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**Criticality Analysis of Aggregations of
Actinides from Commercial Nuclear Waste
in Geological Storage**

E. J. Allen

OAK RIDGE NATIONAL LABORATORY
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Engineering Technology Division

CRITICALITY ANALYSIS OF AGGREGATIONS OF ACTINIDES FROM
COMMERCIAL NUCLEAR WASTE IN GEOLOGICAL STORAGE

E. J. Allen

Date Published: August 1978

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FOREWORD

This report was prepared by the Engineering Technology Division of Union Carbide Corporation, Nuclear Division, in cooperation with the Office of Waste Isolation for the National Waste Terminal Storage Program. The objective of this OWI program is to establish facilities in various deep geologic formations at several locations in the United States for the safe disposal of commercial nuclear waste. This reported work is in support of this objective.

CRITICALITY ANALYSIS OF AGGREGATIONS OF ACTINIDES FROM COMMERCIAL NUCLEAR WASTE IN GEOLOGICAL STORAGE

E. J. Allen

ABSTRACT

An underground nuclear-waste terminal-storage facility for either spent fuel elements or high level waste from a reprocessing plant will contain large amounts of fissionable actinides. Such a facility must be designed to preclude the concentration of these isotopes into a critical mass. Information on the critical masses of the various isotopes present in spent fuel or high level waste is required as part of such a design effort. This study provides this information. The results of this study will be used, in conjunction with geologic transport rates of the actinide compounds, to estimate mass formation probabilities in waste repositories.

A computational model was developed as part of the study to perform criticality calculations rapidly and efficiently and to produce tables and plots of actinide concentration in geologic material versus critical mass. The criticality model uses a discrete ordinates approximation to neutron transport theory and treats six energy groups and spherical geometry. Neutron cross sections were obtained from ENDF/B-IV or ENDF/B-V cross section libraries. Critical masses calculated with the computational model were checked against experimental values and against more detailed calculational values and were found to be from 30% less to 10% greater.

Critical mass calculations were made for five waste types, five waste ages, five actinide elements, and four geologic compositions. Minimum critical masses were calculated for over 400 combinations of the above variables. The relative importance for criticality of the various actinides and waste types is presented in terms of the number of possible critical masses per waste container.

Key words: nuclear waste, critical mass, actinides, calculations, computer codes.

INTRODUCTION

A nuclear waste repository for spent fuel or high level wastes from a fuel reprocessing plant will contain large amounts of the actinide elements; U, Np, Pu, Am, and Cm. Since many of the isotopes of these elements are fissionable, the repository must be designed to prevent a critical mass

being formed as a result of selective leaching and/or selective transport and selective deposition of one or more of the fissionable actinides.

The results of considerations to date indicate very low possibilities of an assembly of actinides being formed which would meet all of the requirements for criticality; namely, required amounts of actinides, purity, geometric shape and size, and neutron moderation and reflection.¹ To help in further assessments of the criticality possibilities, criticality calculations were made for a wide range of assumed repository conditions for the actinides in nuclear wastes from each of several different fuel cycles.

NUCLEAR WASTE REPOSITORY DESCRIPTION

Preliminary waste repository designs indicate that the high-level waste canisters will be placed in vertical holes in underground chambers. The holes containing the canisters will be placed in a single or double row down the center of each chamber and spaced ~2 to 3 meters apart. There will be several high-level waste chambers in each repository. A similar design will result if fuel elements rather than High Level Waste (HLW) canisters are stored.

Geologic structures considered suitable for terminal storage of nuclear waste include structures composed of salt, granite, or shale. The repository structure and site are selected partially for long-term stability properties. These include infrequency of earthquakes, low probability of groundwater intrusion, and absence of surface drillings.

A more complete description on nuclear-waste terminal-storage facilities is presented in Ref. 2.

NUCLEAR WASTE TYPES CONSIDERED

Five nuclear waste types were considered in this study. The waste types are summarized in Table 1 and will be specified throughout this paper as being of types 1-5 as in the table.

All five waste types were assumed to be from light-water reactor fuel since most of the nuclear waste generated for the first terminal-storage facility will come from such reactors. The fuel was assumed to

Table 1. Descriptions of the nuclear waste types considered

Nuclear waste type	Description ^a
1	Spent fuel
2	High level waste (HLW) from fresh uranium fuel
3	HLW from plutonium recycled fuel
4	HLW from fresh uranium fuel but with all the plutonium remaining in the waste
5	HLW from 2/3 fresh uranium fuel and 1/3 plutonium recycled fuel

^aNote that all five nuclear waste types originate from PWR fuel burned to 33,000 MWD/MT.

have undergone a burnup of 33,000 MWD/MT. For the waste types other than spent fuel, reprocessing was assumed to occur one year after discharge from the reactor. In waste types 2 through 5, 99.5% of the uranium was assumed to be removed during reprocessing. In type four waste, the plutonium was not removed during reprocessing and remained in the waste. In types 2, 3, and 5 waste, 99.5% of the plutonium was removed. Type 5 waste is representative high-level waste of a pressurized-water reactor (PWR) operating with plutonium recycle of the plutonium to the reactor.

Since the critical mass of a particular actinide with a particular moderator and reflector is dependent on the isotopic composition of the actinide, the isotopic compositions of the five most important actinides were calculated for the five waste types and for five waste ages. The isotopic compositions change with time due to decay of the nuclides in the waste. The decay calculations were performed by the Office of Waste Isolation in their fiscal year 1977 projections with the isotope generation and depletion code ORIGEN.³

In Tables 2-6, the isotopic weight fractions of five actinide elements for the five waste types are presented. Note that the isotopic weight fractions are given for oxides of the actinides. The time periods or ages of the waste refer back to when the fuel was discharged from the reactor.

Table 2. Isotopic weight fractions of uranium in nuclear waste

Nuclear waste type	Age (years)	Weight fraction of uranium isotopes in uranium oxide				Kilograms uranium per metric ton of fuel charged
		^{234}U	^{235}U	^{236}U	^{238}U	
1	10	0.00016	0.00743	0.00379	0.87098	955.3
1	100	0.00022	0.00744	0.00380	0.87089	955.4
1	1,000	0.00027	0.00756	0.00398	0.87054	955.8
1	10,000	0.00027	0.00862	0.00507	0.86839	958.2
1	100,000	0.00022	0.01201	0.00576	0.86442	962.6
2	10	0.00018	0.00743	0.00379	0.87095	4.77
2	100	0.00039	0.00745	0.00384	0.87067	4.77
2	1,000	0.00068	0.00759	0.00438	0.86970	4.78
2	10,000	0.00067	0.00998	0.00770	0.86400	4.81
2	100,000	0.00052	0.02587	0.00969	0.84632	4.91
3	10	0.00049	0.00290	0.00068	0.87828	4.65
3	100	0.00346	0.00291	0.00164	0.87435	4.67
3	1,000	0.01035	0.00342	0.01259	0.85599	4.77
3	10,000	0.00927	0.02493	0.07345	0.77470	5.27
3	100,000	0.00569	0.17423	0.09002	0.61246	6.69
4	10	0.00379	0.00839	0.00750	0.86267	4.80
4	100	0.02789	0.01055	0.01082	0.83310	4.97
4	1,000	0.04730	0.03186	0.04096	0.76225	5.43
4	10,000	0.03199	0.15768	0.16332	0.52937	7.83
4	100,000	0.01567	0.37095	0.15817	0.33761	12.44
5	10	0.00028	0.00595	0.00277	0.87335	4.73
5	100	0.00140	0.00596	0.00312	0.87188	4.74
5	1,000	0.00390	0.00620	0.00711	0.86514	4.78
5	10,000	0.00371	0.01527	0.03098	0.83239	4.96
5	100,000	0.00261	0.08596	0.04222	0.75161	5.50

Table 3. Isotopic weight fractions of
neptunium in nuclear waste

Nuclear waste type	Age (years)	Weight fraction of neptunium isotopes in neptunium oxide	Kilograms neptunium per metric ton of fuel charged
		^{237}Np	
1	10	0.882	0.467
1	100	0.882	0.614
1	1,000	0.882	1.47
1	10,000	0.882	1.73
2	10	0.882	0.464
2	100	0.882	0.478
2	1,000	0.882	0.547
2	10,000	0.882	0.567
3	10	0.882	0.176
3	100	0.882	0.276
3	1,000	0.882	0.771
3	10,000	0.882	0.964
4	10	0.882	0.968
4	100	0.882	1.11
4	1,000	0.882	1.94
4	10,000	0.882	2.20
5	10	0.882	0.368
5	100	0.882	0.411
5	1,000	0.882	0.622
5	10,000	0.882	0.699

Table 4. Isotopic weight fractions of plutonium in nuclear waste

Nuclear waste type	Age (years)	Weight fractions of the plutonium isotopes in plutonium oxide					Kilograms plutonium per metric ton of fuel charged
		^{238}Pu	^{239}Pu	^{240}Pu	^{241}Pu	^{242}Pu	
1	10	0.0129	0.531	0.219	0.0764	0.0437	8.96
1	100	0.00707	0.585	0.240	0.00118	0.0483	8.11
1	1,000	0.00001	0.601	0.231	0.0	0.0507	7.71
1	10,000	0.0	0.678	0.132	0.0	0.0720	5.35
2	10	0.0374	0.448	0.296	0.0644	0.0369	0.0532
2	100	0.0171	0.379	0.455	0.00074	0.0310	0.0646
2	1,000	0.00013	0.445	0.407	0.00001	0.0309	0.0671
2	10,000	0.0	0.720	0.136	0.0	0.0259	0.0795
3	10	0.0637	0.138	0.575	0.0460	0.0593	0.359
3	100	0.0222	0.0760	0.754	0.00046	0.0296	0.786
3	1,000	0.00047	0.184	0.664	0.00015	0.0338	0.831
3	10,000	0.0	0.638	0.212	0.00006	0.0318	1.04
4	10	0.0265	0.531	0.213	0.0726	0.0395	9.20
4	100	0.0146	0.587	0.236	0.00113	0.0439	8.28
4	1,000	0.00001	0.608	0.227	0.0	0.0466	7.80
4	10,000	0.0	0.686	0.131	0.0	0.0661	5.41
5	10	0.0577	0.209	0.511	0.0502	0.0541	0.155
5	100	0.0215	0.119	0.712	0.00050	0.0298	0.305
5	1,000	0.00043	0.220	0.629	0.00013	0.0334	0.322
5	10,000	0.0	0.649	0.202	0.00005	0.0310	0.399

Table 5. Isotopic weight fractions of
americium in nuclear waste

Nuclear waste type	Age (years)	Weight fractions of americium isotopes in americium oxide			Kilograms americium per metric ton of fuel charged
		^{241}Am	$^{242\text{m}}\text{Am}$	^{243}Am	
1	10	0.750	0.00105	0.131	0.601
1	100	0.818	0.00034	0.0640	1.22
1	1,000	0.677	0.00002	0.205	0.351
1	10,000	0.00014	0.0	0.882	0.0361
2	10	0.471	0.00327	0.408	1.93
2	100	0.450	0.00231	0.431	0.181
2	1,000	0.187	0.00007	0.695	0.103
2	10,000	0.00014	0.0	0.882	0.0361
3	10	0.297	0.0146	0.571	2.20
3	100	0.278	0.0102	0.594	2.08
3	1,000	0.0968	0.00024	0.785	1.45
3	10,000	0.00316	0.0	0.879	0.575
4	10	0.760	0.00105	0.121	0.579
4	100	0.823	0.00034	0.0590	1.18
4	1,000	0.691	0.00002	0.191	0.336
4	10,000	0.00014	0.0	0.882	0.0321
5	10	0.323	0.0129	0.546	0.860
5	100	0.304	0.00905	0.570	0.814
5	1,000	0.108	0.00022	0.774	0.552
5	10,000	0.00282	0.0	0.880	0.216

Table 6. Isotopic weight fractions of curium in nuclear waste

Nuclear waste type	Age (years)	Weight fraction of curium isotopes in curium oxide					Kilograms curium per metric ton of fuel charged
		^{242}Cm	^{243}Cm	^{244}Cm	^{245}Cm	^{246}Cm	
1	10	0.00009	0.00267	0.865	0.0129	0.00154	0.0169
1	100	0.00124	0.00792	0.574	0.267	0.0316	0.000813
1	1,000	0.00007	0.0	0.0	0.794	0.0888	0.000254
1	10,000	0.0	0.0	0.0	0.830	0.0525	0.000114
2	10	0.00009	0.00267	0.865	0.0129	0.00154	0.0169
2	100	0.00124	0.00792	0.574	0.267	0.0316	0.000813
2	1,000	0.00007	0.0	0.0	0.794	0.0888	0.000254
2	10,000	0.0	0.0	0.0	0.830	0.0525	0.000114
3	10	0.00014	0.00075	0.728	0.138	0.0152	0.564
3	100	0.00046	0.00053	0.116	0.690	0.0754	0.112
3	1,000	0.00001	0.0	0.0	0.800	0.0826	0.0898
3	10,000	0.0	0.0	0.0	0.834	0.0488	0.0405
4	10	0.00010	0.00282	0.865	0.0126	0.00143	0.0144
4	100	0.00142	0.00845	0.580	0.263	0.0297	0.000684
4	1,000	0.00008	0.0	0.0	0.797	0.0848	0.000209
4	10,000	0.0	0.0	0.0	0.832	0.0502	0.0000943
5	10	0.00013	0.00086	0.736	0.131	0.0145	0.199
5	100	0.00047	0.00064	0.123	0.684	0.0748	0.0380
5	1,000	0.00001	0.0	0.0	0.800	0.0827	0.0301
5	10,000	0.0	0.0	0.0	0.834	0.0488	0.0136

Five actinides were considered in this study. These were uranium, neptunium, plutonium, americium, and curium. Heavier actinides were not considered as they were not discharged in enough abundance to cause a criticality problem. Of the five actinides considered, uranium had to be followed for a longer time than the others because of the long half-lives of the uranium isotopes and because the isotope ^{235}U continued to increase in relative abundance. Critical mass calculations for uranium were performed to a waste age of 100,000 years; the other actinides were only considered to a waste age of 10,000 years.

In Tables 2-6, the heavy metal masses in the nuclear waste per metric ton of heavy metal charged to the reactor are presented in addition to the isotopic weight fractions. There are two types of waste containers; the spent fuel element of waste type 1 and the HLW container of the other waste types. There are approximately 0.523 metric tons of heavy-metal oxide initially present in each spent fuel element and 2.38 metric tons of

heavy-metal oxide reprocessed per HLW container.⁴ Using this information and the information in Tables 2-6, the heavy-metal oxide masses per waste container can be calculated and are presented in Table 7.

Table 7. Masses of various actinide oxides per nuclear waste container

Nuclear waste type	Age (years)	Mass of actinide oxide per waste container (kg)					Total
		Uranium	Neptunium	Plutonium	Americium	Curium	
1	10	499.5	0.244	4.69	0.314	0.0089	504.8
1	100	499.6	0.321	4.24	0.637	0.000425	504.8
1	1,000	499.8	0.769	4.03	0.183	0.000133	504.8
1	10,000	501.0	0.905	2.80	0.0189	0.000060	504.7
1	100,000	503.4		0.362			
2	10	11.36	1.10	0.127	0.459	0.0403	13.09
2	100	11.36	1.14	0.154	0.431	0.00193	13.08
2	1,000	11.37	1.30	0.160	0.246	0.000603	13.08
2	10,000	11.45	1.35	0.189	0.0859	0.000271	13.07
2	100,000	11.69		0.0262			
3	10	11.07	0.419	0.854	5.22	1.34	18.91
3	100	11.12	0.657	1.87	4.95	0.267	18.87
3	1,000	11.36	1.84	1.98	3.45	0.214	18.84
3	10,000	12.55	2.29	2.47	1.37	0.0965	18.78
3	100,000	15.91		0.370			
4	10	11.42	2.30	21.89	1.38	0.0342	37.02
4	100	11.82	2.64	19.71	2.81	0.00163	36.98
4	1,000	12.92	4.62	18.57	0.799	0.000498	36.91
4	10,000	18.64	5.24	12.86	0.0764	0.000224	36.81
4	100,000	29.61		1.60			
5	10	11.26	0.876	0.369	2.05	0.474	15.03
5	100	11.28	0.977	0.726	1.94	0.0904	15.01
5	1,000	11.37	1.48	0.766	1.31	0.0716	15.00
5	10,000	11.81	1.66	0.948	0.513	0.0323	14.97
5	100,000	13.09		0.141			

INFORMATION PERTAINING TO THE CRITICAL MASS CALCULATIONS

Information pertinent to the critical mass calculations is presented in this section. In the discussion which follows, the moderator is defined to be the material with which the actinide compounds are mixed, whether it is water, brine, granite, or salt. The reflector is the outer shell or

annulus of material which does not contain actinide compounds but may be the same material as the moderator.

All calculations in this study assumed a spherical geometry. For a given composition of actinide compounds in a moderator material, the critical mass is least for a sphere of the composition.

For a given moderator, reflector, and actinide compound, there exists a specific concentration of actinide compound in moderator at which the critical mass is minimum. Several interacting effects, described in Ref. 5, result in a minimum in the curve of critical mass versus actinide concentration in moderator. This minimum for each moderator, reflector, and actinide compound will be referred to as the minimum critical mass throughout this paper.

The critical masses were calculated for homogeneous spherical mixtures of actinide compounds in moderator material. Heterogeneous mixtures were not studied. However, if high concentrations of resonance absorbers such as ^{238}U or ^{240}Pu are present, it is possible that a heterogeneous mixture of lower critical mass can be formed than that calculated for a homogeneous mixture of same actinide compounds in moderator.

Four geologic materials were considered; water, brine, granite or shale, and salt. The elemental compositions of granite and shale are similar but vary from one site to another. A reasonable overall composition was selected and this material will be referred to as granite throughout the remainder of the paper. Water may be present in a granite repository but water in a salt repository will result in brine. Some properties of each of these materials are presented in Table 8.

The moderator-reflector material arrangements studied were water-water, brine-brine, granite-granite, and salt-salt. Test cases were calculated for water-granite and brine-salt systems. The results of these test cases indicate that for low concentrations of actinide compound in moderator the reflector composition has only a small effect on the calculated critical mass. For high concentrations of actinide compounds, granite and salt reflected systems generally have lower critical masses. Mixtures of water and granite or brine and salt for moderator or reflector materials were not studied.

Table 8.. Some properties of the moderator and reflector materials

Moderator or reflector material	Chemical composition (weight percent)	Density (g/cm ³)
Water	Hydrogen (11.11), oxygen (88.89)	1.00
Brine	Hydrogen (8.17), oxygen (65.36), sodium (10.42), chlorine (16.06) ^a	1.18
Granite and shale	Oxygen (52.02), aluminum (10.58), silicon (37.40) ^b	2.91
Salt	Sodium (39.34), chlorine (60.66)	2.165

^aComposition of brine was assumed to be that of a saturated solution of salt in water at 23°C.

^bComposition of shale and granite was assumed to be SiO₂ (80.0) and Al₂O₃ (20.0). Oxygen, aluminum, and silicon are the most abundant elements in many granites and shales.

There are five actinides abundant enough in nuclear waste to consider either separately or in combination as forming critical masses in waste repositories. These five actinides are uranium, neptunium, plutonium, americium, and curium. Critical mass calculations were made for the oxide state of each of these actinides and for a mixture of the five actinide oxides.

The calculated critical mass is dependent on the isotopic composition of the actinide. Isotopic compositions vary from one waste type to another and also change with time due to decay of the waste. As a result, five waste types and five waste ages were considered in this study.

CRITICAL MASS COMPUTATIONAL MODEL

A computational model was developed to perform the criticality calculations and to produce plots of critical mass versus actinide compound concentration in moderator. The discrete-ordinate code XSDRNPM⁶ was used to check computational model development. Use of conventional

computer codes to perform the survey calculations was abandoned early in the study because conventional computer codes are programmed to perform one criticality search (a search on the radius until the multiplication factor is unity) at a time. It was estimated that approximately 4000 search calculations would be required to complete the survey. The data manipulation for input and output of conventional computer codes would have been unwieldy.

The computational model was developed to perform progressive radial search calculations until a curve of critical mass versus actinide compound concentration in mixture was generated. The model was programmed to be fast and efficient. The computational model uses a discrete-ordinates approximation to neutron transport theory and treats six neutron groups and spherical geometry. Little input is required and output consists of tables and curves of actinide compound concentration in moderator versus critical mass and critical radius. More details on the computational model are presented in Appendix 1.

Most of the neutron cross sections used by the computational model were taken from a 218-neutron-group cross-section library⁷ developed for use in criticality calculations from ENDF/B-IV⁸ cross section data. The cross sections for ^{242}mAm , ^{242}Cm , ^{244}Cm , ^{245}Cm , and ^{246}Cm were processed from a preliminary ENDF/B-V library because cross section data for these nuclides were not in ENDF/B-IV. The 218-group cross sections were collapsed to six-group sets using weighting spectra for water and brine mixtures.

Critical masses calculated with the computational model using the six-group ENDF/B based cross sections were checked against experimental values and against more detailed calculated values. Critical radius and critical mass curves for several of the test cases are given in Figs. 1-12. These test cases are: ^{235}U , ^{239}Pu , ^{239}Pu (0.90) + ^{240}Pu (0.10), ^{239}Pu (0.80) + ^{240}Pu (0.20) in water, and ^{239}Pu and PuO_2 [^{238}Pu (0.0195) + ^{239}Pu (0.4979) + ^{240}Pu (0.2138) + ^{241}Pu (0.1086) + ^{242}Pu (0.0420) + 0 (0.118)] in brine. The calculated critical masses in these test cases were from 30% less to 10% greater than experimental values or more detailed calculated values.

Fig. 1. Calculated critical mass plot of ^{235}U in water.

Fig. 2. Calculated critical radius plot of ^{235}U in water.

Fig. 3. Calculated critical mass plot of ^{239}Pu in water.

Fig. 4. Calculated critical radius plot of ^{239}Pu in water.

Fig. 5. Calculated critical mass plot of ^{240}Pu + ^{239}Pu in water.

Fig. 6. Calculated critical radius plot of ^{240}Pu + ^{239}Pu in water.

Fig. 7. Calculated critical mass plot of ^{240}Pu + ^{239}Pu in water.

Fig. 8. Calculated critical radius plot of ^{240}Pu + ^{239}Pu in water.

Fig. 9. Calculated critical mass plot of ^{239}Pu in brine.

Fig. 10. Calculated critical radius plot of ^{239}Pu in brine.

Fig. 11. Calculated critical mass plot of PuO_2 in brine.

Fig. 12. Calculated critical radius plot of PuO_2 in brine.

The primary accuracy limitation of the critical mass calculational model is the lack of detail in the six-group cross-section structure. The six-group energy boundaries are given in Table 9. To obtain better accuracy a finer group structure is necessary but computational time increases rapidly with number of groups.

Table 9. Six-group neutron energy group structure

Group number	Upper energy (ev)	Lower energy (ev)
1	2.00×10^7	1.85×10^6
2	1.85×10^6	1.00×10^5
3	1.00×10^5	5.5×10^2
4	5.5×10^2	3.05
5	3.05	1.25×10^{-1}
6	1.25×10^{-1}	1.00×10^{-5}

Critical masses calculated with these ENDF/B-IV and ENDF/B-V cross sections may differ from critical masses calculated using other cross section sets or previous ENDF/B cross section libraries. This is due to basic differences in the cross section data. Several metal-water mixture calculations were made to compare with critical mass calculational results given in Ref. 9. The results of the calculations are given in Table 10. Critical mass plots for several of the calculations are given in Figs. 13-19. Generally, the agreement between minimum critical masses is within 10% except for ^{244}Cm , ^{241}Am , ^{237}Np , and ^{240}Pu . For these nuclides, the calculated minimum critical masses differ by a factor of 1.5, 1.6, 2.2, and 7.0, respectively. These results indicate basic differences between the cross section sets used. In all cases, the minimum critical masses calculated with the six-group computational model were less than those of Ref. 9.

CALCULATIONAL RESULTS

Over 400 different cases were calculated in the survey study. Each actinide compound of a specific isotopic composition mixed with a

Table 10. Metal-water critical mass calculational results and comparison with values given in reference 9

Actinide metal	Density of actinide compound in the moderator for minimum critical mass (g/cm ³)		Minimum critical mass (kg)	
	Calculated value	Reference value	Calculated value	Reference value
²³⁵ U	0.0604	0.045	0.799	0.820
²³⁷ Np	20.45	20.45	29.1	64.9
²³⁸ Pu	19.74	19.6	5.79	5.6
²³⁹ Pu	0.0290	0.032	0.509	0.530
²⁴⁰ Pu	19.74	19.6	21.3	148.4
²⁴¹ Pu	0.0290	0.032	0.278	0.260
²⁴¹ Am	11.7	11.7	66.2	105.3
^{242m} Am	0.00370	0.005	0.0201	0.023
²⁴³ Cm	0.0627	0.040	0.225	0.213
²⁴⁴ Cm	13.5	13.5	14.9	22.0
²³⁹ Pu (80%) + ²⁴⁰ Pu (20%)	0.0425	~0.035	1.18	~1.15
²³⁹ Pu (90%) + ²⁴⁰ Pu (10%)	0.0425	~0.035	0.750	~0.78
²⁴⁵ Cm	0.0135	0.015	0.0409	0.042

Note: Reflector and moderator materials were both water. Thickness of the reflector was 20 cm.

Fig. 13. Calculated critical mass plot of ²³⁷Np in water.

Fig. 14. Calculated critical mass plot of ^{238}Pu in water.

Fig. 15. Calculated critical mass plot of ^{240}Pu in water.

Fig. 16. Calculated critical mass plot of ^{241}Pu in water.

Fig. 17. Calculated critical mass plot of ^{242m}Am in water.

Fig. 18. Calculated critical mass plot of ^{243}Cm in water.

Fig. 19. Calculated critical mass plot of ^{244}Cm in water.

particular moderator material represented a different case. Output from each case was in the form of tables and plots of critical mass and critical radius versus actinide compound density in the mixture. The minimum critical mass for each case was estimated. For each case from 1 to 15 critical radii search calculations were performed.

Cases were run for waste ages of 10, 100, 1000, and 10,000 years for all actinides. As the ^{235}U isotopic percentage continues to increase and the total mass of uranium continues to increase beyond 10,000 years due to decay of the heavier elements to uranium, uranium was looked at also for an age of 100,000 years. Actinide compounds considered were oxides of uranium, neptunium, plutonium, americium, curium, and a mixture of these five. As only one neptunium isotope, ^{237}Np , is present in abundance, only four neptunium oxide calculations were required; one for each moderator material. (The neptunium isotopic composition does not change with waste type or waste age.) The reflector material was chosen to be identical to the moderator material and four materials were considered: water, brine, granite, and salt. Combinations of these variables result in $4 \times 5 \times 4 \times 5 = 400$ cases.

There is a minimum critical mass for each actinide oxide in each geologic material for each waste type of each waste age. The minimum critical masses are given in Tables 11-14 for each geologic material. The concentrations of actinide oxides in the water and brine mixtures at which the minimum critical masses occur are given in Tables 15 and 16. For salt and granite moderator materials, the minimum critical masses occur at the maximum theoretical densities of the oxides. In other words, for granite or salt moderated and reflected cases, the minimum critical mass occurs for a sphere of high-density pure actinide oxide surrounded by a reflector of granite or salt. The maximum theoretical densities of the actinide oxides are given in Table 17.

In Tables 18-21, the maximum number of critical masses per waste container for each of the four moderator materials are presented for each waste type and waste age. These tabulated values were obtained by dividing the masses of actinide oxide per waste container given in Table 7 by the minimum critical masses given in Tables 11-14.

Table 11. Calculated minimum critical masses of actinide oxides moderated and reflected by water

Actinide	Age (years)	Minimum critical mass of oxide (kg)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N ^a	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	523.3	N
	10,000	N	N	307.2	9.02	N
	100,000	N	N	67.5	2.62	17.9
Neptunium	Any age	90.7	90.7	90.7	90.7	90.7
Plutonium	10	1.84	4.13	28.4	1.88	24.5
	100	2.37	21.3	41.5	2.39	36.7
	1,000	2.12	11.3	32.0	2.08	29.5
	10,000	1.27	1.12	1.11	1.20	1.61
Americium	10	69.0	85.5	84.4	68.5	84.7
	100	65.9	88.4	91.7	65.6	91.2
	1,000	74.4	119.9	132.5	73.5	130.8
	10,000	150.3	150.3	245.5	150.3	149.8
Curium	10	6.84	6.83	0.325	7.09	0.347
	100	0.160	0.160	0.0588	0.163	0.0593
	1,000	0.0515	0.0515	0.0512	0.0513	0.0512
	10,000	0.0495	0.0495	0.0493	0.0495	0.0492
Mixture of five actinides	10	N	3931.2	267.6	5.41	784.6
	100	N	4256.1	340.8	16.2	950.7
	1,000	N	4242.7	361.2	8.52	990.3
	10,000	N	3390.5	237.4	4.56	680.8

^aN means that criticality cannot be achieved for a one-meter radius spherical mass of maximum density material.

Table 12. Calculated minimum critical masses of actinide oxides moderated and reflected by brine

Actinide	Age (years)	Minimum critical mass of oxide (kg)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N ^a	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	10323.0	N
	10,000	N	N	N	180.1	N
	100,000	N	N	112.5	34.4	403.1
Neptunium	Any age	89.8	89.8	89.8	89.8	89.8
Plutonium	10	16.4	20.0	31.6	16.6	27.9
	100	19.3	24.9	43.6	19.1	39.6
	1,000	19.1	23.1	35.6	18.9	33.1
	10,000	12.3	10.8	17.4	12.0	15.9
Americium	10	71.7	89.7	92.0	71.2	91.7
	100	68.3	92.7	98.9	68.0	98.0
	1,000	77.2	125.7	139.4	76.3	137.3
	10,000	158.2	158.1	256.1	158.1	157.6
Curium	10	15.0	15.0	3.35	15.0	3.56
	100	1.58	1.50	0.551	1.61	0.556
	1,000	0.471	0.471	0.461	0.469	0.467
	10,000	0.451	0.451	0.451	0.450	0.450
Mixture of five actinides	10	N	4760.3	304.8	43.3	901.1
	100	N	5181.1	381.9	50.9	1084.0
	1,000	N	5232.9	407.7	53.6	1139.6
	10,000	N	4216.9	286.7	70.5	818.6

^aN means that criticality cannot be achieved for a one-meter radius spherical mass of maximum density material.

Table 13. Calculated minimum critical masses of actinide oxides moderated and reflected by granite

Actinide	Age (years)	Minimum critical mass of oxide (kg)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N ^a	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	5353.4	N
	10,000	N	N	23609.0	344.5	N
	100,000	N	N	281.1	111.1	787.9
Neptunium	Any age	45.0	45.0	45.0	45.0	45.0
Plutonium	10	12.2	13.0	18.6	12.1	17.0
	100	12.5	15.4	23.4	12.4	21.8
	1,000	12.4	14.5	20.3	12.3	19.3
	10,000	11.6	11.1	14.5	11.5	11.8
Americium	10	36.1	44.6	46.6	35.0	46.3
	100	34.5	45.9	49.7	34.3	49.1
	1,000	38.7	61.8	68.8	38.2	67.9
	10,000	78.9	79.0	90.2	78.9	78.6
Curium	10	10.3	10.3	7.81	10.3	7.91
	100	6.19	6.19	3.55	6.22	3.58
	1,000	3.17	3.17	3.15	3.16	3.15
	10,000	3.03	3.03	3.61	3.03	3.02
Mixture of five actinides	10	N	2444.4	151.9	26.2	457.4
	100	N	2648.4	185.6	29.4	549.9
	1,000	N	2669.9	197.4	31.4	580.1
	10,000	N	2204.4	151.4	41.2	432.4

^aN means that criticality cannot be achieved for a one-meter radius spherical mass of maximum density material.

Table 14. Calculated minimum critical masses of actinide oxides moderated and reflected by salt

Actinide	Age (years)	Minimum critical mass of oxide (kg)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N ^a	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	9145.0	N
	10,000	N	N	N	649.2	N
	100,000	N	N	657.2	192.8	2225.7
Neptunium	Any age	73.9	73.9	73.9	73.9	73.9
Plutonium	10	21.1	22.6	32.1	20.9	29.4
	100	21.7	26.7	40.4	21.5	37.7
	1,000	21.5	25.3	35.2	21.3	33.4
	10,000	20.1	19.1	29.4	19.9	20.5
Americium	10	60.9	76.1	80.0	60.4	79.4
	100	57.9	78.3	85.1	57.7	84.1
	1,000	65.0	105.0	116.8	64.2	115.2
	10,000	133.1	133.1	172.3	133.1	132.6
Curium	10	17.0	17.0	13.1	17.0	13.2
	100	10.2	10.2	5.60	10.3	5.64
	1,000	4.95	4.95	4.90	4.92	4.91
	10,000	4.72	4.72	4.70	4.71	4.70
Mixture of five actinides	10	N	4066.2	264.3	45.9	769.1
	100	N	4427.8	326.1	51.3	919.8
	1,000	N	4481.1	348.8	55.1	970.4
	10,000	N	3657.4	264.4	72.9	730.0

^aN means that criticality cannot be achieved for a one-meter radius spherical mass of maximum density material.

Table 15. Concentrations of actinide oxides in water for minimum critical mass

Actinide	Age (years)	Density in water at which minimum critical mass occurs (g/cm ³)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	1.61	N
	10,000	N	N	2.36	0.347	N
	100,000	N	N	0.347	0.161	0.747
Neptunium	Any age	11.11	11.11	11.11	11.11	11.11
Plutonium	10	0.053	0.053	11.46	0.053	11.46
	100	0.053	11.46	11.46	0.053	11.46
	1,000	0.053	0.115	11.46	0.053	11.46
	10,000	0.053	0.053	0.053	0.053	0.053
Americium	Any age	11.68	11.68	11.68	11.68	11.68
Curium	10	0.813	0.813	0.081	0.813	0.081
	100	0.038	0.038	0.018	0.038	0.018
	1,000	0.018	0.018	0.018	0.018	0.018
	10,000	0.012	0.012	0.012	0.012	0.012
Mixture of five actinides	10	N	11.5	11.5	0.078	11.5
	100	N	11.5	11.5	0.078	11.5
	1,000	N	11.5	11.5	0.078	11.5
	10,000	N	11.5	11.5	0.115	11.5

Table 16. Concentrations of actinide oxides in brine for minimum critical mass

Actinide	Age (years)	Density in brine at which minimum critical mass occurs (g/cm ³)				
		Nuclear waste type				
		1	2	3	4	5
Uranium	10	N	N	N	N	N
	100	N	N	N	N	N
	1,000	N	N	N	10.96	N
	10,000	N	N	N	1.61	N
	100,000	N	N	1.61	0.747	3.47
Neptunium	Any age	11.11	11.11	11.11	11.11	11.11
Plutonium	10	0.362	11.46	11.46	0.362	11.46
	100	11.46	11.46	11.46	11.46	11.46
	1,000	11.46	11.46	11.46	11.46	11.46
	10,000	0.247	0.247	0.362	0.247	0.247
Americium	Any age	11.68	11.68	11.68	11.68	11.68
Curium	10	11.93	11.93	0.377	11.93	0.377
	100	0.175	0.175	0.081	0.175	0.081
	1,000	0.081	0.081	0.081	0.081	0.081
	10,000	0.081	0.081	0.081	0.081	0.081
Mixture of five actinides	10	N	11.5	11.5	11.5	11.5
	100	N	11.5	11.5	11.5	11.5
	1,000	N	11.5	11.5	11.5	11.5
	10,000	N	11.5	11.5	11.5	11.5

Table 17. Maximum densities of actinide oxides

Actinide oxide	Maximum theoretical density (g/cm ³)
Uranium oxide	10.96 ^a
Neptunium oxide	11.11 ^a
Plutonium oxide	11.46 ^a
Americium oxide	11.68 ^a
Curium oxide	11.93 ^b
Mixture of five actinide oxides	11.5 ^c

^aFrom *CRC Handbook of Chemistry and Physics*, 58th edition.

^bEstimated based on extrapolation of densities of uranium oxide, neptunium oxide, plutonium oxide, and americium oxide.

^cApproximate average density.

Table 18. Maximum number of critical masses per waste container for water moderator and reflector

Nuclear waste type	Age (years)	Maximum number of critical masses per container for each actinide oxide					
		Uranium	Neptunium	Plutonium	Americium	Curium	Mixture of five actinides
1	10	0	0.0027	2.55	0.0046	0.0013	0
1	100	0	0.0035	1.79	0.0097	0.0027	0
1	1,000	0	0.0085	1.90	0.0025	0.0026	0
1	10,000	0	0.0100	2.20	0.0001	0.0012	0
1	100,000	0					
2	10	0	0.0121	0.0306	0.0054	0.0059	0.0033
2	100	0	0.0126	0.0072	0.0049	0.0121	0.0031
2	1,000	0	0.0143	0.0141	0.0021	0.0117	0.0031
2	10,000	0	0.0149	0.1690	0.0006	0.0053	0.0039
2	100,000	0					
3	10	0	0.0046	0.0301	0.0619	4.13	0.0707
3	100	0	0.0072	0.0451	0.0540	4.55	0.0554
3	1,000	0	0.0203	0.0618	0.0260	4.17	0.0522
3	10,000	0	0.0252	1.393	0.0056	1.96	0.0791
3	100,000	0.236					
4	10	0	0.0254	11.64	0.0201	0.0048	6.84
4	100	0	0.0291	8.25	0.0428	0.0100	2.28
4	1,000	0.0247	0.0509	8.93	0.0109	0.0971	4.33
4	10,000	2.07	0.0578	10.72	0.0005	0.0045	8.07
4	100,000	11.30					
5	10	0	0.0097	0.0151	0.0242	1.37	0.0192
5	100	0	0.0108	0.0198	0.0213	1.52	0.0158
5	1,000	0	0.0163	0.0260	0.0100	1.40	0.0151
5	10,000	0	0.0183	0.5891	0.0034	0.657	0.0220
5	100,000	0.731					

Table 19. Maximum number of critical masses per waste container for brine moderator and reflector

Nuclear waste type	Age (years)	Maximum number of critical masses per container for each actinide oxide					Mixture of five actinides
		Uranium	Neptunium	Plutonium	Americium	Curium	
1	10	0	0.0027	0.286	0.0044	0.0006	0
1	100	0	0.0036	0.220	0.0093	0.0003	0
1	1,000	0	0.0086	0.211	0.0024	0.0003	0
1	10,000	0	0.0101	0.227	0.0001	0.0001	0
1	100,000	0					
2	10	0	0.0122	0.0063	0.0051	0.0027	0.0027
2	100	0	0.0127	0.0062	0.0047	0.0012	0.0025
2	1,000	0	0.0145	0.0069	0.0020	0.0013	0.0025
2	10,000	0	0.0150	0.0175	0.0005	0.0006	0.0031
2	100,000	0					
3	10	0	0.0047	0.0270	0.0568	0.401	0.0620
3	100	0	0.0073	0.0429	0.0501	0.485	0.0494
3	1,000	0	0.0205	0.0515	0.0247	0.464	0.0462
3	10,000	0	0.0255	0.1417	0.0053	0.214	0.0655
3	100,000	0.141					
4	10	0	0.0256	1.32	0.0194	0.0023	0.855
4	100	0	0.0294	1.03	0.0413	0.0010	0.727
4	1,000	0.0013	0.0514	0.983	0.0105	0.0011	0.689
4	10,000	0.104	0.0584	1.07	0.0005	0.0005	0.522
4	100,000	0.861					
5	10	0	0.0098	0.0132	0.0223	0.1332	0.0167
5	100	0	0.0109	0.0183	0.0198	0.1626	0.0138
5	1,000	0	0.0165	0.0231	0.0096	0.1523	0.0132
5	10,000	0	0.0185	0.0596	0.0033	0.0718	0.0183
5	100,000	0.032					

Table 20. Maximum number of critical masses per waste container for granite moderator and reflector

Nuclear waste type	Age (years)	Maximum number of critical masses per container for each actinide oxide					Mixture of Five Actinides
		Uranium	Neptunium	Plutonium	Americium	Curium	
1	10	0	0.0054	0.384	0.0087	0.0009	0
1	100	0	0.0071	0.339	0.0185	0.0001	0
1	1,000	0	0.0171	0.325	0.0047	0.00004	0
1	10,000	0	0.0201	0.241	0.0002	0.00002	0
1	100,000	0					
2	10	0	0.0244	0.0098	0.0103	0.0039	0.0054
2	100	0	0.0253	0.0100	0.0094	0.0003	0.0049
2	1,000	0	0.0289	0.0110	0.0040	0.0002	0.0049
2	10,000	0	0.0300	0.0170	0.0011	0.0001	0.0059
2	100,000	0					
3	10	0	0.0093	0.0459	0.112	0.1716	0.1245
3	100	0	0.0146	0.0799	0.0996	0.0752	0.1017
3	1,000	0	0.0409	0.0975	0.0501	0.0679	0.0954
3	10,000	0.0005	0.0509	0.170	0.0152	0.0318	0.1240
3	100,000	0.0566					
4	10	0	0.0511	1.81	0.0385	0.0033	1.41
4	100	0	0.0587	1.59	0.0819	0.0003	1.26
4	1,000	0.0024	0.103	1.51	0.0209	0.0002	1.18
4	10,000	0.0541	0.116	1.12	0.0010	0.0001	0.893
4	100,000	0.267					
5	10	0	0.0195	0.0217	0.0443	0.0599	0.0329
5	100	0	0.0217	0.0333	0.0395	0.0253	0.0273
5	1,000	0	0.0329	0.0397	0.0193	0.0227	0.0259
5	10,000	0	0.0369	0.0803	0.0065	0.0107	0.0346
5	100,000	0.0166					

Table 21. Maximum number of critical masses per waste container for salt moderator and reflector

Nuclear waste type	Age (years)	Maximum number of critical masses per container for each actinide oxide					Mixture of five actinides
		Uranium	Neptunium	Plutonium	Americium	Curium	
1	10	0	0.0033	0.222	0.0052	0.0005	0
1	100	0	0.0043	0.195	0.0110	0.00004	0
1	1,000	0	0.0104	0.187	0.0028	0.00003	0
1	10,000	0	0.0122	0.139	0.0001	0.00001	0
1	100,000	0					
2	10	0	0.0149	0.0056	0.0060	0.0024	0.0032
2	100	0	0.0154	0.0058	0.0081	0.0002	0.0030
2	1,000	0	0.0176	0.0063	0.0023	0.0001	0.0029
2	10,000	0	0.0183	0.0099	0.0006	0.0001	0.0036
2	100,000	0					
3	10	0	0.0057	0.0266	0.0653	0.102	0.0715
3	100	0	0.0089	0.0463	0.0582	0.0477	0.0579
3	1,000	0	0.0249	0.0563	0.0295	0.0437	0.0540
3	10,000	0	0.0310	0.0840	0.0080	0.0205	0.0710
3	100,000	0.0242					
4	10	0	0.0311	1.05	0.0228	0.0020	0.807
4	100	0	0.0357	0.917	0.0487	0.0002	0.721
4	1,000	0.0014	0.0625	0.872	0.0124	0.0001	0.670
4	10,000	0.0287	0.0709	0.646	0.0006	0.00005	0.505
4	100,000	0.1536					
5	10	0	0.0119	0.0126	0.0258	0.0359	0.0195
5	100	0	0.0132	0.0193	0.0231	0.0160	0.0163
5	1,000	0	0.0200	0.0229	0.0114	0.0146	0.0155
5	10,000	0	0.0225	0.0462	0.0039	0.0069	0.0205
5	100,000	0.0059					

For nuclear waste type 3, plutonium-recycled high level waste, minimum critical masses were calculated for water-water, water-granite, granite-granite, brine-brine, brine-salt, and salt-salt moderator-reflector arrangements. The minimum critical masses for these calculations are given in Table 22. The reflector material has the greatest effect on the calculated critical masses for high concentrations of actinide compounds in moderator. For high concentrations of actinide compounds in moderator, granite or salt reflected spheres generally have lower critical masses than water or brine reflected spheres.

ESTIMATED ACCURACY OF THE CALCULATIONAL RESULTS

The primary limitation on the accuracy of the calculated critical radii and critical masses, neglecting inherent errors that may have existed in the ENDF/B cross section data, was use of six-group cross sections in the computations. Several test cases were run using cross section sets of 42 groups and 218 groups to check the accuracy of the six-group calculations.

In all test cases the minimum critical masses for water, brine, granite, and salt mixtures calculated with the fine-group cross-section sets were from 10% less to 30% greater than the values calculated using the six-group computational model. Based on these results, the minimum critical masses given in this paper are estimated to be not less than 30% smaller and not greater than 10% higher than critical masses obtained using more detailed calculations.

The tabulated critical masses given in Appendix 2 are estimated to be from 30% less to 10% greater than critical mass values obtained using fine-group calculations for water and brine mixtures at all concentrations of actinide compound in moderator. However, for granite and salt mixtures, as cross section sets were not specifically made for these materials, the calculated critical radii given in the appendix for dilute concentrations of actinide compound in moderator may be a factor of two less than those calculated using fine-group cross sections. For high concentrations of actinide compounds in granite or salt, the calculated critical masses are estimated to be from 30% less to 10% greater than those obtained by more detailed calculations.

Table 22. Calculated critical masses of nuclear waste type 3
for various moderator-reflector compositions

Actinide oxide	Waste age (years)	Minimum critical mass (kg)					
		Water/water	Water/granite	Granite/granite	Brine/brine	Brine/salt	Salt/salt
Uranium	10	N	N	N	N	N	N
	100	N	N	N	N	N	N
	1,000	N	N	N	N	N	N
	10,000	307.2	282.5	23609.0	N	N	N
Plutonium	10	28.4	18.6	18.6	31.6	32.1	32.1
	100	41.5	23.4	23.4	43.6	40.4	40.4
	1,000	32.0	20.3	20.3	35.6	35.2	35.2
	10,000	1.77	1.49	14.5	17.4	15.6	29.4
Americium	10	84.4	46.6	46.6	92.0	80.0	80.0
	100	91.7	49.7	49.7	98.9	85.1	85.1
	1,000	132.5	68.8	68.8	139.4	116.8	116.8
	10,000	245.5	90.2	90.2	256.1	172.3	172.3
Curium	10	0.325	0.456	7.81	3.35	3.61	13.1
	100	0.0588	0.0843	3.55	0.551	0.604	5.60
	1,000	0.0512	0.0724	3.15	0.461	0.510	4.90
	10,000	0.0493	0.0697	3.61	0.451	0.488	6.23
Mixture of five actinides	10	267.6	151.9	151.9	304.8	264.3	264.3
	100	340.8	185.6	185.6	381.9	326.1	326.1
	1,000	361.2	197.4	197.4	407.7	348.8	348.8
	10,000	237.4	151.4	151.4	286.7	264.4	264.4

DISCUSSION OF THE CALCULATIONAL RESULTS AND CONCLUSIONS

Several general observations on the calculational results are presented in this section.

1. Neptunium oxide and americium oxide have such large minimum critical masses (60-90 kg) that they probably do not present a potential criticality problem.
2. The only actinide, disregarding neptunium, in nuclear waste that can form more critical masses at 100,000 years than at 10,000 years is uranium.
3. The only waste type which does not have at least one critical mass per waste container at any waste age in any geologic material is waste type 2, high level waste from fresh uranium fuel.

The following conclusions are related to whether ground water has intruded into the waste repository or whether water already present in the repository has collected in some manner.

1. If water is not present in the repository, the only waste type which has at least one critical mass per waste container for any geologic material is high level waste plus 100% of the plutonium in discharged fuel, type 4 waste.
2. Even if water is present in a salt repository (in the form of brine), again there is only one waste type which has at least one critical mass per container, high level waste plus 100% of the plutonium.
3. If water is present in a granite or shale repository, several waste types have enough heavy-metal oxides to form at least one critical mass per waste container.

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Appendix 1

CRITICAL MASS COMPUTATIONAL MODEL

The function of the computational model was to calculate and prepare tables and plots of critical mass and critical radius versus actinide compound concentration in moderator material. Several unique approaches and methods were used in the computational model to reduce computer time and data manipulation.

The computational model performs progressive radial search calculations until a curve of critical mass versus actinide compound concentration in mixture is generated. The calculations start at the maximum theoretical density of actinide compound. A search for the critical radius is made. Then the concentration of actinide compound is reduced by a factor of $(0.1)^{1/3}$ and the remaining volume is replaced by the moderator material. The critical radius for the new composition is calculated. These steps continue until criticality is not achieved or the critical radius exceeds one meter. Then, the smallest critical mass is determined and about this point two more concentrations are selected and critical radii are calculated. The results are then output in the form of tables and plots. In all critical mass calculations the mixture of actinide compound and moderator material are surrounded by a reflector of 0.20 meters thickness.

The computational model had to be accurate from very high actinide compound concentrations to very low concentrations (~ 0.01 g/cm³). To satisfy this requirement, a discrete-ordinates neutron-transport method was selected to compute the multiplication factors for each spherical radius. The discrete-ordinates method selected uses a diamond-difference* scheme and treats four angles (S4) and second-order scattering (P2).

Critical radii searches for each concentration are made in the following manner. A starting radius to begin calculations is estimated. This starting radius is selected to be the critical radius of the previous concentration of actinide compound in moderator or 7.5 cm for the first

*George I. Bell and Samuel Glasstone, *Nuclear Reactor Theory*, VanNostrand Reinhold, New York, 1970.

concentration (maximum theoretical density). Multiplication factors are calculated for radii of 0.67 and 1.5 times the starting radius. These multiplication factors and radii are then used in the equation

$$1/k = a + b/R^2$$

to estimate a and b . In this equation, k is the multiplication factor and R is the spherical radius. This equation fairly accurately describes the curve of multiplication factor versus spherical radius. The third radius is calculated using this equation by setting $k = 1.0$. A multiplication factor for this third radius is next calculated and the parameters a and b are again calculated using the additional information from the third radius. A fourth radius and multiplication factor are then calculated. At this point the search is normally completed. However, if for some reason the multiplication factor differs from unity by more than 2%, the search calculations continue. Usually, the multiplication factor for the fourth radius is within 0.5% of unity. If during the search the radius exceeds one meter, the multiplication factor for a sphere of one meter radius is calculated. If this multiplication factor is less than unity, the search calculations are terminated.

The multiplication factors for each radius are calculated using the following procedure. The angular neutron flux calculations are allowed to proceed without interruption for 25 outer iterations. For each outer iteration, two inner iterations are made for groups 1-4 and four inner iterations are made for the two lower energy groups. After the 25 outer iterations are performed, if the current multiplication factor differs by less than 0.01% from the proceeding multiplication factor, convergence is assumed and the current multiplication factor is taken as the true multiplication factor. If convergence is not satisfied, single-mode extrapolation on the multiplication factor is performed if the requirements for extrapolation are satisfied. If extrapolation criteria are not satisfied, outer iterations continue until convergence, extrapolation, or the maximum number (65) of outer iterations is reached. In all test cases the maximum number of outer iterations was never reached. Extrapolation or convergence generally occurred between 25 and 35 outer iterations.

Single-mode extrapolation on the multiplication factor is carried out using the following procedure. Consider the equation:

$$k_n - k_{n-1} = c(k_t - k_n)$$

where

k_n = multiplication factor for nth outer iterations,

k_t = the multiplication factor at the infinite outer iteration,

and

c = a constant.

This equation assumes that the difference between successive multiplication factors decreases as the calculated multiplication factor approaches the true multiplication factor. From this equation the true multiplication factor can be estimated:

$$k_e = k_t = k_n + \mu(k_n - k_{n-1})/(1 - \mu)$$

where

k_e = extrapolated multiplication factor,

and

$$\mu = (k_n - k_{n-1})/(k_{n-1} - k_{n-2}) = 1/(1 + c) .$$

The value of μ must be constant, less than unity, and greater than zero. Extrapolation is allowed (after a minimum of 25 outer iterations) if μ is less than 0.99 but greater than zero and successive μ 's differ by less than 2%.

The cross section handling by the computational model is straightforward. Cross section resonances were treated for various metal-to-hydrogen ratios for each actinide and tables of absorption and fission cross sections were prepared. For each concentration of actinide compound in moderator, the tabulated cross sections are interpolated depending on the ratio of actinide to hydrogen concentration. Therefore, a unique cross section set is used for each concentration of actinide compound in the moderator.

Input other than cross section information which is the same for every case consists of the following seven cards:

CARD 1 Title card of all calculations Format(20A4)

CARD 2 NCALC,NPLOT,NRADP Format(24I3)

NCALC = Number of calculations

NPLOT = 0 No plots requested

1 Plots requested

NRADP = 1 Plot both critical radius and critical mass

2 Plot critical mass but not critical radius

The following cards are input NCALC times in the order shown for each of the NCALC calculations.

CARD 3 Title card of current calculation Format(8A4)

CARD 4 Number of nuclides in the reflector, density of the reflector in grams per cubic centimeter, number of nuclides in the moderator, density of the moderator, number of nuclides in the actinide compounds, maximum density of the actinide compounds Format(6(I3,E9.3))

CARD 5 Cross section identifier for first nuclide in the reflector, mass fraction of first nuclide in the reflector, cross section identifier for second nuclide in the reflector, . . . continue until all nuclides in the reflector are described Format (6(I3,E9.3))

CARD 6 Same as Card 5 but for the moderator

CARD 7 Same as Card 5 but for the actinide compounds

Output for each calculation consists of several tables and plots if requested. The first table summarizes input information, such as moderator, and actinide compound compositions. The next table gives concentrations of actinide compound in the moderator, critical radii at these concentrations, critical masses, and calculated multiplication factors. The table continues until the actinide compound concentration is so low that criticality cannot be achieved for a radius of one meter. If plots are requested, critical radius and critical mass are plotted against actinide compound concentration in the moderator.

Running time and storage requirements on the IBM 360-91 computer are low. To do a calculation of 15 critical radii searches and plotting these points requires approximately two minutes computer time and less than 270,000 bytes of computer memory.

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Appendix 2

PLOTS AND TABLES OF CALCULATED CRITICAL MASSES

Many plots and tables of critical mass versus concentration of actinide oxide in moderator were generated. In this appendix, the calculated critical masses are tabulated for nearly all the water, brine, granite, and salt mixtures studied. Critical mass plots are given for nearly all the water and brine mixtures studied. Each plot or table has a unique identification which is explained below.

Identification for each case is:

CASE HLW,PWR-WW,XXXXXX,Y,Y,Z-O

where

WW = SF = Type 1 waste (spent fuel)
 = UR = Type 2 waste (fresh uranium)
 = PU = Type 3 waste (recycled plutonium)
 = PP = Type 4 waste (plus plutonium)
 = UP = Type 5 waste (Mixture of Type 2 and Type 3 waste)

XXXXXX = waste age in years

Y,Y = W,W = water moderated and reflected
 = B,B = brine moderated and reflected
 = G,G = granite moderated and reflected
 = S,S = salt moderated and reflected

Z-O = U,N,P,A,C = oxide of uranium, neptunium, plutonium,
 americium, or curium, respectively
 = UNPAC-O = mixture of all five actinide oxides

CRITICALITY STUDY OF NUCLEAR WASTE

CASE HLW,PWF-SF,10.W.W,F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	C.68064F 01	0.15138E 02	0.99958F 00
0.53193F 01	C.92576E 01	0.17679E 02	0.99990F 00
0.24690F 01	0.11401E 02	0.15227F 02	0.10008E 01
0.11460F 01	C.13403F 02	0.11559F 02	0.10006F 01
0.53193F 00	C.14956F 02	0.74546E 01	0.10002F 01
0.24690F 00	C.15479F 02	0.41413F 01	0.10001F 01
0.11460F 00	C.17586E 02	0.26108E 01	0.10001F 01
C.76077F-01	0.18824E 02	0.21814F 01	0.99993F 00
0.53193F-01	0.20197E 02	0.18356F 01	0.99700F 00
0.36240F-01	0.26046F 02	0.26823E 01	0.99977F 00
0.24690F-01	C.37191E 02	0.54068F 01	0.99976F 00

MINIMUM CRITICAL MASS IS 0.15755E 01 KILOGRAMS

CASE HLW,PWF-SF,100.W.W,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	C.69295E 01	0.15574F 02	0.99961E 00
0.53193F 01	C.99876E 01	0.22200F 02	0.10001E 01
0.24690F 01	C.12539E 02	0.20391E 02	0.10009F 01
0.11460E 01	0.14634E 02	0.15046E 02	0.10004E 01
C.53193E 00	0.16196E 02	0.94666E 01	0.10001F 01
0.24690F 00	0.17065F 02	0.51398F 01	0.10000F 01
0.11460E 00	C.18923E 02	0.32530E 01	0.10001F 01
0.76077E-01	0.20414E 02	C.27823E 01	0.99985F 00
0.53193F-01	C.21979E 02	0.23658E 01	0.10005F 01
0.36240F-01	C.30033F 02	0.41126E 01	0.99998E 00
0.24690F-01	0.47419E 02	0.11028E 02	0.99765F 00

MINIMUM CRITICAL MASS IS 0.23655E 01 KILOGRAMS

CASE HLW,PWF-SF,1000.W.W,F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	C.69004E 01	0.15773F 02	0.99940F 00
0.53193F 01	C.99170E 01	0.21732F 02	0.99979F 00
0.24690F 01	C.12412E 02	0.19775E 02	0.10008F 01
0.11460F 01	C.14442F 02	0.14462F 02	0.10004F 01
C.53193E 00	0.15901E 02	0.89580E 01	0.10002F 01
0.24690F 00	0.16691E 02	C.48089F 01	0.10000F 01
0.11460F 00	C.18429F 02	0.30046E 01	0.10001F 01
0.76077F-01	C.19800E 02	0.25386F 01	0.99992E 00
0.53193E-01	0.21185E 02	0.21187F 01	0.99870F 00
0.36240E-01	C.28379E 02	0.34697F 01	0.99992F 00
0.24690E-01	0.43080E 02	0.82690E 01	0.99988F 00

MINIMUM CRITICAL MASS IS 0.21187E 01 KILOGRAMS

CASE HLW,PWF-SF,10000.W.W,F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	C.66999E 01	0.14438F 02	0.99995F 00
0.53193F 01	C.94773E 01	0.18948E 02	0.10003E 01
0.24690F 01	C.11651E 02	0.16359F 02	0.10008F 01
C.11460F 01	0.13267E 02	0.11211F 02	0.10004E 01
0.53193F 00	0.14169F 02	0.63383E 01	0.10001E 01
0.24690F 00	C.14994E 02	0.34172E 01	0.10000E 01
0.11460E 00	0.15876F 02	0.19208F 01	0.10001E 01
0.76077F-01	0.16748E 02	0.15363E 01	0.99995F 00
C.53193F-01	C.17846E 02	0.12664F 01	0.10055E 01
0.36240E-01	C.21611E 02	0.15323F 01	0.99989F 00
0.24690E-01	C.28100E 02	0.22950F 01	0.99984F 00

MINIMUM CRITICAL MASS IS 0.12664E 01 KILOGRAMS

CASE HLW,PWF-SF,10.W.W,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11690F 02	C.11216E 02	0.69028E 02	0.10000F 01

MINIMUM CRITICAL MASS IS 0.69028E 02 KILOGRAMS

CASE HLW.PWR-SF.100.W.W.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11042E 02	0.65667E 02	0.99998E 00

MINIMUM CRITICAL MASS IS 0.65667E 02 KILOGRAMS

CASE HLW.PWR-SF.1000.W.W.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11459E 02	0.74384E 02	0.99997E 00

MINIMUM CRITICAL MASS IS 0.74384E 02 KILOGRAMS

CASE HLW.PWR-SF.10000.W.W.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14538E 02	0.15032E 02	0.99169E 00

MINIMUM CRITICAL MASS IS 0.15032E 02 KILOGRAMS

CASE HLW.PWR-SF.10.W.W.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.58692E 01	0.10104E 02	0.10023E 01
0.55374E 01	0.89013E 01	0.16360E 02	0.99998E 00
0.25703E 01	0.10545E 02	0.12626E 02	0.10125E 01
0.11930E 01	0.11597E 02	0.77746E 01	0.10004E 01
0.81279E 00	0.12617E 02	0.68386E 01	0.99966E 00
0.55375E 00	0.14504E 02	0.70781E 01	0.10005E 01
0.37726E 00	0.18184E 02	0.95015E 01	0.10009E 01
0.25703E 00	0.26391E 02	0.19791E 02	0.99869E 00

MINIMUM CRITICAL MASS IS 0.95015E 01 KILOGRAMS

CASE HLW.PWR-SF.100.W.W.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46104E 01	0.48974E 01	0.10003E 01
0.55374E 01	0.64229E 01	0.41237E 01	0.10018E 01
0.25703E 01	0.61756E 01	0.24669E 01	0.10003E 01
0.11930E 01	0.54744E 01	0.13778E 01	0.99999E 00
0.81279E 00	0.67198E 01	0.71018E 00	0.10002E 01
0.25703E 00	0.71051E 01	0.38619E 00	0.10002E 01
0.11930E 00	0.77570E 01	0.23220E 00	0.10004E 01
0.81279E 01	0.81793E 01	0.18768E 00	0.99948E 00
0.55375E 01	0.89223E 01	0.16476E 00	0.10008E 01
0.37726E 01	0.10042E 02	0.16002E 00	0.10006E 01
0.25703E 01	0.11365E 02	0.17486E 00	0.99910E 00
0.11930E 01	0.21886E 02	0.52393E 00	0.99821E 00

MINIMUM CRITICAL MASS IS 0.16002E 00 KILOGRAMS

CASE HLW.PWR-SF.1000.W.W.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.77512E 01	0.25380E 01	0.10071E 01
0.55374E 01	0.45697E 01	0.22136E 01	0.10017E 01
0.25703E 01	0.60999E 01	0.14197E 01	0.10004E 01
0.11930E 01	0.54691E 01	0.83104E 00	0.10004E 01
0.81279E 00	0.65666E 01	0.46835E 00	0.10000E 01
0.25703E 00	0.62342E 01	0.26088E 00	0.10002E 01
0.11930E 00	0.66395E 01	0.14628E 00	0.10002E 01
0.81279E 01	0.71242E 01	0.83875E 00	0.99761E 00
0.25703E 01	0.81291E 01	0.57817E 00	0.10011E 01
0.17511E 01	0.88891E 01	0.51523E 00	0.99907E 00
0.11930E 01	0.10148E 02	0.52222E 00	0.10017E 01
0.81280E 02	0.12139E 02	0.60907E 00	0.10015E 01
0.55375E 02	0.15701E 02	0.65780E 00	0.10003E 01
0.25703E 02	0.27910E 02	0.20910E 01	0.98140E 00

MINIMUM CRITICAL MASS IS 0.98140E 00 KILOGRAMS

CASE HLW,PWR-SF,10000,W,W,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	C.77049E 01	0.25415E 01	0.10080E 01
0.55774E 01	0.45242E 01	0.21481E 01	0.10017E 01
0.24670E 01	0.50503E 01	0.13666E 01	0.10004E 01
0.11930E 01	C.54637E 01	0.21511E 00	0.99988E 00
C.55375E 00	C.58765E 01	0.46120E 00	0.10003E 01
C.25703E 00	C.62057E 01	0.25726E 00	0.10001E 01
0.11930E 00	C.66110E 01	0.14440E 00	0.10002E 01
C.55375E -01	C.70496E 01	0.81266E -01	0.10032E 01
0.25703E -01	0.80563E 01	0.56298E -01	0.10009E 01
0.17511E -01	C.87798E 01	0.49646E -01	0.99911E 00
0.11930E -01	C.97099E 01	0.49541E -01	0.10017E 01
C.81280E -02	C.11442E 02	0.56545E -01	0.10004E 01
0.55375E -02	C.15135E 02	0.80427E -01	0.99953E 00
0.25703E -02	0.41656E 02	0.77824E 00	0.10003E 01

MINIMUM CRITICAL MASS IS 0.49641E-01 KILOGRAMS

CASE HLW,PWR-UR,10,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.70403E 01	0.16752E 02	0.99985E 00
0.53193E 01	0.97891E 01	0.20902E 02	0.99975E 00
0.24690E 01	0.12393E 02	0.19687E 02	0.10009E 01
0.11460E 01	0.14859E 02	0.15750E 02	0.10006E 01
0.53193E 00	0.17255E 02	0.11448E 02	0.10002E 01
0.24690E 00	0.18854E 02	0.69322E 01	0.10000E 01
0.11460E 00	0.21479E 02	0.47574E 01	0.10000E 01
0.78077E -01	0.23798E 02	0.44079E 01	0.99991E 00
0.53193E -01	0.26462E 02	0.41291E 01	0.10012E 01
C.36240E -01	0.41662E 02	0.10978E 02	0.99994E 00
C.38942E -01	0.38411E 02	0.92449E 01	0.99995E 00

MINIMUM CRITICAL MASS IS 0.41291E 01 KILOGRAMS

CASE HLW,PWR-UR,100,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.76276E 01	0.21304E 02	0.10000E 01
0.53193E 01	0.11694E 02	0.35634E 02	0.10001E 01
C.24690E 01	0.16059E 02	0.42835E 02	0.99984E 00
0.11460E 01	0.20101E 02	0.38991E 02	0.10004E 01
0.53193E 00	0.26621E 02	0.42039E 02	0.99998E 00
0.24690E 00	0.33272E 02	0.38094E 02	0.10001E 01
0.11460E 00	0.43697E 02	0.40055E 02	0.99995E 00

MINIMUM CRITICAL MASS IS 0.21304E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.74116E 01	0.19545E 02	0.10004E 01
0.53193E 01	0.11071E 02	0.30237E 02	0.99997E 00
C.24690E 01	0.14636E 02	0.32423E 02	0.99967E 00
0.11460E 01	0.17637E 02	0.26336E 02	0.10004E 01
0.53193E 00	0.21577E 02	0.22384E 02	0.10002E 01
0.24690E 00	0.24484E 02	0.15180E 02	0.10001E 01
0.16821E 00	0.25864E 02	0.12191E 02	0.99994E 00
0.11460E 00	0.28671E 02	0.11314E 02	0.10000E 01
C.78077E -01	0.34889E 02	0.13890E 02	0.10002E 01
0.53193E -01	0.42656E 02	0.17294E 02	0.10057E 01

MINIMUM CRITICAL MASS IS 0.11314E 02 KILOGRAMS

CASE HLW,PWR-UR,10000,W,W,P-U			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.65833E 01	0.13697E 02	0.99935E 00
0.53193E 01	0.92879E 01	0.17853E 02	0.99994E 00
C.24690E 01	0.11418E 02	0.15398E 02	0.10008E 01
0.11460E 01	0.13020E 02	0.10597E 02	0.10004E 01
0.53193E 00	0.13922E 02	0.60122E 01	0.10001E 01
0.24690E 00	0.14614E 02	0.32281E 01	0.10000E 01
0.11460E 00	0.15529E 02	0.17977E 01	0.10000E 01
C.78077E -01	0.16328E 02	0.14236E 01	0.99991E 00
0.53193E -01	0.17138E 02	0.11217E 01	0.99917E 00
C.36240E -01	0.20699E 02	0.13463E 01	0.10005E 01
C.24690E -01	0.26172E 02	0.18542E 01	0.10001E 01

MINIMUM CRITICAL MASS IS 0.11217E 01 KILOGRAMS

CASE HLW,PWR-UR,10,W,W,A-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12043E 02	0.85460E 02	0.99967E 00
MINIMUM CRITICAL MASS IS 0.85460E 02 KILOGRAMS			

CASE HLW,PWR-UR,100,W,W,A-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12179E 02	0.88385E 02	0.99945E 00
MINIMUM CRITICAL MASS IS 0.88385E 02 KILOGRAMS			

CASE HLW,PWR-UR,1000,W,W,A-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13482E 02	0.11991E 03	0.99640E 00
MINIMUM CRITICAL MASS IS 0.11991E 03 KILOGRAMS			

CASE HLW,PWR-UR,10000,W,W,A-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14538E 02	0.15034E 03	0.99170E 00
MINIMUM CRITICAL MASS IS 0.15034E 03 KILOGRAMS			

CASE HLW,PWR-UR,10,W,W,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.58634E 01	0.10074E 02	0.10016E 01
0.55374E 01	0.89032E 01	0.16370E 02	0.10002E 01
0.25703E 01	0.10528E 02	0.12565E 02	0.10114E 01
0.11930E 01	0.11585E 02	0.77700E 01	0.10002E 01
0.81279E 00	0.12610E 02	0.68273E 01	0.99923E 00
0.55375E 00	0.14516E 02	0.70948E 01	0.10005E 01
0.37726E 00	0.18144E 02	0.94399E 01	0.99977E 00
0.25703E 00	0.26428E 02	0.19875E 02	0.10002E 01
MINIMUM CRITICAL MASS IS 0.68273E 01 KILOGRAMS			

CASE HLW,PWR-UR,100,W,W,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46104E 01	0.48974E 01	0.10003E 01
0.55374E 01	0.56217E 01	0.41211E 01	0.10013E 01
0.25703E 01	0.61345E 01	0.24856E 01	0.10001E 01
0.11930E 01	0.64289E 01	0.13279E 01	0.10000E 01
0.55375E 00	0.67392E 01	0.70998E 00	0.99950E 00
0.25703E 00	0.71060E 01	0.38634E 00	0.10003E 01
0.11930E 00	0.77567E 01	0.23323E 00	0.10004E 01
0.81279E-01	0.81979E 01	0.18759E 00	0.99941E 00
0.55375E-01	0.89240E 01	0.16485E 00	0.10012E 01
0.37727E-01	0.10047E 02	0.16027E 00	0.10009E 01
0.25703E-01	0.11856E 02	0.17945E 00	0.99929E 00
0.11930E-01	0.21887E 02	0.52402E 00	0.99887E 00
MINIMUM CRITICAL MASS IS 0.16027E 00 KILOGRAMS			

CASE HLW,PWR-UR,1000.W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.37512E 01	0.26380E 01	0.10068E 01
0.55374E 01	0.45698E 01	0.22137E 01	0.10015E 01
0.25703E 01	0.50896E 01	0.14195E 01	0.10006E 01
0.11930E 01	0.54984E 01	0.83074E 00	0.10002E 01
0.55375E 00	0.58672E 01	0.46851E 00	0.10002E 01
0.25703E 00	0.62352E 01	0.26099E 00	0.10005E 01
0.11930E 00	0.66392E 01	0.14625E 00	0.10001E 01
0.55375E-01	0.71248E 01	0.83898E-01	0.99705E 00
0.25703E-01	0.81265E 01	0.57784E-01	0.10009E 01
0.17511E-01	0.88879E 01	0.51501E-01	0.99894E 00
0.11930E-01	0.10152E 02	0.52296E-01	0.10020E 01
0.81280E-02	0.12155E 02	0.61142E-01	0.10019E 01
0.55375E-02	0.15713E 02	0.89999E-01	0.99955E 00
0.25703E-02	0.49745E 02	0.13254E 01	0.10026E 01

MINIMUM CRITICAL MASS IS 0.51501E-01 KILOGRAMS

CASE HLW,PWR-UR,10000.W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.37049E 01	0.25415E 01	0.10080E 01
0.55374E 01	0.45245E 01	0.21485E 01	0.10020E 01
0.25703E 01	0.50509E 01	0.13874E 01	0.10003E 01
0.11930E 01	0.54650E 01	0.81570E 00	0.10001E 01
0.55375E 00	0.58369E 01	0.46129E 00	0.10002E 01
0.25703E 00	0.62063E 01	0.25739E 00	0.10003E 01
0.11930E 00	0.66115E 01	0.14443E 00	0.10003E 01
0.55375E-01	0.70496E 01	0.81266E-01	0.10035E 01
0.25703E-01	0.80551E 01	0.56274E-01	0.10011E 01
0.17511E-01	0.87788E 01	0.49629E-01	0.99915E 00
0.11930E-01	0.99673E 01	0.49487E-01	0.10015E 01
0.81280E-02	0.11850E 02	0.56659E-01	0.10008E 01
0.55375E-02	0.15161E 02	0.80833E-01	0.10012E 01
0.25703E-02	0.41455E 02	0.76705E 00	0.99689E 00

MINIMUM CRITICAL MASS IS 0.49487E-01 KILOGRAMS

CASE HLW,PWR-UR,10.W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.43375E 02	0.39312E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.39312E 04 KILOGRAMS

CASE HLW,PWR-UR,100.W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.44538E 02	0.42561E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.42561E 04 KILOGRAMS

CASE HLW,PWR-UR,1000.W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.44492E 02	0.42427E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.42427E 04 KILOGRAMS

CASE HLW,PWR-UR,10000.W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.41287E 02	0.33905E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.33905E 04 KILOGRAMS

CASE HLW,PWR-PU,10000,W,W,U-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.1562E 02	0.24324E 02	0.38505E 03	0.59540E 00
0.52872E 01	0.45137E 02	0.14583E 04	0.10005E 01
0.34859E 01	0.36232E 02	0.69055E 03	0.10001E 01
0.23813E 01	0.31434E 02	0.37724E 03	0.10015E 01
0.16087E 01	0.42794E 02	0.52813E 03	0.10002E 01
0.1566E 01	0.65765E 02	0.13059E 04	0.59812E 00
MINIMUM CRITICAL MASS IS 0.30724E 03 KILOGRAMS			

CASE HLW,PWR-PU,100000,W,W,U-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.21886E 02	0.48131E 03	0.10001E 01
0.50872E 01	0.18642E 02	0.13807E 03	0.99960E 00
0.23613E 01	0.16010E 02	0.40588E 02	0.99967E 00
0.10960E 01	0.14716E 02	0.14832E 02	0.99984E 00
0.50872E 00	0.15442E 02	0.78473E 01	0.99986E 00
0.34859E 00	0.16688E 02	0.67479E 01	0.99978E 00
0.23613E 00	0.19303E 02	0.71140E 01	0.10003E 01
0.16087E 00	0.25016E 02	0.10550E 02	0.10002E 01
0.10960E 00	0.42621E 02	0.35546E 02	0.99608E 00
MINIMUM CRITICAL MASS IS 0.67479E 01 KILOGRAMS			

CASE HLW,PWR-PU,10,W,W,F-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.83952E 01	0.28405E 02	0.10003E 01
0.53193E 01	0.13510E 02	0.54944E 02	0.10002E 01
0.24690E 01	0.24089E 02	0.14456E 03	0.99945E 00
0.11460E 01	0.62472E 02	0.25013E 04	0.59774E 00
MINIMUM CRITICAL MASS IS 0.28405E 02 KILOGRAMS			

CASE HLW,PWR-PU,100,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.95233E 01	0.41463E 02	0.10015E 01
0.53193E 01	0.25216E 02	0.35725E 03	0.10002E 01
MINIMUM CRITICAL MASS IS 0.41463E 02 KILOGRAMS			

CASE HLW,PWR-PU,1000,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.87365E 01	0.32012E 02	0.10005E 01
0.53193E 01	0.15711E 02	0.86240E 02	0.99763E 00
0.24690E 01	0.32974E 02	0.17082E 03	0.99862E 00
MINIMUM CRITICAL MASS IS 0.32012E 02 KILOGRAMS			

CASE HLW,PWR-PU,10000,W,W,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.74732E 01	0.20036E 02	0.10002E 01
0.53193E 01	0.10243E 02	0.23949E 02	0.99986E 00
0.24690E 01	0.12392E 02	0.19679E 02	0.10008E 01
0.11460E 01	0.14212E 02	0.13780E 02	0.10005E 01
0.53193E 00	0.15408E 02	0.81504E 01	0.10001E 01
0.24690E 00	0.16053E 02	0.42785E 01	0.10003E 01
0.11460E 00	0.17536E 02	0.25892E 01	0.10000E 01
0.78077E 01	0.18693E 02	0.21365E 01	0.99594E 00
0.53193E 01	0.19948E 02	0.17648E 01	0.10051E 01
0.32240E 01	0.25560E 02	0.25351E 01	0.10000E 01
0.24690E 01	0.35950E 02	0.48053E 01	0.99572E 00
MINIMUM CRITICAL MASS IS 0.17688E 01 KILOGRAMS			

CASE HLW,PWR-PU,10,W,W,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11994E 02	0.84414E 02	0.99917E 00

MINIMUM CRITICAL MASS IS 0.84414E 02 KILOGRAMS

CASE HLW,PWR-PU,100,W,W,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12330E 02	0.91720E 02	0.99918E 00

MINIMUM CRITICAL MASS IS 0.91720E 02 KILOGRAMS

CASE HLW,PWR-PU,1000,W,W,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13938E 02	0.13247E 03	0.99475E 00

MINIMUM CRITICAL MASS IS 0.13247E 03 KILOGRAMS

CASE HLW,PWR-PU,10000,W,W,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.17120E 02	0.24552E 03	0.10004E 01

MINIMUM CRITICAL MASS IS 0.24552E 03 KILOGRAMS

CASE HLW,PWR-PU,10,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.50126E 01	0.62942E 01	0.99979E 00
0.55374E 01	0.62438E 01	0.55462E 01	0.10015E 01
0.25703E 01	0.67425E 01	0.33002E 01	0.10002E 01
0.11930E 01	0.69932E 01	0.17092E 01	0.10001E 01
0.55375E 00	0.72957E 01	0.90080E 00	0.99999E 00
0.25703E 00	0.79082E 01	0.53250E 00	0.10000E 01
0.11930E 00	0.88882E 01	0.35091E 00	0.10002E 01
0.81279E 01	0.98505E 01	0.32544E 00	0.99916E 00
0.55375E 01	0.11453E 02	0.34849E 00	0.99947E 00
0.37727E 01	0.14216E 02	0.45407E 00	0.10004E 01
0.25703E 01	0.19723E 02	0.82610E 00	0.10006E 01

MINIMUM CRITICAL MASS IS 0.32544E 00 KILOGRAMS

CASE HLW,PWR-PU,100,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.38806E 01	0.29204E 01	0.10049E 01
0.55374E 01	0.47437E 01	0.24761E 01	0.10018E 01
0.25703E 01	0.52754E 01	0.15807E 01	0.10008E 01
0.11930E 01	0.56758E 01	0.91378E 00	0.10001E 01
0.55375E 00	0.60167E 01	0.50525E 00	0.99955E 00
0.25703E 00	0.63658E 01	0.27774E 00	0.10002E 01
0.11930E 00	0.67652E 01	0.15474E 00	0.10001E 01
0.55375E 01	0.74178E 01	0.94579E 01	0.10001E 01
0.25703E 01	0.83900E 01	0.63589E 01	0.10003E 01
0.17511E 01	0.92890E 01	0.58793E 01	0.99882E 00
0.11930E 01	0.10747E 02	0.62034E 01	0.99916E 00
0.81280E 02	0.13207E 02	0.70437E 01	0.10009E 01
0.55375E 02	0.17839E 02	0.13168E 00	0.10003E 01

MINIMUM CRITICAL MASS IS 0.58793E 01 KILOGRAMS

CASE: HLW,PWR-PU,1000,W,W,C-0

MULTIPLICATION FACTOR

0.10063E	01
0.10009E	01
0.10010E	01
0.99986E	00
0.10001E	01
0.10003E	01
0.10002E	01
0.10034E	01
0.10012E	01
0.99910E	00
0.10024E	01
0.10012E	01
0.99576E	00
0.98073E	00

MINIMUM CRITICAL MASS IS 0.51193E-01 KILOGRAMS

CASE: HL 1, PW 2-RII.10000.W.W.C-11

MULTIPLICATION FACTOR

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0.10058E 01
0.10013E 01
0.10004E 01
0.99985E 00
0.99988E 00
0.10003E 01
0.10005E 01
0.10008E 01
0.10008E 01
0.99942E 00
0.10018E 01
0.10004E 01
0.10009E 01
0.10004E 01

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MINIMUM CRITICAL MASS IS 0.49314E-01 KILOGRAMS

CASE HLW,PWR-PU,10.W,W,UNPAC-D

MULTIPLICATION FACTOR

0.00054E 00

MINIMUM CRITICAL MASS IS 0.26758E 03 KILOGRAMS

CASE HLW, PWR-PU, 100, W, W, UNPAC-D

MULTIPLICATION FACTOR

0.10007E 01

MINIMUM CRITICAL MASS IS 0.340812 03 KILOGRAMS

CASE HLW,PWR-FU,1000,W,W,UNPAC-U

MULTIPLICATION FACTOR

0.10007E 01

MINIMUM CRITICAL MASS IS 0.36122E 03 KILOGRAMS

CASE HLW,PWR-PU,10000,W,W,UNPAC-D

MULTIPLICATION FACTOR

0.99938E CC

MINIMUM CRITICAL MASS IS 0.23736E 03 KILOGRAMS

CASE HLW,PWR-PP,1000,W,W,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.53449E 02	0.70105E 04	0.99990E 00
0.50872E 01	0.67083E 02	0.66074E 04	0.99996E 00
0.34659E 01	0.53307E 02	0.21993E 04	0.10000E 01
0.23613E 01	0.49529E 02	0.12053E 04	0.99995E 00
0.16037E 01	0.42662E 02	0.52327E 03	0.10014E 01
0.10960E 01	0.79185E 02	0.22796E 04	0.99962E 00

MINIMUM CRITICAL MASS IS 0.52327E 03 KILOGRAMS

CASE HLW,PWR-PP,10000,W,W,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.21792E 02	0.48767E 03	0.10001E 01
0.50872E 01	0.20736E 02	0.19002E 03	0.99992E 00
0.23613E 01	0.17458E 02	0.52626E 02	0.10006E 01
0.10960E 01	0.15918E 02	0.18517E 02	0.99985E 00
0.74670E 00	0.15950E 02	0.12692E 02	0.99995E 00
0.50872E 00	0.16412E 02	0.10127E 02	0.99979E 00
0.34659E 00	0.14385E 02	0.90214E 01	0.10003E 01
0.23613E 00	0.21749E 02	0.10175E 02	0.99985E 00
0.10960E 00	0.61736E 02	0.10803E 01	0.99921E 00

MINIMUM CRITICAL MASS IS 0.90214E 01 KILOGRAMS

CASE HLW,PWR-PP,100000,W,W,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.14417E 02	0.13759E 03	0.10014E 01
0.50872E 01	0.15513E 02	0.79552E 02	0.10003E 01
0.23613E 01	0.14343E 02	0.29188E 02	0.99978E 00
0.10960E 01	0.13469E 02	0.11218E 02	0.99986E 00
0.50872E 00	0.13350E 02	0.50707E 01	0.99998E 00
0.23613E 00	0.14414E 02	0.29623E 01	0.10001E 01
0.16087E 00	0.15734E 02	0.26246E 01	0.99984E 00
0.10960E 00	0.18275E 02	0.28021E 01	0.99999E 00
0.74671E-01	0.23722E 02	0.41755E 01	0.10003E 01
0.50873E-01	0.39866E 02	0.13502E 02	0.99634E 00

MINIMUM CRITICAL MASS IS 0.26246E 01 KILOGRAMS

CASE HLW,PWR-PP,10,W,W,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.67941E 01	0.15056E 02	0.99975E 00
0.52193E 01	0.92840E 01	0.17931E 02	0.99974E 00
0.24690E 01	0.11456E 02	0.15549E 02	0.10006E 01
0.11460E 01	0.13477E 02	0.11751E 02	0.10006E 01
0.52193E 00	0.15331E 02	0.75572E 01	0.10002E 01
0.24690E 00	0.15987E 02	0.42259E 01	0.10000E 01
0.11460E 00	0.17727E 02	0.26743E 01	0.10001E 01
0.78077E-01	0.18995E 02	0.22414E 01	0.10000E 01
0.52193E-01	0.20372E 02	0.18430E 01	0.77743E 00
0.26240E-01	0.25449E 02	0.28089E 01	0.75981E 00
0.24690E-01	0.38231E 02	0.57795E 01	0.99926E 00

MINIMUM CRITICAL MASS IS 0.18839E 01 KILOGRAMS

CASE HLW,PWR-PP,100,W,W,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.69064E 01	0.15815E 02	0.99979E 00
0.52193E 01	0.99692E 01	0.22071E 02	0.10002E 01
0.24690E 01	0.12518E 02	0.20287E 02	0.10003E 01
0.11460E 01	0.14611E 02	0.14973E 02	0.10004E 01
0.52193E 00	0.16158E 02	0.93997E 01	0.10001E 01
0.24690E 00	0.17326E 02	0.51044E 01	0.10000E 01
0.11460E 00	0.18993E 02	0.32374E 01	0.10001E 01
0.78077E-01	0.20376E 02	0.27670E 01	0.99996E 00
0.52193E-01	0.22044E 02	0.23449E 01	0.10005E 01
0.26240E-01	0.29905E 02	0.40599E 01	0.10001E 01
0.24690E-01	0.47105E 02	0.10813E 02	0.99752E 00

MINIMUM CRITICAL MASS IS 0.23869E 01 KILOGRAMS

CASE HLW,PWR-PP,1000,W,W,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.58435E 01	0.15054E 02	0.10001E 01
0.53193E 01	0.98771E 01	0.21471E 02	0.99953E 00
0.24690E 00	0.12142E 02	0.16443E 02	0.10010E 01
0.11460E 01	0.14349E 02	0.14180E 02	0.10004E 01
0.53193E 00	0.15769E 02	0.97375E 01	0.10001E 01
0.24690E 00	0.16534E 02	0.46750E 01	0.10000E 01
0.11460E 00	0.18229E 02	0.29078E 01	0.10001E 01
0.78077E-01	0.17552E 02	0.24444E 01	0.10162E 00
0.53193E-01	0.21048E 02	0.20779E 01	0.99951E 00
0.36240E-01	0.27731E 02	0.32373E 01	0.99951E 00
0.24690E-01	0.41340E 02	0.73069E 01	0.99934E 00

MINIMUM CRITICAL MASS IS 0.20779E 01 KILOGRAMS

CASE HLW,PWR-PP,10000,W,W,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.66779E 01	0.14296E 02	0.76976E 00
0.53193E 01	0.94404E 01	0.18747E 02	0.10002E 01
0.24690E 00	0.11507E 02	0.16174E 02	0.10005E 01
0.11460E 01	0.13210E 02	0.11065E 02	0.10014E 01
0.53193E 00	0.14103E 02	0.62501E 01	0.10001E 01
0.24690E 00	0.14921E 02	0.33672E 01	0.10001E 01
0.11460E 00	0.15790E 02	0.18362E 01	0.10000E 01
0.78077E-01	0.16634E 02	0.15053E 01	0.99956E 00
0.53193E-01	0.17523E 02	0.11989E 01	0.99923E 00
0.36240E-01	0.21366E 02	0.14909E 01	0.99957E 00
0.24690E-01	0.27528E 02	0.21911E 01	0.10003E 01

MINIMUM CRITICAL MASS IS 0.11989E 01 KILOGRAMS

CASE HLW,PWR-PP,10,W,W,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.11185E 02	0.58467E 02	0.10000E 01

MINIMUM CRITICAL MASS IS 0.68467E 02 KILOGRAMS

CASE HLW,PWR-PP,100,W,W,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.11027E 02	0.65601E 02	0.99996E 00

MINIMUM CRITICAL MASS IS 0.65601E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,W,W,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.11452E 02	0.73477E 02	0.99958E 00

MINIMUM CRITICAL MASS IS 0.73477E 02 KILOGRAMS

CASE HLW,PWR-PP,10000,W,W,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.14538E 02	0.15034E 03	0.99171E 00

MINIMUM CRITICAL MASS IS 0.15034E 03 KILOGRAMS

CASE HLW,FWR-PP,10,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	J.39561E 01	J.10389E 02	J.10006E C1
C.55374E 01	J.39353E 01	J.10348E 02	J.10000E 01
C.25703E 01	J.12574E 02	J.12735E 02	J.10598E C1
C.11930E 01	0.11697E 02	J.79995E 01	0.10003E 01
C.81279E 00	0.12767E 02	J.70961E 01	0.99940E 00
C.55375E 00	J.14745E 02	J.74369E 01	J.10003E C1
C.77726E 00	J.18597E 02	J.10149E 02	J.10007E C1
C.25703E 00	0.27451E 02	J.22273E 02	J.99944E 00

MINIMUM CRITICAL MASS IS 0.70861E 01 KILOGRAMS

CASE HLW,FWR-PP,100,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	J.46203E 01	J.49299E 01	0.10006E 01
C.55374E 01	0.56346E 01	J.41495E 01	0.10016E C1
C.25703E 01	0.61447E 01	0.24979E 01	0.99983E 00
C.11930E 01	0.64375E 01	0.13332E 01	J.10001E C1
C.55375E 00	0.67490E 01	J.71309E 00	J.99993E 00
C.25703E 00	0.71188E 01	0.38343E 00	0.10005E 01
C.11930E 00	0.77731E 01	0.23471E 00	J.10004E 01
C.81279E 01	J.82220E 01	J.18924E 00	0.99950E 00
C.55375E 01	J.89540E 01	J.16674E 00	J.10010E 01
C.77727E 01	0.10096E 02	J.16263E 00	0.10004E C1
C.25703E 01	0.11947E 02	J.18361E 00	0.99862E 00
C.11930E 01	0.22376E 02	J.55987E 00	0.99906E 00

MINIMUM CRITICAL MASS IS 0.16263E 00 KILOGRAMS

CASE HLW,FWR-PP,1000,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.47440E 01	J.26227E 01	J.10006E C1
C.55374E 01	0.45644E 01	J.22059E 01	J.10016E C1
C.25703E 01	0.50855E 01	J.14161E 01	0.10003E 01
C.11930E 01	0.54962E 01	J.82972E 00	0.10005E 01
C.55375E 00	J.58629E 01	J.46749E 00	J.10000E 01
C.25703E 00	J.62296E 01	0.26030E 00	0.99980E 00
C.11930E 00	0.56365E 01	0.14607E 00	J.10002E C1
C.55375E 01	0.71337E 01	J.44125E 01	J.10052E C1
C.25703E 01	0.51183E 01	J.57609E 01	0.10010E 01
C.17511E 01	0.38771E 01	J.51315E 01	J.79881E 00
C.11930E 01	0.10131E 02	J.51955E 01	J.10021E C1
C.81240E 02	0.12107E 02	J.60424E 01	J.10010E C1
C.55375E 02	0.15666E 02	J.89187E 01	J.10014E C1
C.25703E 02	0.56878E 02	J.19312E 01	0.99063E 00

MINIMUM CRITICAL MASS IS 0.51315E 01 KILOGRAMS

CASE HLW,FWR-PP,10000,W,W,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	J.36769E 01	J.25249E 01	0.10009E 01
C.55374E 01	0.46196E 01	J.21415E 01	0.10015E C1
C.25703E 01	0.50482E 01	J.13852E 01	0.10005E C1
C.11930E 01	0.54622E 01	J.81442E 00	J.10001E 01
C.55375E 00	0.53340E 01	J.46160E 00	J.99986E 00
C.25703E 00	0.62044E 01	J.25715E 00	J.10001E 01
C.11930E 00	0.66100E 01	J.14433E 00	J.10000E 01
C.55375E 01	J.72465E 01	J.81162E 01	J.10013E 01
C.25703E 01	J.80489E 01	0.56144E 01	J.10003E 01
C.17511E 01	J.37732E 01	J.44531E 01	J.99941E 00
C.11930E 01	0.93552E 01	J.44945E 01	0.10016E C1
C.81280E 02	J.11441E 02	J.56331E 01	0.10014E C1
C.55375E 02	0.15129E 02	J.80329E 01	J.10009E 01
C.25703E 02	0.41438E 02	J.76609E 00	0.10011E C1

MINIMUM CRITICAL MASS IS 0.49459E 01 KILOGRAMS

CASE HLW,FWR-PP,1000,W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.91750E 01	0.38369E 02	0.10316E 01
0.53378E 01	0.13780E 02	0.58515E 02	0.99954E 00
0.24776E 01	0.17246E 02	0.53241E 02	0.10000E 01
C.11500E 01	0.17383E 02	0.35084E 02	0.10001E 01
0.53379E 00	0.19768E 02	0.17801E 02	0.10000E 01
0.24776E 00	0.20307E 02	0.93486E 01	0.99959E 00
C.16880E 00	0.11700E 02	0.72256E 01	0.99957E 00
C.11500E 00	0.23219E 02	0.50302E 01	0.10000E 01
C.7835CE -C1	0.25445E 02	0.54071E 01	0.10004E 01
0.53379E -C1	0.35419E 02	0.10301E 02	0.99950E 00

MINIMUM CRITICAL MASS IS 0.54071E 01 KILOGRAMS

CASE HLW,FWR-PP,100,W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.96497E 01	0.43287E 02	0.99913E 00
0.53378E 01	0.17326E 02	0.12666E 03	0.99578E 00
0.24776E 01	0.25051E 02	0.16316E 03	0.99956E 00
C.11500E 01	0.28543E 02	0.11202E 03	0.10001E 01
0.53379E 00	0.27814E 02	0.48116E 02	0.10000E 01
0.24776E 00	0.28245E 02	0.23388E 02	0.10001E 01
0.16880E 00	0.29690E 02	0.18506E 02	0.10000E 01
C.11500E 00	0.32725E 02	0.16884E 02	0.10000E 01
C.7835CE -C1	0.36718E 02	0.16247E 02	0.10115E 01
0.53379E -C1	0.79116E 02	0.11073E 03	0.99708E 00

MINIMUM CRITICAL MASS IS 0.16247E 02 KILOGRAMS

CASE HLW,FWR-PP,1000,W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.97639E 01	0.44342E 02	0.99931E 00
0.53378E 01	0.17308E 02	0.11593E 03	0.99738E 00
0.24776E 01	0.22318E 02	0.11851E 03	0.99966E 00
C.11500E 01	0.23897E 02	0.85744E 02	0.10000E 01
0.53379E 00	0.22934E 02	0.26971E 02	0.99998E 00
0.24776E 00	0.23351E 02	0.13214E 02	0.10000E 01
0.16880E 00	0.24372E 02	0.10217E 02	0.99956E 00
C.11500E 00	0.26292E 02	0.47553E 01	0.10007E 01
C.7835CE -C1	0.29604E 02	0.45155E 01	0.99751E 00
0.53379E -C1	0.51469E 02	0.30497E 02	0.99904E 00

MINIMUM CRITICAL MASS IS 0.85155E 01 KILOGRAMS

CASE HLW,FWR-PP,10000,W,W,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.10664E 02	0.58413E 02	0.99974E 00
0.53378E 01	0.17663E 02	0.12745E 03	0.99903E 00
0.24776E 01	0.21058E 02	0.10544E 03	0.10003E 01
C.11500E 01	0.20853E 02	0.43680E 02	0.99956E 00
0.53379E 00	0.19696E 02	0.17086E 02	0.99956E 00
0.24776E 00	0.19374E 02	0.75474E 01	0.99997E 00
0.16880E 00	0.19993E 02	0.56505E 01	0.99957E 00
C.11500E 00	0.21155E 02	0.45607E 01	0.99945E 00
C.7835CE -C1	0.26531E 02	0.61290E 01	0.10001E 01
0.53379E -C1	0.37597E 02	0.11883E 02	0.99978E 00

MINIMUM CRITICAL MASS IS 0.45607E 01 KILOGRAMS

CASE HLW,PWR-UP,100000,W,W,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.32883E 02	0.16324E 04	0.99987E 00
0.50872E 01	0.21666E 02	0.21673E 03	0.10000E 01
0.23613E 01	0.17681E 02	0.54673E 02	0.10000E 01
0.10960E 01	0.16555E 02	0.20835E 02	0.99980E 00
0.74670E 00	0.17877E 02	0.17871E 02	0.99982E 00
0.50872E 00	0.20342E 02	0.17939E 02	0.10003E 01
0.34659E 00	0.25957E 02	0.25393E 02	0.99967E 00
0.23613E 00	0.43343E 02	0.80539E 02	0.99725E 00

MINIMUM CRITICAL MASS IS 0.17871E 02 KILOGRAMS

CASE HLW,PWR-UP,100000.W.W,U-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.32883E 02	0.16324E 04	0.99987E 00
0.50872E 01	0.21656E 02	0.21673E 03	0.10000E 01
0.23613E 01	0.17681E 02	0.54673E 02	0.10004E 01
0.10960E 01	0.16556E 02	0.20835E 02	0.99988E 00
0.74670E 00	0.17877E 02	0.17871E 02	0.99992E 00
0.50872E 00	0.20342E 02	0.17939E 02	0.10003E 01
0.34659E 00	0.25957E 02	0.25393E 02	0.99967E 00
0.23613E 00	0.43343E 02	0.80539E 02	0.99725E 00

MINIMUM CRITICAL MASS IS 0.17871E 02 KILOGRAMS

CASE HLW,PWR-UP,10.W.W,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.79491E 01	0.24479E 02	0.99983E 00
0.53193E 01	0.12104E 02	0.39516E 02	0.10000E 01
0.24690E 01	0.18113E 02	0.61456E 02	0.99959E 00
0.11460E 01	0.27236E 02	0.96991E 02	0.99959E 00
0.53193E 00	0.53214E 02	0.50286E 03	0.99903E 00

MINIMUM CRITICAL MASS IS 0.24479E 02 KILOGRAMS

CASE HLW,PWR-UP,100.W.W,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.71409E 01	0.36666E 02	0.10014E 01
0.53193E 01	0.19955E 02	0.15176E 03	0.99167E 00

MINIMUM CRITICAL MASS IS 0.36666E 02 KILOGRAMS

CASE HLW,PWR-UP,1000.W.W,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.35006E 01	0.29497E 02	0.10007E 01
0.53193E 01	0.14529E 02	0.68342E 02	0.99956E 00
0.24690E 01	0.35574E 02	0.17299E 03	0.99959E 00
0.11460E 01	0.65312E 02	0.13998E 04	0.99834E 00

MINIMUM CRITICAL MASS IS 0.29497E 02 KILOGRAMS

CASE HLW,PWR-UP,10000.W.W,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.67596E 01	0.14827E 02	0.99873E 00
0.53193E 01	0.96466E 01	0.20003E 02	0.99961E 00
0.24690E 01	0.11973E 02	0.17751E 02	0.10009E 01
0.11460E 01	0.13858E 02	0.12775E 02	0.10005E 01
0.53193E 00	0.15084E 02	0.76478E 01	0.10001E 01
0.24690E 00	0.15794E 02	0.40750E 01	0.10000E 01
0.11460E 00	0.17207E 02	0.24457E 01	0.10001E 01
0.78077E-01	0.18311E 02	0.20079E 01	0.10000E 01
0.53193E-01	0.19336E 02	0.16109E 01	0.10005E 01
0.36240E-01	0.24722E 02	0.22937E 01	0.10000E 01
0.24690E-01	0.34096E 02	0.40997E 01	0.99900E 00

MINIMUM CRITICAL MASS IS 0.16109E 01 KILOGRAMS

CASE HLW,PWR-UP,10.W.W,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12006E 02	0.84682E 02	0.99946E 00

MINIMUM CRITICAL MASS IS 0.84682E 02 KILOGRAMS

CASE HLW,PWR-UP,100,W,W,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12308E 02	0.91229E 02	0.99939E 00

MINIMUM CRITICAL MASS IS 0.91229E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,W,W,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13379E 02	0.13379E 03	0.99503E 00

MINIMUM CRITICAL MASS IS 0.13379E 03 KILOGRAMS

CASE HLW,PWR-UP,10000,W,W,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14521E 02	0.14982E 03	0.99120E 00

MINIMUM CRITICAL MASS IS 0.14982E 03 KILOGRAMS

CASE HLW,PWR-UP,10,W,W,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.50396E 01	0.63966E 01	0.10001E 01
0.55274E 01	0.62914E 01	0.37765E 01	0.10012E 01
0.25703E 01	0.57387E 01	0.33686E 01	0.99956E 00
0.11630E 01	0.70401E 01	0.17437E 01	0.10005E 01
0.55275E 00	0.73434E 01	0.91856E 00	0.10001E 01
0.25703E 00	0.70592E 01	0.54237E 00	0.10000E 01
0.17511E 00	0.83567E 01	0.42809E 00	0.99969E 00
0.11630E 00	0.90170E 01	0.30639E 00	0.10000E 01
0.55275E 01	0.10065E 02	0.34715E 00	0.10012E 01
0.25703E 01	0.11775E 02	0.37867E 00	0.99970E 00
0.17511E 01	0.20970E 02	0.99246E 00	0.99917E 00

MINIMUM CRITICAL MASS IS 0.34715E 00 KILOGRAMS

CASE HLW,PWR-UP,100,W,W,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11630E 02	0.34859E 01	0.29325E 01	0.10051E 01
0.55274E 01	0.47536E 01	0.24916E 01	0.10016E 01
0.25703E 01	0.52422E 01	0.15888E 01	0.10002E 01
0.11630E 01	0.56356E 01	0.91864E 00	0.10003E 01
0.55275E 00	0.60295E 01	0.52846E 00	0.10002E 01
0.25703E 00	0.53732E 01	0.27872E 00	0.10001E 01
0.11630E 00	0.57707E 01	0.15512E 00	0.10001E 01
0.55275E 01	0.76245E 01	0.74948E 00	0.10001E 01
0.25703E 01	0.84114E 01	0.64076E 00	0.10002E 01
0.17511E 01	0.93171E 01	0.59329E 00	0.99881E 00
0.11630E 01	0.10792E 02	0.52607E 00	0.99952E 00
0.55275E 02	0.13271E 02	0.79580E 00	0.99930E 00
0.25703E 02	0.17264E 02	0.13447E 02	0.99957E 00

MINIMUM CRITICAL MASS IS 0.50322E 01 KILOGRAMS

CASE HLW,PWR-UP,1000,W,W,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.37395E 01	0.26132E 01	0.10063E 01
0.55375E 01	0.45583E 01	0.21969E 01	0.10013E 01
C.25703E 01	0.50947E 01	0.14154E 01	0.10007E 01
0.11930E 01	0.54941E 01	0.82878E 00	0.10003E 01
0.55375E 00	0.58613E 01	0.46710E 00	0.10002E 01
0.25703E 00	0.62281E 01	0.26011E 00	0.99999E 00
0.11930E 00	0.66354E 01	0.14600E 00	0.10003E 01
C.55375E -01	0.71267E 01	0.83962E -01	0.10029E 01
0.25703E -01	0.41147E 01	0.57532E -01	0.10011E 01
0.17511E -01	0.89713E 01	0.51214E -01	0.99922E 00
C.11930E -01	0.10117E 02	0.51754E -01	0.10020E 01
0.81280E -02	0.12098E 02	0.60285E -01	0.10009E 01
0.55375E -02	0.15597E 02	0.88016E -01	0.10001E 01
0.25703E -02	0.56116E 02	0.19027E 01	0.99344E 00
MINIMUM CRITICAL MASS IS 0.51214E-01 KILOGRAMS			

CASE HLW,PWR-UP,10000,W,W,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.37306E 01	0.25325E 01	0.10075E 01
0.55375E 01	0.45190E 01	0.21392E 01	0.10017E 01
C.25703E 01	0.50471E 01	0.13842E 01	0.10004E 01
0.11930E 01	0.54608E 01	0.81341E 00	0.99995E 00
0.55375E 00	0.58339E 01	0.46336E 00	0.10002E 01
0.25703E 00	0.62342E 01	0.26712E 00	0.10002E 01
C.11930E 00	0.66392E 01	0.14428E 00	0.10004E 01
C.55375E -01	0.71254E 01	0.81447E -01	0.10017E 01
0.25703E -01	0.40486E 01	0.56137E -01	0.10011E 01
0.17511E -01	0.87709E 01	0.49495E -01	0.99943E 00
C.11930E -01	0.99495E 01	0.44223E -01	0.10017E 01
C.81280E -02	0.11336E 02	0.54461E -01	0.10024E 01
0.55375E -02	0.15103E 02	0.74515E -01	0.10002E 01
0.25703E -02	0.41126E 02	0.74891E 00	0.99967E 00
MINIMUM CRITICAL MASS IS 0.49223E-01 KILOGRAMS			

CASE HLW,PWR-UP,10,W,W,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.25349E 02	0.78461E 03	0.10001E 01
MINIMUM CRITICAL MASS IS 0.78461E 03 KILOGRAMS			

CASE HLW,PWR-UP,100,W,W,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.27024E 02	0.95073E 03	0.10003E 01
MINIMUM CRITICAL MASS IS 0.95073E 03 KILOGRAMS			

CASE HLW,PWR-UP,1000,W,W,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.27394E 02	0.99034E 03	0.10002E 01
MINIMUM CRITICAL MASS IS 0.99034E 03 KILOGRAMS			

CASE HLW,PWR-UP,10000,W,W,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.24177E 02	0.68076E 03	0.10001E 01
MINIMUM CRITICAL MASS IS 0.68076E 03 KILOGRAMS			

CASE HLW.PWR-SF.10.B.R.F-D

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.36240E 00
0.24690E 00
0.16421E 00
0.11460E 00

0.72557E 01
0.10325E 02
0.13096E 02
0.16094E 02
0.19735E 02
0.22090E 02
0.25480E 02
0.2770E 02
0.57956E 02

0.18337E 02
0.24529E 02
0.23232E 02
0.20013E 02
0.17126E 02
0.16363E 02
0.17108E 02
0.24796E 02
0.93455E 02

0.10000E 01
0.99991E 00
0.99968E 00
0.10003E 01
0.10002E 01
0.99993E 00
0.99997E 00
0.99999E 00
0.99907E 00

MINIMUM CRITICAL MASS IS 0.16363E 02 KILOGRAMS

CASE HLW.PWR-SF.100.B.R.P-C

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.24690E 00
0.11460E 00

0.77766E 01
0.11092E 02
0.14404E 02
0.17712E 02
0.21915E 02
0.28920E 02
0.45524E 02

0.19269E 02
0.30410E 02
0.30906E 02
0.26673E 02
0.23137E 02
0.24737E 02
0.41845E 02

0.99998E 00
0.10000E 01
0.99976E 00
0.10003E 01
0.10002E 01
0.99997E 00
0.99999E 00

MINIMUM CRITICAL MASS IS 0.19269E 02 KILOGRAMS

CASE HLW.PWR-SF.1000.B.E.P-D

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.24690E 00
0.11460E 00

0.77517E 01
0.11033E 02
0.14271E 02
0.17494E 02
0.21333E 02
0.27726E 02
0.74276E 02

0.19075E 02
0.24929E 02
0.30061E 02
0.25657E 02
0.21634E 02
0.22043E 02
0.19672E 02

0.99966E 00
0.10000E 01
0.99975E 00
0.10005E 01
0.10002E 01
0.99997E 00
0.99607E 00

MINIMUM CRITICAL MASS IS 0.19075E 02 KILOGRAMS

CASE HLW.PWR-SF.10000.B.D.F-D

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.36240E 00
0.24690E 00
0.16421E 00
0.11460E 00

0.71510E 01
0.10600E 02
0.12429E 02
0.16044E 02
0.18151E 02
0.20111E 02
0.22829E 02
0.27505E 02
0.38540E 02

0.17555E 02
0.26535E 02
0.25048E 02
0.19827E 02
0.14224E 02
0.12349E 02
0.12305E 02
0.14662E 02
0.27480E 02

0.99994E 00
0.10000E 01
0.99969E 00
0.10003E 01
0.10001E 01
0.99993E 00
0.10001E 01
0.10001E 01
0.99994E 00

MINIMUM CRITICAL MASS IS 0.12305E 02 KILOGRAMS

CASE HLW.PWR-SF.10.B.R.A-D

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11680E 02

0.11361E 02

0.71745E 02

0.99999E 00

MINIMUM CRITICAL MASS IS 0.71745E 02 KILOGRAMS

CASE HLW.PWR-SF.100.B.R.A-C

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11680E 02

0.11177E 02

0.68308E 02

0.10000E 01

MINIMUM CRITICAL MASS IS 0.68308E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,B.E,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11644E 02	0.77243E 02	0.99993E 00

MINIMUM CRITICAL MASS IS 0.77243E 02 KILOGRAMS

CASE HLW,PWR-SF,10000,B.H,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14785E 02	0.15815E 03	0.99018E 00

MINIMUM CRITICAL MASS IS 0.15815E 03 KILOGRAMS

CASE HLW,PWR-SF,10,B.B,C-F

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46372E 01	0.15011E 02	0.99941E 00
0.55374E 01	0.11505E 02	0.35321E 02	0.99881E 00
0.25703E 01	0.16591E 02	0.50061E 02	0.99927E 00
0.11930E 01	0.33025E 02	0.18000E 03	0.99948E 00

MINIMUM CRITICAL MASS IS 0.15011E 02 KILOGRAMS

CASE HLW,PWR-SF,100,B.B,C-F

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.52232E 01	0.71244E 01	0.10001E 01
0.55374E 01	0.67919E 01	0.72676E 01	0.99940E 00
0.25703E 01	0.77955E 01	0.51005E 01	0.10003E 01
0.11930E 01	0.85860E 01	0.31632E 01	0.10001E 01
0.55375E 00	0.96201E 01	0.20652E 01	0.10001E 01
0.25703E 00	0.10371E 02	0.17631E 01	0.99994E 00
0.11930E 00	0.11403E 02	0.15958E 01	0.10001E 01
0.55375E 00	0.12914E 02	0.15798E 01	0.10001E 01
0.25703E 00	0.15333E 02	0.18013E 01	0.99999E 00
0.55375E 01	0.28693E 02	0.54795E 01	0.99414E 00

MINIMUM CRITICAL MASS IS 0.15798E 01 KILOGRAMS

CASE HLW,PWR-SF,1000,B.F,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.41163E 01	0.34956E 01	0.10007E 01
0.55374E 01	0.57262E 01	0.35049E 01	0.99933E 00
0.25703E 01	0.61870E 01	0.25499E 01	0.10005E 01
0.11930E 01	0.69094E 01	0.16484E 01	0.10002E 01
0.55375E 00	0.76529E 01	0.10438E 01	0.10001E 01
0.25703E 00	0.86072E 01	0.68656E 00	0.10001E 01
0.11930E 00	0.10034E 02	0.50485E 00	0.10001E 01
0.55375E 01	0.11140E 02	0.47076E 00	0.99994E 00
0.25703E 01	0.12771E 02	0.48313E 00	0.99994E 00
0.55375E 01	0.15378E 02	0.57476E 00	0.10001E 01
0.25703E 01	0.20055E 02	0.86845E 00	0.99998E 00

MINIMUM CRITICAL MASS IS 0.47076E 00 KILOGRAMS

CASE HLW,PWR-SF,10000,B.B,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.40574E 01	0.33382E 01	0.10031E 01
0.55374E 01	0.52646E 01	0.33847E 01	0.99934E 00
0.25703E 01	0.61301E 01	0.24803E 01	0.10005E 01
0.11930E 01	0.68539E 01	0.16090E 01	0.10002E 01
0.55375E 00	0.76027E 01	0.10193E 01	0.10001E 01
0.25703E 00	0.85351E 01	0.66945E 00	0.10001E 01
0.11930E 00	0.99223E 01	0.48819E 00	0.10001E 01
0.55375E 01	0.10986E 02	0.45144E 00	0.99993E 00
0.25703E 01	0.12539E 02	0.45727E 00	0.99993E 00
0.55375E 01	0.14997E 02	0.53302E 00	0.10001E 01
0.25703E 01	0.19327E 02	0.77727E 00	0.99991E 00

MINIMUM CRITICAL MASS IS 0.45144E 00 KILOGRAMS

CASE HLW,PWR-UR,10,B,B,P-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.24690E 00

0.74709E 01
0.10823E 02
0.14138E 02
0.17843E 02
0.23550E 02
0.35170E 02

0.20018E 02
0.28251E 02
0.29231E 02
0.27273E 02
0.29102E 02
0.44994E 02

0.10000E 01
0.99996E 00
0.99977E 00
0.10003E 01
0.99993E 00
0.10000E 01

MINIMUM CRITICAL MASS IS 0.20018E 02 KILOGRAMS

CASE HLW,PWR-UR,100,B,B,P-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00

0.80307E 01
0.12691E 02
0.18298E 02
0.25313E 02
0.46656E 02

0.24863E 02
0.45547E 02
0.63361E 02
0.77863E 02
0.22630E 03

0.10002E 01
0.99989E 00
0.99997E 00
0.99996E 00
0.99990E 00

MINIMUM CRITICAL MASS IS 0.24863E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,B,B,P-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.24690E 00

0.78386E 01
0.12117E 02
0.16727E 02
0.21682E 02
0.32305E 02
0.84387E 02

0.23121E 02
0.39639E 02
0.48406E 02
0.48930E 02
0.75123E 02
0.62151E 03

0.10001E 01
0.99996E 00
0.99991E 00
0.99989E 00
0.99998E 00
0.99820E 00

MINIMUM CRITICAL MASS IS 0.23121E 02 KILOGRAMS

CASE HLW,PWR-UR,10000,B,B,P-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11460E 02
0.53193E 01
0.24690E 01
0.11460E 01
0.53193E 00
0.36240E 00
0.24690E 00
0.16821E 00
0.11460E 00

0.70241E 01
0.10392E 02
0.13154E 02
0.15684E 02
0.18057E 02
0.19486E 02
0.21889E 02
0.25923E 02
0.34606E 02

0.16637E 02
0.25003E 02
0.23542E 02
0.18522E 02
0.13120E 02
0.11233E 02
0.10847E 02
0.12275E 02
0.19896E 02

0.99979E 00
0.99999E 00
0.99967E 00
0.10003E 01
0.10001E 01
0.99993E 00
0.99993E 01
0.10001E 01
0.99999E 00

MINIMUM CRITICAL MASS IS 0.10847E 02 KILOGRAMS

CASE HLW,PWR-UR,10,B,B,A-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11680E 02

0.12239E 02

0.89706E 02

0.99947E 00

MINIMUM CRITICAL MASS IS 0.89706E 02 KILOGRAMS

CASE HLW,PWR-UR,100,B,B,A-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11680E 02

0.12372E 02

0.92656E 02

0.99930E 00

MINIMUM CRITICAL MASS IS 0.92656E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,B,B,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13696E 02	0.12569E 03	0.99565E 00

MINIMUM CRITICAL MASS IS 0.12569E 03 KILOGRAMS

CASE HLW,PWR-UR,10000,B,B,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14785E 02	0.15813E 03	0.99016E 00

MINIMUM CRITICAL MASS IS 0.15813E 03 KILOGRAMS

CASE HLW,PWR-UR,10,B,B,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.66972E 01	0.15011E 02	0.99941E 00
0.55374E 01	0.11505E 02	0.35321E 02	0.99880E 00
0.25703E 01	0.16691E 02	0.50064E 02	0.99999E 00
0.11930E 01	0.33024E 02	0.17999E 03	0.99951E 00

MINIMUM CRITICAL MASS IS 0.15011E 02 KILOGRAMS

CASE HLW,PWR-UR,100,B,B,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.52241E 01	0.71252E 01	0.10001E 01
0.55374E 01	0.67920E 01	0.72679E 01	0.99938E 00
0.25703E 01	0.77955E 01	0.51006E 01	0.10004E 01
0.11930E 01	0.85859E 01	0.31631E 01	0.10001E 01
0.55375E 00	0.96202E 01	0.20652E 01	0.10001E 01
0.37726E 00	0.10371E 02	0.17631E 01	0.99994E 00
0.25703E 00	0.11402E 02	0.15958E 01	0.10001E 01
0.17511E 00	0.12914E 02	0.15799E 01	0.10001E 01
0.11930E 00	0.15332E 02	0.18012E 01	0.99996E 00
0.55375E-01	0.28698E 02	0.54828E 01	0.99417E 00

MINIMUM CRITICAL MASS IS 0.15799E 01 KILOGRAMS

CASE HLW,PWR-UR,1000,B,B,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.41160E 01	0.34849E 01	0.10026E 01
0.55374E 01	0.53261E 01	0.35047E 01	0.99932E 00
0.25703E 01	0.61870E 01	0.25500E 01	0.10005E 01
0.11930E 01	0.69094E 01	0.16485E 01	0.10002E 01
0.55375E 00	0.76629E 01	0.10438E 01	0.10001E 01
0.25703E 00	0.86072E 01	0.68656E 00	0.10001E 01
0.11930E 00	0.10034E 02	0.50484E 00	0.10001E 01
0.81279E-01	0.11140E 02	0.47075E 00	0.99993E 00
0.55375E-01	0.12771E 02	0.48313E 00	0.99993E 00
0.37727E-01	0.15378E 02	0.57474E 00	0.10001E 01
0.25703E-01	0.20055E 02	0.86848E 00	0.99998E 00

MINIMUM CRITICAL MASS IS 0.47075E 00 KILOGRAMS

CASE HLW,PWR-UR,10000,B,B,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.40573E 01	0.33378E 01	0.10031E 01
0.55374E 01	0.52645E 01	0.33845E 01	0.99931E 00
0.25703E 01	0.61301E 01	0.24802E 01	0.10005E 01
0.11930E 01	0.68540E 01	0.16091E 01	0.10002E 01
0.55375E 00	0.76027E 01	0.10193E 01	0.10001E 01
0.25703E 00	0.85351E 01	0.66945E 00	0.10001E 01
0.11930E 00	0.99223E 01	0.48819E 00	0.10001E 01
0.81279E-01	0.10986E 02	0.45145E 00	0.99994E 00
0.55375E-01	0.12539E 02	0.45726E 00	0.99993E 00
0.37727E-01	0.14996E 02	0.53296E 00	0.10001E 01
0.25703E-01	0.19329E 02	0.77755E 00	0.10000E 01

MINIMUM CRITICAL MASS IS 0.45145E 00 KILOGRAMS

CASE HLW,PWR-UR,10,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.46232E 02	0.47603E 04	0.10001E 01

MINIMUM CRITICAL MASS IS 0.47603E 04 KILOGRAMS

CASE HLW,PWR-UR,100,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.47556E 02	0.51811E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.51811E 04 KILOGRAMS

CASE HLW,PWR-UR,1000,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.47714E 02	0.52329E 04	0.10002E 01

MINIMUM CRITICAL MASS IS 0.52329E 04 KILOGRAMS

CASE HLW,PWR-UR,10000,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.44401E 02	0.42169E 04	0.10001E 01

MINIMUM CRITICAL MASS IS 0.42169E 04 KILOGRAMS

CASE HLW,PWR-PU,10000,B,B,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.24026E 02	0.63678E 03	0.10003E 01
0.50872E 01	0.23230E 02	0.26714E 03	0.99999E 00
0.23613E 01	0.23740E 02	0.13235E 03	0.99999E 00
0.16087E 01	0.25556E 02	0.11248E 03	0.99995E 00
0.10960E 01	0.30070E 02	0.12483E 03	0.99995E 00
0.74670E 00	0.43945E 02	0.26545E 03	0.10001E 01
0.80236E 00	0.39640E 02	0.20935E 03	0.99998E 00

MINIMUM CRITICAL MASS IS 0.11248E 03 KILOGRAMS

CASE HLW,PWR-FU,10,B,B,F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.47717E 01	0.31630E 02	0.10008E 01
0.53193E 01	0.14345E 02	0.65778E 02	0.99965E 00
0.24690E 01	0.26880E 02	0.20088E 03	0.99924E 00

MINIMUM CRITICAL MASS IS 0.31630E 02 KILOGRAMS

CASE HLW,PWR-FU,100,B,B,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.56976E 01	0.43646E 02	0.99930E 00
0.53193E 01	0.25354E 02	0.36315E 03	0.10001E 01

MINIMUM CRITICAL MASS IS 0.43646E 02 KILOGRAMS

CASE HLW,PWF-FU,1000,B,R,F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	0.00504E 01	0.35587E 02	0.10011F 01
0.53193F 01	0.16633F 02	0.10254E 03	0.99803F 00
0.24690F 01	0.37909F 02	0.56342F 03	0.95814F 00

MINIMUM CRITICAL MASS IS 0.35587E 02 KILOGRAMS

CASE HLW,PWF-FU,10000,B,R,F-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	0.80866E 01	0.25386F 02	0.10003E 01
0.53193F 01	0.11587F 02	0.34662F 02	0.99993F 00
0.24690F 01	0.14446E 02	0.31182E 02	0.10005F 01
0.11460E 01	0.17223E 02	0.24524E 02	0.10003E 01
0.53193F 00	0.20446E 02	0.19044E 02	0.10002E 01
0.36240F 00	0.22535E 02	0.17374F 02	0.99992F 00
0.24690F 00	0.25622E 02	0.17396E 02	0.10001F 01
0.16821F 00	0.32426E 02	0.24025E 02	0.99997F 00
0.11460F 00	0.54366E 02	0.77141E 02	0.99949E 00

MINIMUM CRITICAL MASS IS 0.17374E 02 KILOGRAMS

CASE HLW,PWF-FU,10,F,R,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680F 02	0.12342E 02	0.91983E 02	0.99932F 00

MINIMUM CRITICAL MASS IS 0.91983E 02 KILOGRAMS

CASE HLW,PWF-FU,100,B,R,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12644E 02	0.98908E 02	0.99884E 00

MINIMUM CRITICAL MASS IS 0.98908E 02 KILOGRAMS

CASE HLW,PWF-FU,1000,B,R,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14175E 02	0.13936E 03	0.99375E 00

MINIMUM CRITICAL MASS IS 0.13936E 03 KILOGRAMS

CASE HLW,PWF-FU,10000,B,R,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680F 02	0.17362E 02	0.25606F 03	0.10003E 01

MINIMUM CRITICAL MASS IS 0.25606E 03 KILOGRAMS

CASE HLW,PWF-FU,10,F,R,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930F 02	0.57359E 01	0.94308F 01	0.10008F 01
0.55374F 01	0.77056F 01	0.10613E 02	0.99960F 00
0.25703F 01	0.88534F 01	0.74716E 01	0.10003F 01
0.11930F 01	0.98612E 01	0.47923F 01	0.10001F 01
0.81279F 00	0.10498E 02	0.39389E 01	0.99993E 00
0.55375F 00	0.11426E 02	0.34599E 01	0.10001F 01
0.37726F 00	0.12843F 02	0.33476E 01	0.10001F 01
0.25703F 00	0.15031F 02	0.36566E 01	0.99994F 00
0.11930F 00	0.27143F 02	0.10001E 02	0.10029F 01

MINIMUM CRITICAL MASS IS 0.33476E 01 KILOGRAMS

CASE HLW.PWR-FU.100.R.R.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.42797E 01	0.39174E 01	0.10018E 01
0.55374E 01	0.55565E 01	0.39795E 01	0.99939E 00
0.25703E 01	0.44482E 01	0.28867E 01	0.10005E 01
0.11930E 01	0.71929E 01	0.18598E 01	0.10002E 01
0.55375E 00	0.79497E 01	0.11654E 01	0.10001E 01
0.25703E 00	0.89244E 01	0.76529E 00	0.10001E 01
0.17511E 00	0.95496E 01	0.64689E 00	0.99995E 00
0.11930E 00	0.10480E 02	0.57528E 00	0.10001E 01
0.81279E-01	0.11740E 02	0.55048E 00	0.10001E 01
0.55375E-01	0.13653E 02	0.59040E 00	0.99995E 00
0.25703E-01	0.22988E 02	0.13076E 01	0.10010E 01

MINIMUM CRITICAL MASS IS 0.55048E 00 KILOGRAMS

CASE HLW.PWR-FU.1000.R.R.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.41061E 01	0.34597E 01	0.10027E 01
0.55374E 01	0.57156E 01	0.34839E 01	0.99934E 00
0.25703E 01	0.61773E 01	0.25380E 01	0.10005E 01
0.11930E 01	0.69000E 01	0.16417E 01	0.10002E 01
0.55375E 00	0.76526E 01	0.10396E 01	0.10001E 01
0.25703E 00	0.85346E 01	0.68355E 00	0.10001E 01
0.11930E 00	0.10014E 02	0.50138E 00	0.10001E 01
0.81279E-01	0.11117E 02	0.46730E 00	0.99992E 00
0.55375E-01	0.12729E 02	0.47847E 00	0.99994E 00
0.37727E-01	0.15311E 02	0.56720E 00	0.10001E 01
0.25703E-01	0.19923E 02	0.85146E 00	0.99999E 00

MINIMUM CRITICAL MASS IS 0.46730E 00 KILOGRAMS

CASE HLW.PWR-FU.10000.R.R.C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.43413E 01	0.40850E 01	0.10014E 01
0.55374E 01	0.54999E 01	0.38592E 01	0.10013E 01
0.25703E 01	0.62644E 01	0.28474E 01	0.10008E 01
0.11930E 01	0.69278E 01	0.16616E 01	0.10002E 01
0.55375E 00	0.76408E 01	0.10348E 01	0.10001E 01
0.25703E 00	0.85530E 01	0.67366E 00	0.10001E 01
0.11930E 00	0.99262E 01	0.48878E 00	0.10001E 01
0.81279E-01	0.10983E 02	0.45105E 00	0.99993E 00
0.55375E-01	0.12526E 02	0.45888E 00	0.99992E 00
0.37727E-01	0.14963E 02	0.52597E 00	0.10001E 01
0.25703E-01	0.19267E 02	0.77004E 00	0.99998E 00

MINIMUM CRITICAL MASS IS 0.45105E 00 KILOGRAMS

CASE HLW.PWR-FU.10.R.R.UNPAC-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.19496E 02	0.30480E 03	0.10000E 01

MINIMUM CRITICAL MASS IS 0.30480E 03 KILOGRAMS

CASE HLW.PWR-FU.100.R.R.UNPAC-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.19239E 02	0.38185E 03	0.10005E 01

MINIMUM CRITICAL MASS IS 0.38185E 03 KILOGRAMS

CASE HLW.PWR-FU.1000.R.R.UNPAC-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.20378E 02	0.40767E 03	0.10003E 01

MINIMUM CRITICAL MASS IS 0.40767E 03 KILOGRAMS

CASE HLW.PWR-FU.10000.B.R.UNPAC-G

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500F 02	0.18123F 02	0.2873E 03	0.10000E 01

MINIMUM CRITICAL MASS IS 0.2873E 03 KILOGRAMS

CASE HLW.PWR-FE.1000.B.P.L-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.6090E 02	0.10323F 05	0.10002F 01

MINIMUM CRITICAL MASS IS 0.10323F 05 KILOGRAMS

CASE HLW.PWR-FE.10000.B.B.U-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.24028E 02	0.63690E 03	0.99973F 00
0.50872E 01	0.25878E 02	0.36531E 03	0.10000E 01
0.34655E 01	0.26345E 02	0.26548E 03	0.10000E 01
0.23613E 01	0.27030E 02	0.19534E 03	0.10000E 01
0.16087E 01	0.25896E 02	0.18006E 03	0.99996E 00
0.10960E 01	0.37571E 02	0.24350E 03	0.10000F 01

MINIMUM CRITICAL MASS IS 0.18006E 03 KILOGRAMS

CASE HLW.PWR-PP.100000.B.B.U-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.15953E 02	0.18640E 03	0.10007E 01
0.50872E 01	0.17977E 02	0.12381E 03	0.10002E 01
0.23613E 01	0.18551E 02	0.63152E 02	0.10000E 01
0.16087E 01	0.19035E 02	0.46481E 02	0.99998E 00
0.10960E 01	0.20078E 02	0.37160E 02	0.10000E 01
0.74670E 00	0.22245E 02	0.34432E 02	0.10000E 01
0.50872E 00	0.26590E 02	0.40064E 02	0.10000E 01

MINIMUM CRITICAL MASS IS 0.34432E 02 KILOGRAMS

CASE HLW.PWR-FE.10.B.B.F-F

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	0.72357E 01	0.18186E 02	0.99999E 00
0.53193F 01	0.10743F 02	0.24655E 02	0.99992F 00
0.24690F 01	0.13148E 02	0.23507F 02	0.99969E 00
0.11460F 01	0.16174F 02	0.20311E 02	0.10003E 01
0.75077F 00	0.17876E 02	0.18683E 02	0.99992F 00
0.53193F 00	0.19927E 02	0.17368E 02	0.10002F 01
0.36240E 00	0.22205E 02	0.16621F 02	0.10001F 01
0.24690E 00	0.25632E 02	0.17418E 02	0.99994E 00
0.11460E 00	0.55527E 02	0.10126E 03	0.99886E 00

MINIMUM CRITICAL MASS IS 0.16621E 02 KILOGRAMS

CASE HLW.PWR-FE.100.B.B.F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460F 02	0.73515E 01	0.19073E 02	0.99997F 00
0.53193E 01	0.11069F 02	0.30215E 02	0.10000F 01
0.24690F 01	0.14375E 02	0.30720F 02	0.99976F 00
0.11460F 01	0.17670F 02	0.26487F 02	0.10003F 01
0.53193F 00	0.21721E 02	0.22835E 02	0.10002F 01
0.24690F 00	0.28606E 02	0.24210F 02	0.99994F 00
0.11460F 00	0.91041E 02	0.36226E 03	0.99856F 00

MINIMUM CRITICAL MASS IS 0.19073E 02 KILOGRAMS

CASE HLW.FWF-FF.1000.B.E.F-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11450F 02	C.73276F C1	0.18888E 02	0.59965F 00
0.53153F C1	0.10987F C2	0.29550F 02	0.10000F 01
C.24690F C1	C.14191E C2	0.29557F 02	0.59975F C0
0.11460F C1	C.17357F C2	0.25104E 02	0.10003F 01
C.53153F C0	C.21097F 02	0.20924E 02	0.10002F 01
0.24690F 00	C.27219E 02	0.20958F 02	0.59994F 00
C.11460F 00	C.65153F 02	0.15882F 03	0.59738F C0

MINIMUM CRITICAL MASS IS 0.18888E 02 KILOGRAMS

CASE HLW.FWF-FF.10000.H.B.F-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460F 02	C.71291F 01	0.17394E 02	0.59992F 00
0.53153F C1	0.10561E 02	0.28250F 02	0.59995F C0
0.24690F 01	0.13779F C2	0.24742F 02	0.59968F 00
0.11460F 01	0.15445F 02	0.19537F 02	0.10003E 01
C.53153F C0	L.14411E 02	0.13532F 02	0.10001F 01
0.24690F 00	C.19258F 02	0.12068E 02	0.59991F 00
C.24690F C0	C.22516F 02	0.11965F 02	0.10001F 01
C.11460F 00	C.27134E 02	0.14077F 02	0.10001F 01
C.11460F 00	C.37583F C2	0.25485E 02	0.59994E 00

MINIMUM CRITICAL MASS IS 0.11965E 02 KILOGRAMS

CASE HLW.PWF-FF.10.B.B.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	C.11329E 02	0.71151F 02	0.10000F 01

MINIMUM CRITICAL MASS IS 0.71151E 02 KILOGRAMS

CASE HLW.FWF-FF.100.B.B.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680F 02	C.11161E 02	0.68027F 02	0.59995F 00

MINIMUM CRITICAL MASS IS 0.68027E 02 KILOGRAMS

CASE HLW.FWF-FF.1000.B.B.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680F 02	C.11594F 02	0.76284F 02	0.59994F 00

MINIMUM CRITICAL MASS IS 0.76284F 02 KILOGRAMS

CASE HLW.PWF-FF.10000.H.B.A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680F 02	C.14785E 02	0.15814E 03	0.59018F 00

MINIMUM CRITICAL MASS IS 0.15814E 03 KILOGRAMS

CASE HLW.PWF-FF.10.B.B.C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11630F 02	C.67024F 01	0.15047E 02	0.59941F 00
C.56374F 01	C.11542F 02	0.35668F 02	0.59875F C0
0.25703F 01	C.16854F 02	0.51541F 02	0.59998F C0
0.11930F 01	C.74230E 02	0.20043F 03	0.59931F 00

MINIMUM CRITICAL MASS IS 0.15047E 02 KILOGRAMS

CASE HLW,PWF-FF,100,R,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	C.52346E 01	0.71682E 01	0.10001E 01
0.55374E 01	C.68080E 01	0.73193E 01	0.55939E 00
C.25703E 01	C.78126E 01	0.51342E 01	0.10004E 01
C.11930E 01	C.86060E 01	0.31853E 01	0.10001E 01
C.55375E 00	C.56468E 01	0.20825E 01	0.10001E 01
0.37727E 00	C.10407E 02	0.17812E 01	0.99993E 00
C.25703E 00	C.11451E 02	0.16166E 01	0.10001E 01
C.17511E 00	C.12988E 02	0.16070E 01	0.10001E 01
0.11930E 00	C.15452E 02	0.18438E 01	0.99996E 00
C.55375E-01	C.26959E 02	0.55812E 01	0.55123E 00

MINIMUM CRITICAL MASS IS 0.16070E 01 KILOGRAMS

CASE HLW,PWF-FF,1000,B,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	C.41098E 01	0.34691E 01	0.10027E 01
0.55374E 01	C.53195E 01	0.34916E 01	0.59935E 00
0.25703E 01	C.61809E 01	0.25423E 01	0.10005E 01
0.11930E 01	C.69033E 01	0.16441E 01	0.10002E 01
C.55375E 00	C.76563E 01	0.10411E 01	0.10001E 01
C.25703E 00	C.85592E 01	0.68464E 00	0.10001E 01
0.11930E 00	C.10021E 02	0.50297E 00	0.10001E 01
0.81279E-01	C.11123E 02	0.46855E 00	0.99992E 00
0.55375E-01	C.12744E 02	0.48017E 00	0.99993E 00
0.37727E-01	C.15335E 02	0.56995E 00	0.10001E 01
0.25703E-01	C.19971E 02	0.85762E 00	0.59995E 00

MINIMUM CRITICAL MASS IS 0.46855E 00 KILOGRAMS

CASE HLW,PWF-FF,10000,B,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	C.40535E 01	0.32295E 01	0.10032E 01
C.55374E 01	C.52260E 01	0.37772E 01	0.59934E 00
C.25703E 01	C.61266E 01	0.24740E 01	0.10005E 01
C.11930E 01	C.68505E 01	0.16066E 01	0.10002E 01
C.55375E 00	C.75599E 01	0.10178E 01	0.10001E 01
0.25703E 00	C.85706E 01	0.66840E 00	0.10001E 01
C.11930E 00	C.99154E 01	0.48718E 00	0.10001E 01
C.81279E-01	C.10977E 02	0.45028E 00	0.99993E 00
C.55375E-01	C.12524E 02	0.45571E 00	0.99993E 00
0.37727E-01	C.14573E 02	0.51055E 00	0.10001E 01
0.25703E-01	C.19285E 02	0.77218E 00	0.59996E 00

MINIMUM CRITICAL MASS IS 0.45028E 00 KILOGRAMS

CASE HLW,PWF-FF,10,B,B,UNFAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	C.96525E 01	0.43325E 02	0.55917E 00
0.53378E 01	C.15191E 02	0.78382E 02	0.99992E 00
C.24776E 01	C.20362E 02	0.87620E 02	0.55990E 00
0.11500E 01	C.25747E 02	0.82225E 02	0.59991E 00
0.53375E 00	C.32977E 02	0.80189E 02	0.59998E 00
C.24776E 00	C.70702E 02	0.36681E 03	0.59924E 00

MINIMUM CRITICAL MASS IS 0.43325E 02 KILOGRAMS

CASE HLW,PWF-FF,100,B,B,UNFAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	C.10188E 02	0.50946E 02	0.59956E 00
0.53378E 01	C.19490E 02	0.16555E 03	0.99721E 00
0.24776E 01	C.31130E 02	0.31516E 03	0.59997E 00
0.11500E 01	C.46653E 02	0.48917E 03	0.59998E 00
0.53375E 00	C.82252E 02	0.12443E 04	0.59987E 00

MINIMUM CRITICAL MASS IS 0.50946E 02 KILOGRAMS

CASE HLW,PWR-FF,1000,R,P,UNPAC-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.10364E 02	0.53635E 02	0.99967E 00
0.53378E 01	0.19071E 02	0.15508E 03	0.99826E 00
0.24776E 01	0.28081E 02	0.22582E 03	0.10000E 01
0.11500E 01	0.35917E 02	0.22135E 03	0.99997E 00
0.53379E 00	0.47945E 02	0.24644E 03	0.10000E 01

MINIMUM CRITICAL MASS IS 0.53635E 02 KILOGRAMS

CASE HLW,PWR-EP,10000,R,P,UNPAC-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.11352E 02	0.70470E 02	0.99999E 00
0.53378E 01	0.19448E 02	0.17479E 03	0.99922E 00
0.24776E 01	0.27339E 02	0.21660E 03	0.99997E 00
0.11500E 01	0.31040E 02	0.14408E 03	0.10000E 01
0.53379E 00	0.37640E 02	0.12669E 03	0.10000E 01
0.33077E 00	0.47603E 02	0.17659E 03	0.10001E 01

MINIMUM CRITICAL MASS IS 0.70470E 02 KILOGRAMS

CASE HLW,PWR-UP,100000,B,B,U-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.36773E 02	0.32870E 04	0.10001E 01
0.53378E 01	0.35493E 02	0.30000E 03	0.10000E 01
0.14659E 01	0.30279E 02	0.40305E 03	0.99998E 00
0.23613E 01	0.35526E 02	0.44352E 03	0.99999E 00
0.16087E 01	0.52968E 02	0.10014E 04	0.99999E 00
0.17286E 01	0.47335E 02	0.76801E 03	0.99997E 00

MINIMUM CRITICAL MASS IS 0.40305E 03 KILOGRAMS

CASE HLW,PWR-UP,100,B,B,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.93488E 01	0.37436E 02	0.10000E 01
0.53193E 01	0.12989E 02	0.48134E 02	0.99995E 00
0.24690E 01	0.20367E 02	0.87390E 02	0.99997E 00
0.11460E 01	0.36670E 02	0.23671E 03	0.99992E 00

MINIMUM CRITICAL MASS IS 0.27936E 02 KILOGRAMS

CASE HLW,PWR-UP,100,B,B,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.93799E 01	0.39518E 02	0.10014E 01
0.53193E 01	0.19720E 02	0.17099E 03	0.99301E 00

MINIMUM CRITICAL MASS IS 0.39518E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,B,B,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.48365E 01	0.33124E 02	0.10009E 01
0.53193E 01	0.15489E 02	0.82401E 02	0.99891E 00
0.24690E 01	0.29172E 02	0.25576E 03	0.99929E 00

MINIMUM CRITICAL MASS IS 0.33124E 02 KILOGRAMS

CASE HLW,PWR-UP,10000,B,B,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.72081E 01	J.17379E 02	J.99956E 00
C.53193E 01	0.15755E 02	J.27716E 02	J.10000E 01
0.24690E 01	0.13784E 02	J.27037E 02	J.99972E 00
0.11460E 01	0.16721E 02	J.22445E 02	J.10003E 01
0.53193E 00	0.19320E 02	J.17612E 02	J.10002E 01
C.36240E 00	J.21934E 02	J.16019E 02	J.99992E 00
0.24690E 00	0.24854E 02	J.15878E 02	J.10001E 01
0.16821E 00	0.31244E 02	J.21491E 02	J.99958E 00
0.11460E 00	0.50046E 02	J.60173E 02	J.99969E 00

MINIMUM CRITICAL MASS IS 0.15878E 02 KILOGRAMS

CASE HLW,PWR-UP,10,B,B,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12327E 02	J.91658E 02	J.99934E 00

MINIMUM CRITICAL MASS IS 0.91658E 02 KILOGRAMS

CASE HLW,PWR-UP,100,B,B,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12604E 02	J.97964E 02	J.99892E 00

MINIMUM CRITICAL MASS IS 0.97964E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,B,B,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14113E 02	J.13752E 03	J.99406E 00

MINIMUM CRITICAL MASS IS 0.13752E 03 KILOGRAMS

CASE HLW,PWR-UP,10000,B,B,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.14768E 02	J.15739E 03	J.99022E 00

MINIMUM CRITICAL MASS IS 0.15739E 03 KILOGRAMS

CASE HLW,PWR-UP,10,B,B,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.57693E 01	0.95965E 01	J.10008E 01
C.55374E 01	J.77555E 01	0.10905E 02	J.99962E 00
0.25703E 01	0.49401E 01	J.76932E 01	0.10007E 01
C.11930E 01	J.99750E 01	J.49602E 01	J.10001E 01
C.81275E 00	0.10638E 02	0.40991E 01	J.99992E 00
0.55375E 00	0.11610E 02	0.36301E 01	0.10001E 01
0.77726E 00	0.13113E 02	J.35636E 01	J.10001E 01
C.25701E 00	J.15464E 02	0.30314E 01	J.99953E 00
0.11930E 00	0.29008E 02	0.12199E 02	J.10001E 01

MINIMUM CRITICAL MASS IS 0.35636E 01 KILOGRAMS

CASE HLW,PWR-UP,100,B,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.42395E 01	0.36444E 01	0.10015E 01
0.55274E 01	0.55694E 01	0.40372E 01	0.99935E 00
0.25703E 01	0.54604E 01	0.29032E 01	0.10005E 01
0.11930E 01	0.72370E 01	0.18737E 01	0.10002E 01
0.55275E 00	0.72654E 01	0.11723E 01	0.10001E 01
0.25703E 00	0.94427E 01	0.77300E 00	0.10001E 01
0.11930E 00	0.75115E 01	0.55141E 00	0.99955E 00
0.55275E 01	0.10508E 02	0.57750E 00	0.10001E 01
0.25703E 01	0.11778E 02	0.55516E 00	0.10001E 01
0.55275E 01	0.13713E 02	0.59310E 00	0.99956E 00
0.25703E 01	0.23214E 02	0.13470E 01	0.10014E 01

MINIMUM CRITICAL MASS IS 0.55615E 00 KILOGRAMS

CASE HLW,PWR-UP,1000,B,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.41061E 01	0.34598E 01	0.10029E 01
0.55274E 01	0.53155E 01	0.34339E 01	0.99931E 00
0.25703E 01	0.61773E 01	0.25380E 01	0.10005E 01
0.11930E 01	0.68999E 01	0.16417E 01	0.10002E 01
0.55275E 00	0.76526E 01	0.10395E 01	0.10001E 01
0.25703E 00	0.85947E 01	0.68358E 00	0.10001E 01
0.11930E 00	0.10014E 02	0.50189E 00	0.10001E 01
0.55275E 01	0.11113E 02	0.46733E 00	0.99953E 00
0.25703E 01	0.12730E 02	0.47850E 00	0.99953E 00
0.55275E 01	0.15310E 02	0.56718E 00	0.10001E 01
0.25703E 01	0.19729E 02	0.85215E 00	0.10001E 01

MINIMUM CRITICAL MASS IS 0.46733E 00 KILOGRAMS

CASE HLW,PWR-UP,10000,B,B,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.40511E 01	0.33226E 01	0.10031E 01
0.55274E 01	0.52584E 01	0.33727E 01	0.99933E 00
0.25703E 01	0.61244E 01	0.24733E 01	0.10005E 01
0.11930E 01	0.68483E 01	0.16051E 01	0.10002E 01
0.55275E 00	0.75967E 01	0.10167E 01	0.10001E 01
0.25703E 00	0.85279E 01	0.66776E 00	0.10001E 01
0.11930E 00	0.99114E 01	0.48659E 00	0.10001E 01
0.55275E 01	0.10771E 02	0.44959E 00	0.99953E 00
0.25703E 01	0.12516E 02	0.45477E 00	0.99953E 00
0.55275E 01	0.14960E 02	0.52404E 00	0.10001E 01
0.25703E 01	0.19257E 02	0.76493E 00	0.99952E 00
0.11930E 01	0.23009E 02	0.36443E 02	0.98236E 00

MINIMUM CRITICAL MASS IS 0.44958E 00 KILOGRAMS

CASE HLW,PWR-UP,10,H,B,UNPAC-3

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11900E 02	0.26545E 02	0.90198E 03	0.10002E 01

MINIMUM CRITICAL MASS IS 0.90198E 03 KILOGRAMS

CASE HLW,PWR-UP,100,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11900E 02	0.28232E 02	0.10840E 04	0.10002E 01

MINIMUM CRITICAL MASS IS 0.10840E 04 KILOGRAMS

CASE HLW,PWR-UP,1000,B,B,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11900E 02	0.28707E 02	0.11396E 04	0.10002E 01

MINIMUM CRITICAL MASS IS 0.11396E 04 KILOGRAMS

CASE HLW,PWR-UP,1000,B,R,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.1150E 02	0.25709E 02	0.81955E 03	0.10001E 01

MINIMUM CRITICAL MASS IS 0.81853E 03 KILOGRAMS

CASE HLW,PWR-SF,10,G,G,P-0

COMPOSITION OF ACTINIDE COMPOUNDS, MODERATOR, AND REFLECTOR

REFLECTOR	DENSITY IN GM/CC IS 0.2910E 01
NUCLIDE	MASS FRACTION
O-16	0.5202E 00
AL-27	0.1258E 00
SI-28	0.3740E 00

MODERATOR	DENSITY IN GM/CC IS 0.2910E 01
NUCLIDE	MASS FRACTION
O-16	0.5202E 00
AL-27	0.1258E 00
SI-28	0.3740E 00

ACTINIDES	DENSITY IN GM/CC IS 0.1146E 02
NUCLIDE	MASS FRACTION
PU-238	0.1290E-01
PU-239	0.5337E 00
PU-240	0.2136E 00
PU-241	0.7641E-01
PU-242	0.4372E-01
O-16	0.1175E 00

CASE HLW,PWR-SF,10,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63290E 01	0.12170E 02	0.10007E 01
0.53193E 01	0.17525E 02	0.25977E 02	0.99958E 00
0.24690E 01	0.17116E 02	0.51864E 02	0.10003E 01
0.11460E 01	0.26951E 02	0.93979E 02	0.10003E 01
0.53193E 00	0.37115E 02	0.11392E 03	0.10004E 01
0.24690E 00	0.38409E 02	0.59603E 02	0.99863E 00
0.11460E 00	0.47565E 02	0.51661E 02	0.99502E 00
0.53193E 01	0.61367E 02	0.51495E 02	0.98080E 00
0.24690E 01	0.77429E 02	0.48913E 02	0.10094E 01

MINIMUM CRITICAL MASS IS 0.12170E 02 KILOGRAMS

CASE HLW,PWR-SF,100,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63859E 01	0.12501E 02	0.99950E 00
0.53193E 01	0.10674E 02	0.27101E 02	0.99966E 00
0.24690E 01	0.17478E 02	0.55221E 02	0.99977E 00
0.11460E 01	0.27773E 02	0.10289E 03	0.99993E 00
0.53193E 00	0.33428E 02	0.12645E 03	0.99894E 00
0.24690E 00	0.39406E 02	0.63287E 02	0.10001E 01
0.11460E 00	0.51403E 02	0.65201E 02	0.98591E 00
0.53193E 01	0.65290E 02	0.62016E 02	0.10925E 01

MINIMUM CRITICAL MASS IS 0.12501E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63717E 01	0.12418E 02	0.99947E 00
0.53193E 01	0.10646E 02	0.26898E 02	0.99979E 00
0.24690E 01	0.17424E 02	0.54712E 02	0.99995E 00
0.11460E 01	0.27675E 02	0.10176E 03	0.99992E 00
0.53193E 00	0.38292E 02	0.12510E 03	0.99899E 00
0.24690E 00	0.39359E 02	0.63061E 02	0.10016E 01
0.11460E 00	0.51943E 02	0.67280E 02	0.10099E 01
0.53193E 01	0.65530E 02	0.62734E 02	0.10111E 01

MINIMUM CRITICAL MASS IS 0.12418E 02 KILOGRAMS

CASE HLW,PWR-SF,10000,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	C.62352E 01	0.11637E 02	0.10007E 01
C.53193E 01	C.17393E 02	0.24987E 02	0.99951E 00
C.24690E 01	C.16942E 02	0.50297E 02	0.99986E 00
C.11460E 01	C.26851E 02	0.92939E 02	0.10000E 01
C.53193E 00	C.37406E 02	0.11663E 03	0.10002E 01
C.24690E 00	C.39104E 02	0.61843E 02	0.99956E 00
C.11460E 00	C.48977E 02	0.56401E 02	0.98828E 00
C.53193E 01	C.62008E 02	0.53126E 02	0.99813E 00
C.24690E 01	C.73453E 02	0.41679E 02	0.99575E 00

MINIMUM CRITICAL MASS IS 0.11637E 02 KILOGRAMS

CASE HLW,PWR-SF,10,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.70776E 01	0.36117E 02	0.10006E 01
C.54214E 01	0.18157E 02	0.78327E 02	0.99856E 00
C.25164E 01	0.30544E 02	0.30037E 03	0.99743E 00
C.11680E 01	0.70446E 02	0.17105E 04	0.99849E 00

MINIMUM CRITICAL MASS IS 0.36117E 02 KILOGRAMS

CASE HLW,PWR-SF,100,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.88973E 01	0.34461E 02	0.10005E 01
C.54214E 01	0.15222E 02	0.91669E 02	0.99864E 00
C.25164E 01	0.29933E 02	0.29271E 03	0.99737E 00
C.11680E 01	0.67693E 02	0.15177E 04	0.99882E 00

MINIMUM CRITICAL MASS IS 0.34461E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.92444E 01	0.38654E 02	0.10007E 01
C.54214E 01	0.16599E 02	0.10384E 03	0.99834E 00
C.25164E 01	0.31525E 02	0.33025E 03	0.99731E 00
C.11680E 01	0.75954E 02	0.21448E 04	0.99882E 00

MINIMUM CRITICAL MASS IS 0.38654E 02 KILOGRAMS

CASE HLW,PWR-SF,10000,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.11728E 02	0.78933E 02	0.99999E 00
C.54214E 01	0.21926E 02	0.23872E 03	0.10022E 01
C.25164E 01	0.44011E 02	0.11666E 04	0.99884E 00

MINIMUM CRITICAL MASS IS 0.78933E 02 KILOGRAMS

CASE HLW,PWR-SF,1,G,G,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	C.54990E 01	0.10254E 02	0.10003E 01
C.55374E 01	C.10235E 02	0.24877E 02	0.99877E 00
C.25703E 01	C.17729E 02	0.59998E 02	0.99891E 00
C.11930E 01	C.30258E 02	0.13844E 03	0.99935E 00
C.55374E 00	C.37241E 02	0.11990E 03	0.10026E 01
C.25703E 00	C.54227E 02	0.17162E 03	0.10061E 01

MINIMUM CRITICAL MASS IS 0.10254E 02 KILOGRAMS

CASE HLW,PWR-SF,100,G,G,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.49836E 01	0.61856E 01	0.99999E 00
0.55374E 01	0.83778E 01	0.13640E 02	0.99927E 00
0.25703E 01	0.13554E 02	0.26810E 02	0.99989E 00
0.11930E 01	0.20910E 02	0.45688E 02	0.10001E 01
0.55375E 00	0.28460E 02	0.53469E 02	0.99989E 00
0.25703E 00	0.29939E 02	0.28894E 02	0.99959E 00
0.11930E 00	0.33644E 02	0.28850E 02	0.10002E 01
0.55375E-01	0.42413E 02	0.17697E 02	0.10002E 01
0.25703E-01	0.57185E 02	0.13609E 02	0.99433E 00
MINIMUM CRITICAL MASS IS 0.61856E 01 KILOGRAMS			

CASE HLW,PWR-SF,1000,G,G,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.39889E 01	0.31718E 01	0.10023E 01
0.55374E 01	0.66538E 01	0.68334E 01	0.99925E 00
0.25703E 01	0.10594E 02	0.12801E 02	0.99998E 00
0.11930E 01	0.16092E 02	0.20825E 02	0.10001E 01
0.55375E 00	0.22793E 02	0.27467E 02	0.99993E 00
0.25703E 00	0.27992E 02	0.23615E 02	0.10003E 01
0.11930E 00	0.27589E 02	0.10494E 02	0.99907E 00
0.55375E-01	0.33375E 02	0.86235E 01	0.98905E 00
0.25703E-01	0.40338E 02	0.70672E 01	0.10191E 01
0.11930E-01	0.47959E 02	0.55128E 01	0.10405E 01
0.55375E-02	0.56797E 02	0.42501E 01	0.98425E 00
MINIMUM CRITICAL MASS IS 0.31718E 01 KILOGRAMS			

CASE HLW,PWR-SF,10000,G,G,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.32305E 01	0.30344E 01	0.10025E 01
0.55374E 01	0.55576E 01	0.65412E 01	0.99913E 00
0.25703E 01	0.10444E 02	0.12264E 02	0.99991E 00
0.11930E 01	0.15868E 02	0.19968E 02	0.10001E 01
0.55375E 00	0.22531E 02	0.26531E 02	0.99998E 00
0.25703E 00	0.27860E 02	0.23282E 02	0.99983E 00
0.11930E 00	0.27735E 02	0.10662E 02	0.99998E 00
0.55375E-01	0.37360E 02	0.12096E 02	0.99820E 00
0.25703E-01	0.39153E 02	0.64621E 01	0.99915E 00
0.11930E-01	0.46392E 02	0.49898E 01	0.99670E 00
0.55375E-02	0.55044E 02	0.40833E 01	0.99019E 00
MINIMUM CRITICAL MASS IS 0.30344E 01 KILOGRAMS			

CASE HLW,PWR-UR,10,G,G,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.64694E 01	0.12999E 02	0.99960E 00
0.53193E 01	0.10802E 02	0.28084E 02	0.99963E 00
0.24690E 01	0.17651E 02	0.56875E 02	0.99980E 00
0.11460E 01	0.27907E 02	0.10434E 03	0.99986E 00
0.53193E 00	0.38206E 02	0.12427E 03	0.99999E 00
0.24690E 00	0.38806E 02	0.67441E 02	0.99945E 00
0.11460E 00	0.49623E 02	0.58662E 02	0.97387E 00
0.53193E-01	0.66349E 02	0.65083E 02	0.99451E 00
MINIMUM CRITICAL MASS IS 0.12999E 02 KILOGRAMS			

CASE HLW,PWR-UR,100,G,G,P-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.68440E 01	0.15390E 02	0.99975E 00
0.53193E 01	0.11515E 02	0.34018E 02	0.99948E 00
0.24690E 01	0.19109E 02	0.72171E 02	0.99977E 00
0.11460E 01	0.30706E 02	0.13898E 03	0.99955E 00
0.53193E 00	0.41813E 02	0.16289E 03	0.99962E 00
0.24690E 00	0.41562E 02	0.74254E 02	0.99976E 00
0.11460E 00	0.61908E 02	0.11391E 03	0.10031E 01
0.53193E-01	0.80069E 02	0.11438E 03	0.99775E 00
MINIMUM CRITICAL MASS IS 0.15390E 02 KILOGRAMS			

CASE HLW,PWR-UR,1000,G,G,P-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (CM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.67161E 01	J.14543E 02	0.99966E 01
C.53193E 01	0.11268E 02	0.31883E 02	0.99957E 00
C.24690E 01	0.18606E 02	J.66620E 02	0.99966E 00
C.11460E 01	0.29762E 02	J.12655E 03	0.99973E 00
C.53193E 00	0.40631E 02	0.14946E 03	0.99939E 00
C.24690E 00	0.40055E 02	J.66464E 02	0.10042E 01
C.11460E 00	0.57533E 02	J.91422E 02	0.10058E 01
C.53193E-C1	0.75127E 02	0.94483E 02	0.10245E 01

MINIMUM CRITICAL MASS IS 0.14543E 02 KILOGRAMS

CASE HLW,PWR-UR,10000,G,G,P-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (CM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.61336E 01	J.11077E 02	0.10008E 01
C.53193E 01	0.10210E 02	J.23718E 02	0.99956E 00
C.24690E 01	0.18628E 02	J.47344E 02	0.99973E 00
C.11460E 01	0.26344E 02	0.87773E 02	0.99951E 00
C.53193E 00	0.36956E 02	J.11247E 03	0.10006E 01
C.24690E 00	0.39195E 02	J.02276E 02	0.99955E 00
C.11460E 00	0.46909E 02	J.49235E 02	0.99153E 00
C.53193E-01	0.62267E 02	J.33794E 02	0.10014E 01
C.24690E 01	0.73900E 02	J.41742E 02	0.99652E 00

MINIMUM CRITICAL MASS IS 0.11077E 02 KILOGRAMS

CASE HLW,PWR-UR,10,G,G,C-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (CM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.58990E 01	0.10258E 02	0.10008E 01
C.55374E 01	0.10235E 02	0.24870E 02	0.99877E 00
C.25703E 01	0.17729E 02	0.59998E 02	0.99851E 00
C.11930E 01	0.30258E 02	0.13844E 03	0.99935E 00
C.55375E 00	0.37241E 02	0.11990E 03	0.10026E 01
C.25703E 00	0.54220E 02	0.17162E 03	0.10061E 01

MINIMUM CRITICAL MASS IS 0.10258E 02 KILOGRAMS

CASE HLW,PWR-UR,10,G,G,A-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (CM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.96964E 01	0.44604E 02	0.99967E 00
C.54214E 01	0.17502E 02	J.12176E 03	0.99845E 00
C.25164E 01	0.33611E 02	J.43027E 03	0.99651E 00
C.11680E 01	0.89071E 02	0.33423E 04	0.99854E 00

MINIMUM CRITICAL MASS IS 0.44604E 02 KILOGRAMS

CASE HLW,PWR-UR,100,G,G,A-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.97919E 01	0.45937E 02	0.99974E 00
C.54214E 01	0.17706E 02	0.12607E 03	0.99839E 00
C.25164E 01	0.34161E 02	0.42022E 03	0.99706E 00
0.11680E 01	0.93600E 02	0.40122E 04	0.99919E 00

MINIMUM CRITICAL MASS IS 0.45937E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,G,G,A-O

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11680E 02	0.10811E 02	0.61815E 02	0.99956E 00
C.54214E 01	0.19854E 02	J.17772E 03	0.99821E 00
C.25164E 01	0.40313E 02	0.69059E 03	0.99627E 00

MINIMUM CRITICAL MASS IS 0.61815E 02 KILOGRAMS

CASE HLW,PWR-UR,10000,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11730E 02	0.78970E 02	0.10002E 01
0.54214E 01	0.21904E 02	0.23867E 03	0.10021E 01
0.25164E 01	0.47988E 02	0.11649E 04	0.99875E 00

MINIMUM CRITICAL MASS IS 0.78970E 02 KILOGRAMS

CASE HLW,PWR-UR,10,G,G,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.58990E 01	0.10258E 02	0.10008E 01
0.55374E 01	0.10235E 02	0.24870E 02	0.99877E 00
0.25703E 01	0.17729E 02	0.59999E 02	0.99851E 00
0.11930E 01	0.30258E 02	0.13844E 03	0.99935E 00
0.55375E 00	0.37241E 02	0.11980E 03	0.10026E 01
0.25703E 00	0.54220E 02	0.17162E 03	0.10061E 01

MINIMUM CRITICAL MASS IS 0.10258E 02 KILOGRAMS

CASE HLW,PWR-UR,10,G,G,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.49836E 01	0.61856E 01	0.99959E 00
0.55374E 01	0.83778E 01	0.13640E 02	0.99920E 00
0.25703E 01	0.13554E 02	0.26810E 02	0.99989E 00
0.11930E 01	0.20910E 02	0.45699E 02	0.10001E 01
0.55375E 00	0.28460E 02	0.53469E 02	0.99982E 00
0.25703E 00	0.29939E 02	0.28894E 02	0.99959E 00
0.11930E 00	0.38648E 02	0.25850E 02	0.10002E 01
0.55375E 01	0.42413E 02	0.17697E 02	0.10002E 01
0.25703E 01	0.50185E 02	0.13609E 02	0.99433E 00

MINIMUM CRITICAL MASS IS 0.61856E 01 KILOGRAMS

CASE HLW,PWR-UR,1000,G,G,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.39889E 01	0.31719E 01	0.10023E 01
0.55374E 01	0.66538E 01	0.74334E 01	0.99925E 00
0.25703E 01	0.10594E 02	0.12901E 02	0.99958E 00
0.11930E 01	0.16092E 02	0.20325E 02	0.10001E 01
0.55375E 00	0.22793E 02	0.27467E 02	0.99953E 00
0.25703E 00	0.27992E 02	0.27615E 02	0.10003E 01
0.11930E 00	0.27589E 02	0.10494E 02	0.99902E 00
0.55375E 01	0.33375E 02	0.86235E 01	0.99905E 00
0.25703E 01	0.40338E 02	0.70572E 01	0.10151E 01
0.11930E 01	0.47359E 02	0.55129E 01	0.10405E 01
0.55375E 02	0.56797E 02	0.42501E 01	0.98425E 00

MINIMUM CRITICAL MASS IS 0.31719E 01 KILOGRAMS

CASE HLW,PWR-UR,10000,G,G,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.49305E 01	0.30344E 01	0.10025E 01
0.55374E 01	0.65576E 01	0.65412E 01	0.99910E 00
0.25703E 01	0.10444E 02	0.12264E 02	0.99951E 00
0.11930E 01	0.15869E 02	0.19969E 02	0.10001E 01
0.55375E 00	0.22531E 02	0.26531E 02	0.99959E 00
0.25703E 00	0.27860E 02	0.23282E 02	0.99983E 00
0.11930E 00	0.27735E 02	0.10552E 02	0.99759E 00
0.55375E 01	0.37860E 02	0.12004E 02	0.99320E 00
0.25703E 01	0.49154E 02	0.64021E 01	0.99015E 01
0.11930E 01	0.46392E 02	0.49494E 01	0.99670E 00
0.55375E 02	0.56044E 02	0.40933E 01	0.99019E 00

MINIMUM CRITICAL MASS IS 0.30344E 01 KILOGRAMS

CASE HLW,PWR-UR,10,G,G,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11900E 02	0.37022E 02	0.24444E 04	0.99985E 00

MINIMUM CRITICAL MASS IS 0.24444E 04 KILOGRAMS

CASE HLW,PWR-UR,100,G,G,UNPAC-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11000E 02	0.38024E 02	0.26434E 04	0.99952E 00

MINIMUM CRITICAL MASS IS 0.26434E 04 KILOGRAMS

CASE HLW,PWR-UR,1000,G,G,UNPAC-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.38126E 02	0.26699E 04	0.99954E 00

MINIMUM CRITICAL MASS IS 0.26699E 04 KILOGRAMS

CASE HLW,PWR-UR,10000,G,G,UNPAC-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.33780E 02	0.22044E 04	0.99993E 00

MINIMUM CRITICAL MASS IS 0.22044E 04 KILOGRAMS

CASE HLW,PWR-PU,10000,G,G,U-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.80116E 02	0.23609E 05	0.98909E 00

MINIMUM CRITICAL MASS IS 0.23609E 05 KILOGRAMS

CASE HLW,PWR-PU,100000,G,G,U-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.20167E 02	0.37659E 03	0.10002E 01
0.50872E 01	0.33149E 02	0.77628E 03	0.99984E 01
0.23613E 01	0.46167E 02	0.97331E 03	0.99991E 00
0.10960E 01	0.42365E 02	0.34909E 03	0.10004E 01
0.50872E 00	0.54765E 02	0.35003E 03	0.11194E 01
0.34659E 00	0.60553E 02	0.32236E 03	0.91354E 00
0.23613E 00	0.69378E 02	0.33031E 03	0.10042E 01
0.10960E 00	0.74721E 02	0.28114E 03	0.99436E 00

MINIMUM CRITICAL MASS IS 0.28114E 03 KILOGRAMS

CASE HLW,PWR-PU,10,G,G,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.72921E 01	0.18614E 02	0.10001E 01
0.53193E 01	0.12355E 02	0.42128E 02	0.99940E 00
0.24690E 01	0.20819E 02	0.93333E 02	0.99955E 00
0.11460E 01	0.33888E 02	0.18682E 03	0.99970E 00
0.53193E 00	0.45977E 02	0.21656E 03	0.99979E 00
0.24690E 00	0.51938E 02	0.14491E 03	0.10057E 01
0.11460E 00	0.82802E 02	0.27253E 03	0.99694E 00

MINIMUM CRITICAL MASS IS 0.18614E 02 KILOGRAMS

CASE HLW,PWR-PU,100,G,G,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.78722E 01	0.23418E 02	0.10001E 01
0.53193E 01	0.13607E 02	0.56133E 02	0.99912E 00
0.24690E 01	0.23893E 02	0.14107E 03	0.99907E 00
0.11460E 01	0.42325E 02	0.36398E 03	0.99978E 00
0.53193E 00	0.68540E 02	0.71746E 03	0.10009E 01
0.24690E 00	0.99367E 02	0.98442E 03	0.98132E 00

MINIMUM CRITICAL MASS IS 0.23418E 02 KILOGRAMS

CASE HLW,PWR-PU,1000,G,G,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.75076E 01	0.20314E 02	0.99995E 00
0.53193E 01	0.12798E 02	0.46710E 02	0.99932E 00
0.24690E 01	0.21811E 02	0.10731E 03	0.99946E 00
0.11460E 01	0.36197E 02	0.22768E 03	0.99987E 00
0.53193E 00	0.49819E 02	0.27553E 03	0.99977E 00
0.24690E 00	0.55659E 02	0.17834E 03	0.99846E 00
0.11460E 00	0.96007E 02	0.42482E 03	0.99914E 00

MINIMUM CRITICAL MASS IS 0.20314E 02 KILOGRAMS

CASE HLW,PWR-PU,1000,G,G,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.67150E 01	0.14536E 02	0.99959E 00
0.53193E 01	0.10907E 02	0.28916E 02	0.99971E 00
0.24690E 01	0.17531E 02	0.55724E 02	0.99946E 00
0.11460E 01	0.27705E 02	0.10208E 03	0.99981E 00
0.53193E 00	0.38539E 02	0.12774E 03	0.99967E 00
0.24690E 00	0.39947E 02	0.65932E 02	0.99902E 00
0.11460E 00	0.49873E 02	0.59553E 02	0.10054E 01
0.53193E 01	0.63458E 02	0.56940E 02	0.98730E 00
0.24690E 01	0.74029E 02	0.49136E 02	0.10062E 01

MINIMUM CRITICAL MASS IS 0.14536E 02 KILOGRAMS

CASE HLW,PWR-PU,10,G,G,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.98393E 01	0.46606E 02	0.99972E 00
0.54214E 01	0.17650E 02	0.12576E 03	0.99853E 00
0.25164E 01	0.33452E 02	0.39461E 03	0.99753E 00
0.11680E 01	0.73759E 02	0.23912E 04	0.99912E 00

MINIMUM CRITICAL MASS IS 0.46606E 02 KILOGRAMS

CASE HLW,PWR-PU,100,G,G,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.10052E 02	0.49688E 02	0.99972E 00
0.54214E 01	0.18142E 02	0.13561E 03	0.99863E 00
0.25164E 01	0.34829E 02	0.44538E 03	0.99724E 00
0.11680E 01	0.90544E 02	0.36440E 04	0.99840E 00

MINIMUM CRITICAL MASS IS 0.49688E 02 KILOGRAMS

CASE HLW,PWR-PU,1000,G,G,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11205E 02	0.68833E 02	0.99993E 00
0.54214E 01	0.20720E 02	0.20202E 03	0.99809E 00
0.25164E 01	0.43083E 02	0.84296E 03	0.99682E 00

MINIMUM CRITICAL MASS IS 0.68833E 02 KILOGRAMS

CASE HLW,PWR-PU,10000,G,G,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12261E 02	0.20174E 02	0.99979E 00
0.54214E 01	0.21819E 02	0.23589E 03	0.99409E 00
0.25164E 01	0.45226E 02	0.97509E 03	0.99754E 00

MINIMUM CRITICAL MASS IS 0.20174E 02 KILOGRAMS

CASE HLW,PWR-PU,10,G,G,C-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11930E 02
0.55374E 01
0.25703E 01
0.11930E 01
0.55375E 00
0.25703E 00
0.11930E 00
0.55375E-01
0.25703E-01

0.53854E 01
0.91307E 01
0.15027E 02
0.23611E 02
0.31338E 02
0.37453E 02
0.32219E 02
0.49151E 02
0.61293E 02

0.78056E 01
0.17658E 02
0.36538E 02
0.65780E 02
0.71391E 02
0.30406E 02
0.30147E 02
0.27544E 02
0.23605E 02

0.10002E 01
0.99910E 00
0.99971E 00
0.99994E 00
0.99964E 00
0.10019E 01
0.98689E 00
0.10046E 01
0.99518E 00

MINIMUM CRITICAL MASS IS 0.78056E 01 KILOGRAMS

CASE HLW,PWR-PU,100,G,G,C-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11930E 02
0.55374E 01
0.25703E 01
0.11930E 01
0.55375E 00
0.25703E 00
0.11930E 00
0.55375E-01
0.25703E-01
0.11930E-01
0.55375E-02

0.41417E 01
0.69127E 01
0.11015E 02
0.16749E 02
0.23614E 02
0.28431E 02
0.36540E 02
0.34106E 02
0.41359E 02
0.48747E 02
0.59647E 02

0.35505E 01
0.76623E 01
0.14391E 02
0.23481E 02
0.30546E 02
0.24874E 02
0.24381E 02
0.92028E 01
0.76170E 01
0.57889E 01
0.49226E 01

0.10016E 01
0.99947E 00
0.99992E 00
0.10003E 01
0.99991E 00
0.10006E 01
0.10009E 01
0.99909E 00
0.98589E 00
0.99308E 00
0.10213E 01

MINIMUM CRITICAL MASS IS 0.35505E 01 KILOGRAMS

CASE HLW,PWR-PU,1000,G,G,C-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11930E 02
0.55374E 01
0.25703E 01
0.11930E 01
0.55375E 00
0.25703E 00
0.11930E 00
0.55375E-01
0.25703E-01
0.11930E-01
0.55375E-02

0.39790E 01
0.66375E 01
0.10567E 02
0.16053E 02
0.22749E 02
0.27977E 02
0.27625E 02
0.33358E 02
0.40230E 02
0.47349E 02
0.56864E 02

0.31460E 01
0.67831E 01
0.12706E 02
0.20673E 02
0.27308E 02
0.23578E 02
0.10536E 02
0.86103E 01
0.70103E 01
0.53048E 01
0.42653E 01

0.10021E 01
0.99933E 00
0.99988E 00
0.10001E 01
0.99985E 00
0.10005E 01
0.10002E 01
0.98847E 00
0.10150E 01
0.10072E 01
0.98971E 00

MINIMUM CRITICAL MASS IS 0.31460E 01 KILOGRAMS

CASE HLW,PWR-PU,10000,G,G,C-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11930E 02
0.55374E 01
0.25703E 01
0.11930E 01
0.55375E 00
0.25703E 00
0.11930E 00
0.55375E-01
0.25703E-01
0.11930E-01
0.55375E-02

0.41648E 01
0.68015E 01
0.10691E 02
0.16099E 02
0.22779E 02
0.28119E 02
0.27917E 02
0.32637E 02
0.40139E 02
0.47223E 02
0.56107E 02

0.36101E 01
0.72988E 01
0.13120E 02
0.20853E 02
0.27417E 02
0.23938E 02
0.10873E 02
0.80643E 01
0.69631E 01
0.52629E 01
0.40972E 01

0.10016E 01
0.99958E 00
0.99990E 00
0.99999E 00
0.10001E 01
0.10005E 01
0.99949E 00
0.98067E 00
0.10004E 01
0.99731E 00
0.99223E 00

MINIMUM CRITICAL MASS IS 0.36101E 01 KILOGRAMS

CASE HLW,PWR-PU,10,G,G,UNPAC-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01

0.14663E 02
0.27144E 02
0.54439E 02

0.15188E 03
0.44720E 03
0.16745E 04

0.99573E 00
0.99801E 00
0.99890E 00

MINIMUM CRITICAL MASS IS 0.15188E 03 KILOGRAMS

CASE HLW,PWR-PU,100,G,G,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.15678E 02	0.18564E 03	0.99169E 00
C.53378E 01	0.29591E 02	0.57937E 03	0.99747E 00
C.24776E 01	0.63038E 02	0.25998E 04	0.99912E 00

MINIMUM CRITICAL MASS IS 0.18564E 03 KILOGRAMS

CASE HLW,PWR-PU,1000,G,G,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.16001E 02	0.19735E 03	0.99026E 00
C.53378E 01	0.30550E 02	0.63756E 03	0.99737E 00
C.24776E 01	0.68231E 02	0.32968E 04	0.99919E 00

MINIMUM CRITICAL MASS IS 0.19735E 03 KILOGRAMS

CASE HLW,PWR-PU,10000,G,G,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.14648E 02	0.15140E 03	0.99633E 00
0.53378E 01	0.26365E 02	0.40984E 03	0.99861E 00
C.24776E 01	0.47970E 02	0.11456E 04	0.99962E 00
0.11500E 01	0.74218E 02	0.19694E 04	0.10006E 01
0.53379E 00	0.75531E 02	0.96352E 03	0.10018E 01

MINIMUM CRITICAL MASS IS 0.15140E 03 KILOGRAMS

CASE HLW,PWR-PP,1000,G,G,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10560E 02	0.48854E 02	0.53534E 04	0.99979E 00

MINIMUM CRITICAL MASS IS 0.53534E 04 KILOGRAMS

CASE HLW,PWR-PP,10000,G,G,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.10560E 02	0.20122E 02	0.37406E 03	0.10003E 01
C.50872E 01	0.33659E 02	0.81262E 03	0.99974E 00
C.23613E 01	0.47919E 02	0.10883E 04	0.99919E 00
C.10560E 01	0.43546E 02	0.37912E 03	0.99723E 00
C.50872E 00	0.56696E 02	0.38837E 03	0.10004E 01
C.34659E 00	0.65106E 02	0.40067E 03	0.10100E 01
C.23613E 00	0.71984E 02	0.36596E 03	0.10049E 01
C.16087E 00	0.79958E 02	0.31430E 03	0.10064E 01
0.17287E 00	0.90115E 02	0.37235E 03	0.10205E 01

MINIMUM CRITICAL MASS IS 0.34450E 03 KILOGRAMS

CASE HLW,PWR-PP,100000,G,G,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10560E 02	0.13425E 02	0.11109E 03	0.99858E 00
0.50872E 01	0.21990E 02	0.22660E 03	0.99979E 00
0.23613E 01	0.33861E 02	0.38402E 03	0.10000E 01
C.10560E 01	0.42968E 02	0.36422E 03	0.10002E 01
C.50872E 00	0.37481E 02	0.11221E 03	0.99371E 00
C.23613E 00	0.51312E 02	0.13367E 03	0.10059E 01
C.10560E 00	0.64925E 02	0.12565E 03	0.99853E 00

MINIMUM CRITICAL MASS IS 0.11109E 03 KILOGRAMS

CASE HLW,FWR-PP,10,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63116E 01	0.12070E 02	0.10010E 01
0.53193E 01	0.10498E 02	0.25792E 02	0.99960E 00
0.24690E 01	0.17082E 02	0.51553E 02	0.99999E 00
0.11460E 01	0.26921E 02	0.93664E 02	0.10001E 01
0.53193E 00	0.37132E 02	0.11409E 03	0.99986E 00
0.24690E 00	0.38487E 02	0.59964E 02	0.99752E 00
0.11460E 00	0.47615E 02	0.51823E 02	0.99251E 00
0.53193E-01	0.63607E 02	0.57343E 02	0.10059E 01
0.24690E-01	0.77935E 02	0.48960E 02	0.10132E 01

MINIMUM CRITICAL MASS IS 0.12070E 02 KILOGRAMS

CASE HLW,FWR-PP,100,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63567E 01	0.12339E 02	0.99968E 00
0.53193E 01	0.10641E 02	0.26845E 02	0.99959E 00
0.24690E 01	0.17422E 02	0.54690E 02	0.99980E 00
0.11460E 01	0.27697E 02	0.10200E 03	0.10001E 01
0.53193E 00	0.38377E 02	0.12594E 03	0.10004E 01
0.24690E 00	0.39446E 02	0.53491E 02	0.99924E 00
0.11460E 00	0.50424E 02	0.51546E 02	0.99223E 00
0.53193E-01	0.65128E 02	0.51555E 02	0.99554E 00

MINIMUM CRITICAL MASS IS 0.12339E 02 KILOGRAMS

CASE HLW,FWR-PP,1000,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.63531E 01	0.12310E 02	0.99946E 00
0.53193E 01	0.10612E 02	0.26633E 02	0.99955E 00
0.24690E 01	0.17362E 02	0.54126E 02	0.99967E 00
0.11460E 01	0.27577E 02	0.10068E 03	0.99954E 00
0.53193E 00	0.38198E 02	0.12419E 03	0.99952E 00
0.24690E 00	0.39363E 02	0.63079E 02	0.10007E 01
0.11460E 00	0.50217E 02	0.60794E 02	0.98672E 00
0.53193E-01	0.64689E 02	0.60320E 02	0.98879E 00
0.24690E-01	0.77571E 02	0.48464E 02	0.99960E 00

MINIMUM CRITICAL MASS IS 0.12310E 02 KILOGRAMS

CASE HLW,FWR-PP,10000,G,G,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.62181E 01	0.11542E 02	0.10009E 01
0.53193E 01	0.10398E 02	0.24702E 02	0.99960E 00
0.24690E 01	0.16888E 02	0.49816E 02	0.99974E 00
0.11460E 01	0.26700E 02	0.92045E 02	0.99990E 00
0.53193E 00	0.37345E 02	0.11605E 03	0.10000E 01
0.24690E 00	0.39140E 02	0.62017E 02	0.10012E 01
0.11460E 00	0.48069E 02	0.53321E 02	0.99713E 00
0.53193E-01	0.61926E 02	0.52916E 02	0.99627E 00
0.24690E-01	0.74788E 02	0.41551E 02	0.99392E 00

MINIMUM CRITICAL MASS IS 0.11542E 02 KILOGRAMS

CASE HLW,PWR-PP,10,G,G,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.90138E 01	0.35832E 02	0.10005E 01
0.54214E 01	0.16143E 02	0.95529E 02	0.99852E 00
0.25164E 01	0.30438E 02	0.29726E 03	0.99740E 00
0.11680E 01	0.69909E 02	0.16717E 04	0.99860E 00

MINIMUM CRITICAL MASS IS 0.35832E 02 KILOGRAMS

CASE HLW,PWR-PP,100,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.33357E 01	0.34326E 02	0.10005E 01
0.54214E 01	0.15902E 02	0.91205E 02	0.99863E 00
0.25164E 01	0.29895E 02	0.28174E 03	0.99745E 00
0.11680E 01	0.37407E 02	0.14785E 04	0.99862E 00

MINIMUM CRITICAL MASS IS 0.34326E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.72086E 01	0.38207E 02	0.10007E 01
0.54214E 01	0.16529E 02	0.10256E 03	0.99843E 00
0.25164E 01	0.31353E 02	0.32490E 03	0.99742E 00
0.11680E 01	0.74953E 02	0.20603E 04	0.99866E 00

MINIMUM CRITICAL MASS IS 0.38207E 02 KILOGRAMS

CASE HLW,PWR-PP,10000,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11728E 02	0.78934E 02	0.10000E 01
0.54214E 01	0.21902E 02	0.23860E 03	0.10021E 01
0.25164E 01	0.47997E 02	0.11655E 04	0.99881E 00

MINIMUM CRITICAL MASS IS 0.78934E 02 KILOGRAMS

CASE HLW,PWR-PP,10,G,G,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.50006E 01	0.10267E 02	0.10008E 01
0.54214E 01	0.10238E 02	0.34891E 02	0.99875E 00
0.25164E 01	0.17744E 02	0.60147E 02	0.99928E 00
0.11680E 01	0.30291E 02	0.13890E 03	0.99929E 00
0.54214E 00	0.37205E 02	0.11946E 03	0.10048E 01
0.25164E 00	0.35303E 02	0.19211E 03	0.10018E 01

MINIMUM CRITICAL MASS IS 0.10267E 02 KILOGRAMS

CASE HLW,PWR-PP,100,G,G,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.49921E 01	0.62172E 01	0.99987E 00
0.54214E 01	0.93936E 01	0.13717E 02	0.99924E 00
0.25164E 01	0.13582E 02	0.26974E 02	0.99978E 00
0.11680E 01	0.20760E 02	0.46016E 02	0.99958E 00
0.54214E 00	0.28518E 02	0.53799E 02	0.10000E 01
0.25164E 00	0.29954E 02	0.28939E 02	0.99956E 00
0.11680E 00	0.38675E 02	0.28707E 02	0.10019E 01
0.54214E 01	0.42379E 02	0.17655E 02	0.99928E 00
0.25164E 01	0.52205E 02	0.13625E 02	0.99932E 00

MINIMUM CRITICAL MASS IS 0.62172E 01 KILOGRAMS

CASE HLW,PWR-PP,1000,G,G,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.39823E 01	0.31560E 01	0.10022E 01
0.54214E 01	0.66432E 01	0.68006E 01	0.99925E 00
0.25164E 01	0.10577E 02	0.12741E 02	0.99955E 00
0.11930E 01	0.16066E 02	0.2723E 02	0.10007E 01
0.54214E 00	0.22760E 02	0.27348E 02	0.99961E 00
0.25164E 00	0.27980E 02	0.23585E 02	0.10004E 01
0.11930E 00	0.27623E 02	0.15534E 02	0.10011E 01
0.54214E 01	0.33391E 02	0.86376E 01	0.98855E 00
0.25164E 01	0.40288E 02	0.70406E 01	0.10183E 01
0.11930E 01	0.47141E 02	0.52353E 01	0.99925E 00
0.54214E 02	0.57129E 02	0.43250E 01	0.10017E 01

MINIMUM CRITICAL MASS IS 0.31560E 01 KILOGRAMS

CASE HLW,FWR-PP,10000,G,G,C-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 00
0.24776E 00
0.11500E 00
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 01
0.24776E 01

0.39271E 01
0.65518E 01
0.10434E 02
0.15855E 02
0.22514E 02
0.27553E 02
0.27753E 02
0.32532E 02
0.40033E 02
0.47155E 02
0.56027E 02

0.30267E 01
0.65239E 01
0.12231E 02
0.19920E 02
0.26473E 02
0.23266E 02
0.10683E 02
0.79862E 01
0.69078E 01
0.52401E 01
0.40796E 01

0.10025E 01
0.99907E 00
0.99963E 00
0.10000E 01
0.99989E 00
0.10007E 01
0.10004E 01
0.98354E 00
0.99474E 00
0.99866E 00
0.98983E 00

MINIMUM CRITICAL MASS IS 0.30267E 01 KILOGRAMS

CASE HLW,FWR-PP,10,G,G,UNPAC-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 00
0.24776E 00
0.11500E 00
0.53378E 01

0.81578E 01
0.17678E 02
0.22684E 02
0.35625E 02
0.44620E 02
0.57662E 02
0.66076E 02
0.80725E 02

0.26153E 02
0.57223E 02
0.12135E 03
0.21780E 03
0.19864E 03
0.19899E 03
0.13898E 03
0.11763E 03

0.10002E 01
0.99963E 00
0.99980E 00
0.10000E 01
0.10005E 01
0.99984E 00
0.10065E 01
0.10071E 01

MINIMUM CRITICAL MASS IS 0.26153E 02 KILOGRAMS

CASE HLW,FWR-PP,100,G,G,UNPAC-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 00
0.24776E 00
0.11500E 00

0.84805E 01
0.14373E 02
0.24343E 02
0.39523E 02
0.50871E 02
0.54097E 02
0.81451E 02

0.29381E 02
0.66389E 02
0.14972E 03
0.29741E 03
0.29437E 03
0.16431E 03
0.26034E 03

0.10002E 01
0.99956E 00
0.99952E 00
0.99914E 00
0.10001E 01
0.99055E 00
0.10052E 01

MINIMUM CRITICAL MASS IS 0.29381E 02 KILOGRAMS

CASE HLW,FWR-PP,1000,G,G,UNPAC-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 00
0.24776E 00
0.11500E 00
0.53378E 01

0.85688E 01
0.14666E 02
0.24741E 02
0.39424E 02
0.48363E 02
0.51507E 02
0.72806E 02
0.87408E 02

0.31382E 02
0.70540E 02
0.15718E 03
0.29519E 03
0.25294E 03
0.14183E 03
0.18592E 03
0.14933E 03

0.10003E 01
0.99948E 00
0.99961E 00
0.99959E 00
0.10006E 01
0.98264E 00
0.10075E 01
0.98105E 00

MINIMUM CRITICAL MASS IS 0.31382E 02 KILOGRAMS

CASE HLW,FWR-PP,10000,G,G,UNPAC-0

DENSITY OF ACTINIDE
COMPOUNDS IN SOLUTION
(GM/CC)CRITICAL RADIUS
(CM)CRITICAL MASS
(KG)

MULTIPLICATION FACTOR

0.11500E 02
0.53378E 01
0.24776E 01
0.11500E 01
0.53378E 00
0.24776E 00
0.11500E 00

0.94888E 01
0.16048E 02
0.26910E 02
0.41529E 02
0.47183E 02
0.52511E 02
0.71625E 02

0.41156E 02
0.92420E 02
0.20225E 03
0.34534E 03
0.23488E 03
0.15028E 03
0.17702E 03

0.99967E 00
0.99971E 00
0.99963E 00
0.99969E 00
0.99969E 00
0.99554E 00
0.10023E 01

MINIMUM CRITICAL MASS IS 0.41156E 02 KILOGRAMS

CASE HLW,PWR-UP,100000,G,G,U-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.1C960F 02	0.30943E 02	0.13603E 04	0.99981E 01
C.5C672E 01	0.50192E 02	0.26945E 04	0.10003E 01
0.23613E 01	0.54321E 02	0.15855E 04	0.10005E 01
0.16C87E 01	0.79297E 02	0.33602E 04	0.99989E 01
0.10560E 01	0.55571E 02	0.78788E 03	0.99899E 00
C.74670E 00	0.65687E 02	0.88652E 03	0.98292E 00
C.5C672E 00	0.75241E 02	0.90774E 03	0.10061E 01

MINIMUM CRITICAL MASS IS 0.78788E 03 KILOGRAMS

CASE HLW,PWR-UP,10,G,G,F-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.70716E 01	0.16576E 02	0.99956E 00
C.53193E 01	0.11927E 02	0.37808E 02	0.99946E 00
C.24690E 01	0.19974E 02	0.41190E 02	0.99954E 00
C.11460E 01	0.31947E 02	0.15652E 03	0.99983E 00
C.53193E 00	0.42954E 02	0.17660E 03	0.99978E 00
C.24690E 00	0.44748E 02	0.32673E 02	0.98954E 00
0.11460E 00	0.59061E 02	0.15812E 03	0.99755E 00
C.53193E 01	0.94041E 02	0.18532E 03	0.99631E 00

MINIMUM CRITICAL MASS IS 0.16976E 02 KILOGRAMS

CASE HLW,PWR-UP,100,G,G,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.76960E 01	0.21797E 02	0.99956E 00
C.53193E 01	0.13197E 02	0.51214E 02	0.99928E 00
C.24690E 01	0.22829E 02	0.12305E 03	0.99926E 00
C.11460E 01	0.39009E 02	0.28498E 03	0.99966E 00
0.53193E 00	0.56923E 02	0.40842E 03	0.99863E 00
C.24690E 00	0.71767E 02	0.38231E 03	0.10073E 01

MINIMUM CRITICAL MASS IS 0.21797E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,G,G,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.73769E 01	0.19272E 02	0.10000E 01
0.53193E 01	0.12532E 02	0.43852E 02	0.99938E 00
C.24690E 01	0.21213E 02	0.98734E 02	0.99949E 00
C.11460E 01	0.34828E 02	0.20280E 03	0.99931E 00
0.53193E 00	0.47446E 02	0.23799E 03	0.99910E 00
C.24690E 00	0.59983E 02	0.13706E 03	0.98511E 00
0.11460E 00	0.84310E 02	0.28770E 03	0.10007E 01

MINIMUM CRITICAL MASS IS 0.19272E 02 KILOGRAMS

CASE HLW,PWR-UP,10000,G,G,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.62718E 01	0.11843E 02	0.10009E 01
C.53193E 01	0.10452E 02	0.25446E 02	0.99960E 00
C.24690E 01	0.17064E 02	0.51393E 02	0.99952E 00
0.11460E 01	0.27083E 02	0.95365E 02	0.99985E 00
C.53193E 00	0.37735E 02	0.11973E 03	0.10001E 01
C.24690E 00	0.39318E 02	0.62866E 02	0.10001E 01
0.11460E 00	0.49181E 02	0.57109E 02	0.98971E 00
C.53193E 01	0.63403E 02	0.56794E 02	0.99052E 00
C.24690E 01	0.77567E 02	0.48268E 02	0.10067E 01

MINIMUM CRITICAL MASS IS 0.11843E 02 KILOGRAMS

CASE HLW,PWR-UP,10,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.98184E 01	0.46310E 02	0.99974E 00
0.54214E 01	0.17639E 02	0.12463E 03	0.99864E 00
0.25164E 01	0.33486E 02	0.39580E 03	0.99749E 00
0.11680E 01	0.80020E 02	0.25070E 04	0.99865E 00

MINIMUM CRITICAL MASS IS 0.46310E 02 KILOGRAMS

CASE HLW,PWR-UP,100,G,G,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.10013E 02	0.49119E 02	0.99979E 00
0.54214E 01	0.14076E 02	0.13412E 03	0.99853E 00
0.25164E 01	0.34743E 02	0.44209E 03	0.99714E 00
0.11680E 01	0.91420E 02	0.37384E 04	0.99902E 00

MINIMUM CRITICAL MASS IS 0.49119E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11153E 02	0.67882E 02	0.99958E 00
0.54214E 01	0.20608E 02	0.19876E 03	0.99824E 00
0.25164E 01	0.42705E 02	0.82097E 03	0.99650E 00

MINIMUM CRITICAL MASS IS 0.67882E 02 KILOGRAMS

CASE HLW,PWR-UP,10000,G,G,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11710E 02	0.78560E 02	0.99977E 00
0.54214E 01	0.21890E 02	0.23822E 03	0.10025E 01
0.25164E 01	0.47376E 02	0.11568E 04	0.99908E 00

MINIMUM CRITICAL MASS IS 0.78560E 02 KILOGRAMS

CASE HLW,PWR-UP,10,G,G,C-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.54094E 01	0.79103E 01	0.10002E 01
0.54214E 01	0.91781E 01	0.17034E 02	0.99915E 00
0.25703E 01	0.15125E 02	0.37254E 02	0.99983E 00
0.11930E 01	0.23308E 02	0.67439E 02	0.10001E 01
0.55375E 00	0.31539E 02	0.72772E 02	0.99921E 00
0.25703E 00	0.31356E 02	0.33193E 02	0.99973E 00
0.11680E 00	0.80172E 02	0.12398E 02	0.99949E 00
0.55375E 01	0.49456E 02	0.27050E 02	0.99834E 00

MINIMUM CRITICAL MASS IS 0.79103E 01 KILOGRAMS

CASE HLW,PWR-UP,100,G,G,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.41516E 01	0.35750E 01	0.10017E 01
0.54214E 01	0.69284E 01	0.77146E 01	0.99941E 00
0.25703E 01	0.11040E 02	0.14489E 02	0.99985E 00
0.11680E 01	0.15788E 02	0.23643E 02	0.10002E 01
0.55375E 00	0.23660E 02	0.30724E 02	0.99978E 00
0.25703E 00	0.29511E 02	0.24954E 02	0.10005E 01
0.11680E 00	0.35575E 02	0.24452E 02	0.99940E 00
0.55375E 01	0.34117E 02	0.42114E 01	0.10015E 01
0.25703E 01	0.41355E 02	0.75151E 01	0.98579E 00
0.11680E 01	0.48789E 02	0.58003E 01	0.99533E 00
0.55375E 02	0.59694E 02	0.49342E 01	0.10216E 01

MINIMUM CRITICAL MASS IS 0.35750E 01 KILOGRAMS

CASE HLW,FWR-UP,1000,G,G,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.39792E 01	0.31487E 01	0.10024E 01
C.55374E 01	0.65378E 01	0.67842E 01	0.99931E 00
C.25703E 01	0.10568E 02	0.12708E 02	0.99958E 00
C.11930E 01	0.19354E 02	0.20677E 02	0.10001E 01
C.55375E 00	0.22746E 02	0.27299E 02	0.99980E 00
C.25703E 00	0.27984E 02	0.23505E 02	0.10019E 01
C.11930E 00	0.27536E 02	0.19543E 02	0.98757E 00
C.55375E-01	0.33375E 02	0.30237E 01	0.10155E 01
C.25703E-01	0.42666E 02	0.70294E 01	0.98945E 00
C.11930E-01	0.47033E 02	0.51996E 01	0.99467E 00
C.55375E-02	0.56973E 02	0.42899E 01	

MINIMUM CRITICAL MASS IS 0.31487E 01 KILOGRAMS

CASE HLW,FWR-UP,10000,G,G,C-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11930E 02	0.39250E 01	0.30219E 01	0.10025E 01
C.55374E 01	0.65489E 01	0.65152E 01	0.99927E 00
C.25703E 01	0.10428E 02	0.12211E 02	0.99954E 00
C.11930E 01	0.15846E 02	0.19886E 02	0.10001E 01
C.55375E 00	0.22503E 02	0.26434E 02	0.99988E 00
C.25703E 00	0.27945E 02	0.23245E 02	0.10003E 01
C.11930E 00	0.27748E 02	0.19677E 02	0.10003E 01
C.55375E-01	0.37354E 02	0.12090E 02	0.99959E 00
C.25703E-01	0.47226E 02	0.64996E 01	0.99759E 00
C.11930E-01	0.47033E 02	0.51997E 01	0.98739E 00
C.55375E-02	0.56006E 02	0.40751E 01	0.98666E 00

MINIMUM CRITICAL MASS IS 0.30219E 01 KILOGRAMS

CASE HLW,FWR-UP,10,G,G,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.21175E 02	0.45739E 03	0.10001E 01
C.53378E 01	0.42365E 02	0.17002E 04	0.99780E 00

MINIMUM CRITICAL MASS IS 0.45739E 03 KILOGRAMS

CASE HLW,FWR-UP,100,G,G,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.22517E 02	0.54994E 03	0.99955E 00
C.53378E 01	0.46424E 02	0.22372E 04	0.99806E 00

MINIMUM CRITICAL MASS IS 0.54994E 03 KILOGRAMS

CASE HLW,FWR-UP,1000,G,G,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.22921E 02	0.58014E 03	0.99959E 00
C.53378E 01	0.48126E 02	0.24923E 04	0.99844E 00

MINIMUM CRITICAL MASS IS 0.58014E 03 KILOGRAMS

CASE HLW,FWR-UP,10000,G,G,UNPAC-0			
DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.20782E 02	0.43240E 03	0.99967E 00
C.53378E 01	0.39923E 02	0.14224E 04	0.99052E 00
C.24776E 01	0.89487E 02	0.74774E 04	0.99950E 00

MINIMUM CRITICAL MASS IS 0.43240E 03 KILOGRAMS

CASE HLW,PWR-SF,10,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.75009E 01	0.21090E 02	0.10000E 01
0.53193E 01	0.14004E 02	0.61177E 02	0.99558E 00
0.24690E 01	0.25025E 02	0.16204E 03	0.99793E 00
0.11460E 01	0.43726E 02	0.40134E 03	0.99881E 00
0.53193E 00	0.76666E 02	0.10041E 04	0.99859E 00

MINIMUM CRITICAL MASS IS 0.21090E 02 KILOGRAMS

CASE HLW,PWR-SF,100,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.75717E 01	0.21575E 02	0.10001E 01
0.53193E 01	0.14156E 02	0.63204E 02	0.99542E 00
0.24690E 01	0.25372E 02	0.16892E 03	0.99770E 00
0.11460E 01	0.44504E 02	0.42601E 03	0.99870E 00
0.53193E 00	0.79064E 02	0.11013E 04	0.99873E 00

MINIMUM CRITICAL MASS IS 0.21575E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.76557E 01	0.21540E 02	0.99955E 00
0.53193E 01	0.14122E 02	0.62761E 02	0.99543E 00
0.24690E 01	0.25302E 02	0.16754E 03	0.99769E 00
0.11460E 01	0.44454E 02	0.42174E 03	0.99882E 00
0.53193E 00	0.78704E 02	0.10863E 04	0.99878E 00

MINIMUM CRITICAL MASS IS 0.21540E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.74783E 01	0.20077E 02	0.10002E 01
0.53193E 01	0.13785E 02	0.58365E 02	0.99541E 00
0.24690E 01	0.24554E 02	0.15499E 03	0.99781E 00
0.11460E 01	0.43118E 02	0.38483E 03	0.99870E 00
0.53193E 00	0.75736E 02	0.96799E 03	0.99857E 00

MINIMUM CRITICAL MASS IS 0.20077E 02 KILOGRAMS

CASE HLW,PWR-SF,10,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.10756E 02	0.60890E 02	0.99943E 00
0.54214E 01	0.20516E 02	0.19900E 03	0.99414E 00
0.25164E 01	0.39582E 02	0.65370E 03	0.99466E 00
0.11680E 01	0.78127E 02	0.23332E 04	0.99573E 00

MINIMUM CRITICAL MASS IS 0.60890E 02 KILOGRAMS

CASE HLW,PWR-SF,100,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.10578E 02	0.57908E 02	0.99987E 00
0.54214E 01	0.20271E 02	0.18917E 03	0.99377E 00
0.25164E 01	0.38889E 02	0.61937E 03	0.99474E 00
0.11680E 01	0.76529E 02	0.21930E 04	0.99566E 00

MINIMUM CRITICAL MASS IS 0.57908E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11690E 02	0.10993E 02	0.64995E 02	0.99959E 00
0.54214E 01	0.21396E 02	0.21323E 03	0.99405E 00
0.25164E 01	0.40061E 02	0.70862E 03	0.99560E 00
0.11680E 01	0.80832E 02	0.25840E 04	0.99554E 00

MINIMUM CRITICAL MASS IS 0.64995E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11687E 02	0.13961E 02	0.13314E 03	0.99591E 00
0.54214E 01	0.27351E 02	0.46467E 03	0.99472E 00
0.25164E 01	0.54795E 02	0.17343E 04	0.99539E 00

MINIMUM CRITICAL MASS IS 0.13314E 03 KILOGRAMS

CASE HLW,PWR-SF,10,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11530E 02	0.69829E 01	0.17016E 02	0.99975E 00
0.55374E 01	0.13171E 02	0.53004E 02	0.99219E 00
0.25703E 01	0.24472E 02	0.15780E 03	0.99540E 00
0.11930E 01	0.45366E 02	0.46659E 03	0.99672E 00
0.55375E 00	0.87301E 02	0.15434E 04	0.99673E 00

MINIMUM CRITICAL MASS IS 0.17016E 02 KILOGRAMS

CASE HLW,PWR-SF,100,S,S,C-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11530E 02	0.59765E 01	0.10246E 02	0.10009E 01
0.55374E 01	0.10951E 02	0.30458E 02	0.99372E 00
0.25703E 01	0.15174E 02	0.83037E 02	0.99685E 00
0.11930E 01	0.34758E 02	0.20946E 03	0.99842E 00
0.55375E 00	0.61244E 02	0.53245E 03	0.99829E 00

MINIMUM CRITICAL MASS IS 0.10246E 02 KILOGRAMS

CASE HLW,PWR-SF,1000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46257E 01	0.49464E 01	0.10001E 01
0.55374E 01	0.85390E 01	0.14442E 02	0.99356E 00
0.25703E 01	0.15174E 02	0.37618E 02	0.99731E 00
0.11930E 01	0.25889E 02	0.86711E 02	0.99901E 00
0.55375E 00	0.43219E 02	0.18726E 03	0.99960E 00
0.25703E 00	0.71879E 02	0.39995E 03	0.99952E 00

MINIMUM CRITICAL MASS IS 0.49464E 01 KILOGRAMS

CASE HLW,PWR-SF,10000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.45552E 01	0.47237E 01	0.10007E 01
0.55374E 01	0.84070E 01	0.13783E 02	0.99359E 00
0.25703E 01	0.14935E 02	0.35871E 02	0.99735E 00
0.11930E 01	0.25466E 02	0.82537E 02	0.99907E 00
0.55375E 00	0.42436E 02	0.17726E 03	0.99957E 00
0.25703E 00	0.70416E 02	0.37592E 03	0.99958E 00

MINIMUM CRITICAL MASS IS 0.47237E 01 KILOGRAMS

CASE HLW,PWR-UR,10,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.77758E 01	0.22570E 02	0.10001E 01
0.53193E 01	0.14343E 02	0.65742E 02	0.99540E 00
0.24690E 01	0.25705E 02	0.17567E 03	0.99767E 00
0.11460E 01	0.45193E 02	0.44312E 03	0.99854E 00
0.53193E 00	0.80123E 02	0.11461E 04	0.99888E 00

MINIMUM CRITICAL MASS IS 0.22570E 02 KILOGRAMS

CASE HLW,PWR-UR,100,S,S,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.82231E 01	0.26693E 02	0.10003E 01
0.53193E 01	0.15220E 02	0.70557E 02	0.99545E 00
0.24690E 01	0.27493E 02	0.21492E 03	0.99760E 00
0.11460E 01	0.49151E 02	0.57003E 03	0.99848E 00
0.53193E 00	0.89778E 02	0.16124E 04	0.99877E 00

MINIMUM CRITICAL MASS IS 0.26693E 02 KILOGRAMS

CASE HLW,PWR-UR,10,S,S,F-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.77758E 01	0.22570E 02	0.10001E 01
0.53193E 01	0.14343E 02	0.65742E 02	0.99540E 00
0.24690E 01	0.25705E 02	0.17567E 03	0.99767E 00
0.11460E 01	0.45193E 02	0.44312E 03	0.99854E 00
0.53193E 00	0.80123E 02	0.11461E 04	0.99888E 00

MINIMUM CRITICAL MASS IS 0.22570E 02 KILOGRAMS

CASE HLW,PWR-UR,100,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.82231E 01	0.26693E 02	0.10003E 01
0.53193E 01	0.15220E 02	0.70557E 02	0.99545E 00
0.24690E 01	0.27493E 02	0.21492E 03	0.99760E 00
0.11460E 01	0.49151E 02	0.57003E 03	0.99848E 00
0.53193E 00	0.89778E 02	0.16124E 04	0.99877E 00

MINIMUM CRITICAL MASS IS 0.26693E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.80729E 01	0.25257E 02	0.10001E 01
0.53193E 01	0.14922E 02	0.74537E 02	0.99541E 00
0.24690E 01	0.26877E 02	0.20887E 03	0.99763E 00
0.11460E 01	0.47770E 02	0.52333E 03	0.99851E 00
0.53193E 00	0.46366E 02	0.14355E 04	0.99854E 00

MINIMUM CRITICAL MASS IS 0.25257E 02 KILOGRAMS

CASE HLW,PWR-UR,10000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.73570E 01	0.19116E 02	0.99998E 00
0.53193E 01	0.13555E 02	0.55501E 02	0.99548E 00
0.24690E 01	0.24215E 02	0.14680E 03	0.99784E 00
0.11460E 01	0.42247E 02	0.36198E 03	0.99884E 00
0.53193E 00	0.73905E 02	0.89952E 03	0.99899E 00

MINIMUM CRITICAL MASS IS 0.19116E 02 KILOGRAMS

CASE HLW,PWR-UR,10,S,S,A-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11585E 02	0.76083E 02	0.99996E 00
0.54214E 01	0.22231E 02	0.24952E 03	0.99422E 00
0.25164E 01	0.42962E 02	0.83590E 03	0.99525E 00
0.11680E 01	0.86591E 02	0.31767E 04	0.99661E 00

MINIMUM CRITICAL MASS IS 0.76083E 02 KILOGRAMS

CASE HLW,PWR-UR,100,S,S,A-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11698E 02	0.78317E 02	0.99993E 00
0.54214E 01	0.22463E 02	0.25741E 03	0.99418E 00
0.25164E 01	0.43488E 02	0.86690E 03	0.99526E 00
0.11680E 01	0.88115E 02	0.33474E 04	0.99666E 00

MINIMUM CRITICAL MASS IS 0.78317E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,S,S,A-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.12898E 02	0.10498E 03	0.99885E 00
0.54214E 01	0.24994E 02	0.35458E 03	0.99469E 00
0.25164E 01	0.49179E 02	0.12538E 04	0.99484E 00

MINIMUM CRITICAL MASS IS 0.10498E 03 KILOGRAMS

CASE HLW,PWR-UR,10000,S,S,A-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13961E 02	0.13313E 03	0.99585E 00
0.54214E 01	0.27351E 02	0.46468E 03	0.99474E 00
0.25164E 01	0.54797E 02	0.17344E 04	0.99541E 00

MINIMUM CRITICAL MASS IS 0.13313E 03 KILOGRAMS

CASE HLW,PWR-UR,10,S,S,C-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.09829E 01	0.17016E 02	0.99975E 00
0.55374E 01	0.13171E 02	0.53004E 02	0.99219E 00
0.25703E 01	0.24472E 02	0.15780E 03	0.99542E 00
0.11930E 01	0.45366E 02	0.46659E 03	0.99672E 00
0.55375E 00	0.87301E 02	0.15434E 04	0.99673E 00

MINIMUM CRITICAL MASS IS 0.17016E 02 KILOGRAMS

CASE HLW,PWR-UR,100,S,S,C-U

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIIJS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.58965E 01	0.10246E 02	0.10009E 01
0.55374E 01	0.13951E 02	0.37468E 02	0.99372E 00
0.25703E 01	0.19757E 02	0.83030E 02	0.99885E 00
0.11930E 01	0.34758E 02	0.20986E 03	0.99842E 00
0.55375E 00	0.61244E 02	0.53285E 03	0.99829E 00

MINIMUM CRITICAL MASS IS 0.10246E 02 KILOGRAMS

CASE HLW,PWR-UR,1000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46257E 01	0.49464E 01	0.10001E 01
0.55374E 01	0.63390E 01	0.14442E 02	0.99396E 00
0.25703E 01	0.15174E 02	0.37613E 02	0.99731E 00
0.11930E 01	0.25889E 02	0.86711E 02	0.99901E 00
0.55375E 00	0.43219E 02	0.18726E 03	0.99967E 00
0.25703E 00	0.71379E 02	0.39983E 03	0.99952E 00

MINIMUM CRITICAL MASS IS 0.49464E 01 KILOGRAMS

CASE HLW,PWR-UR,10000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.45552E 01	0.47237E 01	0.10007E 01
0.55374E 01	0.64070E 01	0.13783E 02	0.99396E 00
0.25703E 01	0.14935E 02	0.35871E 02	0.99735E 00
0.11930E 01	0.25466E 02	0.82537E 02	0.99907E 00
0.55375E 00	0.42436E 02	0.17726E 03	0.99957E 00
0.25703E 00	0.70416E 02	0.37592E 03	0.99958E 00

MINIMUM CRITICAL MASS IS 0.47237E 01 KILOGRAMS

CASE HLW,PWR-UR,10,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.43866E 02	0.40662E 04	0.99997E 00

MINIMUM CRITICAL MASS IS 0.40662E 04 KILOGRAMS

CASE HLW,PWR-UR,100,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.45129E 02	0.44278E 04	0.10000E 01

MINIMUM CRITICAL MASS IS 0.44278E 04 KILOGRAMS

CASE HLW,PWR-UR,1000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.45310E 02	0.44811E 04	0.99994E 00

MINIMUM CRITICAL MASS IS 0.44811E 04 KILOGRAMS

CASE HLW,PWR-UR,10000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.42344E 02	0.36574E 04	0.10001E 01

MINIMUM CRITICAL MASS IS 0.36574E 04 KILOGRAMS

CASE HLW,PWR-PU,100000,S,S,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.24280E 02	0.65718E 03	0.99999E 00
0.50872E 01	0.45763E 02	0.2423E 04	0.99839E 00
0.23613E 01	0.85909E 02	0.62715E 04	0.99965E 00

MINIMUM CRITICAL MASS IS 0.65718E 03 KILOGRAMS

CASE HLW,FWR-PU,10,S,S,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.37482E 01	0.32147E 02	0.10005E 01
0.52193E 01	0.15258E 02	0.95749E 02	0.99523E 00
0.24690E 01	0.29551E 02	0.26942E 03	0.99741E 00
0.11460E 01	0.53950E 02	0.75425E 03	0.99780E 00

MINIMUM CRITICAL MASS IS 0.32140E 02 KILOGRAMS

CASE HLW,FWR-PU,100,S,S,P-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.94377E 01	0.40355E 02	0.10012E 01
0.52193E 01	0.17049E 02	0.12247E 03	0.99505E 00
0.24690E 01	0.32693E 02	0.36141E 03	0.99677E 00
0.11460E 01	0.61185E 02	0.10996E 04	0.99655E 00

MINIMUM CRITICAL MASS IS 0.40355E 02 KILOGRAMS

CASE HLW,FWR-PU,1000,S,S,P-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.90178E 01	0.35204E 02	0.10009E 01
0.52193E 01	0.16785E 02	0.10537E 03	0.99528E 00
0.24690E 01	0.30745E 02	0.30039E 03	0.99718E 00
0.11460E 01	0.56457E 02	0.86386E 03	0.99750E 00

MINIMUM CRITICAL MASS IS 0.35204E 02 KILOGRAMS

CASE HLW,FWR-PU,10000,S,S,F-7

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.34885E 01	0.29362E 02	0.10007E 01
0.52193E 01	0.15155E 02	0.77555E 02	0.99677E 00
0.24690E 01	0.25415E 02	0.14074E 03	0.99825E 00
0.11460E 01	0.45365E 02	0.44817E 03	0.99907E 00
0.52193E 00	0.78746E 02	0.12891E 04	0.99827E 00

MINIMUM CRITICAL MASS IS 0.29362E 02 KILOGRAMS

CASE HLW,FWR-PU,10,S,S,A-D

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.11780E 02	0.79989E 02	0.99953E 00
0.52193E 01	0.22552E 02	0.26047E 03	0.99471E 00
0.24690E 01	0.43363E 02	0.85949E 03	0.99581E 00
0.11460E 01	0.96523E 02	0.31802E 04	0.99652E 00

MINIMUM CRITICAL MASS IS 0.79989E 02 KILOGRAMS

CASE HLW,FWR-PU,100,S,S,A-C

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.12028E 02	0.85147E 02	0.99977E 00
0.52193E 01	0.23086E 02	0.27941E 03	0.99468E 00
0.24690E 01	0.44624E 02	0.93666E 03	0.99573E 00
0.11460E 01	0.90427E 02	0.36178E 04	0.99722E 00

MINIMUM CRITICAL MASS IS 0.85147E 02 KILOGRAMS

CASE HLW,FWR-PU,1000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13364E 02	0.11679E 03	0.99762E 00
0.54214E 01	0.26006E 02	0.39944E 03	0.99473E 00
0.25164E 01	0.51550E 02	0.14440E 04	0.99514E 00

MINIMUM CRITICAL MASS IS 0.11679E 03 KILOGRAMS

CASE HLW,FWR-PU,10000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.15215E 02	0.17234E 03	0.98329E 00
0.54214E 01	0.28942E 02	0.55055E 03	0.99488E 00
0.25164E 01	0.55513E 02	0.18033E 04	0.99564E 00

MINIMUM CRITICAL MASS IS 0.17234E 03 KILOGRAMS

CASE HLW,FWR-PU,10,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.63918E 01	0.17030E 02	0.99919E 00
0.55374E 01	0.11944E 02	0.37529E 02	0.99335E 00
0.25703E 01	0.21791E 02	0.11141E 03	0.99645E 00
0.11930E 01	0.39146E 02	0.27979E 03	0.99783E 00
0.55375E 00	0.71299E 02	0.44074E 03	0.99755E 00

MINIMUM CRITICAL MASS IS 0.13030E 02 KILOGRAMS

CASE HLW,FWR-PU,100,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.48208E 01	0.55999E 01	0.10002E 01
0.55374E 01	0.89047E 01	0.16379E 02	0.99395E 00
0.25703E 01	0.15946E 02	0.42840E 02	0.99733E 00
0.11930E 01	0.27116E 02	0.92638E 02	0.99900E 00
0.55375E 00	0.45559E 02	0.21936E 03	0.99944E 00
0.25703E 00	0.76315E 02	0.47854E 03	0.99829E 00

MINIMUM CRITICAL MASS IS 0.55999E 01 KILOGRAMS

CASE HLW,FWR-PU,1000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46115E 01	0.49038E 01	0.99985E 00
0.55374E 01	0.85157E 01	0.14324E 02	0.99362E 00
0.25703E 01	0.15135E 02	0.37324E 02	0.99749E 00
0.11930E 01	0.25916E 02	0.85983E 02	0.99907E 00
0.55375E 00	0.41083E 02	0.18550E 03	0.99957E 00
0.25703E 00	0.71613E 02	0.39543E 03	0.99924E 00

MINIMUM CRITICAL MASS IS 0.49003E 01 KILOGRAMS

CASE HLW,FWR-PU,10000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.49955E 01	0.62299E 01	0.10001E 01
0.55374E 01	0.90154E 01	0.16997E 02	0.99500E 00
0.25703E 01	0.15711E 02	0.41755E 02	0.99820E 00
0.11930E 01	0.26396E 02	0.91912E 02	0.99925E 00
0.55375E 00	0.43516E 02	0.19114E 03	0.99983E 00
0.25703E 00	0.71657E 02	0.39616E 03	0.99918E 00

MINIMUM CRITICAL MASS IS 0.62299E 01 KILOGRAMS

CASE HLW,FWR-PU,10,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.17637E 02	0.25429E 03	0.10003E 01
0.53378E 01	0.34246E 02	0.89839E 03	0.99566E 00
0.24776E 01	0.78429E 02	0.33256E 04	0.99666E 00

MINIMUM CRITICAL MASS IS 0.25429E 03 KILOGRAMS

CASE HLW,FWR-PU,100,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.18717E 02	0.32610E 03	0.10001E 01
0.53378E 01	0.37027E 02	0.11351E 04	0.99599E 00
0.24776E 01	0.75517E 02	0.44696E 04	0.99733E 00

MINIMUM CRITICAL MASS IS 0.32610E 03 KILOGRAMS

CASE HLW,FWR-PU,1000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.19345E 02	0.34876E 03	0.10001E 01
0.53378E 01	0.38007E 02	0.12276E 04	0.99619E 00
0.24776E 01	0.78359E 02	0.49935E 04	0.99757E 00

MINIMUM CRITICAL MASS IS 0.34876E 03 KILOGRAMS

CASE HLW,FWR-PU,10000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.17639E 02	0.26437E 03	0.10003E 01
0.53378E 01	0.33356E 02	0.86771E 03	0.99666E 00
0.24776E 01	0.65953E 02	0.29774E 04	0.99738E 00

MINIMUM CRITICAL MASS IS 0.26437E 03 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.58401E 02	0.91450E 04	0.99979E 00

MINIMUM CRITICAL MASS IS 0.91450E 04 KILOGRAMS

CASE HLW,PWR-PP,10000,S,S,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.24182E 02	0.64922E 03	0.10000E 01
0.50872E 01	0.46022E 02	0.20773E 04	0.99831E 00
0.23613E 01	0.89437E 02	0.68416E 04	0.99968E 00

MINIMUM CRITICAL MASS IS 0.64922E 03 KILOGRAMS

CASE HLW,FWR-PP,100000,S,S,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10960E 02	0.16133E 02	0.19277E 03	0.98519E 00
0.50872E 01	0.30194E 02	0.58662E 03	0.99751E 00
0.23613E 01	0.53935E 02	0.15519E 04	0.99884E 00
0.10960E 01	0.94233E 02	0.38417E 04	0.99972E 00

MINIMUM CRITICAL MASS IS 0.19277E 03 KILOGRAMS

CASE HLW,PWR-PP,10,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.75744E 01	0.20861E 02	0.99984E 00
0.53193E 01	0.13959E 02	0.60607E 02	0.99550E 00
0.24690E 01	0.24949E 02	0.16062E 03	0.99781E 00
0.11460E 01	0.43606E 02	0.39804E 03	0.99873E 00
0.53193E 00	0.76506E 02	0.99782E 03	0.99889E 00

MINIMUM CRITICAL MASS IS 0.20861E 02 KILOGRAMS

CASE HLW,PWR-PP,100,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.76468E 01	0.21465E 02	0.10001E 01
0.53193E 01	0.14108E 02	0.62571E 02	0.99541E 00
0.24690E 01	0.25285E 02	0.16720E 03	0.99774E 00
0.11460E 01	0.44438E 02	0.42128E 03	0.99864E 00
0.53193E 00	0.74740E 02	0.10878E 04	0.99889E 00

MINIMUM CRITICAL MASS IS 0.21465E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.76325E 01	0.21345E 02	0.99992E 00
0.53193E 01	0.14081E 02	0.62210E 02	0.99548E 00
0.24690E 01	0.25221E 02	0.16592E 03	0.99770E 00
0.11460E 01	0.44297E 02	0.41700E 03	0.99876E 00
0.53193E 00	0.74342E 02	0.10714E 04	0.99889E 00

MINIMUM CRITICAL MASS IS 0.21345E 02 KILOGRAMS

CASE HLW,PWR-PP,10000,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.74575E 01	0.19910E 02	0.10000E 01
0.53193E 01	0.13746E 02	0.57877E 02	0.99543E 00
0.24690E 01	0.24578E 02	0.15355E 03	0.99772E 00
0.11460E 01	0.42970E 02	0.38090E 03	0.99881E 00
0.53193E 00	0.75426E 02	0.95614E 03	0.99896E 00

MINIMUM CRITICAL MASS IS 0.19910E 02 KILOGRAMS

CASE HLW,PWR-PP,10,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11580E 02	0.10728E 02	0.60406E 02	0.99992E 00
0.54214E 01	0.20553E 02	0.19732E 03	0.99401E 00
0.25164E 01	0.39464E 02	0.64788E 03	0.99406E 00
0.11580E 01	0.77845E 02	0.23031E 04	0.99584E 00

MINIMUM CRITICAL MASS IS 0.60406E 02 KILOGRAMS

CASE HLW,PWR-PP,100,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11580E 02	0.10564E 02	0.57680E 02	0.99986E 00
0.54214E 01	0.20244E 02	0.18843E 03	0.99380E 00
0.25164E 01	0.39826E 02	0.61696E 03	0.99455E 00
0.11580E 01	0.76399E 02	0.21818E 04	0.99565E 00

MINIMUM CRITICAL MASS IS 0.57680E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11640E 02	0.10749E 02	0.64222E 02	0.99997E 00
0.54214E 01	0.21010E 02	0.21061E 03	0.99403E 00
0.25164E 01	0.40478E 02	0.69913E 03	0.99562E 00
0.11640E 01	0.80375E 02	0.25405E 04	0.99592E 00

MINIMUM CRITICAL MASS IS 0.64222E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,A-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11640E 02	0.13761E 02	0.13313E 03	0.99589E 00
0.54214E 01	0.27451E 02	0.46469E 03	0.99472E 00
0.25164E 01	0.54789E 02	0.17336E 04	0.99535E 00

MINIMUM CRITICAL MASS IS 0.13313E 03 KILOGRAMS

CASE HLW,PWR-PP,10,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.67840E 01	0.17024E 02	0.99975E 00
0.55374E 01	0.13174E 02	0.53034E 02	0.99222E 00
0.25703E 01	0.26479E 02	0.15791E 03	0.99541E 00
0.11930E 01	0.43174E 02	0.46685E 03	0.99664E 00
0.55375E 00	0.87338E 02	0.15454E 04	0.99663E 00

MINIMUM CRITICAL MASS IS 0.17024E 02 KILOGRAMS

CASE HLW,PWR-PP,100,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.59264E 01	0.10300E 02	0.10000E 01
0.55374E 01	0.10373E 02	0.30647E 02	0.99378E 00
0.25703E 01	0.19002E 02	0.83573E 02	0.99685E 00
0.11930E 01	0.34346E 02	0.21145E 03	0.99837E 00
0.55375E 00	0.61442E 02	0.53894E 03	0.99833E 00

MINIMUM CRITICAL MASS IS 0.10300E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.40194E 01	0.49229E 01	0.10000E 01
0.55374E 01	0.83240E 01	0.14366E 02	0.99385E 00
0.25703E 01	0.13150E 02	0.37441E 02	0.99751E 00
0.11930E 01	0.25943E 02	0.96250E 02	0.99907E 00
0.55374E 00	0.43140E 02	0.18624E 03	0.99983E 00
0.25703E 00	0.71712E 02	0.19777E 03	0.99999E 00

MINIMUM CRITICAL MASS IS 0.49229E 01 KILOGRAMS

CASE HLW,PWR-PP,10000,S,S,C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.45505E 01	0.47091E 01	0.10000E 01
0.55374E 01	0.83998E 01	0.13743E 02	0.99413E 00
0.25703E 01	0.14923E 02	0.35783E 02	0.99756E 00
0.11930E 01	0.25440E 02	0.82241E 02	0.99909E 00
0.55375E 00	0.42483E 02	0.17660E 03	0.99956E 00
0.25703E 00	0.70317E 02	0.37434E 03	0.99929E 00

MINIMUM CRITICAL MASS IS 0.47091E 01 KILOGRAMS

CASE HLW,PWR-PP,10,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.98435E 01	0.45947E 02	0.99953E 00
C.53378E 01	0.18214E 02	0.13511E 03	0.99607E 00
C.24776E 01	0.32204E 02	0.36975E 03	0.95790E 00
C.11500E 01	0.58921E 02	0.98542E 03	0.99836E 00

MINIMUM CRITICAL MASS IS 0.45947E 02 KILOGRAMS

CASE HLW,PWR-PP,100,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.17211E 02	0.51288E 02	0.99576E 00
C.53378E 01	0.18975E 02	0.15277E 03	0.99602E 00
C.24776E 01	0.34553E 02	0.42869E 03	0.95775E 00
C.11500E 01	0.62770E 02	0.11914E 04	0.99790E 00

MINIMUM CRITICAL MASS IS 0.51288E 02 KILOGRAMS

CASE HLW,PWR-PP,1000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.10456E 02	0.55073E 02	0.99982E 00
C.53378E 01	0.19425E 02	0.16388E 03	0.99619E 00
C.24776E 01	0.35393E 02	0.45976E 03	0.95778E 00
C.11500E 01	0.64297E 02	0.12805E 04	0.99820E 00

MINIMUM CRITICAL MASS IS 0.55073E 02 KILOGRAMS

CASE HLW,PWR-PP,10000,S,S,UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.11480E 02	0.72847E 02	0.99956E 00
C.53378E 01	0.21332E 02	0.21707E 03	0.99657E 00
C.24776E 01	0.38889E 02	0.61241E 03	0.95782E 00
C.11500E 01	0.70721E 02	0.17039E 04	0.99826E 00

MINIMUM CRITICAL MASS IS 0.72847E 02 KILOGRAMS

CASE HLW,PWR-UP,100000,S,S,U-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.10560E 02	0.36463E 02	0.22257E 04	0.10000E 01
0.50872E 01	0.73437E 02	0.84399E 04	0.99941E 00

MINIMUM CRITICAL MASS IS 0.22257E 04 KILOGRAMS

CASE HLW,PWR-UP,10,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.44919E 01	0.29395E 02	0.10000E 01
C.53193E 01	0.15749E 02	0.36090E 02	0.99949E 00
C.24690E 01	0.23545E 02	0.24059E 03	0.95746E 00
C.11460E 01	0.51415E 02	0.65250E 03	0.99811E 00
C.53193E 02	0.95265E 02	0.19265E 04	0.99863E 00

MINIMUM CRITICAL MASS IS 0.29395E 02 KILOGRAMS

CASE HLW,PWR-UP,100,S,S,P-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11460E 02	0.92242E 01	0.37675E 02	0.10010E 01
C.53193E 01	0.17206E 02	0.11351E 03	0.99513E 00
C.24690E 01	0.31709E 02	0.32974E 03	0.95703E 00
C.11460E 01	0.59817E 02	0.97679E 03	0.99719E 00

MINIMUM CRITICAL MASS IS 0.37675E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,S,S,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.88624E 01	0.33415E 02	0.10006E 01
0.53193E 01	0.16472E 02	0.00592E 02	0.99532E 00
0.24690E 01	0.30074E 02	0.24132E 03	0.99723E 00
0.11460E 01	0.54975E 02	0.79457E 03	0.99772E 00

MINIMUM CRITICAL MASS IS 0.33415E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,S,S,P=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11460E 02	0.75244E 01	0.20451E 02	0.99994E 00
0.53193E 01	0.13872E 02	0.59486E 02	0.99531E 00
0.24690E 01	0.24871E 02	0.15816E 03	0.99780E 00
0.11460E 01	0.43457E 02	0.39424E 03	0.99663E 00
0.53193E 00	0.76547E 02	0.99943E 03	0.99875E 00

MINIMUM CRITICAL MASS IS 0.20451E 02 KILOGRAMS

CASE HLW,PWR-UP,10,S,S,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11751E 02	0.79391E 02	0.99990E 00
0.54214E 01	0.22505E 02	0.25888E 03	0.99464E 00
0.25164E 01	0.43211E 02	0.15638E 03	0.99572E 00
0.11680E 01	0.46650E 02	0.11831E 04	0.99698E 00

MINIMUM CRITICAL MASS IS 0.79391E 02 KILOGRAMS

CASE HLW,PWR-UP,100,S,S,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.11974E 02	0.84083E 02	0.99979E 00
0.54214E 01	0.22993E 02	0.27605E 03	0.99464E 00
0.25164E 01	0.44450E 02	0.92580E 03	0.99557E 00
0.11680E 01	0.90089E 02	0.35773E 04	0.99714E 00

MINIMUM CRITICAL MASS IS 0.84083E 02 KILOGRAMS

CASE HLW,PWR-UP,1000,S,S,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13303E 02	0.11519E 03	0.99779E 00
0.54214E 01	0.25871E 02	0.19325E 03	0.99470E 00
0.25164E 01	0.51249E 02	0.14149E 04	0.99534E 00

MINIMUM CRITICAL MASS IS 0.11519E 03 KILOGRAMS

CASE HLW,PWR-UP,10000,S,S,A=0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11680E 02	0.13943E 02	0.13263E 03	0.99589E 00
0.54214E 01	0.27312E 02	0.46270E 03	0.99475E 00
0.25164E 01	0.54703E 02	0.17255E 04	0.99539E 00

MINIMUM CRITICAL MASS IS 0.13263E 03 KILOGRAMS

CASE HLW, PWR-UP, 10, S, S, C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.64212E 01	0.13231E 02	0.99912E 00
0.55374E 01	0.12003E 02	0.40115E 02	0.99322E 00
0.25703E 01	0.21915E 02	0.11332E 03	0.99637E 00
0.11930E 01	0.39424E 02	0.30621E 03	0.99773E 00
0.55375E 00	0.71970E 02	0.86472E 03	0.99755E 00

MINIMUM CRITICAL MASS IS 0.13231E 02 KILOGRAMS

CASE HLW, PWR-UP, 100, S, S, C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.43334E 01	0.56431E 01	0.10005E 01
0.55374E 01	0.82251E 01	0.16497E 02	0.99394E 00
0.25703E 01	0.15457E 02	0.43176E 02	0.99737E 00
0.11930E 01	0.27132E 02	0.10048E 03	0.99900E 00
0.55375E 00	0.45709E 02	0.22153E 03	0.99940E 00
0.25703E 00	0.70009E 02	0.48404E 03	0.99919E 00

MINIMUM CRITICAL MASS IS 0.56431E 01 KILOGRAMS

CASE HLW, PWR-UP, 1000, S, S, C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.46148E 01	0.49115E 01	0.10005E 01
0.55374E 01	0.85160E 01	0.14326E 02	0.99400E 00
0.25703E 01	0.15135E 02	0.37328E 02	0.99750E 00
0.11930E 01	0.25816E 02	0.85985E 02	0.99908E 00
0.55375E 00	0.43097E 02	0.18555E 03	0.99983E 00
0.25703E 00	0.71624E 02	0.39561E 03	0.99985E 00

MINIMUM CRITICAL MASS IS 0.49115E 01 KILOGRAMS

CASE HLW, PWR-UP, 10000, S, S, C-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11930E 02	0.45494E 01	0.47026E 01	0.10007E 01
0.55374E 01	0.83922E 01	0.13710E 02	0.99377E 00
0.25703E 01	0.14914E 02	0.35714E 02	0.99748E 00
0.11930E 01	0.25425E 02	0.82136E 02	0.99916E 00
0.55375E 00	0.42359E 02	0.17630E 03	0.99970E 00
0.25703E 00	0.70276E 02	0.37369E 03	0.99937E 00

MINIMUM CRITICAL MASS IS 0.47026E 01 KILOGRAMS

CASE HLW, PWR-UP, 10, S, S, UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.25190E 02	0.76907E 03	0.10001E 01
0.53378E 01	0.51233E 02	0.30158E 04	0.99699E 00

MINIMUM CRITICAL MASS IS 0.76907E 03 KILOGRAMS

CASE HLW, PWR-UP, 100, S, S, UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
0.11500E 02	0.25728E 02	0.91980E 03	0.10001E 01
0.53378E 01	0.55240E 02	0.37691E 04	0.99750E 00

MINIMUM CRITICAL MASS IS 0.91980E 03 KILOGRAMS

CASE HLW,PWR-UP,1000,S.S.UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.27209E 02	0.97037E 03	0.10001E 01
0.53378E 01	0.56618E 02	0.40583E 04	0.99766E 00

MINIMUM CRITICAL MASS IS 0.97037E 03 KILOGRAMS

CASE HLW,PWR-UP,10000,S.S.UNPAC-0

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11500E 02	0.24746E 02	0.73002E 03	0.10001E 01
0.53378E 01	0.49637E 02	0.27345E 04	0.99730E 00

MINIMUM CRITICAL MASS IS 0.73002E 03 KILOGRAMS

CASE NEPTUNIUM OXIDE IN WATER

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11110E 02	0.12491E 02	0.90692E 02	0.99922E 00

MINIMUM CRITICAL MASS IS 0.90692E 02 KILOGRAMS

CASE NEPTUNIUM OXIDE IN BRINE

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11110E 02	0.12451E 02	0.89842E 02	0.99928E 00

MINIMUM CRITICAL MASS IS 0.89842E 02 KILOGRAMS

CASE NEPTUNIUM OXIDE IN GRANITE

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11110E 02	0.58869E 01	0.44978E 02	0.99952E 00
0.51568E 01	0.18079E 02	0.12765E 03	0.98863E 00
0.23936E 01	0.35674E 02	0.45523E 03	0.99837E 00

MINIMUM CRITICAL MASS IS 0.44978E 02 KILOGRAMS

CASE NEPTUNIUM OXIDE IN SALT

DENSITY OF ACTINIDE COMPOUNDS IN SOLUTION (GM/CC)	CRITICAL RADIUS (CM)	CRITICAL MASS (KG)	MULTIPLICATION FACTOR
C.11110E 02	0.11664E 02	0.73861E 02	0.99954E 00
0.51568E 01	0.22219E 02	0.23697E 03	0.99550E 00
0.23936E 01	0.42529E 02	0.77129E 03	0.99670E 00
0.11110E 01	0.85014E 02	0.28595E 04	0.99759E 00

MINIMUM CRITICAL MASS IS 0.73861E 02 KILOGRAMS

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