299E+13,1.763E+08,2.305E+03,7.332E+10,1.143E+08
0.000E+00,0.000E+00,1.025E+06,3.687E+13,3.028E+08,1.001E+04,3.601E+11,2.865E+08
0.000E+00,0.000E+00,1.400E+05,1.099E+13,2.825E+07,8.771E+05,6.881E+13,2.758E+08
0.000E+00,0.000E+00,1.196E+05,2.165E+11,2.325E+07,8.955E+05,1.620E+12,2.915E+08
6.501E-05,1.670E+02,4.553E+05,1.167E+12,6.575E+07,5.472E+05,1.402E+12,4.948E+08
0.000E+00,0.000E+00,2.452E+05,3.160E+11,2.650E+07,6.386E+05,8.228E+11,1.445E+08
0.000E+00,0.000E+00,8.410E+05,6.946E+12,5.775E+07,1.926E+05,1.590E+12,3.180E+08
0.000E+00,0.000E+00,5.434E+05,2.363E+13,1.533E+08,4.904E+05,2.132E+13,6.385E+08
0.000E+00,0.000E+00,8.870E+05,2.351E+13,4.925E+07,1.525E+05,4.041E+12,1.225E+08
4.967E-04,6.195E+02,1.787E+05,2.231E+11,2.675E+07,8.086E+05,1.009E+12,2.978E+08
0.000E+00,0.000E+00,6.552E+05,1.533E+12,4.925E+07,3.512E+05,8.216E+11,2.305E+08
2.671E-05,9.465E+02,9.017E+05,3.198E+13,1.078E+08,1.351E+05,4.787E+12,6.285E+08
2.068E-04,5.015E+03,5.401E+05,1.310E+13,1.040E+08,4.969E+05,1.205E+13,6.838E+08
0.000E+00,0.000E+00,1.319E+05,5.552E+12,1.300E+07,8.571E+05,3.607E+13,1.490E+08
8.519E-06,9.498E+02,9.820E+05,1.096E+14,2.328E+08,5.709E+04,6.366E+12,7.505E+08
0.000E+00,0.000E+00,1.002E+06,1.691E+12,2.450E+07,3.505E+04,5.912E+10,2.600E+07
0.000E+00,0.000E+00,5.229E+05,2.694E+12,1.445E+08,3.842E+05,1.979E+12,3.260E+08
0.000E+00,0.000E+00,9.291E+05,1.074E+12,7.475E+07,9.832E+04,1.136E+11,1.260E+08
0.000E+00,0.000E+00,8.165E+05,7.620E+13,1.220E+08,0.000E+00,0.000E+00,0.000E+00
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0.000E+00,0.000E+00,1.037E+06,6.693E+13,1.578E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,7.422E+05,4.939E+12,8.350E+07,2.884E+05,1.918E+12,5.725E+08
0.000E+00,0.000E+00,1.039E+06,1.109E+14,1.490E+08,1.383E+02,1.476E+10,1.850E+07
0.000E+00,0.000E+00,7.342E+05,2.566E+12,2.075E+07,3.037E+05,1.061E+12,9.750E+07
0.000E+00,0.000E+00,7.341E+05,6.938E+13,2.365E+08,2.272E+05,2.147E+13,1.268E+08
0.000E+00,0.000E+00,1.037E+06,4.496E+12,6.850E+07,1.530E+03,6.630E+09,9.750E+06
0.000E+00,0.000E+00,1.017E+06,1.215E+12,9.850E+07,1.526E+04,1.823E+10,3.925E+07
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0.000E+00,0.000E+00,1.010E+06,8.825E+13,1.113E+08,2.982E+04,2.605E+12,3.673E+08
3.062E-04,8.236E+03,5.823E+05,1.567E+13,6.425E+07,4.376E+05,1.177E+13,5.753E+08
0.000E+00,0.000E+00,1.019E+06,5.134E+13,2.435E+08,2.023E+04,1.019E+12,3.898E+08
8.497E-06,3.005E+02,9.944E+05,3.515E+13,6.325E+07,4.498E+04,1.589E+12,1.273E+08
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0.000E+00,0.000E+00,9.633E+05,3.629E+13,2.163E+08,1.014E+04,3.817E+11,4.650E+07
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0.000E+00,0.000E+00,9.773E+05,2.943E+13,2.865E+08,5.432E+04,1.635E+12,2.490E+08
0.000E+00,0.000E+00,1.033E+06,2.795E+13,1.165E+08,6.191E+03,1.674E+11,8.625E+07
0.000E+00,0.000E+00,8.639E+05,2.600E+12,1.050E+08,1.479E+05,4.450E+11,5.700E+07
4.157E-04,4.104E+03,2.749E+05,2.717E+12,7.625E+07,7.490E+05,7.398E+12,5.183E+08
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7.558E-06,6.270E+02,6.969E+05,5.786E+13,2.955E+08,3.192E+05,2.650E+13,6.420E+08
0.000E+00,0.000E+00,2.070E+05,3.025E+12,5.750E+07,7.909E+05,1.155E+13,4.365E+08
0.000E+00,0.000E+00,4.901E+05,4.850E+12,1.175E+08,5.266E+05,5.211E+12,3.143E+08
0.000E+00,0.000E+00,2.219E+05,1.053E+13,3.900E+07,5.888E+05,2.794E+13,4.093E+08
0.000E+00,0.000E+00,1.034E+06,3.189E+12,8.975E+07,3.833E+03,1.182E+10,2.875E+07
0.000E+00,0.000E+00,7.121E+05,1.628E+13,9.175E+07,9.618E+04,2.199E+12,2.675E+07
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1.338E-05,2.182E+02,7.949E+05,1.298E+13,8.050E+07,2.325E+05,3.795E+12,4.988E+08
0.000E+00,0.000E+00,2.592E+05,2.309E+13,7.075E+07,5.799E+05,5.165E+13,1.570E+08
1.927E-05,3.547E+02,7.597E+05,1.400E+13,3.150E+08,2.758E+05,5.080E+12,4.973E+08
0.000E+00,0.000E+00,1.039E+06,1.357E+13,9.400E+07,7.443E+02,9.726E+09,2.850E+07
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0.000E+00,0.000E+00,4.005E+05,6.175E+11,2.100E+07,6.299E+05,9.707E+11,2.030E+08
0.000E+00,0.000E+00,1.024E+06,7.185E+13,2.240E+08,2.710E+02,1.900E+10,4.150E+07
0.000E+00,0.000E+00,2.234E+05,2.170E+13,3.650E+07,5.172E+05,5.024E+13,9.325E+07
1.169E-05,1.438E+02,9.800E+05,1.206E+13,1.490E+08,5.851E+04,7.195E+11,1.203E+08
0.000E+00,0.000E+00,1.021E+06,3.859E+12,2.153E+08,6.945E+03,2.623E+10,6.150E+07
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2.029E-05,1.555E+02,4.150E+05,3.182E+12,1.525E+08,6.054E+05,4.642E+12,3.193E+08
0.000E+00,0.000E+00,1.034E+06,7.668E+13,1.503E+08,5.471E+03,4.055E+11,1.433E+08

0.000E+00,0.000E+00,6.777E+05,2.534E+12,4.200E+07,3.587E+05,1.341E+12,1.753E+08
0.000E+00,0.000E+00,8.942E+05,2.061E+12,1.568E+08,1.277E+05,2.942E+11,5.675E+07
0.000E+00,0.000E+00,8.528E+05,4.031E+12,1.280E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.468E+05,3.513E+12,1.845E+08,3.876E+03,1.437E+10,4.525E+07
0.000E+00,0.000E+00,9.224E+05,5.412E+12,9.525E+07,1.139E+05,6.681E+11,2.650E+08
0.000E+00,0.000E+00,9.932E+05,2.469E+13,2.315E+08,4.949E+03,1.229E+11,5.625E+07
0.000E+00,0.000E+00,9.015E+05,1.487E+13,2.018E+08,1.367E+05,2.254E+12,2.773E+08
0.000E+00,0.000E+00,9.367E+05,3.088E+12,1.625E+08,8.298E+04,2.735E+11,1.015E+08
0.000E+00,0.000E+00,7.431E+05,3.660E+12,1.425E+08,2.862E+05,1.409E+12,2.640E+08
0.000E+00,0.000E+00,9.966E+04,6.485E+11,9.500E+06,8.022E+05,5.218E+12,1.145E+08
0.000E+00,0.000E+00,4.315E+05,3.382E+13,4.275E+07,5.572E+05,4.366E+13,4.585E+08
0.000E+00,0.000E+00,8.817E+05,1.387E+12,1.058E+08,7.921E+04,1.245E+11,3.000E+07
0.000E+00,0.000E+00,9.007E+05,9.612E+12,2.038E+08,1.069E+05,1.141E+12,1.848E+08
0.000E+00,0.000E+00,1.030E+06,1.600E+12,1.335E+08,1.133E+03,1.758E+09,8.250E+06
0.000E+00,0.000E+00,9.521E+05,1.211E+13,1.885E+08,6.326E+00,8.038E+07,5.000E+05
0.000E+00,0.000E+00,9.405E+05,1.015E+13,1.570E+08,9.154E+04,9.875E+11,3.260E+08
0.000E+00,0.000E+00,1.001E+06,4.144E+13,4.700E+07,3.868E+04,1.601E+12,1.963E+08
0.000E+00,0.000E+00,1.024E+06,4.370E+13,8.350E+07,4.292E+02,1.831E+10,6.500E+06
0.000E+00,0.000E+00,6.808E+05,3.191E+13,2.123E+08,3.062E+05,1.435E+13,5.228E+08
8.638E-05,1.318E+03,1.524E+05,2.328E+12,4.550E+07,8.639E+05,1.319E+13,6.403E+08
0.000E+00,0.000E+00,1.033E+06,1.346E+12,1.103E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.185E+05,5.630E+13,2.065E+08,6.328E+02,3.875E+10,1.150E+07
0.000E+00,0.000E+00,6.321E+05,3.527E+12,7.800E+07,3.938E+05,2.197E+12,1.528E+08
0.000E+00,0.000E+00,6.712E+05,4.381E+13,1.340E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,1.021E+06,1.437E+13,1.675E+08,9.367E+03,1.318E+11,9.525E+07
0.000E+00,0.000E+00,1.013E+06,2.592E+12,5.750E+07,2.495E+04,6.383E+10,5.875E+07
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0.000E+00,0.000E+00,1.034E+06,7.902E+13,1.535E+08,4.441E+03,3.391E+11,6.200E+07
0.000E+00,0.000E+00,9.881E+05,9.244E+13,2.358E+08,2.499E+03,2.336E+11,3.775E+07
0.000E+00,0.000E+00,7.977E+05,1.814E+13,8.350E+07,2.323E+05,5.283E+12,5.070E+08
0.000E+00,0.000E+00,1.020E+06,4.303E+13,3.063E+08,1.234E+04,5.202E+11,3.100E+08
5.482E-06,1.436E+02,7.118E+05,1.866E+13,1.158E+08,2.661E+05,6.971E+12,2.995E+08
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9.214E-06,1.853E+02,3.024E+05,6.084E+12,2.475E+07,7.354E+05,1.479E+13,5.128E+08
0.000E+00,0.000E+00,8.188E+05,3.043E+12,7.450E+07,1.222E+05,4.539E+11,7.250E+07
0.000E+00,0.000E+00,4.985E+05,4.748E+13,1.248E+08,4.665E+05,4.441E+13,7.510E+08
0.000E+00,0.000E+00,7.544E+05,2.401E+13,4.900E+07,2.848E+05,9.059E+12,3.078E+08
4.939E-04,1.777E+04,5.965E+05,2.147E+13,2.655E+08,3.413E+05,1.228E+13,7.200E+08
0.000E+00,0.000E+00,5.883E+05,4.617E+13,7.300E+07,4.297E+05,3.370E+13,6.235E+08
0.000E+00,0.000E+00,6.206E+05,1.123E+12,1.275E+08,1.920E+05,3.474E+11,1.063E+08
0.000E+00,0.000E+00,8.586E+05,2.200E+12,1.270E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,5.793E+05,7.466E+11,1.860E+08,4.211E+05,5.425E+11,1.575E+08
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0.000E+00,0.000E+00,2.073E+04,9.020E+11,7.075E+07,9.570E+05,4.162E+13,4.193E+08
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6.992E-04,8.718E+02,3.192E+05,3.985E+11,5.625E+07,6.592E+05,8.226E+11,4.085E+08
0.000E+00,0.000E+00,1.003E+06,2.348E+12,1.393E+08,2.891E+03,6.760E+09,1.150E+07
0.000E+00,0.000E+00,4.365E+05,1.548E+13,2.503E+08,4.535E+05,1.608E+13,2.838E+08
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1.533E-04,1.709E+04,3.539E+05,3.949E+13,8.750E+07,4.691E+05,5.234E+13,9.053E+08
0.000E+00,0.000E+00,1.016E+06,1.715E+12,1.015E+08,1.778E+04,2.999E+10,4.875E+07
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0.000E+00,0.000E+00,8.865E+05,5.720E+13,2.050E+07,1.527E+05,9.849E+12,1.043E+08
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0.000E+00,0.000E+00,9.868E+05,1.053E+14,8.025E+07,5.317E+04,5.673E+12,1.075E+08
0.000E+00,0.000E+00,9.733E+05,3.402E+12,8.850E+07,6.288E+04,2.197E+11,1.310E+08
2.940E-06,2.776E+02,4.844E+05,4.578E+13,2.180E+08,5.492E+05,5.189E+13,6.480E+08
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0.000E+00,0.000E+00,6.822E+05,4.418E+13,2.030E+08,3.037E+05,1.966E+13,4.930E+08
0.000E+00,0.000E+00,9.737E+05,8.512E+13,8.875E+07,6.601E+04,5.768E+12,1.405E+08
6.604E-06,1.777E+02,1.003E+06,2.698E+13,2.048E+08,3.639E+04,9.786E+11,1.795E+08
0.000E+00,0.000E+00,4.472E+05,2.254E+13,7.825E+07,5.439E+05,2.740E+13,7.648E+08
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6.481E-05,1.951E+03,6.815E+05,2.052E+13,1.555E+08,3.544E+05,1.067E+13,9.500E+08
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0.000E+00,0.000E+00,5.630E+05,1.695E+12,5.075E+07,4.714E+05,1.418E+12,1.105E+08
0.000E+00,0.000E+00,5.391E+05,5.327E+12,7.050E+07,4.909E+05,4.849E+12,3.243E+08
0.000E+00,0.000E+00,7.980E+05,1.810E+13,2.140E+08,1.620E+05,3.675E+12,2.193E+08
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0.000E+00,0.000E+00,1.033E+06,1.687E+13,2.433E+08,3.864E+03,6.307E+10,1.078E+08
0.000E+00,0.000E+00,5.655E+05,5.038E+13,1.410E+08,4.736E+05,4.218E+13,6.460E+08
1.253E-05,2.307E+02,3.292E+05,6.065E+12,6.400E+07,6.313E+05,1.163E+13,4.265E+08
0.000E+00,0.000E+00,1.031E+06,1.348E+13,8.975E+07,7.869E+03,1.028E+11,1.048E+08
3.473E-05,3.851E+02,6.847E+05,7.600E+12,6.475E+07,3.478E+05,3.858E+12,6.235E+08
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0.000E+00,0.000E+00,1.030E+06,7.229E+13,1.023E+08,9.303E+03,6.525E+11,2.055E+08
0.000E+00,0.000E+00,9.030E+05,8.772E+13,2.748E+08,1.243E+05,1.207E+13,4.275E+08
0.000E+00,0.000E+00,1.037E+06,1.276E+13,1.523E+08,1.319E+03,1.622E+10,4.275E+07
0.000E+00,0.000E+00,2.255E+05,8.527E+11,1.250E+07,8.080E+05,3.054E+12,1.960E+08
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0.000E+00,0.000E+00,9.535E+05,2.533E+12,1.440E+08,7.778E+04,2.065E+11,2.020E+08
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0.000E+00,0.000E+00,8.016E+05,6.147E+12,7.550E+07,2.353E+05,1.804E+12,1.660E+08
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0.000E+00,0.000E+00,3.802E+05,8.765E+11,1.250E+07,6.537E+05,1.507E+12,2.090E+08
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2.483E-05,4.093E+02,9.469E+05,1.561E+13,1.313E+08,9.101E+04,1.500E+12,4.533E+08
0.000E+00,0.000E+00,9.831E+05,3.241E+12,2.048E+08,4.854E+04,1.599E+11,7.950E+07
0.000E+00,0.000E+00,6.048E+04,2.980E+11,1.775E+07,8.149E+05,4.014E+12,3.840E+08
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0.000E+00,0.000E+00,1.005E+06,7.879E+13,2.838E+08,2.386E+04,1.869E+12,3.093E+08
0.000E+00,0.000E+00,4.070E+05,6.402E+11,3.175E+07,5.588E+05,8.788E+11,1.130E+08
0.000E+00,0.000E+00,7.632E+05,8.145E+12,1.805E+08,2.532E+05,2.701E+12,3.185E+08
0.000E+00,0.000E+00,9.955E+05,1.546E+12,1.978E+08,1.780E+04,2.763E+10,5.600E+07
0.000E+00,0.000E+00,6.194E+05,7.879E+12,1.200E+08,3.527E+05,4.485E+12,1.848E+08
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3.025E-05,4.613E+02,6.403E+05,9.775E+12,8.800E+07,3.816E+05,5.825E+12,7.700E+08
0.000E+00,0.000E+00,9.994E+05,1.302E+12,7.075E+07,3.233E+04,4.211E+10,1.600E+07
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0.000E+00,0.000E+00,1.002E+06,5.593E+12,1.953E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,2.285E+05,1.492E+13,9.750E+06,7.995E+05,5.217E+13,1.638E+08
0.000E+00,0.000E+00,9.802E+05,1.380E+13,1.505E+08,5.813E+04,8.177E+11,1.970E+08
0.000E+00,0.000E+00,1.023E+06,2.617E+12,1.000E+08,7.518E+03,1.924E+10,4.100E+07
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0.000E+00,0.000E+00,5.207E+05,3.978E+13,7.875E+07,5.158E+05,3.940E+13,3.335E+08

0.000E+00,0.000E+00,7.599E+05,7.109E+13,3.023E+08,2.750E+05,2.572E+13,4.608E+08
0.000E+00,0.000E+00,8.770E+05,1.995E+13,2.728E+08,1.590E+05,3.614E+12,4.173E+08
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1.097E-04,2.875E+03,8.154E+05,2.137E+13,1.550E+08,1.976E+05,5.177E+12,5.695E+08
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0.000E+00,0.000E+00,4.094E+05,1.522E+12,6.075E+07,4.483E+05,1.666E+12,1.030E+08
4.932E-06,4.694E+02,8.894E+05,8.469E+13,2.645E+08,1.485E+05,1.413E+13,7.468E+08
0.000E+00,0.000E+00,1.035E+06,3.294E+13,1.865E+08,1.828E+03,5.814E+10,2.850E+07
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0.000E+00,0.000E+00,9.005E+04,7.067E+12,7.275E+07,6.294E+05,4.938E+13,5.095E+08
0.000E+00,0.000E+00,7.037E+05,1.274E+12,1.183E+08,5.357E+04,9.701E+10,2.050E+07
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0.000E+00,0.000E+00,6.102E+05,7.863E+11,9.475E+07,3.932E+05,5.065E+11,4.040E+08
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3.324E-04,1.444E+04,8.257E+05,3.591E+13,2.730E+08,2.120E+05,9.218E+12,1.074E+09
0.000E+00,0.000E+00,1.038E+06,2.752E+13,1.670E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,8.269E+05,1.032E+12,8.575E+07,2.036E+05,2.541E+11,8.350E+07
0.000E+00,0.000E+00,6.469E+05,1.514E+12,6.475E+07,3.871E+05,9.055E+11,1.455E+08
0.000E+00,0.000E+00,9.617E+05,3.410E+13,3.145E+08,7.429E+04,2.634E+12,3.268E+08
0.000E+00,0.000E+00,1.032E+06,2.504E+13,1.725E+08,6.997E+03,1.696E+11,1.403E+08
0.000E+00,0.000E+00,1.388E+05,5.845E+12,1.150E+07,8.960E+05,3.770E+13,2.618E+08
0.000E+00,0.000E+00,3.237E+05,3.611E+13,1.495E+08,6.762E+05,7.544E+13,4.068E+08
0.000E+00,0.000E+00,1.037E+06,1.750E+12,7.025E+07,1.945E+01,3.281E+07,2.500E+05
0.000E+00,0.000E+00,6.918E+04,3.566E+11,2.000E+07,8.582E+05,4.422E+12,4.445E+08
0.000E+00,0.000E+00,1.222E+05,1.413E+11,2.350E+07,7.237E+05,8.365E+11,1.060E+08
0.000E+00,0.000E+00,8.968E+05,8.369E+13,2.738E+08,1.387E+05,1.294E+13,3.248E+08
0.000E+00,0.000E+00,8.717E+05,1.530E+13,1.233E+08,1.607E+05,2.819E+12,4.473E+08
0.000E+00,0.000E+00,1.034E+06,6.675E+13,5.550E+07,6.735E+03,4.344E+11,3.925E+07
0.000E+00,0.000E+00,8.228E+05,5.475E+12,1.873E+08,2.002E+05,1.332E+12,9.625E+07
0.000E+00,0.000E+00,1.036E+06,1.106E+14,8.650E+07,3.439E+03,3.670E+11,1.328E+08
0.000E+00,0.000E+00,6.274E+04,2.194E+11,5.500E+06,9.690E+05,3.387E+12,1.725E+08
0.000E+00,0.000E+00,5.803E+05,5.485E+13,8.850E+07,4.251E+05,4.016E+13,8.388E+08
0.000E+00,0.000E+00,1.034E+06,4.484E+12,1.218E+08,6.501E+02,2.817E+09,1.025E+07
0.000E+00,0.000E+00,9.467E+05,1.131E+12,3.150E+07,8.902E+04,1.063E+11,3.625E+07
0.000E+00,0.000E+00,3.702E+05,2.398E+13,2.288E+08,5.496E+05,3.558E+13,2.585E+08
0.000E+00,0.000E+00,1.034E+06,9.037E+13,1.290E+08,5.618E+03,4.909E+11,1.903E+08
0.000E+00,0.000E+00,1.035E+06,2.786E+13,1.483E+08,4.040E+03,1.087E+11,6.225E+07
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0.000E+00,0.000E+00,7.921E+05,1.967E+13,3.525E+07,2.448E+05,6.077E+12,1.213E+08
0.000E+00,0.000E+00,9.849E+05,3.711E+13,1.938E+08,1.034E+04,3.895E+11,1.525E+07
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5.327E-04,1.604E+04,4.209E+05,1.268E+13,2.033E+08,3.273E+05,9.855E+12,8.583E+08
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0.000E+00,0.000E+00,9.858E+05,9.755E+12,2.305E+08,8.853E+03,8.756E+10,6.825E+07
6.368E-05,3.020E+03,9.037E+05,4.288E+13,2.395E+08,1.349E+05,6.400E+12,6.830E+08
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5.616E-04,8.847E+03,6.040E+05,9.520E+12,1.383E+08,4.009E+05,6.318E+12,5.720E+08
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1.563E-06,1.393E+02,5.268E+05,4.693E+13,7.025E+07,5.086E+05,4.529E+13,4.293E+08
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1.787E-05,7.203E+02,9.542E+05,3.849E+13,1.163E+08,8.474E+04,3.416E+12,3.945E+08
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0.000E+00,0.000E+00,8.107E+05,2.673E+12,9.775E+07,1.986E+05,6.545E+11,2.348E+08
0.000E+00,0.000E+00,5.390E+05,2.655E+12,8.425E+07,4.931E+05,2.428E+12,3.353E+08
0.000E+00,0.000E+00,2.273E+05,1.479E+12,1.275E+07,7.618E+05,4.955E+12,1.273E+08
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0.000E+00,0.000E+00,5.854E+05,9.093E+11,4.675E+07,4.401E+05,6.834E+11,1.760E+08
0.000E+00,0.000E+00,8.001E+05,1.018E+13,9.600E+07,2.248E+05,2.858E+12,3.995E+08
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3.959E-06,2.425E+02,8.878E+05,5.442E+13,1.215E+08,1.450E+05,8.885E+12,6.778E+08
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1.384E-05,5.832E+02,7.300E+05,3.079E+13,1.308E+08,2.466E+05,1.040E+13,5.720E+08
0.000E+00,0.000E+00,9.266E+05,2.428E+13,2.128E+08,3.309E+04,8.670E+11,2.425E+07
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0.000E+00,0.000E+00,7.016E+05,2.436E+13,4.150E+07,3.367E+05,1.169E+13,2.113E+08
0.000E+00,0.000E+00,8.832E+05,1.776E+13,1.328E+08,2.456E+04,4.940E+11,1.500E+07
0.000E+00,0.000E+00,9.850E+05,3.661E+12,1.873E+08,1.227E+03,4.556E+09,4.250E+06
0.000E+00,0.000E+00,9.610E+05,9.151E+13,2.878E+08,6.571E+04,6.255E+12,3.233E+08
0.000E+00,0.000E+00,9.495E+05,3.021E+13,1.088E+08,4.536E+04,1.443E+12,1.950E+07
0.000E+00,0.000E+00,5.268E+05,1.896E+13,1.343E+08,2.952E+05,1.062E+13,3.378E+08
2.396E-05,1.878E+03,4.263E+05,3.345E+13,1.995E+08,5.806E+05,4.554E+13,9.410E+08
0.000E+00,0.000E+00,9.919E+05,1.795E+12,2.275E+08,7.320E+03,1.325E+10,2.225E+07
0.000E+00,0.000E+00,9.656E+05,2.475E+12,1.583E+08,0.000E+00,0.000E+00,0.000E+00
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3.046E-05,1.324E+03,8.682E+05,3.775E+13,1.895E+08,1.667E+05,7.248E+12,7.745E+08
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0.000E+00,0.000E+00,9.123E+05,2.213E+13,2.035E+08,1.234E+05,2.992E+12,1.210E+08
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0.000E+00,0.000E+00,8.029E+05,8.958E+13,2.458E+08,1.804E+05,2.012E+13,7.728E+08
0.000E+00,0.000E+00,7.605E+05,1.284E+12,1.625E+07,2.760E+05,4.657E+11,7.000E+07
0.000E+00,0.000E+00,9.723E+05,5.010E+12,1.613E+08,6.267E+04,3.228E+11,1.478E+08
0.000E+00,0.000E+00,9.259E+05,1.070E+12,1.575E+08,9.438E+03,1.090E+10,3.950E+07

0.000E+00,0.000E+00,5.262E+05,4.911E+13,1.730E+08,4.031E+05,3.762E+13,1.848E+08
0.000E+00,0.000E+00,6.106E+05,1.072E+13,2.365E+08,2.616E+05,4.591E+12,2.058E+08
0.000E+00,0.000E+00,1.014E+06,6.542E+13,5.225E+07,2.727E+04,1.759E+12,7.150E+07
0.000E+00,0.000E+00,2.658E+05,1.769E+12,3.650E+07,7.341E+05,4.884E+12,3.110E+08
0.000E+00,0.000E+00,5.332E+05,5.693E+13,1.475E+07,5.060E+05,5.400E+13,2.315E+08
0.000E+00,0.000E+00,6.348E+05,2.219E+12,3.750E+07,4.007E+05,1.400E+12,9.325E+07
1.302E-06,1.231E+02,5.778E+05,5.460E+13,1.538E+08,4.542E+05,4.292E+13,4.503E+08
0.000E+00,0.000E+00,9.628E+05,4.174E+12,1.900E+07,7.611E+04,3.298E+11,5.025E+07
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1.022E-05,8.933E+02,9.329E+05,8.155E+13,4.750E+07,1.068E+05,9.331E+12,2.923E+08
0.000E+00,0.000E+00,1.032E+06,2.777E+13,1.678E+08,6.873E+03,1.848E+11,1.515E+08
1.889E-03,9.515E+04,5.111E+05,2.576E+13,6.325E+07,5.250E+05,2.645E+13,7.613E+08
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0.000E+00,0.000E+00,2.998E+05,4.896E+12,4.150E+07,5.144E+05,8.401E+12,1.173E+08
0.000E+00,0.000E+00,1.616E+05,1.440E+13,2.425E+07,8.087E+05,7.203E+13,5.448E+08
0.000E+00,0.000E+00,8.930E+05,1.645E+13,2.370E+08,1.352E+05,2.489E+12,3.538E+08
0.000E+00,0.000E+00,1.038E+06,1.357E+13,9.075E+07,1.080E+03,1.412E+10,3.500E+07
0.000E+00,0.000E+00,4.616E+05,5.124E+12,1.363E+08,4.241E+03,4.708E+10,2.750E+07
0.000E+00,0.000E+00,9.581E+05,1.477E+12,1.213E+08,7.255E+04,1.118E+11,6.950E+07
0.000E+00,0.000E+00,1.022E+06,7.174E+13,1.995E+08,5.531E+03,3.880E+11,4.475E+07
7.114E-05,6.907E+03,2.546E+05,2.474E+13,8.650E+07,7.497E+05,7.282E+13,8.890E+08
0.000E+00,0.000E+00,1.037E+06,1.276E+13,1.663E+08,1.879E+03,2.310E+10,5.100E+07
0.000E+00,0.000E+00,1.027E+06,3.881E+12,1.653E+08,1.043E+03,3.940E+09,1.025E+07
0.000E+00,0.000E+00,1.025E+06,4.134E+13,1.900E+08,1.111E+04,4.478E+11,4.850E+07
0.000E+00,0.000E+00,1.028E+06,2.731E+12,2.255E+08,4.770E+03,1.267E+10,3.825E+07
0.000E+00,0.000E+00,9.961E+05,1.355E+13,2.090E+08,9.693E+02,1.317E+10,2.725E+07
0.000E+00,0.000E+00,4.454E+05,3.416E+12,4.525E+07,5.608E+05,4.299E+12,3.028E+08
0.000E+00,0.000E+00,9.100E+05,6.748E+13,1.428E+08,1.160E+05,8.601E+12,1.208E+08
0.000E+00,0.000E+00,3.325E+05,1.243E+12,5.875E+07,6.138E+05,2.295E+12,4.768E+08
0.000E+00,0.000E+00,3.906E+05,9.005E+11,2.500E+07,6.338E+05,1.461E+12,2.145E+08
0.000E+00,0.000E+00,5.023E+05,2.374E+12,1.045E+08,4.199E+05,1.984E+12,1.725E+08
0.000E+00,0.000E+00,8.746E+05,3.245E+12,1.510E+08,1.592E+05,5.906E+11,1.098E+08
0.000E+00,0.000E+00,9.905E+05,5.811E+12,1.313E+08,4.581E+04,2.686E+11,2.168E+08
0.000E+00,0.000E+00,7.207E+05,1.792E+13,2.180E+08,2.457E+05,6.107E+12,2.010E+08
0.000E+00,0.000E+00,9.291E+05,1.532E+13,2.155E+08,9.558E+04,1.576E+12,2.268E+08
0.000E+00,0.000E+00,7.935E+05,2.616E+12,1.280E+08,2.213E+05,7.293E+11,1.908E+08
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0.000E+00,0.000E+00,5.140E+05,4.028E+13,6.400E+07,5.097E+05,3.994E+13,7.030E+08
0.000E+00,0.000E+00,5.903E+05,9.286E+11,5.525E+07,4.320E+05,6.793E+11,1.735E+08
0.000E+00,0.000E+00,1.016E+06,1.084E+13,2.630E+08,9.950E+03,1.061E+11,1.348E+08
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5.407E-05,6.872E+02,9.109E+05,1.159E+13,2.285E+08,1.248E+05,1.587E+12,3.700E+08
0.000E+00,0.000E+00,6.630E+05,7.156E+12,1.695E+08,3.727E+05,4.021E+12,3.260E+08
0.000E+00,0.000E+00,1.037E+06,4.292E+13,6.350E+07,2.919E+03,1.208E+11,7.125E+07
0.000E+00,0.000E+00,1.025E+06,4.373E+13,2.195E+08,2.740E+00,1.169E+08,7.500E+05
0.000E+00,0.000E+00,6.939E+05,3.253E+13,2.358E+08,6.263E+04,2.935E+12,1.820E+08
0.000E+00,0.000E+00,7.966E+05,1.216E+13,1.963E+08,1.938E+05,2.957E+12,3.230E+08

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0.000E+00,0.000E+00,9.858E+05,6.433E+13,9.550E+07,5.382E+04,3.511E+12,2.110E+08
0.000E+00,0.000E+00,4.038E+05,5.686E+12,3.475E+07,4.593E+05,6.464E+12,4.675E+07
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0.000E+00,0.000E+00,4.441E+05,4.155E+13,1.233E+08,5.434E+05,5.083E+13,9.413E+08
0.000E+00,0.000E+00,1.012E+06,2.301E+13,2.205E+08,2.693E+04,6.123E+11,2.655E+08
0.000E+00,0.000E+00,6.610E+05,2.788E+13,1.893E+08,2.772E+05,1.169E+13,1.253E+08
0.000E+00,0.000E+00,9.871E+05,2.587E+13,2.540E+08,8.761E+03,2.294E+11,1.453E+08
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0.000E+00,0.000E+00,8.847E+05,1.245E+12,3.675E+07,1.422E+05,1.999E+11,9.275E+07
0.000E+00,0.000E+00,1.012E+06,3.512E+13,1.763E+08,2.352E+04,8.162E+11,7.475E+07
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0.000E+00,0.000E+00,5.726E+05,5.453E+13,2.668E+08,4.340E+05,4.131E+13,2.858E+08
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2.833E-05,2.221E+03,8.741E+05,6.858E+13,2.988E+08,1.621E+05,1.272E+13,8.763E+08
0.000E+00,0.000E+00,4.917E+05,8.899E+11,5.525E+07,4.757E+05,8.608E+11,2.268E+08
0.000E+00,0.000E+00,8.923E+05,2.287E+12,1.530E+08,1.396E+05,3.576E+11,1.643E+08
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2.154E-05,1.778E+02,6.706E+05,5.539E+12,5.525E+07,3.668E+05,3.028E+12,3.000E+08
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0.000E+00,0.000E+00,1.039E+06,2.752E+13,1.173E+08,1.155E+03,3.058E+10,3.550E+07
0.000E+00,0.000E+00,1.033E+06,1.289E+12,1.268E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,6.466E+05,1.513E+12,8.950E+07,3.814E+05,8.923E+11,2.960E+08
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0.000E+00,0.000E+00,4.352E+05,1.056E+13,2.350E+07,5.987E+05,1.452E+13,2.658E+08
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0.000E+00,0.000E+00,8.768E+05,9.782E+13,2.185E+08,1.251E+04,1.396E+12,3.850E+07
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0.000E+00,0.000E+00,8.164E+05,5.287E+13,2.520E+08,2.719E+04,1.761E+12,2.950E+07
0.000E+00,0.000E+00,8.964E+05,7.837E+13,7.675E+07,1.432E+05,1.251E+13,2.010E+08
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0.000E+00,0.000E+00,9.789E+05,2.430E+13,3.875E+07,6.084E+04,1.510E+12,6.275E+07
0.000E+00,0.000E+00,1.031E+06,3.883E+13,2.915E+08,4.027E+03,1.516E+11,1.523E+08
0.000E+00,0.000E+00,6.691E+05,1.175E+12,9.500E+06,3.675E+05,6.452E+11,7.225E+07
4.282E-05,1.289E+03,7.111E+05,2.142E+13,1.620E+08,3.101E+05,9.335E+12,1.009E+09
0.000E+00,0.000E+00,9.914E+05,2.682E+13,1.580E+08,4.761E+04,1.287E+12,2.115E+08
0.000E+00,0.000E+00,1.025E+06,3.084E+12,8.925E+07,0.000E+00,0.000E+00,0.000E+00
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8.637E-05,1.958E+03,2.013E+05,4.566E+12,9.775E+07,7.691E+05,1.744E+13,7.268E+08
0.000E+00,0.000E+00,1.003E+06,8.325E+13,2.840E+08,5.018E+03,4.164E+11,1.848E+08
0.000E+00,0.000E+00,3.662E+05,5.351E+12,6.025E+07,6.221E+05,9.087E+12,5.710E+08
0.000E+00,0.000E+00,7.381E+05,7.305E+12,9.525E+07,2.995E+05,2.963E+12,2.960E+08
0.000E+00,0.000E+00,9.964E+05,4.728E+13,1.993E+08,6.295E+01,2.984E+09,4.750E+06
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0.000E+00,0.000E+00,9.679E+05,8.621E+13,2.908E+08,6.897E+04,6.141E+12,2.168E+08
2.753E-05,5.068E+02,4.763E+05,8.775E+12,6.825E+07,4.794E+05,8.830E+12,7.250E+08
0.000E+00,0.000E+00,9.784E+05,1.279E+13,7.475E+07,6.017E+04,7.861E+11,2.263E+08
0.000E+00,0.000E+00,6.227E+02,6.926E+09,3.750E+06,5.156E+05,5.723E+12,1.428E+08
0.000E+00,0.000E+00,9.593E+05,1.479E+12,9.350E+07,6.926E+04,1.067E+11,1.393E+08
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0.000E+00,0.000E+00,9.793E+05,3.702E+12,1.803E+08,5.382E+04,2.034E+11,1.863E+08
0.000E+00,0.000E+00,1.031E+06,4.160E+13,1.315E+08,8.050E+03,3.245E+11,1.725E+08
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0.000E+00,0.000E+00,8.108E+05,6.217E+12,9.025E+07,2.198E+05,1.685E+12,3.070E+08
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0.000E+00,0.000E+00,1.008E+06,6.556E-12,6.575E+07,3.057E+04,1.987E+11,1.060E+08
1.668E-06,1.307E+02,9.950E+05,7.798E+13,2.828E+08,3.896E+04,3.052E+12,5.385E+08
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0.000E+00,0.000E+00,9.660E+05,1.229E+13,2.383E+08,6.277E+04,7.982E+11,1.160E+08
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0.000E+00,0.000E+00,1.034E+06,4.281E+13,1.343E+08,5.350E+03,2.214E+11,1.143E+08
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4.253E-04,1.992E+04,5.005E+05,2.346E+13,2.123E+08,4.779E+05,2.240E+13,1.036E+09
0.000E+00,0.000E+00,9.789E+05,1.494E+13,2.155E+08,3.980E+03,6.073E+10,2.175E+07
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2.998E-04,1.671E+03,7.543E+05,4.209E+12,1.215E+08,2.771E+05,1.546E+12,5.593E+08
1.400E-05,9.134E+02,8.231E+05,5.372E+13,7.825E+07,2.150E+05,1.403E+13,3.595E+08
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0.000E+00,0.000E+00,9.785E+05,7.475E+13,1.790E+08,1.504E+04,1.149E+12,4.500E+07
0.000E+00,0.000E+00,8.917E+05,8.342E+13,3.098E+08,1.463E+05,1.369E+13,6.218E+08
0.000E+00,0.000E+00,1.012E+06,2.301E+13,2.703E+08,1.341E+04,3.048E+11,6.525E+07
0.000E+00,0.000E+00,1.015E+06,4.281E+13,2.133E+08,2.396E+04,1.010E+12,4.505E+08
0.000E+00,0.000E+00,3.019E+05,7.914E+12,4.450E+07,3.218E+05,8.433E+12,1.073E+08
0.000E+00,0.000E+00,9.416E+05,3.921E+12,4.075E+07,9.686E+04,4.032E+11,5.750E+07
0.000E+00,0.000E+00,9.837E+05,1.384E+12,6.100E+07,4.910E+04,6.905E+10,7.550E+07
0.000E+00,0.000E+00,4.786E+05,1.662E+13,1.775E+07,5.489E+05,1.905E+13,1.698E+08
0.000E+00,0.000E+00,9.678E+05,1.947E+13,2.325E+08,4.158E+04,8.360E+11,7.325E+07
0.000E+00,0.000E+00,5.976E+05,2.221E+12,7.050E+07,3.842E+05,1.428E+12,1.245E+08
2.219E-06,2.113E+02,6.179E+05,5.884E-13,1.785E+08,4.193E+05,3.992E+13,8.395E+08
0.000E+00,0.000E+00,9.738E+05,3.098E+13,1.890E+08,6.495E+04,2.066E+12,4.168E+08
5.656E-06,2.034E+02,2.289E+05,8.242E-12,5.775E+07,5.715E+05,2.057E+13,6.890E+08
0.000E+00,0.000E+00,5.899E+05,4.628E+13,2.828E+08,4.357E+05,3.418E+13,6.885E+08
0.000E+00,0.000E+00,3.403E+05,6.159E+11,5.225E+07,7.842E+04,1.420E+11,9.250E+06
0.000E+00,0.000E+00,9.497E+05,2.434E+12,2.468E+08,3.329E+04,8.529E+10,7.625E+07
0.000E+00,0.000E+00,6.070E+05,7.822E+11,8.600E+07,2.906E+05,3.744E+11,1.510E+08
0.000E+00,0.000E+00,9.928E+05,8.200E+12,2.210E+08,5.388E+02,4.448E+09,2.025E+07
1.036E-04,4.501E+03,3.443E+05,1.497E+13,9.350E+07,6.479E+05,2.817E+13,8.073E+08
0.000E+00,0.000E+00,5.275E+05,1.398E+13,2.625E+07,4.417E+05,1.170E+13,7.750E+07
0.000E+00,0.000E+00,6.982E+04,8.718E+10,1.025E+07,8.697E+05,1.085E+12,1.793E+08

0.000E+00,0.000E+00,7.784E+05,1.821E+12,1.218E+08,4.803E+04,1.123E+11,1.030E+08
1.256E-04,4.452E+03,4.102E+05,1.455E+13,8.225E+07,4.474E+05,1.587E+13,5.645E+08
1.665E-05,4.032E+02,8.220E+05,1.994E+13,1.880E+08,1.863E+05,4.516E+12,2.673E+08
0.000E+00,0.000E+00,1.039E+06,4.374E+13,2.128E+08,6.022E+01,2.534E+09,1.325E+07
0.000E+00,0.000E+00,8.798E+05,9.815E+13,2.965E+08,9.966E+04,1.111E+13,6.753E+08
0.000E+00,0.000E+00,1.027E+06,1.734E+12,4.425E+07,1.007E+04,1.699E+10,1.625E+07
0.000E+00,0.000E+00,2.491E+05,1.283E+12,7.400E+07,6.301E+05,3.246E+12,4.945E+08
0.000E+00,0.000E+00,3.887E+05,4.493E+11,9.375E+07,4.597E+05,5.314E+11,9.025E+07
0.000E+00,0.000E+00,8.566E+05,7.994E+13,1.960E+08,1.772E+05,1.653E+13,3.988E+08
4.515E-05,7.920E+02,5.414E+05,9.505E+12,1.808E+08,4.929E+05,8.652E+12,5.425E+08
0.000E+00,0.000E+00,1.034E+06,6.669E+13,6.300E+07,5.605E+03,3.615E+11,1.143E+08
0.000E+00,0.000E+00,1.878E+04,1.249E+11,3.125E+07,6.473E+05,4.308E+12,9.725E+07
0.000E+00,0.000E+00,1.036E+06,1.106E+14,1.338E+08,2.865E+03,3.056E+11,3.150E+07
0.000E+00,0.000E+00,9.704E+05,3.392E+12,1.058E+08,6.533E+04,2.282E+11,1.225E+08
0.000E+00,0.000E+00,4.951E+04,4.681E+12,6.425E+07,6.252E+05,5.908E+13,1.748E+08
0.000E+00,0.000E+00,1.012E+06,4.387E+12,7.575E+07,2.511E+04,1.088E+11,6.850E+07
0.000E+00,0.000E+00,1.004E+06,1.199E+12,1.310E+08,0.000E+00,0.000E+00,0.000E+00
0.000E+00,0.000E+00,9.442E+05,6.114E+13,2.405E+08,1.398E+04,9.047E+11,1.200E+08
0.000E+00,0.000E+00,1.031E+06,9.014E+13,9.625E+07,8.394E+03,7.334E+11,1.883E+08
0.000E+00,0.000E+00,1.033E+06,2.779E+13,1.743E+08,2.678E+03,7.204E+10,5.050E+07
0.000E+00,0.000E+00,6.874E+05,3.464E+13,1.385E+08,3.265E+05,1.644E+13,4.330E+08
0.000E+00,0.000E+00,1.037E+06,3.663E+13,8.475E+07,3.018E+03,1.066E+11,3.775E+07
0.000E+00,0.000E+00,1.012E+06,2.512E+13,9.125E+07,2.676E+04,6.640E+11,6.175E+07
0.000E+00,0.000E+00,8.474E+05,3.193E+13,8.550E+07,1.885E+05,7.099E+12,5.198E+08
0.000E+00,0.000E+00,9.504E+05,1.669E+12,1.525E+07,8.757E+04,1.537E+11,2.900E+07
1.649E-05,4.963E+02,7.633E+05,2.299E+13,3.183E+08,2.625E+05,7.904E+12,7.880E+08
0.000E+00,0.000E+00,1.033E+06,2.796E+13,1.298E+08,5.866E+03,1.586E+11,1.293E+08
0.000E+00,0.000E+00,1.038E+06,3.123E+12,9.025E+07,3.389E+02,1.020E+09,5.750E+06
0.000E+00,0.000E+00,8.615E+05,8.511E+12,1.273E+08,1.765E+05,1.744E+12,1.875E+08
0.000E+00,0.000E+00,1.020E+06,2.313E+13,2.603E+08,1.749E+04,3.965E+11,3.010E+08
6.219E-05,5.160E+03,3.295E+05,2.737E+13,5.775E+07,7.062E+05,5.862E+13,8.358E+08
1.312E-03,1.918E+04,5.800E+05,8.475E+12,8.625E+07,4.555E+05,6.653E+12,6.283E+08
0.000E+00,0.000E+00,6.170E+05,6.106E+12,2.153E+08,3.067E+05,3.035E+12,3.335E+08
0.000E+00,0.000E+00,9.120E+05,4.327E+13,1.998E+08,1.247E+05,5.917E+12,4.330E+08
0.000E+00,0.000E+00,1.038E+06,3.203E+12,6.175E+07,2.845E+02,8.771E+08,4.250E+06
1.094E-04,2.501E+03,4.912E+05,1.123E+13,8.700E+07,5.339E+05,1.221E+13,8.930E+08
0.000E+00,0.000E+00,7.751E+05,1.222E+13,2.225E+08,2.348E+05,3.700E+12,1.930E+08
0.000E+00,0.000E+00,1.270E+05,2.074E+12,3.950E+07,9.019E+05,1.473E+13,4.530E+08
2.004E-06,1.786E+02,3.574E+05,3.183E+13,7.975E+07,6.598E+05,5.876E+13,5.805E+08
0.000E+00,0.000E+00,8.224E+05,1.515E+13,1.723E+08,2.893E+01,5.325E+08,2.000E+06
0.000E+00,0.000E+00,1.039E+06,1.358E+13,1.065E+08,1.748E+02,2.283E+09,7.000E+06
0.000E+00,0.000E+00,9.871E+05,1.095E+13,2.298E+08,4.849E+04,5.379E+11,3.945E+08
0.000E+00,0.000E+00,1.026E+06,1.581E+12,1.125E+08,3.147E+03,4.848E+09,9.750E+06
1.156E-05,8.115E+02,8.940E+05,6.273E+13,6.350E+07,1.454E+05,1.020E+13,4.888E+08
7.407E-06,7.190E+02,5.833E+05,5.666E+13,2.053E+08,4.418E+05,4.290E+13,7.193E+08
0.000E+00,0.000E+00,9.855E+05,1.212E+13,7.325E+07,3.042E+00,3.740E+07,2.500E+05
0.000E+00,0.000E+00,9.498E+05,3.590E+12,1.998E+08,6.414E+03,2.425E+10,1.875E+07
0.000E+00,0.000E+00,7.582E+05,3.058E+13,6.025E+07,2.755E+05,1.111E+13,2.815E+08
2.134E-04,5.669E+02,7.588E+05,2.016E+12,8.900E+07,2.712E+05,7.202E+11,3.280E+08
1.360E-05,1.849E+02,9.678E+05,1.316E+13,6.925E+07,7.093E+04,9.643E+11,2.228E+08
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0.000E+00,0.000E+00,7.110E+05,2.659E+12,7.675E+07,3.252E+05,1.216E+12,1.485E+08
0.000E+00,0.000E+00,6.397E+05,1.475E+12,3.100E+07,3.655E+05,8.423E+11,1.133E+08
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0.000E+00,0.000E+00,7.575E+05,3.731E+12,1.113E+08,2.780E+05,1.369E+12,2.220E+08
0.000E+00,0.000E+00,1.023E+06,6.656E+12,7.950E+07,1.353E+04,8.794E+10,3.925E+07
0.000E+00,0.000E+00,9.830E+05,7.704E+13,2.635E+08,5.074E+04,3.975E+12,4.308E+08
0.000E+00,0.000E+00,8.605E+05,1.353E+12,8.550E+07,1.652E+05,2.598E+11,6.900E+07

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0.000E+00,0.000E+00,7.280E+05,9.260E+12,1.158E+08,3.084E+05,3.922E+12,5.690E+08
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0.000E+00,0.000E+00,1.039E+06,4.433E+13,2.293E+08,8.199E+01,3.497E+09,1.400E+07
0.000E+00,0.000E+00,4.684E+03,2.198E+11,1.025E+07,8.937E+05,4.189E+13,4.230E+08
0.000E+00,0.000E+00,5.501E+04,8.398E+11,2.475E+07,2.695E+05,4.115E+12,6.900E+07
0.000E+00,0.000E+00,4.636E+05,6.043E+11,1.825E+07,5.699E+05,7.425E+11,9.750E+07
0.000E+00,0.000E+00,4.400E+05,2.697E+13,8.800E+07,5.902E+05,3.617E+13,6.615E+08
0.000E+00,0.000E+00,9.518E+05,5.311E+12,1.610E+08,5.480E+04,3.057E+11,1.508E+08
0.000E+00,0.000E+00,9.711E+05,6.337E+13,8.875E+07,6.847E+04,4.467E+12,2.763E+08
0.000E+00,0.000E+00,1.027E+06,1.445E+13,1.693E+08,2.421E+00,3.406E+07,2.500E+05
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0.000E+00,0.000E+00,8.767E+05,6.698E+13,7.675E+07,1.627E+05,1.243E+13,4.570E+08
0.000E+00,0.000E+00,1.079E+05,1.010E+13,1.428E+08,9.181E+05,8.588E+13,6.910E+08
0.000E+00,0.000E+00,6.479E+05,1.474E+13,1.588E+08,3.900E+05,8.868E+12,3.593E+08
0.000E+00,0.000E+00,7.004E+05,2.955E+13,2.015E+08,1.797E+05,7.577E+12,5.625E+07
0.000E+00,0.000E+00,3.605E+05,9.447E+12,8.575E+07,6.516E+05,1.707E+13,6.283E+08
0.000E+00,0.000E+00,9.155E+05,3.812E+12,4.950E+07,1.202E+05,5.004E+11,1.885E+08
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0.000E+00,0.000E+00,9.988E+05,3.467E+13,1.010E+08,3.391E+04,1.177E+12,5.300E+07
0.000E+00,0.000E+00,5.904E+05,1.188E+13,5.200E+07,4.023E+05,8.090E+12,2.165E+08
0.000E+00,0.000E+00,9.913E+05,3.684E+12,9.900E+07,4.593E+04,1.706E+11,5.775E+07
2.066E-05,1.966E+03,2.845E+05,2.710E+13,8.100E+07,7.468E+05,7.110E+13,9.933E+08
0.000E+00,0.000E+00,8.186E+05,2.605E+13,5.850E+07,2.183E+05,6.944E+12,4.495E+08
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0.000E+00,0.000E+00,4.130E+04,3.241E+12,4.125E+07,6.147E+05,4.823E+13,3.528E+08
0.000E+00,0.000E+00,5.411E+05,9.795E+11,4.775E+07,4.393E+05,7.948E+11,2.345E+08
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0.000E+00,0.000E+00,6.265E+05,8.074E+11,1.653E+08,1.234E+05,1.590E+11,8.275E+07
1.495E-05,1.234E+02,9.608E+05,7.935E+12,2.523E+08,6.721E+04,5.549E+11,1.685E+08
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1.538E-04,1.919E+02,7.280E+05,9.087E+11,1.138E+08,2.690E+05,3.356E+11,1.715E+08
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0.000E+00,0.000E+00,7.911E+05,2.805E+13,6.950E+07,2.409E+05,8.538E+12,4.755E+08
0.000E+00,0.000E+00,5.960E+05,1.446E+13,1.570E+08,4.245E+05,1.029E+13,6.418E+08
0.000E+00,0.000E+00,1.039E+06,4.372E+13,2.195E+08,9.556E+01,4.020E+09,1.150E+07
5.350E-06,5.966E+02,7.363E+05,8.215E+13,6.725E+07,2.985E+05,3.329E+13,7.520E+08
0.000E+00,0.000E+00,6.494E+05,1.096E+12,6.175E+07,3.855E+05,6.506E+11,6.400E+07
0.000E+00,0.000E+00,6.976E+05,3.595E+12,1.998E+08,2.755E+05,1.419E+12,4.018E+08
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0.000E+00,0.000E+00,8.310E+04,7.758E+12,2.075E+07,8.809E+05,8.220E+13,6.393E+08
0.000E+00,0.000E+00,8.982E+05,1.577E+13,2.343E+08,1.306E+05,2.291E+12,3.320E+08
0.000E+00,0.000E+00,1.039E+06,6.702E+13,7.775E+07,3.594E+02,2.320E+10,4.150E+07
0.000E+00,0.000E+00,9.840E+05,6.547E+12,2.473E+08,3.500E+04,2.328E+11,1.745E+08
0.000E+00,0.000E+00,1.039E+06,1.109E+14,1.918E+08,4.836E+02,5.163E+10,8.300E+07
0.000E+00,0.000E+00,9.421E+05,3.293E+12,6.750E+07,9.292E+04,3.246E+11,1.910E+08
9.668E-04,9.133E+04,3.667E+05,3.465E+13,7.250E+07,6.670E+05,6.302E+13,1.001E+09
0.000E+00,0.000E+00,9.667E+05,4.191E+12,4.425E+07,7.121E+04,3.085E+11,1.035E+08
0.000E+00,0.000E+00,1.021E+06,1.220E+12,7.050E+07,1.253E+04,1.496E+10,4.025E+07
1.201E-04,7.770E+03,3.977E+05,2.576E+13,8.100E+07,6.384E+05,4.133E+13,1.231E+09
0.000E+00,0.000E+00,9.893E+05,8.648E+13,5.525E+07,3.625E+04,3.168E+12,2.175E+07
0.000E+00,0.000E+00,4.664E+05,1.255E+13,3.300E+07,5.315E+05,1.430E+13,1.553E+08
0.000E+00,0.000E+00,9.045E+05,4.557E+13,1.858E+08,2.342E+03,1.180E+11,1.950E+07
0.000E+00,0.000E+00,1.039E+06,3.671E+13,1.338E+08,1.073E+02,3.795E+09,1.400E+07
0.000E+00,0.000E+00,1.036E+06,2.573E+13,1.030E+08,3.436E+03,8.526E+10,5.375E+07
0.000E+00,0.000E+00,5.666E+05,2.135E+13,3.275E+07,3.920E+05,1.477E+13,1.310E+08
0.000E+00,0.000E+00,1.036E+06,1.820E+12,6.550E+07,7.450E+02,1.307E+09,6.250E+06
0.000E+00,0.000E+00,8.545E+05,2.573E+13,2.230E+08,3.258E+02,9.813E+09,1.200E+07
0.000E+00,0.000E+00,9.414E+05,2.547E+13,1.510E+08,8.911E+04,2.410E+12,2.998E+08
0.000E+00,0.000E+00,1.037E+06,3.120E+12,1.263E+08,3.608E+02,1.085E+09,6.750E+06

0.000E+00,0.000E+00,2.578E+04,2.548E+11,1.375E+07,9.461E+05,9.347E+12,4.965E+08
0.000E+00,0.000E+00,1.006E+06,2.281E+13,2.570E+08,1.284E+04,2.911E+11,1.450E+08
7.621E-05,6.325E+03,1.194E+05,9.919E+12,5.725E+07,8.805E+05,7.309E+13,7.240E+08
0.000E+00,0.000E+00,8.446E+05,1.234E+13,1.860E+08,8.404E+01,1.227E+09,4.000E+06
0.000E+00,0.000E+00,8.534E+05,8.445E+12,2.003E+08,1.826E+05,1.806E+12,4.528E+08
9.624E-05,4.563E+03,7.539E+05,3.578E+13,2.400E+08,2.835E+05,1.345E+13,7.685E+08
0.000E+00,0.000E+00,9.931E+05,3.064E+12,4.250E+07,4.425E+04,1.364E+11,8.575E+07
0.000E+00,0.000E+00,9.566E+05,2.187E+13,1.120E+08,2.218E+04,5.067E+11,5.050E+07
0.000E+00,0.000E+00,9.987E+05,1.574E+13,1.990E+08,6.201E+02,9.766E+09,1.175E+07
0.000E+00,0.000E+00,5.362E+05,8.757E+12,1.183E+08,5.000E+05,8.164E+12,4.355E+08
6.781E-06,6.035E+02,1.481E+05,1.320E+13,2.575E+07,8.546E+05,7.612E+13,6.593E+08
0.000E+00,0.000E+00,8.858E+05,3.840E+12,3.700E+07,1.530E+05,6.631E+11,4.550E+07

GEOSCIENCES AND ENGINEERING DIVISION

SCIENTIFIC NOTEBOOK REVIEW CHECKLIST RECORD

Scientific Notebook No. 755 Project Numbers: 20.06002.01.312

Accomplished

✓	1. Initial entries per QAP-001
✓	2. Dating of entries
N/A	3. Corrections (crossed out, one line through w/initials/date)
✓	4. No White out used
✓	5. Page number visible on copy or original notebook
✓	6. In process entries per QAP-001
✓	7. Figure information present
✓	8. Text readable
NA	9. Copyrighted material is identified
✓	10. Permanent ink or type only
✓	11. Signing of entries (not required on each page)
✓	12. Electronic media in the scientific notebook properly labeled
✓	13. NRC Supplementary Scientific Notebook Questions are addressed.
✓	14. The independent, two person verification required by AP-019, Section 5.2.1.2(b) is complete

Any discrepancies must be resolved before notebook closeout.

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I have reviewed this scientific notebook and find it in agreement with QAP-001.

Manager's Signature 12/28/07 Date

Attach this completed form to the last page of the notebook.

Form QAP-01 (03/2007)