HOKKAIDO UNIVERSITY

Title	A study on the nuclear characteristics of a Molten Salt Breeder Reactor
Author(s)	Shimazu, Yoichiro
Degree Grantor	東京大学
Degree Name	博士(工学)
Issue Date	1980-07
Doc URL	https://hdl.handle.net/2115/20037
Type	doctoral thesis
File Information	3.thesis.pdf

Hokkaido University Collection of Scholarly and Academic Papers : HUSCAP

A study on the nuclear characteristics of a Molten Salt Breeder Reactor

溶融塩増殖炉の核的特性に関する研究

By Yoichiro Shimazu

July 1980

A study on the nuclear characteristics of a Molten Salt Breeder Reactor

By Yoichiro Shimazu

ABSTRACT

Molten-salt breeder reactors (MSBRs) are being developped at Oak Ridge National Laboratory for the great possibilities they promise for generating low-cost nuclear power that could be expected in the conservation and utilization of natural resources such as thorium and uranium. The fluid fuel contained in these reactors, consisting of a mixture of UF_4 and ThF_4 dissolved in fluorides of beryllium and lithium, is circulated through the core moderated by graphite. This fuel composition is what distinguishes MSBRs from the present-day power reactors.

Study is made on the nuclear characteristics of this concept of reactors. First, the stability of the reactors during normal operation is reviewed. It is required to evaluate the transient xenon behavior from the point of view of reactivity control.

The analysis shows a lack of reactivity control capability of control rods during the period of xenon buildup after a reactor shutdown. This leads to the examination of reactivity control capability of fuel processing system integrated to the reactor system.

It is proved that the fuel processing system can be effectively used as a reactivity controller.

Then quantitative reactor safety evaluation for

nuclear and mechanical accidents is performed. The analysis shows that the MSBRs have excellent safety characteristics in virtue of its nuclear and thermal properties than the other types of reactors.

Finally, an evaluation is made of the fuel cycles and their costs with the variation of schemes such as with or without fuel processing system. The resulting fuel cycle costs range from 0.61 to 1.18 mill/kWh. The calculations indicate that somewhat lower fuel cycle costs can be expected from reactor operation in converter mode on ^{235}U makeup with fuel reprocessed in batches every 10 years to avoid fission product precipitation, than from operation as ^{233}U-Th breeder with continuous reprocessing.

Contents

Chapter 1 Introduction 1

1.1 General Description of a Molten Salt Breeder Reactor 1

1.2 Comparison of Nuclear Designs Between Light Water Reactors and the MSBR 7

1.3 Objective of the Study 9

Chapter 2 Stability Analysis on Normal Operations 11

2.1 Review on the Stability 11

2.2 Transient Xenon Analysis 13

2.2.1 Introduction

2.2.2 Method of Calculation

2.2.3 Sensitivity Study on Main Parameters

2.2.4 Results and Discussion

2.3 Conclusion 32

Chapter 3 Reactivity Control Capability of Fuel Processing System (FPS) 36

3.1 Introduction 36

3.2 Analysis of System 37

3.3 Results and Discussion 40

3.4 Conclusion 48

Chapter 4 Accident Analysis 51

4.1 Introduction 51

4.1.1 Safety Analysis

4.1.2 Criteria for Safety Analysis

4.2 Nuclear Safety Analysis 56

4.2.1 Introduction

4.2.2 Events of Reactivity Anormality

4.2.3 Model Used for Calculation

4.2.4 Results and Discussion

4.2.5 Conclusion

4.3 Mechanical Accident Analysis 90

4.3.1 Introduction

4.3.2 Statistics Consideration on the Initiation of the Accidents

4.3.3 Locked Rotor Accident Analysis

4.3.4 Results and Discussion

4.3.5 Conclusion

4.4 Summary and Recommendations 109

Chapter 5 Fuel Cycles and the Cost Analysis 113

5.1 Introduction 113

5.2 Method of Calculation of Fuel Composition Change 116

5.2.1 Basic Equations

5.2.2 Results of Calculations

5.2.2.1 Equilibrium Operation: Scheme A

5.2.2.2 ^{235}U Startup with Integrated Fuel Processing: Scheme B

5.2.2.3 ^{235}U Startup ^{235}U Addition without Integrated Fuel Processing: Scheme C

5.2.2.4 ^{235}U Startup and ^{235}U Addition without Integrated Fuel Processing but Continuous Removal of Fuel salt: Scheme D

5.3 Fuel Cycle Cost Evaluation 155

5.3.1 Assumptions for Fuel Cycle Cost Analysis

5.3.2 Useful Formulae

5.3.3 Fuel Cycle Cost Formation: Based on 30 years life

5.3.4 Equilibrium Fuel Cycle Cost: Scheme A

5.3.5 ^{235}U Startup to Approach Equilibrium: Scheme B

5.3.6 ^{235}U Startup ^{235}U Addition without Integrated Processing: Scheme C

5.3.6.1 3 year Discard Rate: Scheme C-1

5.3.6.2 6 year Discard Rate: Scheme C-2

5.3.6.3 10 year Discard Rate: Scheme C-3

5.3.7 ^{235}U Startup, ^{235}U Addition with continuous Removal of Fuel Salt: Scheme D

5.3.7.1 Removal Rate of 1/2 Inventory per Equivalent Full Power year: Scheme D-1

5.3.7.2 Removal Rate of 1/4 Inventory per Equivalent Full Power year: Scheme D-2

5.3.7.3 Removal Rate of 1/8 Inventory per Equivalent Full Power year: Scheme D-3

5.3.8 Total U-235 Necessary to Complete the Life

5.3.9 Thorium Required for 30 years Operation

5.4 Results and Discussion 172

5.5 Conclusion 177

Chapter 6 Summary and Conclusion 181

Acknowledgement 186

References 187

Appendix A Conceptual Design for a 1000MWe Single-Fluid Molten-Salt Breeder Reactor

A.1 History of Development A-1

A.2 General Discription A-4

A.3 Nuclear Characteristics A-7

A.4 Bubble Generator and Gas Seperator A-14

A.5 Fuel-Salt Processing System A-18

A.6 Primary Salt System A-21

A.7 Fuel-Salt Drain System A-24

Appendix B Program/Input and Output

B.1 Transient Xe Analysis B-1

Program B-2

Input B-5

B.2 Reactor Transient Analysis B-7

Program B-7

Input B-10

B.3 Fuel Cycle Analysis B-13

Programs

Inputs

B.4 Output Lists B-36

List of Table

Table 1-1 Relative assessment of reactor safety [43] (Best: 1, Worst: 5)

Table 1-2 Release to the environment from power reactors [43]

Table 2-1 Reactor parameters used in noble gas migration calculations [20]

Table 3-1 Fuel Salt Compositions

Table 4-1 Items related to reactivity changes in MSBR

Table 4-2 Physical constants and plant parameters

Table 4-3 Representative characteristics in transients

Table 4-4 Lapse of Time in which fuel temperature reaches the limit

Table 4-5 Initiating Probabilities

Table 5-1 Fuel Cycle of Molten Salt Reactors

Table 5-2 Reference reactor design data

Table 5-3 Equilibrium breeding cycle- Startup with equilibrium fuel Concentration from outset

Table 5-4 Startup with ^{235}U followed by approach to equilibrium cycle

Table 5-5 Startup with ^{235}U followed by ^{235}U addition without continuous processing

Table 5-6 Startup with ^{235}U followed by ^{235}U addition with continuous removal of fuel salt at rate of;

Table 5-7 Summary of fuel cycle cost analysis

Table A-1 Principal reactor design data

Table A-2 Isothermal Reactivity Coefficient

Table A-3 Salt pump for the 1000 MW(e) MSBR

List of Figures

Fig. 1-1 Simplified flow diagram of MSBR System[20)]

Fig. 2-1 Xe variations with main parameters

Fig. 2-2 Ratios of peak xenon to the equilibrium

Fig. 2-3 Xe buildup after startup

Fig. 2-4 Xe transient with load increase

Fig. 2-5 Xe transient with load reduction

Fig. 2-6 Xe buildup after shutdown

Fig. 2-7 Xe transient under change in load; Pattern A

Fig. 2-8 Xe transient under change in load; Pattern B

Fig. 3-1 Flowsheet of continuous salt-processing system for single-fluid MSBR based on flourination-reductive extraction and metal-transfer process

Fig. 3-2 Fuel concentration vs. duration of dilution

Fig. 3-3 Fuel concentration vs. duration of uranation

Fig. 3-4 Reactivity vs. duration of uranation and dilution

Fig. 3-5 L_iF-B_eF_2-ThF_4 system

Fig. 4-1 Larson-Miller plot of Hastelloy-N, Sheet 0.063 in. thick, heat-treated at 2,150 deg. F, rapid air-cooled

Fig. 4-2 Lumped parameter model of MSBR

Fig. 4-3 Power pulses produced by step insertion of 0.1, 0.3 and 0.5%$\Delta k/k$; At zero power critical condition (Cases A-1, A-2, and A-3)

Fig. 4-4 Power pulses produced by step insertion of 0.1, 0.3 and 0.5%$\Delta k/k$; At rated power (Cases C-1, C-2 and C-3)

Fig. 4-5 Reactor transient after step reactivity addition; Case A-1

Fig. 4-6 Reactor transient after step reactivity addition; Case A-2

Fig. 4-7 Reactor transient after step reactivity addition; Case A-3

Fig. 4-8 Reactor transient after ramp reactivity addition; Case B-1

Fig. 4-9 Reactor transient after ramp reactivity addition; Case B-2

Fig. 4-10 Reactor transient after ramp reactivity addition; Case B-3

Fig. 4-11 Reactor transient after step reactivity addition; Case C-1

Fig. 4-12 Reactor transient after step reactivity addition; Case C-2

Fig. 4-13 Reactor transient after step reactivity addition; Case C-3

Fig. 4-14 Reactor transient after ramp reactivity addition; Case D-1

Fig. 4-15 Reactor transient after ramp reactivity addition; Case D-2

Fig. 4-16 Reactor transient after ramp reactivity addition; Case D-3

Fig. 4-17 Reactor transient after locked rotor accident of one pump; Variable heat transfer coefficient

Fig. 4-18 Reactor transient after locked rotor accident of two pumps: Variable heat transfer coefficient

Fig. 4-19 Reactor transient after locked rotor accident of three pumps: Variable heat transfer coefficient

Fig. 4-20 Reactor transient after locked rotor accident of four pumps: Variable heat transfer coefficient

Fig. 4-21 Variation of heat transfer coefficient with primary salt flow rate in reactor core[24)]

Fig. 4-22 Reactor transient after locked rotor accident of one pump: Constant heat transfer coefficient

Fig. 4-23 Reactor transient after locked rotor accident of two pumps: Constant heat transfer coefficient

Fig. 4-24 Reactor transient after locked rotor accident of three pumps: Constant heat transfer coefficient

Fig. 4-25 Reactor transient after locked rotor accident of four pumps: Constant heat transfer coefficient

Fig. 5-1 Transmutation scheme of ^{232}Th and ^{235}U

Fig. 5-2 Procedure of calculation

Fig. 5-3 Uranium isotope inventories: ^{235}U startup to approach the equilibrium by Perry and Bauman

Fig. 5-4 Uranium isotope inventories: ^{235}U startup to approach the equilibrium

Fig. 5-5 Startup with ^{235}U followed by approach to equilibrium (Scheme B)

Fig. 5-6 Startup with ^{235}U followed by ^{235}U addition with no integrated fuel processing (Scheme C)

Fig. 5-7 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/2 inventory per equivalent full power year (Scheme D-1)

Fig. 5-8 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/4 inventory per equivalent full power year (Scheme D-2)

Fig. 5-9 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/8 inventory per equivalent full power year (Scheme D-3)

Fig. 5-10 Fuel cycle costs vs. fuel life

Fig. A-1 Plain view of MSBR vessel

Fig. A-2 Sectional elevation of MSBR vessel

Fig. A-3 Graphite moderator element for zone I

Fig. A-4 Preliminary concept of MSBR bubble generator

Fig. A-5 Schematic flow diagram of bubble removal and generation bypass in MSBR fuel salt stream

Fig. A-6 Sectional elevation of primary heat exchanger

Fig. A-7 Primary salt circulation pump

Chapter 1 Introduction

1.1 General Description of Molten Salt Breeder Reactor

The concept of molten-salt reactor technology was originated in 1947 as a heat source of a long ranged aircraft. The effort to pursue this concept has continued through the programs of Aircraft Nuclear Propulsion, Aircraft Reactor Experiment and Molten Salt Reactor Experiment.[1] The successful operation of the MSRE[2] and the substantial amount of research and development already accomplished on molten salt reactor materials[3)∿5)] and processes lead to complete a conceptual design for a 1000 MWe single-fluid molten salt breeder reactor.[20] The history of molten-salt reactors is described in detail in Appendix A-1.

The reference Molten Salt Breeder Reactor (MSBR) mentioned above operates on the Th-^{233}U cycle, with both fissile and fertile materials incorporated in a single-molten-salt mixture of the fluorides of lithium, beryllium, thorium, and uranium. This salt, with the composition $LiF-BeF_2-ThF_4-UF_4$ (71.7-16.0-12.0-0.3 mole %), has a liquidus temperature of 930°F (772°K), has good flow and heat transfer properties, and has a very low vapor pressure in the operating temperature range. It is also nonwetting and virtually noncorrosive to graphite and the Hastelly-N container material.

The 6.8 m-diam by 6.1 m high reactor vessel contains

graphite for neutron moderation and reflection, with the moderating region divided into zones of different fuel-to graphite ratios. As the salt flows upward through the passages in and between the graphite bars, fission energy heats it from about 1050°F (839°K) to 1300°F (978°K). Graphite control rods at the center of the core are moved to displace salt and thus regulate the nuclear power and average temperature, but these rods do not need to be fast scramming for safety purposes. Long-term reactivity control is made by adjustment of the fuel concentration.

The core neutron power density was chosen to give a moderator life of about four years, based on the irradiation tolerance of currently available grades of graphite. The specific inventory of the plant, including the processing system, is 1.508 kg of fissile material per MW(e), which, together with the breeding ratio of 1.06, gives an annual fissile yield of 3.3%. The heat-power system has a net thermal efficiency of over 44%, which makes a reactor plant of about 2250 MW(t) ample for a net electrical output of 1000 MW(e).

A simplified flow diagram of the MSBR is shown in Fig. 1-1. The primary salt is circulated outside the reactor vessel through four loops. (For simplicity, only one loop is shown in the figure.) Each circuit contains a single-stage centrifugal pump and a shell-and tube heat

exchanger. Tritium, xenon, and krypton are sparged from the circulating primary salt by helium introduced in a side stream by a bubble generator and subsequently removed by a gas separator. A 1-gpm (0.06 liter/sec) side stream of the primary salt is continuously processed to remove ^{233}Pa, to recover the bred ^{233}U, and to adjust the fissile content. A drain tank provides safe storage of the salt during maintenance operations.

The heat generated in the fuel salt in the core is transferred from the tube sides of the four primary heat exchangers to a countercurrent secondary salt passing through the shell sides.

More detailed description is seen in Appendix A.

The characteristics that distinguish the MSBR from the other reactor concepts are as follows:[7),8)]

1) An inherent breeder reactor that operates on Th-U fuel cycle.
2) Thermal reactor technology is applicable.
3) A liquid fuel reactor with continuous fuel loading and reprocessing that could result in high loading factor and effective protection against nuclear robbery and proliferation.
4) Molten salt fuel being chemically stable at normal pressure could resolve the difficulties associated with some of reactor safety and

Table 1-1 Relative assessment of reactor safety[43)]
(Best : 1, Worst : 5)

	Inventory of radioactivity	Loss of coolant/ Pump stop	Nuclear excursion	Fuel/ coolant reaction	Final containment	Total
MSBR	1	2	1	2	1	1.3
HTGR	3	2	2	2	1	1.9
CANDU	3	2	2	3	2	2.3
LWBR	3	4	3	3	3	3.2
GCFR	4	5	4	1	4	3.7
Weight	0.2	0.2	0.2	0.1	0.3	

Table 1-2 Release to the environment from power reactors[43)]

	Air (10^3 ton/y)	Thermal polution[a)] (%)	Radioactivity (10^4Ci/y)		Solid Waste Disposal (10^6ton/30y)
			Tritium	Kr-85	
LWR	3	209	2	40	0.04
LWBR	13	199	1	40	1
CANDU	0.2	240	10	0	1
HTGR	4.4	157	1	20	2
GCFR	0.2	163	1	30	0.04
LMFBR	0.2	150	1	30	0.04
MSBR	0.2	127	0.1[b)]	10	0.04

a) Heat released/Electricity generated

b) Estimated in 1975

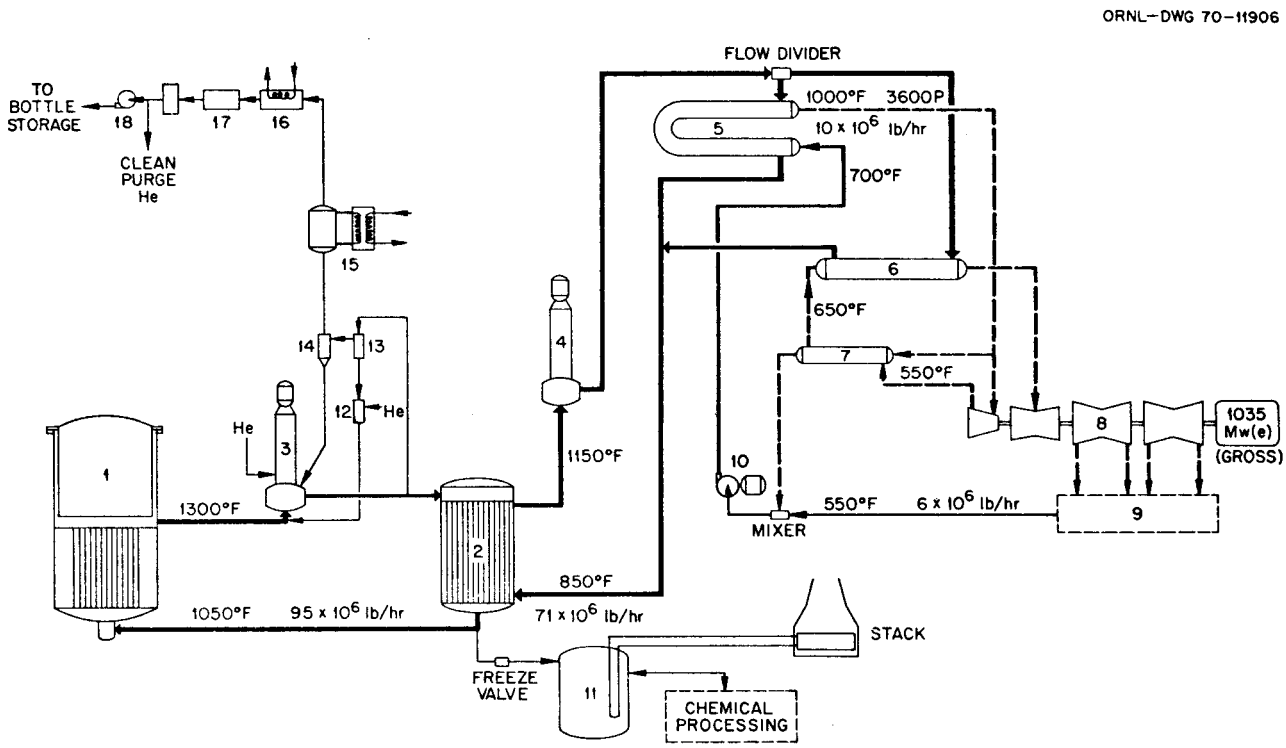


Fig. 1-1 Simplified flow diagram of MSBR system.[20)]

(1) Reactor, (2) Primary heat exchanger, (3) Fuel-salt pump, (4) Coolant-salt pump, (5) Steam generator, (6) Steam reheater, (7) Reheat steam preheater, (8) Steam turbine-generator, (9) Steam condenser, (10) Feedwater booster pump, (11) Fuel-salt drain tank, (12) Bubble generator, (13) Gas separator, (14) Entrainment separator, (15) Holdup tank, (16) 47-hr Xe holdup charcoal bed, (17) Long-delay charcoal bed, (18) Gas cleanup and compressor system.

Fig. 1-1 Simplified flow diagram of MSBR System[20)]

managemental problems related to solid fuel and could generate electricity safely and economically as shown in Table 1-1.

5) A quantity of pultonium necessary to operate a sodium-cooled Fast Breeder Reactor could operate three MSBRs of the same capacity. From this point of view MSBR could be a kind of pultonium burner so that the problem of plutonium accumulation could also be resolved.

6) Not only ^{233}U but also ^{235}U or ^{239}Pu could initially be utilized. ^{239}Pu being utilized, it can result in higher breeding ratio due to its high value of ν.

7) Less radioactive waste disposal are expected as shown in Table 1-2.

8) High thermal efficiency such as 44% could contribute reducing thermal polution as shown in Table 1-2.

1.2 Comparison of Nuclear Designs between Light Water Reactors and the MSBR

A comparison in reactor design between present-day Light Water Reactors (LWRs) and the MSBR reveals the following differences. The nuclear characteristics of a MSBR remains unchanged throughout the entire reactor life and hence only the initial nuclear design fullfils

all the design requirements. On the other hand, for a LWR, the nuclear characteristics change during each fuel cycle as fuel burns. Hence the evaluation of nuclear parameters is necessary at representative points for each fuel cycle.[9)∿19)] In addition, fuel inspection, shuffling, loading and discharging of fuel assemblies at each of fuel cycle is required.

For an LWR, heat flux hot channel factors are limited from the point of view of fuel rod integrity. In other words, strict power distribution monitoring is required for insuring the safe operations. For the MSBR, no such local monitoring is required for reactor safely, but the macroscopic power level monitoring.

The problems such as densification of fuel pellets, pellet-clad interaction and fuel rods bow observed in LWRs do not exist in the MSBR. Also for the MSBR, consideration on the neutron absorption by xenon is not a serious problem as in a LWR because the inventory of xenon in the reactor is reduced to a very low level by fuel processing system, which is incorporated in the reactor system.

As we can see above, we can conclude that nuclear design of the MSBR is considered simpler when compared with that of an LWR.

1.3 Objective of the Study

As described above the MSBR has many advantageous characteristics. However, in order to realize the concept, a detailed quantitative evaluation or assessment in every areas of the concept is indispensable. From this point of view, a study is made on the essential items for nuclear power system such as stability and controlability, safety and economy.

The results obtained through the evaluation can clarify the characteristics of the MSBR and set a developmental program workable for the future.

In chapter 2, reactor stability with special interest in transient xenon behavior during normal operation is described.

In chapter 3, reactivity control capability of Fuel Processing System is analysed.

In chapter 4, reactor safety is analyzed for the abnormal transients both for nuclear and mechanical accidents.

In chapter 5, feasibility of a several kinds of fuel cycles and their fuel cycle costs are evaluated. It is quite important for Japan having less natural resources to diversify her energy resources. Especially, the MSBR can be operated on variety of fuel schemes.

The summary of the study is described in chapter 6.

To achieve the objective, we make this study on the conceptual design of 1000 MWe MSBR[20] as reported by ORNL in 1971.

Chapter 2 Stability Analysis on Normal Operations

2.1 Review on the Stability

In studies of dynamic characteristics of the Molten Salt Reactor Experiment (MSRE) and of prospective molten-salt power reactors, several complementary techniques have been used[21], including analysis of frequency response and of transient response to various perturbations. Stability has been studied by several standard techniques and sensitivity studies have explored the effect on stability of variations in important properties of the systems.

All of these studies have shown the MSRE and the MSBR designs to be stable, tractable system, with stability typically increasing with increasing power level over the range of design power.

In order to test the validity of these models, an extensive series of dynamic tests was carried out at the MSRE, with both ^{235}U and ^{233}U fuel.[22] The tests, like the theoretical studies, included transient response and frequency response characteristics. The good agreement between measured and theoretical results is evidence of the reliability of the computational models employed.

The studies of the dynamics and control of the MSBR system including secondary heat exchanger and steam generator have shown good stability and controlability.[22] The control system analyzed in this study was such that steam

temperature control was accomplished by varying the secondary salt flow rate and reactor temperature control was accomplished by applying the load demand signal directly to the reactor outlet temperature controller as well as the steam generator.

On the other hand, the hydraulic stability of the reactor itself is assured from the following fact that the vapor pressure of the fuel salt at operating temperatures is less than 1 mm Hg. In other words, no boiling occurs and hence no hydraulic instability is concerned.

The last problem that cannot be dispensable for thermal reactor stability is that of xenon. For solid fuel reactors such as LWRs it is necessary to evaluate the stability of spatial oscillations and reactivity changes caused by xenon variations.[25)∿30)] In the MSBR, no spatial distribution of xenon in the fuel salt exists and hence no spatial oscillations exist. The reactivity changes caused by transient operations has not been quantitatively evaluated.

Based on the review above, transient xenon analysis which is the only one area to be investigated is made in the following chapter.

2.2 Transient Xenon Analysis

2.2.1 Introduction

An annexed processing plant that continuously removes protactinium and fission products from the fuel salt is a basic feature of the system, which distinguishes the MSBR from the present-day power reactors. This plant contributes to reducing ^{135}Xe poisoning to a level far below those found in the current power reactors. According to Ref.(20), the "poison fraction", which is defined as the number of neutrons absorbed by ^{135}Xe divided by the total number of neutrons (fast and thermal) absorbed by ^{233}U, is evaluated or designed to be 0.56%. In power reactors operating today, this fraction is about 4%, which occasionally necessitates analysis of xenon behavior, especially under transient conditions such as start-up, load increase and decrease, shut-down, restarting, and variations of load.

With the MSBR, while the processing plant mentioned above will serve to hold the general level of poison fraction quite low, transient xenon analysis is still indispensable for detailed evaluation of the reactivity balance under transient conditions. This is what inspired the present author to undertake an analysis, by point reactor model, of the xenon behavior under certain conditions of transient operation. Some of the results obtained are presented in what follows, comparisions being made with

corresponding results for a typical PWR.[31)]

2.2.2 Method of Calculation

In order to evaluate the poison fraction, we need to know the ^{135}Xe concentrations in the fuel salt, in the bubbles and in the graphite. According to Robertson and Kedel et al.[32)], the steady-state analytical model involves rate balance on the ^{135}Xe and ^{135}I in the fuel salt and a fuel loop with the characteristics of a well-stirred pot:

Iodine generating rate = Iodine decay rate

Xenon generating rate = Rate of decay in salt + Rate of burnup in salt + Rate of migration into graphite + Rate of migration into circulating bubbles,

where

Rate of migration into graphite = Rate of decay in graphite + Rate of burnup in graphite,

and

Rate of migration into circulating bubbles = Rate of decay in bubbles + Rate of burnup in bubbles + Rate of stripping from bubbles.

In transient state, the rates of increase or decrease are determined by the amount of unbalance between the left- and right-hand sides of the equations given above:

$$V_S \frac{dC_I^S}{dt} = Y_I \Sigma_f \phi V_C - \lambda_I C_I^S V_S \qquad 2-1$$

$$V_S \frac{dC_X^S}{dt} = Y_X \Sigma_f \phi V_C + V_S(\lambda_I C_I^S - \lambda_X C_X^S) - \sigma_a^X \phi C_X^S V_C \qquad 2-2$$

$$-XGF - XBF,$$

where

C_I^S : Iodine number density in fuel salt

C_X^S : Xenon number density in fuel salt

Y_I : fission yield of iodine

Y_X : fission yield of xenon

λ_I : decay constant of iodine

λ_X : decay constant of xenon

ϕ : neutron flux

Σ_f : macro-fission cross section of fuel

V_S : fuel volume of primary loop

V_C : fuel volume in reactor

σ_a^X : micro-absorption cross section of xenon

XGF : rate of Xe migration into graphite

XBF : rate of migration into circulating bubbles

Xe migration into graphite

Each graphite core block will be assumed to be a hollow cylinder, which can be considered a good compromise to reconcile the reference design with the requirement to simplify computation. The diffusion of Xe inside the cylindrical core block is governed by the relation.

$$\frac{dC_G}{dt} = \frac{D_G}{\varepsilon}\left(\frac{d^2C_G}{dr^2} + \frac{1}{r}\frac{dC_G}{dr}\right) - (\sigma_a^X \phi + \lambda_X)\, C_G, \qquad 2 - 3$$

the boundary condition being continuity of Xe flux at the surface. The Xe flux in the graphite at the surface is given by

$$\text{Flux}^{X}_{r = r_I,\ r_0} = \frac{D_G}{\varepsilon}\left(\frac{dC_G}{dr}\right)_{r = r_I,\ r_0} \qquad 2 - 4$$

The Xe flux can also be represented by

$$\text{Flux}^{X}_{r = r_I,\ r_0} = h_m \left(C_X^S - \frac{HRT}{\varepsilon} C_G\right)_{r_I,\ r_0} \qquad 2 - 5$$

$$XGF = \text{Flux}^{X}_{r = r_I,\ r_0} \times \text{(Surface area of graphite cylinder)},$$

where

C_G : xenon number density in graphite

D_G : diffusivity of xenon

ε : void fraction in graphite

h_m : mass transfer coefficient

H : constant of Henry's law for xenon in fuel salt

R : universal gas constant

T : absolute temperature

r_I : inner radius

r_0 : outer radius

Rate of Xe migration into circulating bubbles

The rate of Xe migration into the circulating bubbles is given by

Rate of migration into bubbles (XBF) = $h_B A_B (C_X^S - C_{Si}^X)$.

The salt film presents by far the most preponderant resistance; and hence the Xe concentration in the bubble should be uniform and at equilibrium with the concentration in salt at the interface. Consequently the corresponding Xe flux equation can be written in the form

$$XBF = h_B A_B (C_S^X - HRT\, C_B^X) ,$$

where

h_B : mass transfer coefficient

A_B : total bubble surface area

C_B^X : xenon number density in bubble

C_{Si}^X : xenon number density at bubble interface

Therefore,

$$V_S\psi \frac{dc_B^X}{dt} = XBF - \sigma_a^X \phi C_B^X V_C\psi - \lambda_X C_B^X V_S\psi - SC_B^X V_S\psi$$

$$= h_B A_B (C_S^X - HRT\, C_B^X) - \sigma_a^X \phi C_B^X V_C\psi$$

$$- \lambda_X \psi C_B^X V_S - S C_B^X V_S \psi \ , \qquad 2 - 6$$

where

S : rate of Xe stripping from bubbles

ψ : overall void fraction of bubbles

These and the other assumptions and considerations adopted in the foregoing calculations are common to those used by Kedel et al. in Ref. 32), except that the reactor is expressed by an equivalent one point model.

The xenon behavior in the individual elements can now be determined for a given set of initial conditions: The coupled differential equations presented above are solved for C_S^X, C_B^X and $C_G^X(r)$, and the final solutions is obtained by numerical integration over the relevant time and space. A time mesh of 60 sec is chosen, while the space meshes adopted are 0.007cm (x3) and 0.306cm (x14) respectively for the surface and for the bulk of the graphite.

The validity of the foregoing method has been verified by comparing the results for steady state with those given by Robertson[20], the agreement proving to be within ±2%. The reactor parameters used here are listed in Table 2 - 1. The mass transfer coefficients have been evaluated from the established relationship for heat transfer coefficients using the heat-transfer/mass-transfer analogy.[32] The values thus obtained for these coefficients range from about 0.0025 to 0.0085cm/sec, varying with the combinations of parameters.

Table 2-1 Reactor parameters used in noble gas migration calculations [20]

Reactor power (MWt)	2,250
Salt volume in fuel loop (m^3)	40.1
Total fuel-salt flow rate (m^3/min)	218.3
Total volume of core zones I and II (m^3)	52.41
Total volume of annulus and plenums (m^3)	14.22
Graphite surface area in core zones I and II (m^2)	2,304
Graphite surface area in annulus and plenums (m^2)	65.6
Average salt fraction in zones I and II (%)	16
Salt fraction in annulus and plenums (%)	100
Average thermal-neutron flux (n/sec·cm^2)	
In zones I and II	4.0×10^{14}
In annulus	3.0×10^{13}
Average fast-neutron flux (n/sec·cm^2)	
In zones I and II	6.3×10^{14}
In annulus	2.0×10^{14}
Total ^{233}U absorption cross section (b)	
For thermal-neutrons	263.1
For fast-neutrons	32.5
Effective ^{233}U concentration in fuel salt (atoms/b·cm)	8.41×10^{-5}
Henry's law constant for Xe in fuel salt (Xe mol/atm·cm^3)	2.75×10^{-9}
Graphite diffusion coefficient and void fraction	
Diffusion coefficient (cm^2/sec)	
Surface	0.258×10^{-8}
Bulk	0.258×10^{-5}
Void fraction (%)	
Surface	0.32
Bulk	10.
Bubble mass transfer coefficient (cm/sec)	0.01693

These parameters may not in all cases be exactly equal to those used in the MSBR reference design, but the differences would have small effect on the overall conceptual design.

We chose a value of 0.00675cm/sec to obtain the target poison fraction of 0.56%, cited earlier; this fraction, besides, does not change sensitively with variation of the mass-transfer coefficients around the chosen value. The above value can be considered reasonable also form the fact that it is not far from mid-range between 0.0025 and 0.0085.

2.2.3 Sensitivity Study of Main Parameters

The poison fraction is greately affected by two parameters; one is the diffusion coefficient of xenon at the surface of graphite moderator. The other one is the volume fraction of helium bubbles.

We examin the effect of the deviations of these parameters from the nominal values. The case chosen for this sensitivity study is that of the peak xenon buildup after shotdown following full power operation. The diffusion coefficient ranges from 0.258×10^{-9} to 0.258×10^{-7} cm^2/sec and volume fraction varies from 0.1 to 0.4%.

The results are plotted in Fig. 2 - 1 and Fig. 2 - 2. From these figures we can see that the ratio of peak xenon and the equilibrium xenon changes slightly with volume fraction for a diffusion coefficient. Hence the ratio can be predicted from that obtained for nominal values. In other words, the sensitivity of transient xenon can be

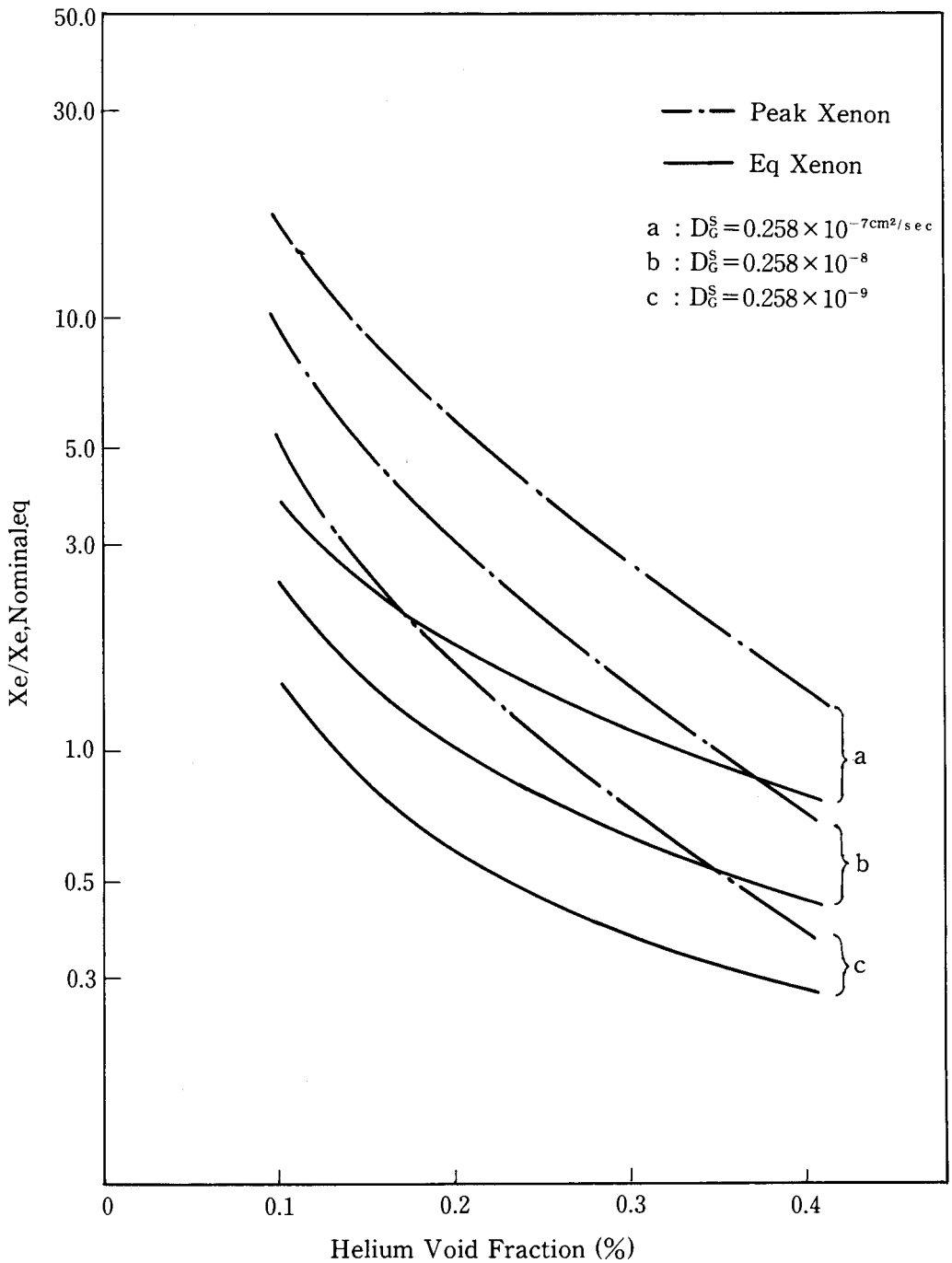


Fig. 2-1 Xe variations with main parameters

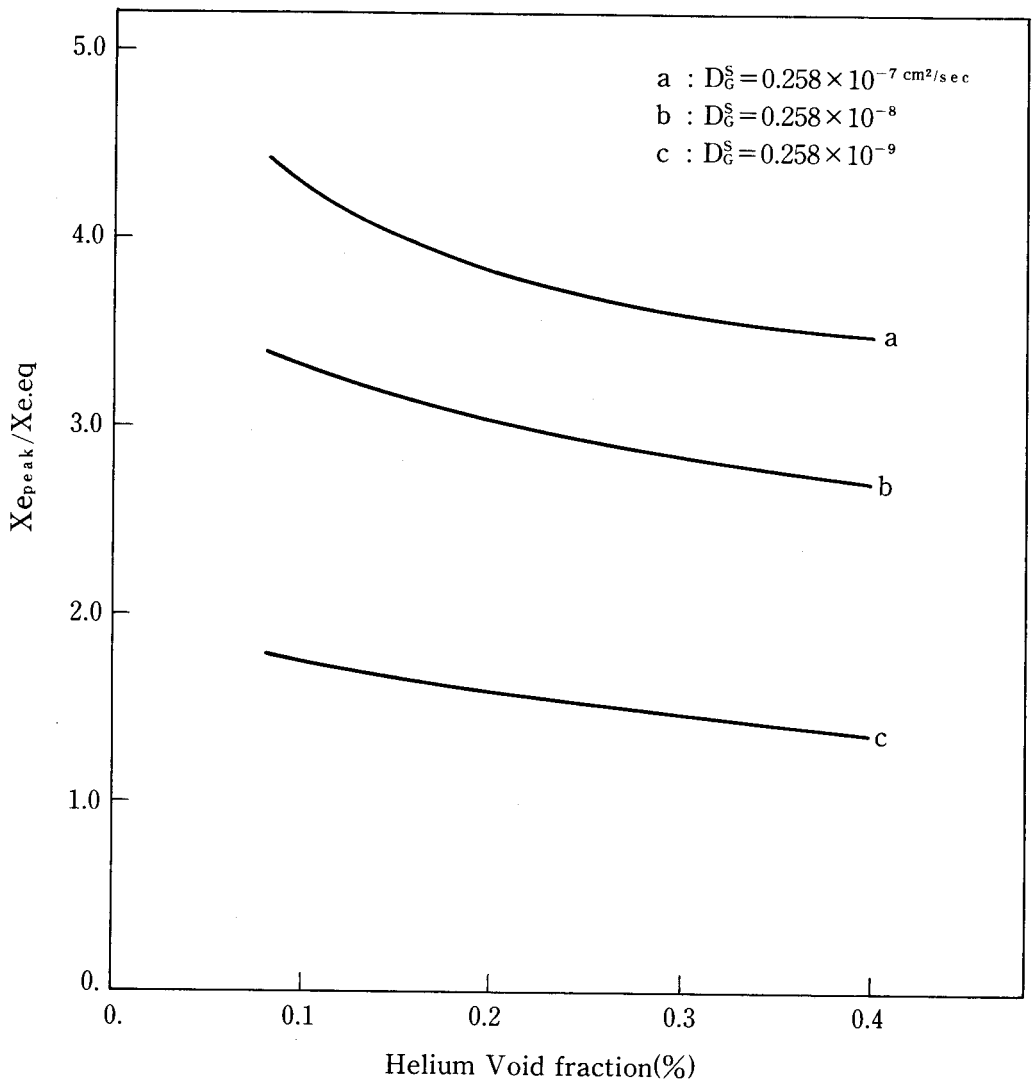


Fig. 2-2 Ratios of peak xenon to the equilibrium

predicted from the results of sensitivity study for steady state.

2.2.4 Results and Discussion

The transient xenon behavior is estimated for the following operations.

(1): Startup with constant power level.

(2): Step rise of load from equilibrium state at various levels of partial load.

(3): Step lowering of load from equilibrium at full power to various levels of partial load.

(4): Shutdown from equilibrium at various load levels.

(5): Routine variations of output: Exemplified in two representative patterns of load variation.

We adopt as measure of change in operating condition the ratio of total xenon actually present in the core in reference to that under equilibrium condition. This enable us to omit consideration of the flux distribution in the core in evaluating the reactivity, since in the MSBR the flux distribution will not be strongly dependent on power level. Hence the reactivity can be easily determined by multiplying the ratio with the reactivity at equilibrium with full power. These ratio vs. time are plotted in Figs. 2-3 ∿ 2-8, together with those for the corresponding operation with a typical PWR. It is seen that in the MSBR, the

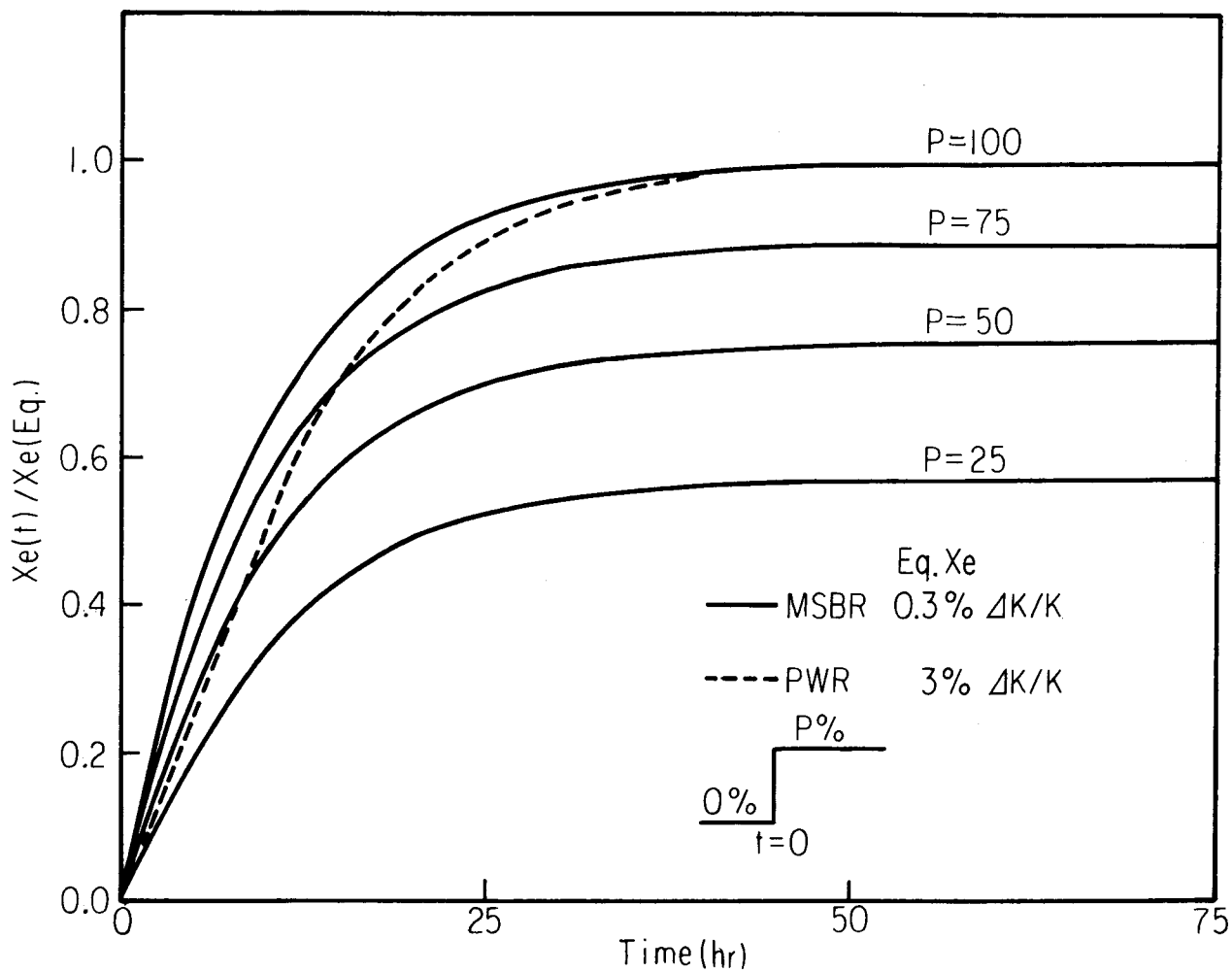


Fig. 2-3 Xe buildup after startup

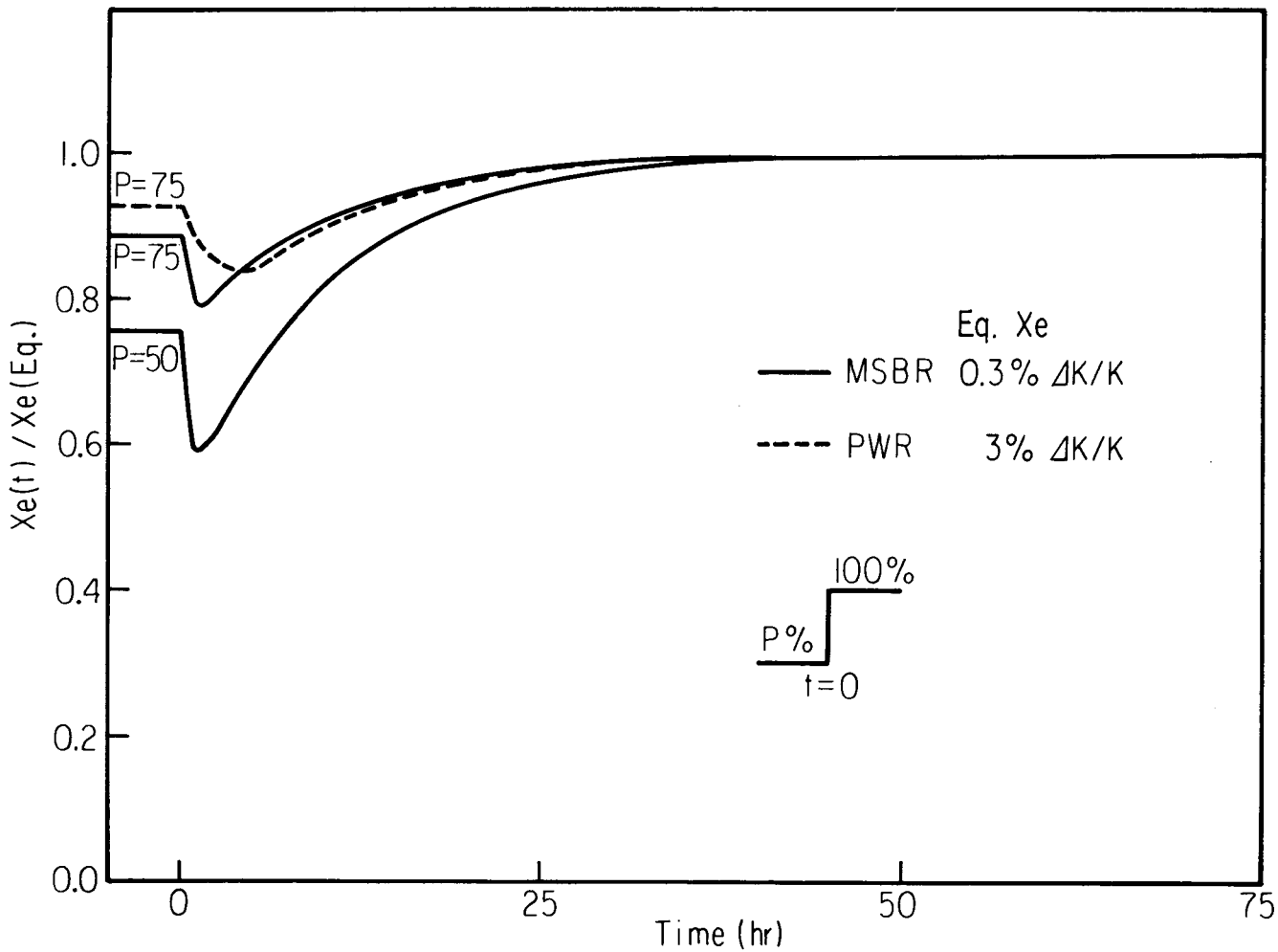


Fig. 2-4 Xe transient with load increase

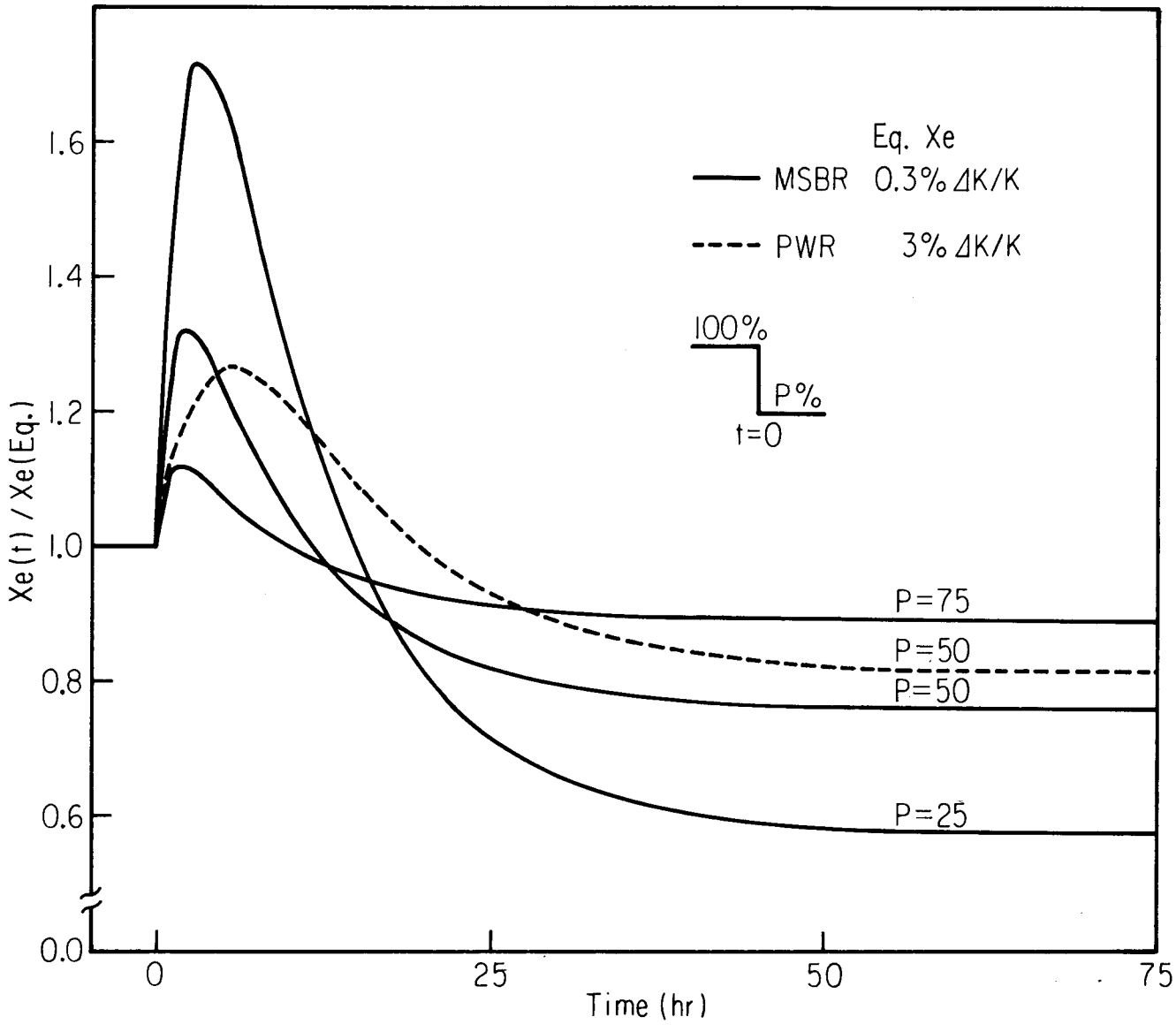


Fig. 2-5 Xe transient with load reduction

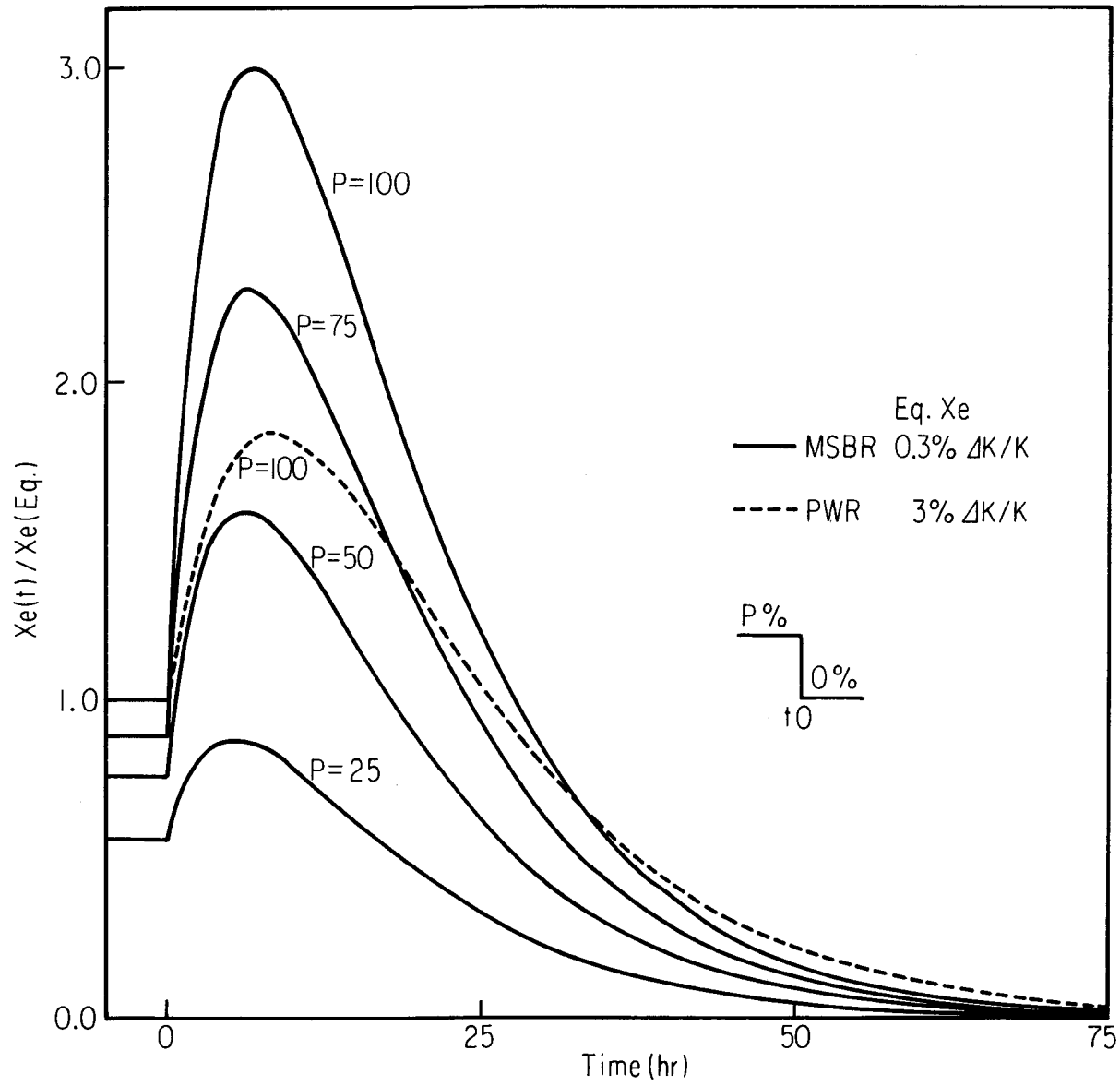


Fig. 2-6 Xe buildup after shutdown

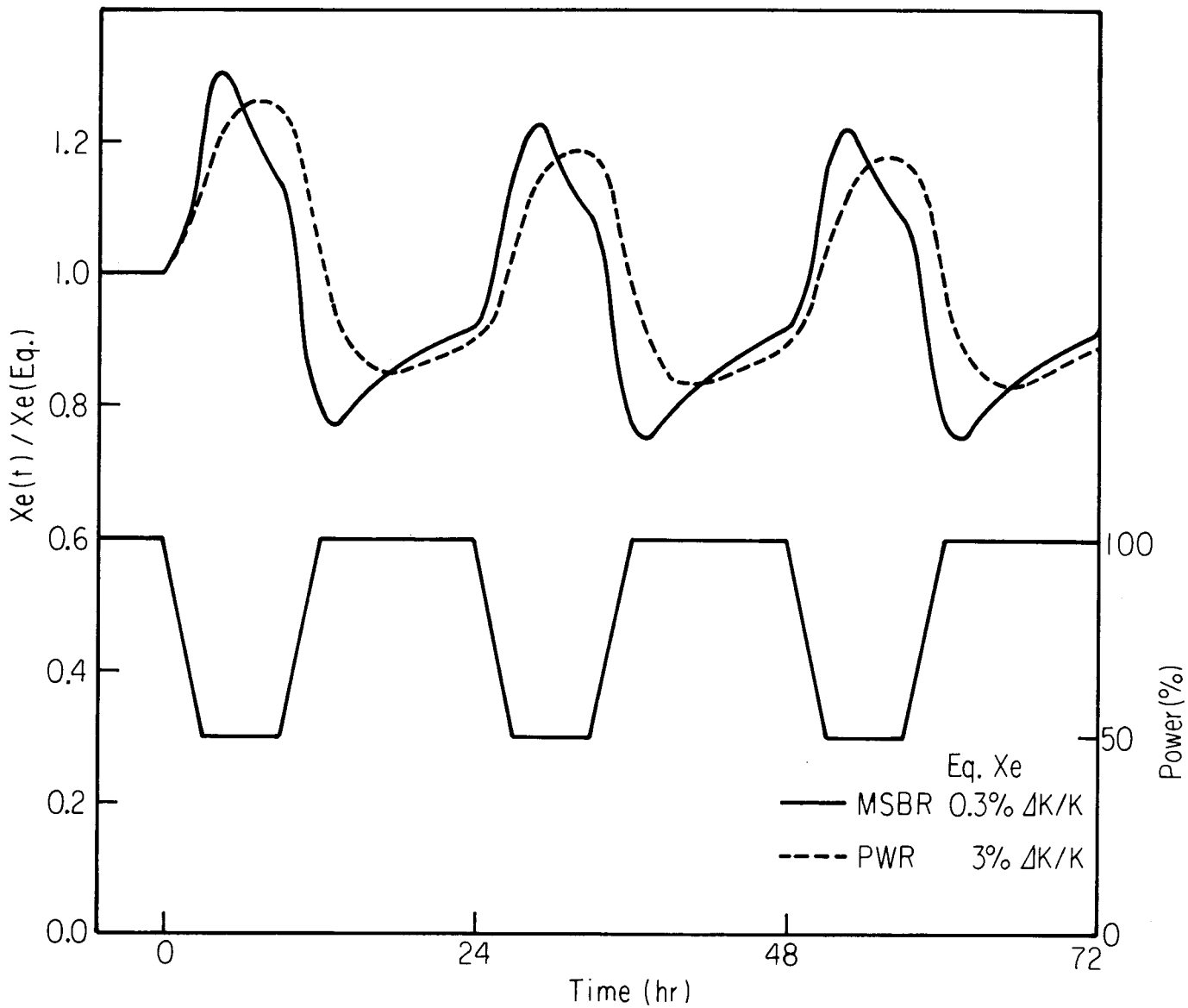


Fig. 2-7 Xe transient under change in load; Pattern A

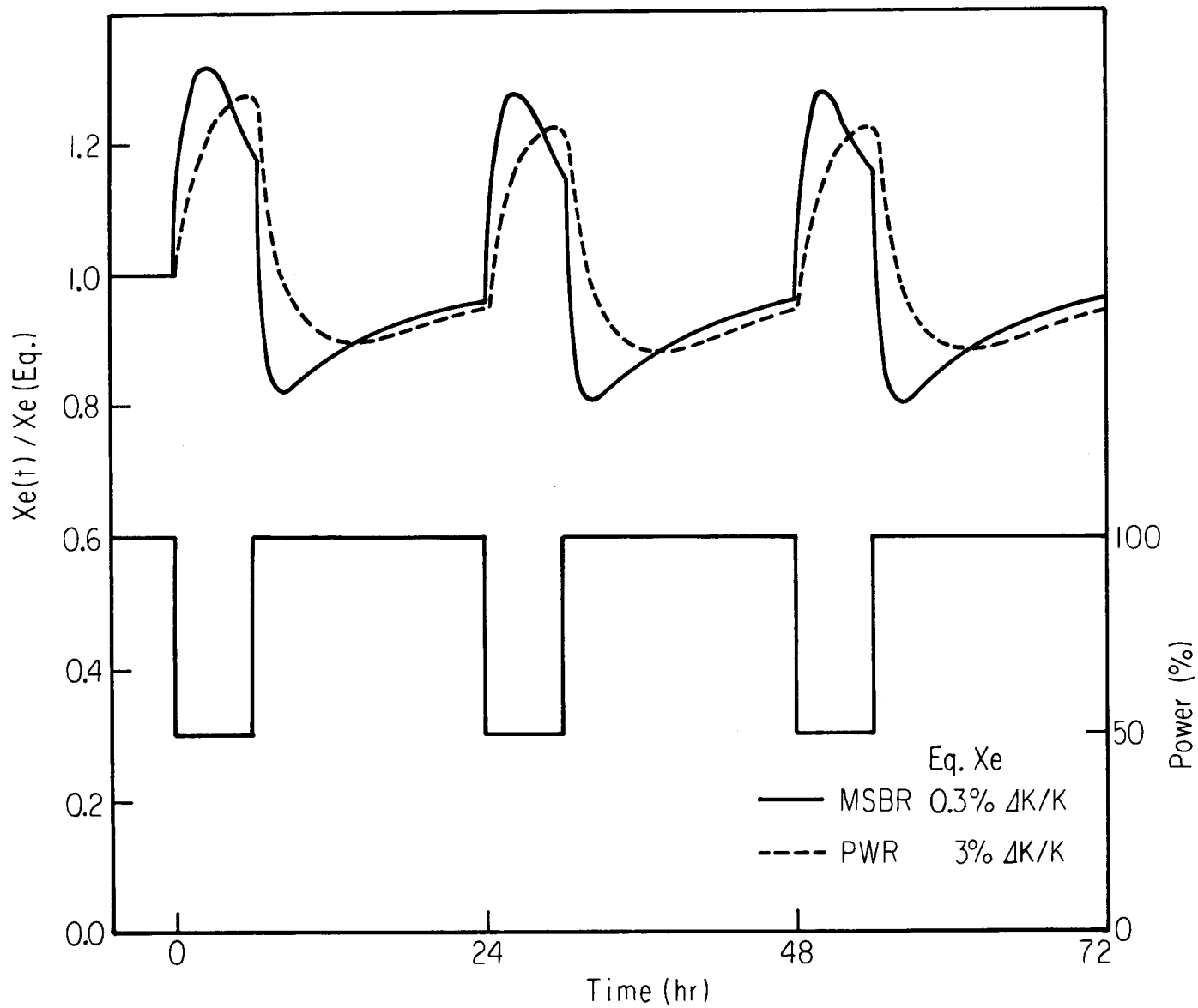


Fig. 2-8 Xe transient under change in load; Pattern B

xenon behavior is quite sensitive to power change. This is mainly due to the higher thermal neutron flux in the core. The other characteristics are not very different from those of the PWR notwithstanding the fact that in the MSBR the xenon behavior is affected not only by diffusion but also by migration processes into the circulating bubbles and into the graphite.

The reactivity coefficient is related to poisoning by a constant, which is a function only of the nuclear parameters. This constant can be determined from the neutron balance:[20]

$(\Delta K/K) = -0.45P$, where P is the poison fraction.

Generally speaking, the xenon transient in thermal reactors tends to rapidly amplify the reactor perturbation. For instance, the insertion of a negative reactivity to reduce power level will cause an increase of the Xe content, which will in turn further reduce the power level. This accentuation of the perturbation is clearly evidenced in Figs. 2-4 ∿ 2-8.

It is also to be noted that the accentuating process is quite rapid in the MSBR.

The total equilibrium xenon effect at full power is about 0.3% $\Delta K/K$; the total worth of control rods is also 0.3% $\Delta K/K$[20]. There is besides a reactivity change of about 0.075% $\Delta K/K$[20] due to increase of the mean temperature of the

salt from startup to full-load conditions.

These values indicate that for normal operation, the core reactivity can well be regulated by control rod movement alone. This finding substantiates what has been reported by Sides[23] and Sides, Jr.[24], though the actual behavior of the control rods and the process of reactivity control are quite different, in that these previous authors did not take the transient xenon effect into account in calculating the reactivity.

Another point to be noted is that during shutdown, xenon buildup* will result in negative reactivity that far exceeds what can be overcome by control rods insertion, so that, during a certain period after shutdown, restarting will not be possible without additional means of reactivity control to supplement the action of the control rods. The required initial boost could be provided when necessary by the fuel salt processing system, which could be utilized to increase the quantity of ^{233}U contained in the fuel salt. This additional flexibility made available for controlling the reactivity should thus prove indispensable in the routine operation of such reactors.

---

* This large buildup of xenon during shutdown is due to the high concentration of iodine in the fuel salt. The number density of iodine is about 100 times that of xenon at equilibrium at full power.

2.3 Conclusion

Review of the results of stability evaluation has shown that the MSBR is very stable and tractable. It is found, however, that the analysis on transient xenon has not been made enough which cannot be dispensable for stability evaluation of thermal reactors.

With the xenon removal system arranged as proposed in the reference design (See Appendix A-4, in detail), the target poison fraction of 0.5% at the equilibrium can be attained with an average circulating void fraction of only 0.2% and graphite coating with a permeability of 10^{-8} cm^2/sec of only a few mils thick.

We have examined by calculation the behavior of xenon in the MSBR operated under certain transient conditions, and the results have been compared with the corresponding behavior of PWRs'. The two types of reactors were found to behave in a manner unexpectedly similar to each other despite the additional processes of migration into circulating bubbles and into the graphite, which are involved in the MSBR besides that of diffusion. The principal difference was seen in the more sensitive reactivity of the MSBR to change in power.

The transient xenon poisoning was found to be kept to a level that could be overridden by control rods movement alone in all normal transient operations. After a

temporary shutdown, however, the xenon buildup will soon exceed the level overridable by control rods insertion alone. Hence some other kinds of systems should favarably be required. From this point of view, the fuel processing system (See Appendix A-5, in detail) is evaluated if it can be employed not only for long-term reactivity adjustment but also for short-term regulation of xenon swing, and thus be needed for flexibility to the available means of reactivity adjustment in the MSBR. This is described in the following chapter.

Nomenclature

Chapter 2

A_B	:	total bubble surface area	(cm^2)
C_B^X	:	xenon number density in bubble	(n/cm^3)
C_G	:	xenon number density in graphite	(n/cm^3)
C_I^S	:	iodine number density in fuel salt	(n/cm^3)
C_{Si}^X	:	xenon number density at bubble interface	(n/cm^3)
C_X^S	:	xenon number density in fuel salt	(n/cm^3)
D_G	:	diffusivity of xenon in graphite	(cm^2/sec)
H	:	constant of Henry's law for xenon in fuel salt	(atoms/b·cm)
h_B	:	mass transfer coefficient into bubbles	(cm/sec)
h_m	:	mass transfer coefficient into graphite	(cm/sec)
PF	:	poison fraction	(-)
R	:	universal gas constant	(cm^3·atom/°k·mol)
r_I	:	inner radius of graphite bar	(cm)
r_O	:	outer radius of graphite bar	(cm)
S	:	rate of xenon stripping from bubbles	(-)
T	:	absolute temperature	(°k)
Vc	:	fuel salt volume in reactor	(cm^3)

V_S	:	fuel salt volume of primary loop	(cm^3)
XBF	:	rate of xenon migration into circulating bubbles	(n/sec)
XGF	:	rate of xenon migration into graphite	(n/sec)
Y_I	:	fission yield of iodine	(n/fission)
Y_X	:	fission yield of xenon	(n/fission)
ε	:	void fraction in graphite	(-)
ψ	:	overall void fraction of bubbles	(-)
ϕ	:	neutron flux	($n/cm^2 \cdot sec$)
λ_I	:	decay constant of iodine	(sec^{-1})
λ_X	:	decay constant of xenon	(sec^{-1})
Σ_f	:	macro-fission cross section	(cm^{-1})
σ_α^X	:	micro-absorption cross section	(b)

Chapter 3 Reactivity Control Capability of Fuel Processing System (FPS)

3.1 Introduction

The He-bubble recirculating system removes the inert gas and its burden of fission product with nearly 100% stripping efficiency. The fission products thus removed consist principally of Xe, Kr, tritium and exceedingly small particles of noble metals. While the Xe contained in the salt circulating through the 10% bypass flow of this system is stripped with very high efficiency, there still remains the Xe present in the bulk of the fuel salt and in the graphite moderator in the reactor. The negative reactivity exerted by this Xe is comparable to the that of the whole number of control rods.[20] The reactivity swing caused by the Xe is known also to result from transient operations such as changes in output power and shutdown of the reactor.

In PWRs changes due to burnup, output variation and transient Xe are adjusted by regulating the concentration of boric acid introduced in the coolant or moderator as neutron absorber. ("Chemical Shim Control System"-CSCS).

We will discuss in what follows the similarities found between the FPS of the MSBR and the CSCS of the PWR after which we will evaluate the capability of the FPS as means of adjusting the primary system reactivity, by seeking answers to the following questions:

(1) How quickly can FPS modify the reactivity?

(2) What are the limiting conditions on such action?

(3) What kinds of practical operation are expected to be required?

(4) Can FPS follow rapidly enough the reactivity swing caused by transient xenon?

3.2 Analysis of System

In PWRs the CSCS makes use of boric acid as medium to adjust the reactivity changes due to:

(1) Temperature change of coolant and fuel

(2) Burnup and fission product accumulation

(3) Transient Xe following power change

The methods commonly adopted for adjusting the boric acid concentration are as follows. For diluting boron in order to augment positive reactivity, the coolant is extracted, and at the same time an equal quantity of pure water is injected so as to maintain constant coolant inventory. The same operation, but with injection of extra rich boric acid solution instead of pure water ("boration"), serves the opposit purpose of raising boron concentration and adding negative reactivity to the primary system.

The flowsheet of the FPS, shown in Fig. 3-1 clearly brings out the similarity existing between the CSCS and the FPS in respect of the principles utilized for adjusting the concentration of specific components in fluid mixtures—boric

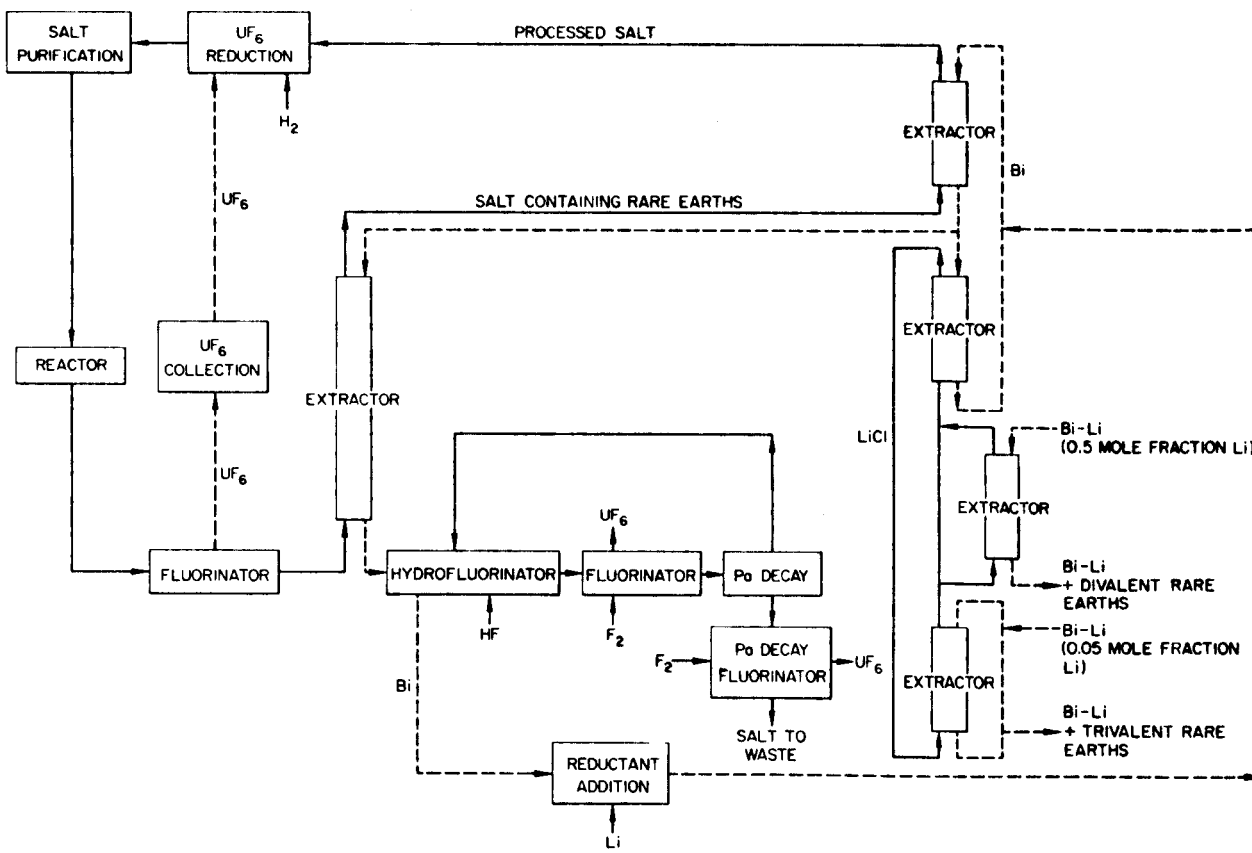


Fig. 3-1 Flowsheet of continuous salt-processing system for single-fluid MSBR based on flourination-reductive extraction and metal-transfer process

acid in the case of CSCS and U in the FPS. In the MSBR, negative reactivity is augmented by simply stopping the addition of U to the salt on its way back to the reactor, thus diluting the fuel. The opposite action of adding more uranium (uranation) raises the reactivity.

We now consider the rate of reactivity change. The equilibrium fuel concentration coefficient $(\Delta K/K)/(\Delta n/n)$, where n is atomic density, is known from calculation to be 0.42 for ^{233}U, 0.0027 for ^{235}U and 0.39 for total fissile U. (The particularly low coefficient for ^{235}U is due to the very small inventory of ^{235}U compared with ^{233}U.) Using these values of $(\Delta K/K)/(\Delta n/n)$, we can derive the reactivity change brought about by a given increment or decrement of U. These changes of U content are determined from the concentration, calculated in the following manner:

(1) Dilution

The fuel mass balance is expressed by

$$\frac{dC}{dt} = -\frac{\alpha}{V_s} C \qquad 3 - 1$$

Hence,

$$\frac{C}{C_o} = e^{-\frac{\alpha}{V_s} t} \qquad 3 - 2$$

where C : fuel concentration

C_o : initial fuel concentration

α : salt processing volume rate

V_s : total fuel volume in primary loop

(2) Uranation

Uranation is governed by the relation

$$\frac{dC}{dt} = \frac{\alpha}{V_s} U - \frac{\alpha}{V_s} C \qquad 3 - 3$$

Hence,

$$C = U + (C_o - U)\, e^{-\frac{\alpha}{V_s} t} \qquad 3 - 4$$

or

$$\frac{C}{C_o} = r - (r - 1)\, e^{-\frac{\alpha}{V_s} t} \qquad 3 - 5$$

where U : fuel concentration in salt returning to reactor

$r = \frac{U}{C_o}$: ratio of fuel concentration

In the above analysis, the fuel consumption by burn-up has been ignored, for the reason that its rate amounts to only about 1% of that of maximum dilution.

3.3 Results and Discussion

Calculations were made for both dilution and uranation, using the parameters

$V_s = 4.87 \times 10^7\ cm^3 (1720\ ft^3)$

$\alpha = 3.33 \times 10^3\ cm^3/min = 2.0 \times 10^5 cm^3/hr$

C_o assumed equal to that at equilibrium condition. The concentration vs. time elapsed from start of operation is plotted in Figs. 3-2 and 3-3. Figure 3-4 presents the corresponding progress of reactivity.

The rate of dilution necessary to maintain negative reactivity is found from calculation to be about -0.16% $\Delta\rho$/hr, to provide which a fuel processing rate of 2.0 x 10^5 cm^3/hr is required. Within this limit, the rate of dilution can be adjusted at will by either of two methods: (a) To reduce the fuel processing rate, and (b) to regulate interval between diluting operations. The reactors can continue to operate even if the processing facility is completely shut down, although at the expense of a gradual deterioration of nuclear performance brought by poison accumulation. Hence, the method (b) is preferable to (a).

To determine the rate of uranation for raising the fuel concentration in the salt returning to the reactor, consideration must be given on the effect of ^{233}U addition to the salt. The reference composition of the salt is $LiF-BeF_2-ThF_4-UF_4$ to the ratio of 71.7-16-12-0.3 mol/o, which gives the most suitable viscosity at the liquidus temperature of the MSBR.

Adding ^{233}U deviates the composition from this reference value, but it may be safety surmised from the general similarity between ThF_4 and UF_4 (particularly in their

substitution behavior), that replacing a small quantity of ThF_4 by UF_4 should scarcely change the phase behavior.[33] Accordingly, Fig. 3-5 should represent a good approximation of the $LiF-BeF_2-ThF_4-UF_4$ system behavior in the range of concentration where the mole fraction of ThF_4 is substantially higher than that of UF_4.[33] This would indicate that the ratio between UF_4 and ThF_4 should advisably be below about 0.02. The fuel composition is listed in Table 3-1 for different ratio r of fuel concentration. The maximum equivalent $ThF_4(UF_4 + ThF_4)$ concentration figuring in Table 3-1 does not reach 14 mol/o. This is consistent with the observation that the maximum ThF_4 concentration available at 500°C liquidus temperature has been found to be just above 14 mol/o. In evaluating the mole fraction of UF_4, account has been taken of the fact that the ratio of fissile to total U in the salt is about 0.71.[20] It can be gathered from Table 3-1 that the deviation of the fuel composition from the reference ratio is so small that the fuel-salt properties will not be modified to any significant extent (see Fig. 3-5)

Calculations reveal that, within the limits of the fuel composition, the maximum uranation rate would be about 1.5%$\Delta\rho$/hr. Against this the reactivity swing caused by transient Xe is expected to be -0.10∿0.20%$\Delta\rho$/hr. This is well within the range of capability of the FPS, and

Table 3-1 Fuel Salt Compositions

r	UF_4/ThF_4	LiF	BeF_2	ThF_4	UF_4	ThF_4+UF_4
2	0.041	71.55	15.97	11.97	0.51	12.48
4	0.072	71.24	15.90	11.92	0.93	12.85
6	0.103	70.94	15.83	11.87	1.36	13.23
8	0.130	70.64	15.77	11.82	1.76	13.58
10	0.156	70.35	15.70	11.77	2.18	13.95

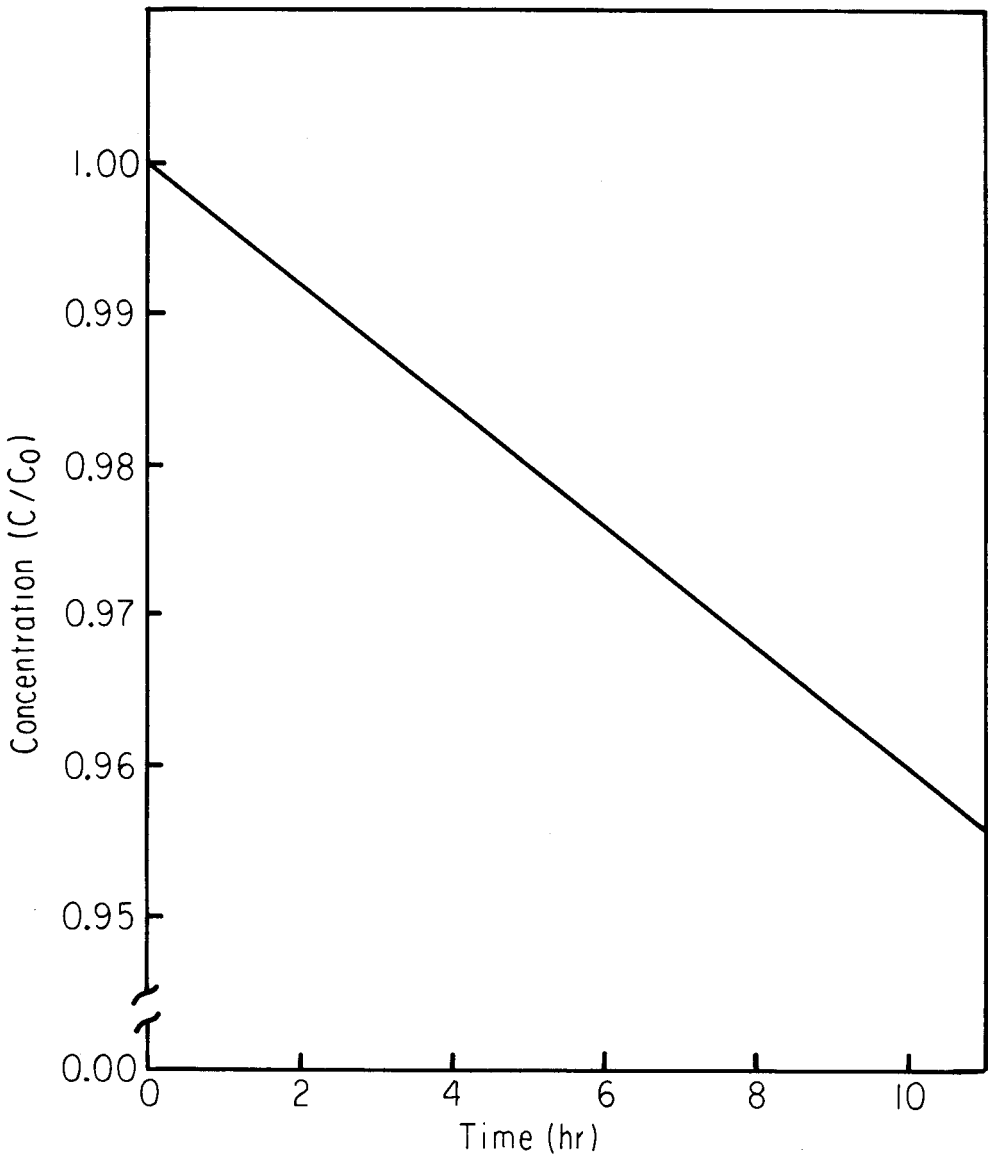


Fig. 3-2 Fuel concentration vs. duration of dilution

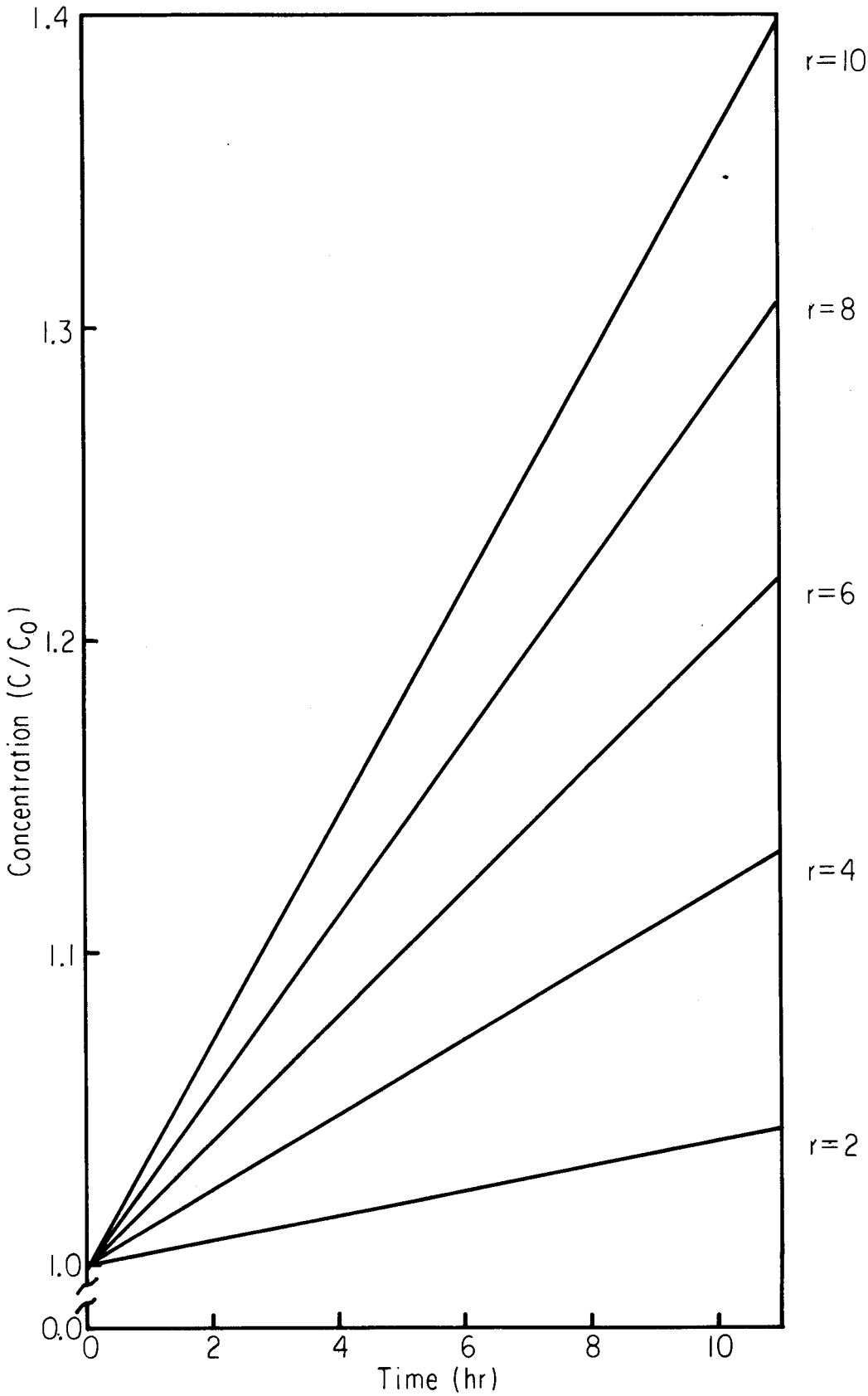


Fig. 3-3 Fuel concentration vs. duration of uranation

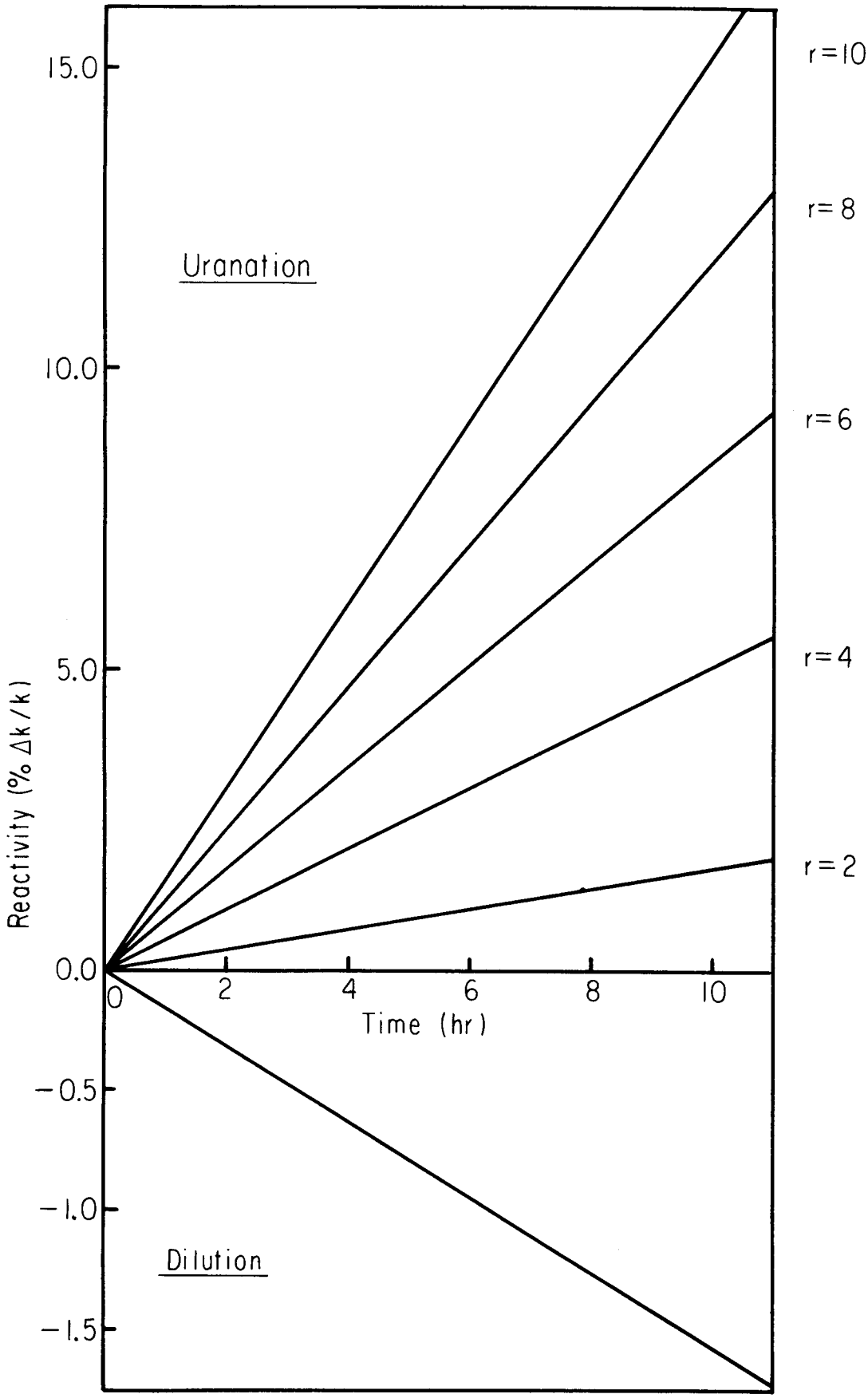


Fig. 3-4 Reactivity vs. duration of uranation and dilution

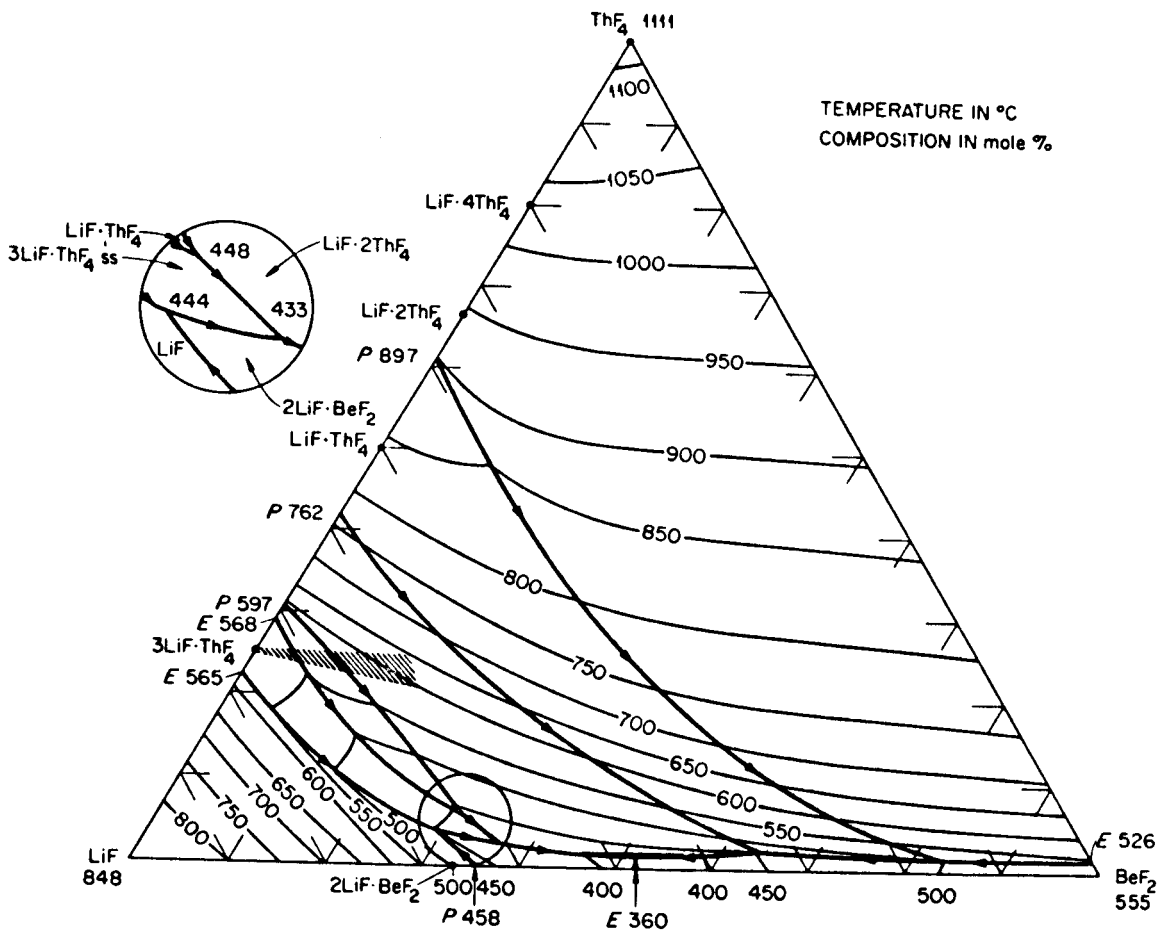


Fig. 3-5 LiF-B_eF_2-ThF_4 system

proves that the action of the FPS is quite capable of following the reactivity change due to Xe buildup resulting from power transients, just as the CSCS can control corresponding phenomena in the PWR.

3.4 Conclusion

The foregoing observations enable us to answer all the questions posed at the beginning of the present chapter.

(1) The FPS is capable of changing the reactivity at rates in the range of $-0.16 \sim 1.5\% \Delta\rho/hr$.

(2) The rate of dilution is limited by the fuel processing capacity. The rate of uranation, on the other hand, is limited by the amount of UF_4 that can be added to the salt, on account of the modification brought thereby to the fuel composition and hence to the physical properties of the salt, such as the liquidus temperature and viscosity. It has been shown, however, that the addition at a moderate rate should effectively control the reactivity with only a small change brought to the composition of the fuel salt returning to the reactor.

(3) No delicate manipulation is required in operating the system: It is only necessary to control of the rate of uranium added to the returning salt:

For dilution, it suffices to stop adding uranium, and for uranation to add extra uranium.

(4) It has also been proved that the reactivity swing caused by transient xenon can well be followed by the FPS, as it is done by the CSCS in a PWR. Fine regulation of the power output will still have to depend on control rods, but the FPS will provide very useful additional flexibility in operation, and serve also to let the control rods be maintained around positions assuring optimum reactor safety, neutron economy and reactor control.

The present study has demonstrated the practical utility of the FPS as a system for adjusting not only long-term shifts in reactivity but also short-term transient changes.

Nomenclature

Chapter 3

C	:	fuel concentration	(n/cm^3)
C_o	:	initial fuel concentration	(n/cm^3)
r	:	ratio of fuel concent ration	(-)
U	:	fuel concentration in the fuel salt back to the reactor	(n/cm^3)
Vs	:	total fuel salt volume in primary loop	(cm^3)
α	:	Salt processing rate	(cm^3/hr)

Chapter 4 Accident Analysis

4.1 Introduction

4.1.1 Safety Analysis

Safety analysis of a reactor is done for the events which exceed reactor condition of normal operation, that is, abnormal transients during normal operation. Then the events which exceed the conditions of the abnormal transients or accidents are analyzed. Although there are many events that must be analyzed as abnormal transients or accidents, they are classified into two categories; Nuclear accidents and mechanical accidents. Considering that the reference MSBR is at conceptual design stage, it is not reasonable to classify the events into abnormal transients and accidents. Hence in this chapter all abnormal events are treated as accidents.

We look into both nuclear accidents and mechanical accidents and select the accidents which would result in the most severe conditions. The transient behaviors of the reactor for the accidents are analyzed quantitatively without any supervisory control or protectional actions. In other words, transient without scram are analyzed. This is mainly due to the fact that the protection system has not designed precisely yet. However, such analyses enable us not only to estimate the design requirement of protection system but also to assess the safety margin of the

reactor system. The reactor safety is discussed based on the above mentioned analyses and also the considerations on the design objective of protection system are given.

4.1.2 Criteria for safety Analysis

In the MSBR the criteria of safety evaluation will be dictated by the integrity of reactor primary system which contains fuel salt and hence the first barrier for radiation release. The main concern is the integrity of reactor vessel because it is the main heat source and the maximum stress is loaded. The structual materials are Hastelloy-N and core graphite.

In order to assure the integrity of reactor vessel, there are several items to be evaluated such as;

1) The rate of temperature rise of constructual materials, especially for core graphite.
2) Temperature gradient in graphite
3) Thermal expantion of fuel salt
4) Thermal stress of reactor vessel
5) Integrity of reactor vessel at elevated temperatures in creep range of Hastelloy-N

As to the items 1) and 2) above, they will not give serious problems by virture of large thermal capacity and good heat conductivity of structual material such as graphite. It is also true for item 3 because enough

volume is provided by pump tanks of four primary salt circulation pump. However a kind of thermal shock producted by sudden temperature rise of fuel salt might be required.

Item 4 is to be evaluated based on the temperature transient of fuel salt, transient heat transfer and stress analysis. However, at present, data for rigorous analysis is not available yet.

Hence the last item is employed as the basis of the safety criteria in this study and described in detail in the following.

A preliminary elastic stress analysis was made for the reactor vessel.[20] The analysis was based on the top of the vessel operating at 704°C and 42 psi and the bottom at 566°C and 61 psi. The maximum stress in the removable head due to pressure alone is 5220 psi. This stress is located in the dished head near the junction of the head and shell skirt. The maximum stress in the vessel occurs at the junction of the lower head and shell and is 16,324 psi. The cylindrical portions of the vessel are 2 in. thick and the dished heads are 3 in thick, (No analytical work has not been done on the nozzles, closure flanges, thermal stresses, or discontinuity stresses at the necked down portion of the vessel).

As the fuel salt temperature could be expected to reach the creep range, the allowable temperature must be

determined by both stress and duration in which the stress is loaded as shown in Fig. 4-1.[38] We chose the maximum duration conservatively to be 1 hour, which is long enough to shutdown the reactor and take corrective actions. The maximum stresses for both top head and reactor vessel are assumed to be 6,300 psi. and 20,000 psi., respectively, with calculational uncertainty of 20%. Finally, the allowable deformation is chosen to be 1%. Assuming the temperature of Hastelloy-N is equal to that of fuel salt, the allowable inlet and outlet temperatures are determined to be 790°C and 930°C respectively.

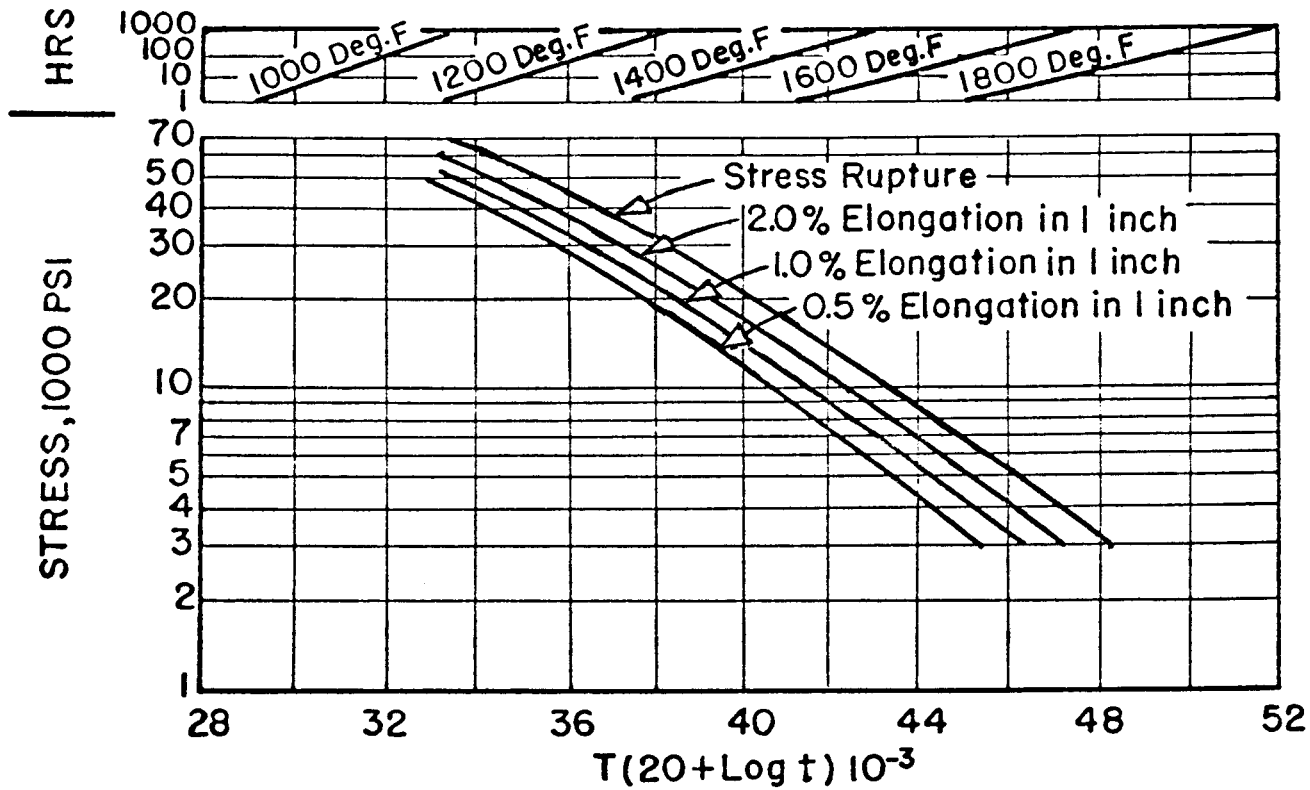


Fig. 4-1 Larson-Miller plot of Hastelloy-N, Sheet 0.063 in. thick, heat-treated at 2,150 deg. F, rapid air-cooled

4.2 Nuclear Safety Analysis

4.2.1 Introduction

Reactors embodying circulating-fuel, particularly those operating on the ^{233}U-Th fuel cycle, have notably small delayed-neutron fractions: The calculated values for the MSBR fall in the range of 0.0010∿0.015, depending on the details of reactor design. In addition, the graphite-moderated MSBR has a very long prompt-neutron generation time, e.g., 0.4msec, in common with most other graphite-moderated reactors.

With respect to the temperature coeffecient of reactivity, the MSBR present characteristics qualitatively similar to natural-uranium, graphite-moderated, gas-cooled reactors: Prompt negagive temperature coefficient for the fuel, delayed-positive coefficient for moderator. In the particular case of the present reference MSBR, these two coefficient roughly cancel each other out. This is conducive to a slow overall coefficient of magnitude, which contrasts with the large prompt negative coefficinet.

In view of these nuclear characteristics, analyses relevant to nuclear safety and in particular those related to the prompt power jump, acquire significant importance, and this is what inspired the present author to undertake an analysis of postulated reactivity accidents. The analysis is made on the basis of a point kinetics model, using a simplified heat transfer mechanism.

Some considerations are also presented relevant to the system for protecting reactor system.

4.2.2 Events of Reactivity Anormality

The estimated values of reactivity change in the MSBR are listed in Table 4-1 (cited from Ref. 34). In the presnet study, the reactivity addition is assumed to be occasioned by control rod displacement, which—in this system—provides the most influential and fast means of changing the reactivity listed in Table 4-1. According to Ref. 20), a total reactivity change of 0.3%ΔK/K and a rate of change about 0.01%ΔK/K·sec should suffice for normal purposes of reactor control. Hence, as conditions applying to the present calculations, we have adopted values of 0.1, 0.3 and 0.5%ΔK/K for the reactivity change, and 0.01%ΔK/K·sec for the change rate.

What are the kinds of transient to be expected when a positive reactivity is inserted in an MSBR operating at constant power level? (a) The neutron flux will rise, which will generate more energy to heat the fuel salt and graphite. (b) This will result in their temperature rise, which will produce a negative reactivity to counteract the inserted reactivity. (c) In time the reactor will stabilize at a new level where reactivity and heat generation will again balance each other. This sequence of events is quite clear-cut, but analysis of nuclear safety

Table 4-1 Items related to reactivity changes in MSBR

Items	Reactivity(%ΔK/k)
Excess reactivity compensated by control rods	less than 1.0
Fissile materials in the fuel processing system returning to the core	less than 0.4
Cessation of fuel flow (reactivity gain due to delayed neutron precursors accumulation)	0.14
Fuel temperature change from maximum operating value to the fuel liquidus temperature	0.7
Fuel temperature change from zero-power value to the fuel liquidus temperature	0.2
Expansion of gas bubbles in the fuel	0.1
Local boiling in the core	0.5 per 100 empty fuel cell

demands further quantitative examination of the reactor system behavior, with calculations of fuel salt and graphite temperatures. The model adopted for these calculations will first be described in what follows.

These simultaneous equations were solved with a digital computer code. A time mesh of 0.01 sec was chosen for analyzing slow transient phenomena and 0.001 sec for fast transients.

4.2.3 Model Used for Calculation

In the MSBR operated at rated power, the fuel salt and graphite temperatures vary from 566°C at the inlet to 704°C at the outlet. These temperatures are closely related to the energy released during the transients, with the temperature reactivity feedback taking part. Thus we adopt a spatially lumped parameter model for treating the heat transfer system after Ref.22). The core is devided into two zones -- a central zone of the salt volume fraction of 13% and an outer zone of 37%, respectively contributing 81.4 and 18.6% to energy generation. In the present study, what we need to know is the maximum temperature of fuel salt that will be expected at the outlet of the core. The detailed temperature distribution in the core is not our main concern. Also the temperature transients are much faster in the fuel salt than in the graphite, in terms of

both time and the rate at which the axial temperature distribution changes, on account of the difference in their thermal characteristics. For this reason, the fuel salt is divided axially into four equal lumps and the graphite into two, in the central zone. In the outer zone the heat generation does not reach one quarter of that in the central zone, which makes it sufficinet to divide the zone into two equal fuel salt lumps and one graphite lump. Since the density of the fuel slat varies only slightly with temperature, the four central-zone and the two outer-zone fuel lumps, as well as the two central-zone graphite lumps are all considered to be respectively of equal mass.

The mass flow rates of the fuel salt in the two zones of the core are determined from the rate of heat generation in each zone in such a manner as to yield an equal temperature rise of the salt in two zones. This results in 81.4% of the flow passing through the central and 18.6% through the outer zone. As to the share of heat generation contributed by each zone, we adopt the data reported in Ref. 20), which attributed 97% of the total core energy generation to the fuel salt, leaving 3% to the contribution from graphite. The respective contributions are then divided equally into fuel lumps and graphite lumps. The heat sink for the primary loop is assumed to be constant at -2,250 MWt at full power , and zero at zero power.

The neutron flux distribution in the MSBR is not strongly dependent on the power level, so that the energy generation ratio in each lump can be assumed constant during transients. Under transient conditions, the delayed neutrons play a very important role, which led us to adopt a two-delayed-group approximation of the point kinetics equations for analyzing nuclear behavior of the core. The circulation lag term for the delayed-neutron precursors of the j-th group $C_j(t-\tau)$ is also included.[37)]

The heat transfer system represented by this model is shown in Fig. 4-2, and expressed by the following equations:

For the graphite-lumps

$$M_g C_{pg} \frac{dT_g}{dt} = h_{fg} Ac(T_p - T_g) + k_g P_r, \qquad 4-1$$

For the fuel salt-lump temperatures T_{p1}, T_{p3} and T_{p5}

$$M_r C_{pf} \frac{dT_g}{dt} = F_1 C_{pf}(T_i - T_p) + h_{fg} A_c (T_g - T_p) + k_r P_r, \qquad 4-2$$

For the fuel salt-lump temperature T_{p2}, T_{p4} and T_{p6},

$$M_r C_{pf} \frac{dT_g}{dt} = F_1 C_{pf}(T_i - T_p) + k_r P_r, \qquad 4-2'$$

For the primary loop

$$M_r C_{pf} \frac{dT_p}{dt} = F_1 C_{pf}(T_i - T_p) - Q, \qquad 4-3$$

where

T_g : graphite temperature (depending on the core zone).

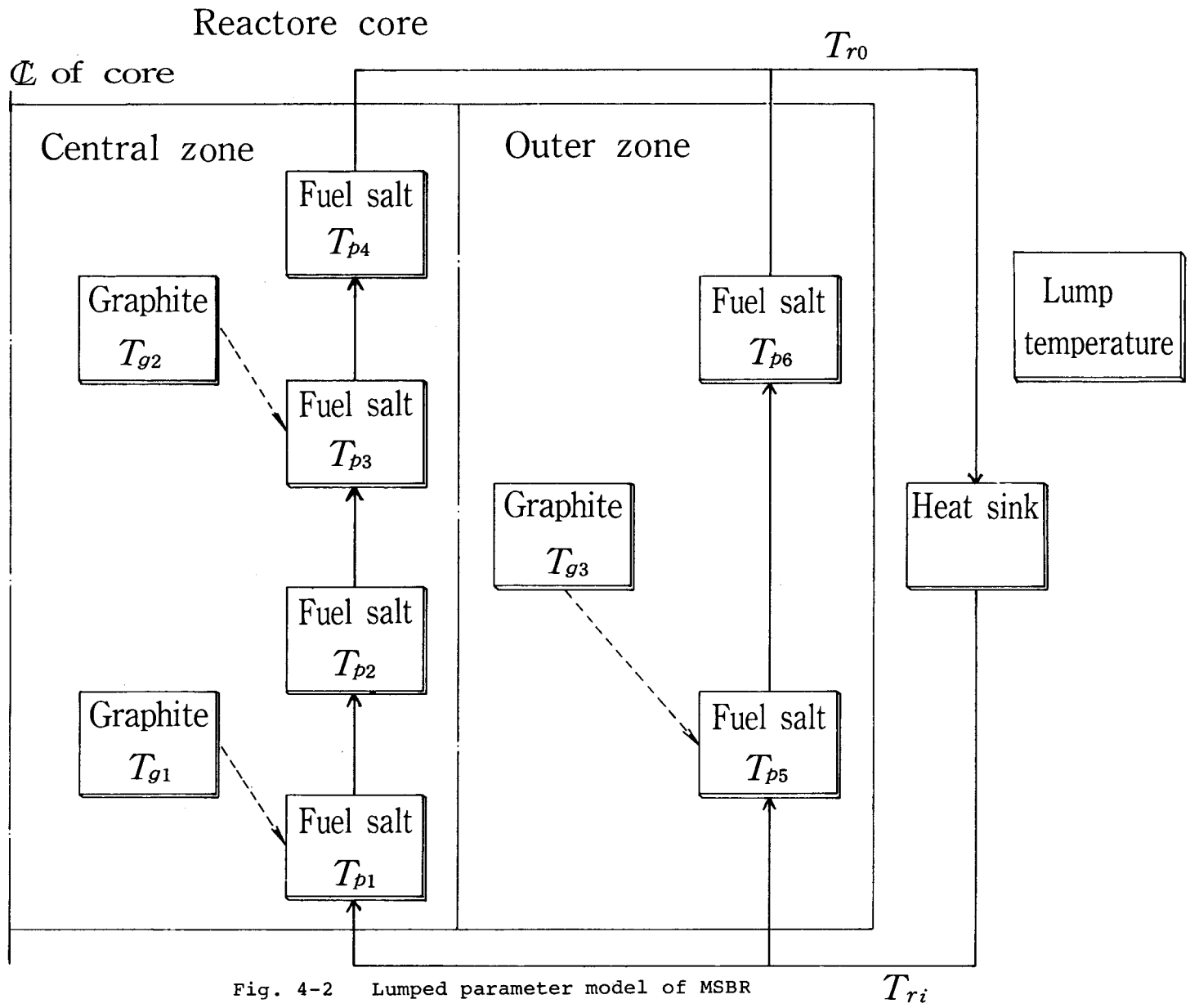


Fig. 4-2 Lumped parameter model of MSBR

T_p : fuel salt temperature (depending on the core zone),

T_i : inlet temperature to lump (depending on the core zone),

C_{pf} : specific heat of fuel salt,

C_{pg} : specific heat of graphite,

M_r : mass of fuel salt lump (depending on the core zone),

M_g : mass of graphite lump (depending on the core zone),

h_{fg} : salt to graphite heat transfer coefficient,

A_c : heat transfer area of graphite lump (depending on the core zone),

P_r : reactor heat generation rate,

k_g : fraction of fission heat generated in graphite lump (depending on the core zone),

k_r : fraction of fission heat generated in fuel salt lump (depending on the core zone),

F_l : fuel salt mass flow rate in lump (depending on the core zone),

Q : heat sink in primary loop.

The reactor outlet temperature

$$T_{ro} = 0.814T_{p4} + 0.186T_{p6}, \qquad 4 - 4$$

where T_{p4} and T_{p6} stand for the outlet fuel temperature of the central and outer zones, respectively

The reactor kinetics equations take the form

$$\frac{dP_r}{dt} = \frac{\rho - \beta}{\ell} P_r + \lambda_1 C_1 + \lambda_2 C_2, \qquad 4 - 5$$

$$\frac{dC_1}{dt} = \frac{\beta_1}{\ell} P_r - \lambda_1 C_1 - \frac{1}{\tau_c}$$

$$+ \frac{e^{-\lambda_1 \tau_L}}{\tau_c} C_1(t - \tau_L), \qquad 4 - 6$$

$$\frac{dC_2}{dt} = \frac{\beta_2}{\ell} P_r - \lambda_2 C_2 - \frac{1}{\tau_c} C_2$$

$$+ \frac{e^{-\lambda_2 \tau_L}}{\tau_c} C_2(t - \tau_L), \qquad 4 - 7$$

$$\rho = \rho_o + \rho_t + \rho_c, \qquad 4 - 8$$

$$\rho_t = \alpha_f \cdot \frac{\sum_{i=1}^{6} (T_{pi} - T_{pi}^D) M_{ri}}{\sum_{i=1}^{6} M_{ri}}$$

$$+ \alpha_g \cdot \frac{\sum_{i=1}^{3} (T_{gi} - T_{gi}^D) M_{gi}}{\sum_{i=1}^{3} M_{gi}} \qquad 4 - 9$$

where

P_r : relative reactor power,

C_j : j-th group delayed-neutron precursor concentration,

β_j : j-th group delayed-neutron fraction,

λ_j : j-th group delayed-neutron precursor decay constant,

ℓ : prompt neutron generation time,

τ_c : transit time of fuel salt through core,

τ_L : transit time of fuel salt through external loop,

ρ_o : steady state design point reactivity (associated with flowing fuel),

ρ_c : control rods reactivity,

α_f : temperature coefficient of reactivity of fuel salt,

α_g : temperature coefficient of reactivity of graphite,

T^D_{pi}, T^D_{gi} : design point temperature of fuel and graphite lump i, respectively,

M_{ri}, M_{gi} : mass of fuel and graphite lump i, respectively,

4.2.4 Results and Discussion

Calculations were made for the following cases:

Case A: Step reactivity addition at zero-power critical condition

Case B: Ramp reactivity addition at a rate of 0.01%ΔK/K·sec, at zero-power critical condition

Case C: Step reactivity addition, at full-power equilibrium condition

Case D: Ramp reactivity addition at a rate of 0.01% $\Delta K/K \cdot sec$, at full-power equilibrium condition

where "zero-power critical condition" means that the reactor is critical at 0.01% of the rated power with no delayed-neutron precursors and without heat removal from the primary system. On the other hand, "full-power equilibrium condition" means that the reactor is operating at full-power with equilibrium delayed-neutron precursors and with normal heat removal rate (2,250 MWt). The heat removal during the transient is assumed to remain unchanged.

Three values were chosen for the amount of reactivity addition: 0.1, 0.3 and 0.5%$\Delta\rho$ which we shall distinguish by adding the symbols -1, -2 and -3, respectively, after the designations A, B, C and D for the three cases. The parameters used in the calculations are as listed in Table 4-2.

In Cases A and C (step reactivity insertion), very fast transient are seen to be set off within a few seconds after the step insertion, as seen from Fig. 4-3 and 4-4 where the ordinates are scaled to let the rated power correspond to unity. The same transients are reproduced and extended to cover an extended period in Figs. 4-5∿4-7 and Figs. 4-11∿4-13, in which temperature transients are

also drawn. Figures 4-8∿4-10 and 4-14∿4-16 present the corresponding curves for Cases B and D (ramp insertion). The arrows drawn on the abscissa on these last-mentioned figures indicate the instant at which the inserted reactivity ramp terminates, and beyond which the reactivity is maintained at the predetermined level. These transients are described numerically in Table 4-3.

It is notable that 0.5%ΔK/K reactivity inserted in step (Cases A and C) produce power pulses as high as 30 to 40 times the rated power, but that these prompt transients terminate within 1 sec in virtue of the very large prompt negative temperature coefficient of the fuel. Comparing Case A with Case C, it is seen that, for the same reactivity insertion, a higher power pulse -- accompanied by higher temperature rise -- is occasioned when the reactivity is introduced at zero output than at full power. Otherwise the transients present profiles generally similar to each other. The power dip observed to follow the peak is attributable to the lag of temperature rise between fuel and graphite.

Ramp insertion, represented by Cases B and D, simulate more realistic occurrences. Between these two transients, that for power is characterized for Case B by the presence of a sharp initial peak that is absent in Case D. The cause of this variance can be traced to the difference in

Table 4-2 Physical constants and plant parameters

Specific heat of fuel salt, J $kg^{-1}(°K)^{-1}$			1357.
Specific heat of graphite, J $kg^{-1}(°K)^{-1}$			1760.
Graphite to salt heat transfer coefficient, J $m^{-2}sec^{-1}$ $(°C)^{-1}$			6045.7
Fuel salt flow rate, $kg.hr^{-1}$			$4.30x10^{7}$
Temperature coefficient of reactivity, $(°C)^{-1}$			
fuel salt			$-3.2x10^{-5}$
graphite			$2.35x10^{-5}$
Thermal neutron life time, sec			$3.6x10^{-4}$
Delayed-neutron constants		β_j	$\lambda_j(sec^{-1})$
	1	0.00102	0.02446
	2	0.00162	0.2445
Steady state reactivity, ρo			0.00140
External loop transit time, sec			6.048
Effective transit time of fuel salt through core, sec			3.58
	Central zone		Outer zone
Heat generation, MWt	1,830		420
Fuel salt mass, kg	26,342		27,863
Graphite mass, kg	96,258		26,364
Heat transfer area, m^2	2,794		1,320
Fuel salt mass in heat exchanger, kg		5,384	

Table 4-3 Representative characteristics in transients.

Case		Peak power relative to rated power		Highest fuel temperature (°C)	
Initial condition	Reactivity (%ΔK/K)	Step	Ramp	Step	Ramp
Zoro power (A and B)	0.1	2.5	1.5	900	900
	0.3	15	1.5	1,150	1,150
	0.5	40	1.5	1,400	1,400
Rated power (C and D)	0.1	2.0	1.5	820	820
	0.3	10	2.0	1,060	1,060
	0.5	28	2.3	1,300	1,300

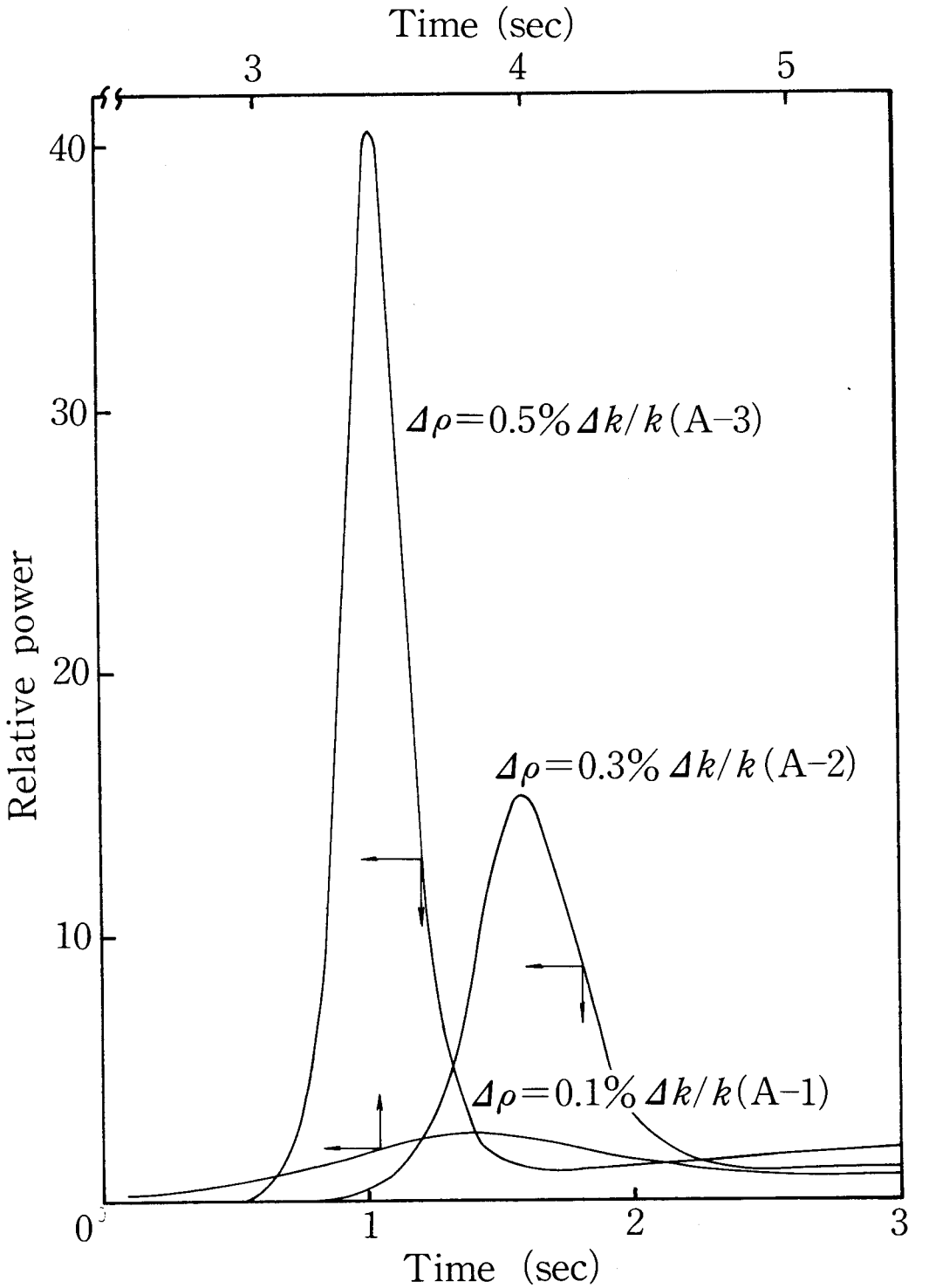


Fig. 4-3 Power pulses produced by step insertion of 0.1, 0.3 and 0.5%Δk/k; At zero power critical condition (Cases A-1, A-2, and A-3)

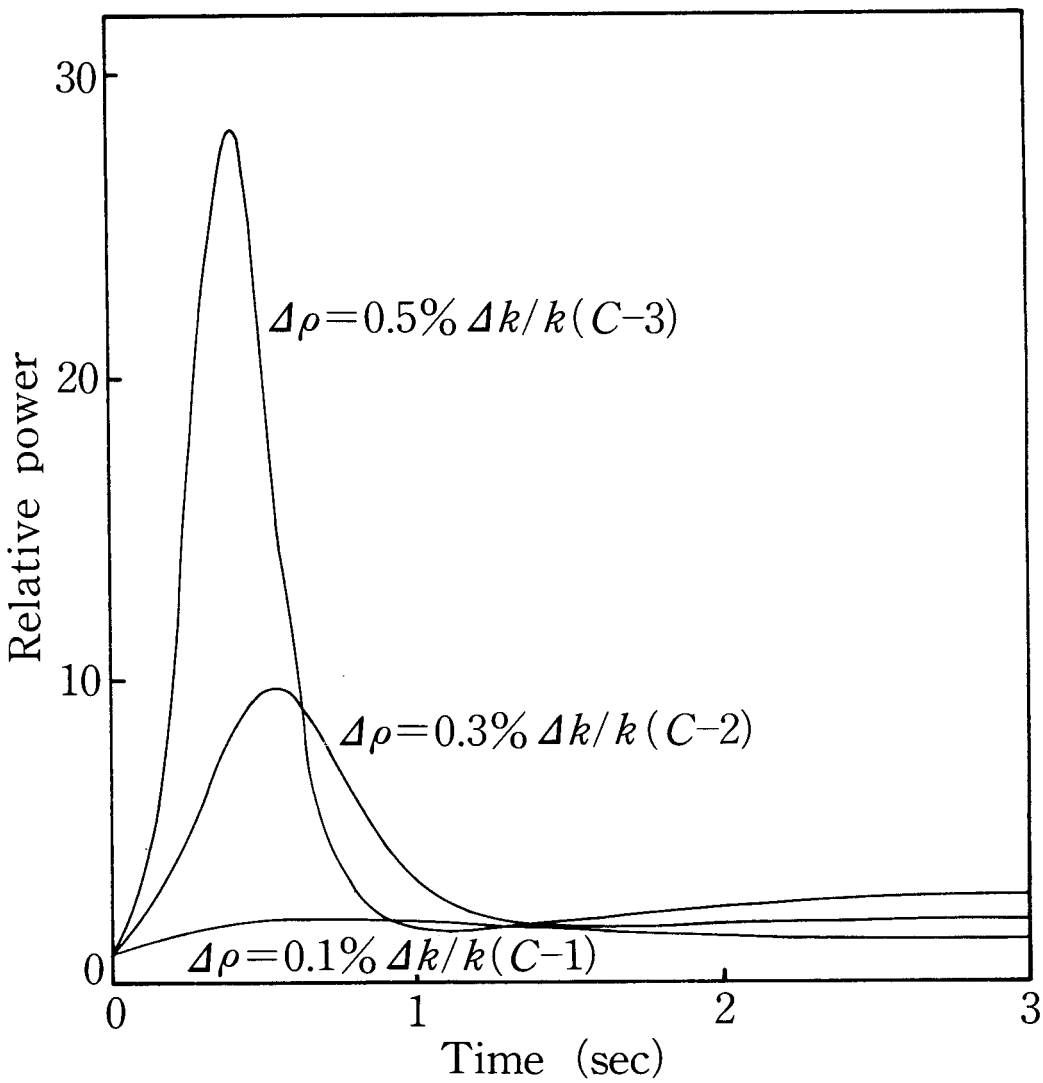


Fig. 4-4 Power pulses produced by step insertion of 0.1, 0.3 and 0.5%Δk/k; At rated power (Cases C-1, C-2 and C-3)

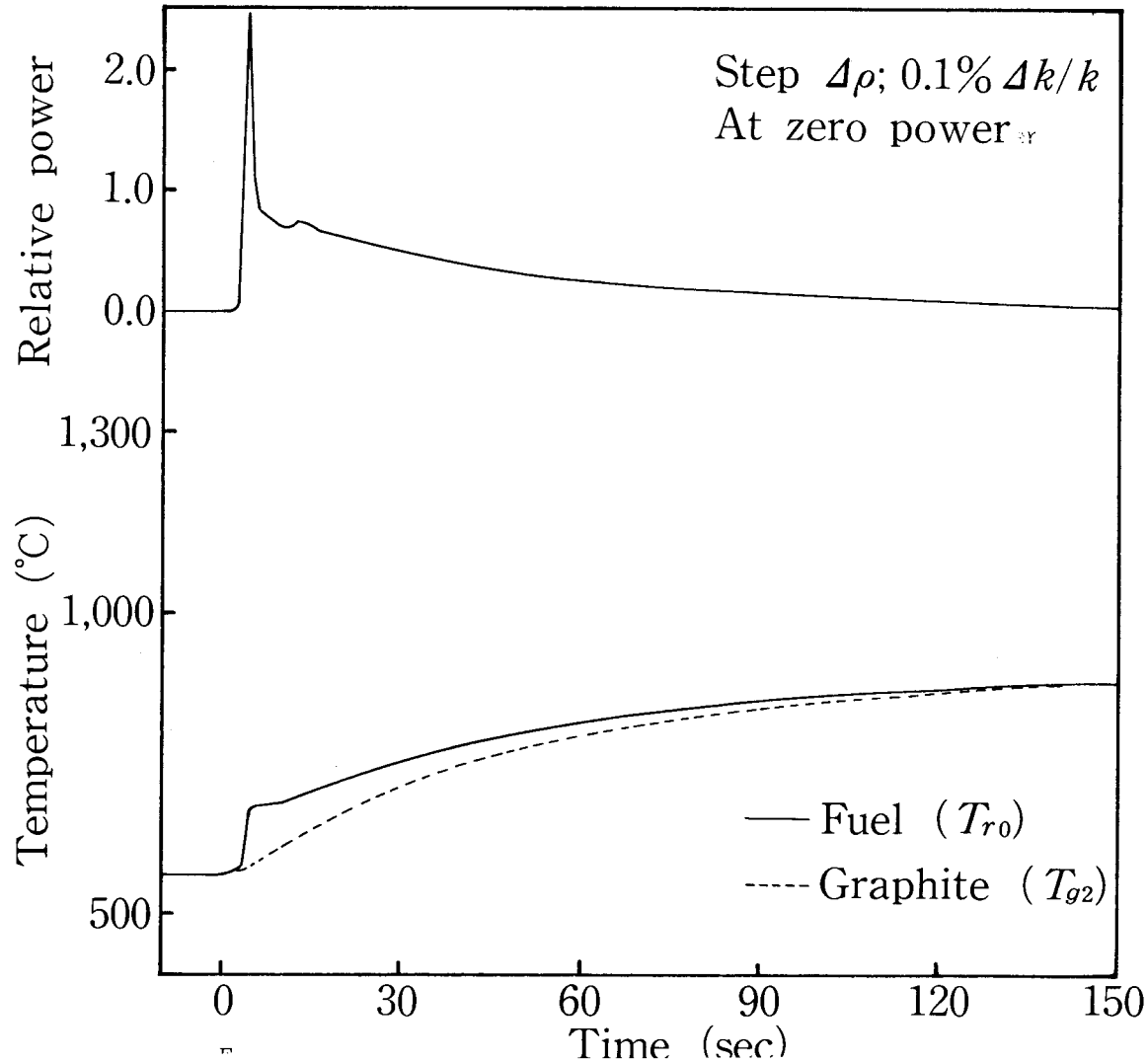


Fig. 4-5 Reactor transient after step reactivity addition; Case A-1

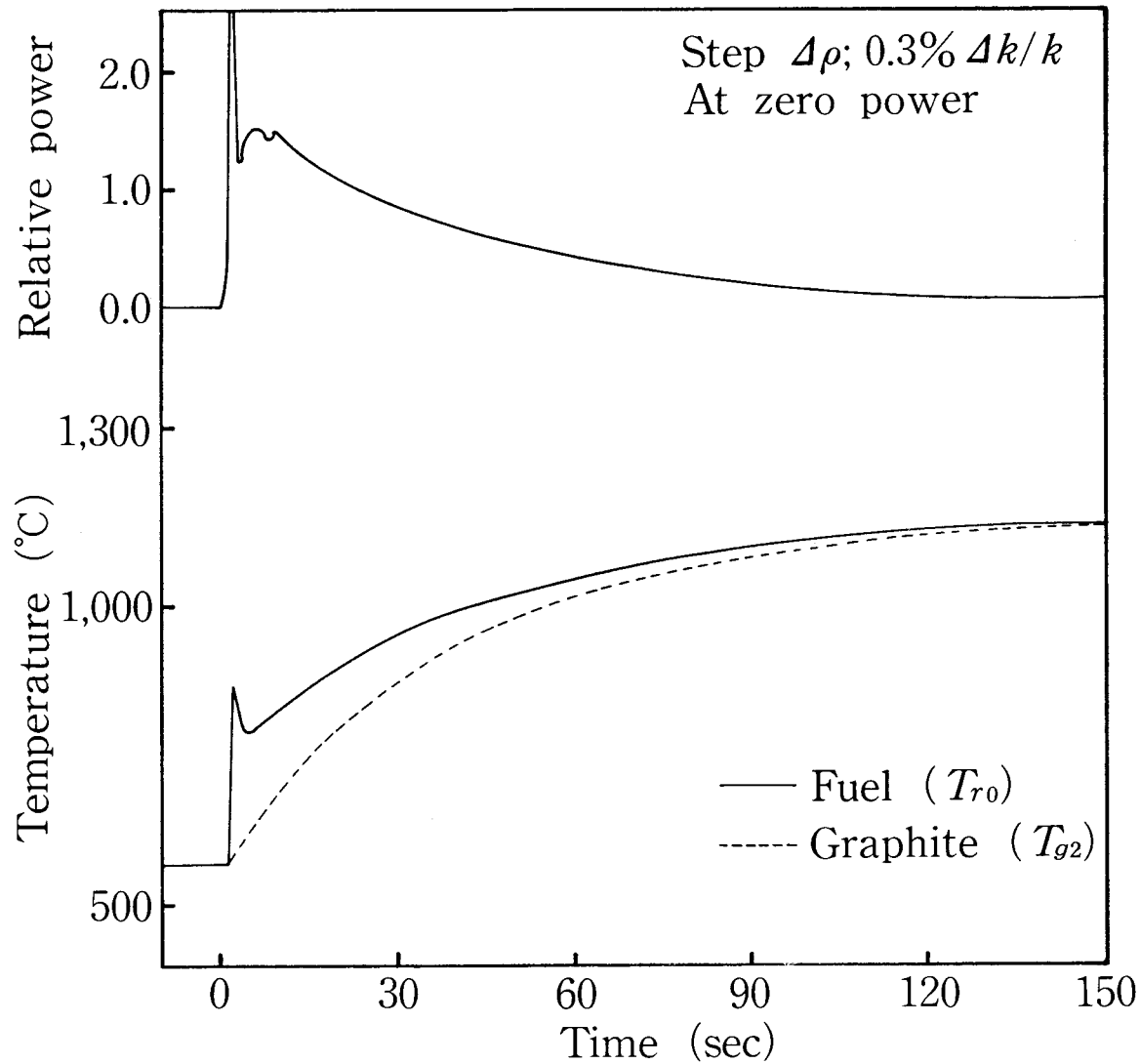


Fig. 4-6 Reactor transient after step reactivity addition; Case A-2

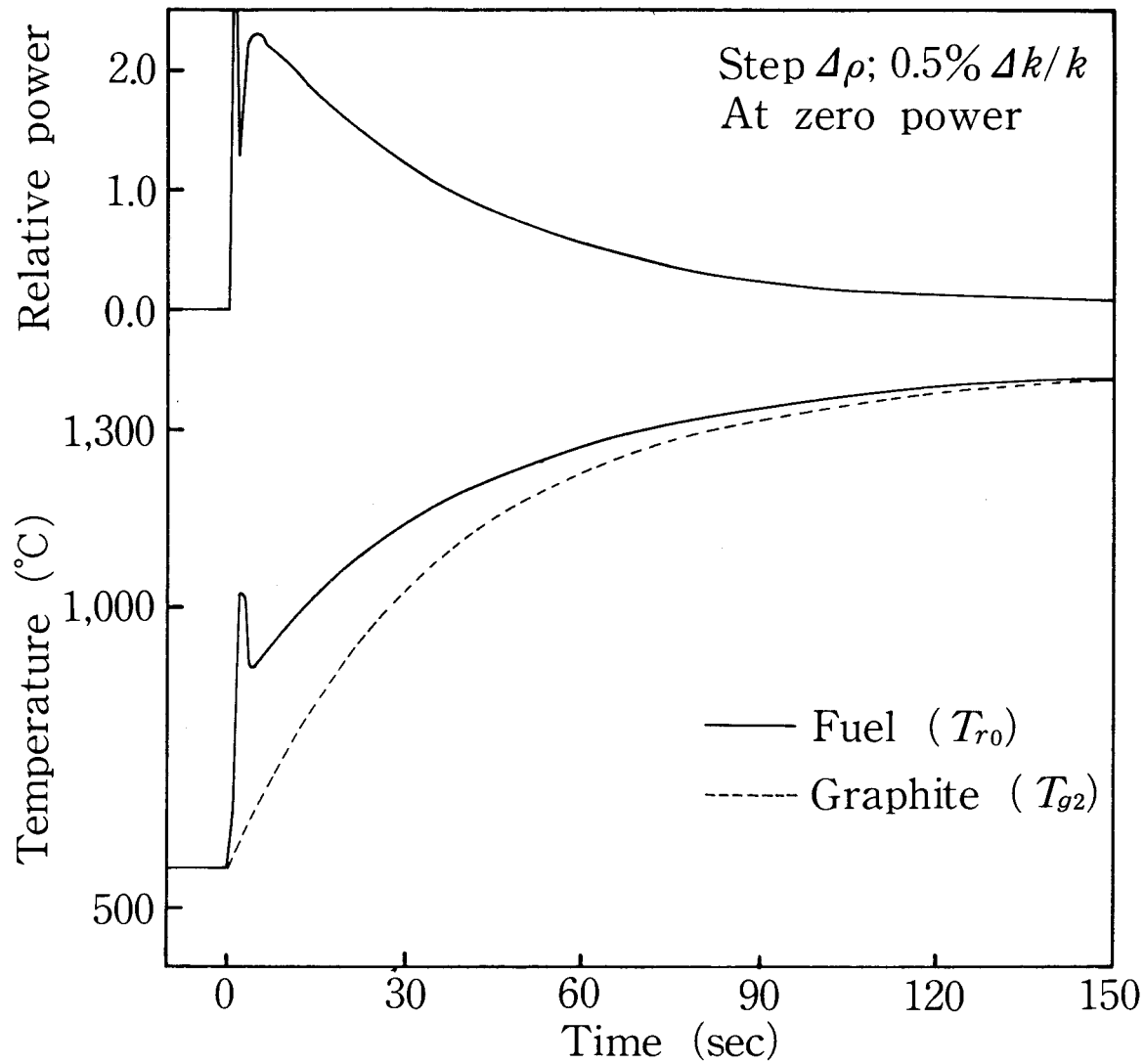


Fig. 4-7 Reactor transient after step reactivity addition; Case A-3

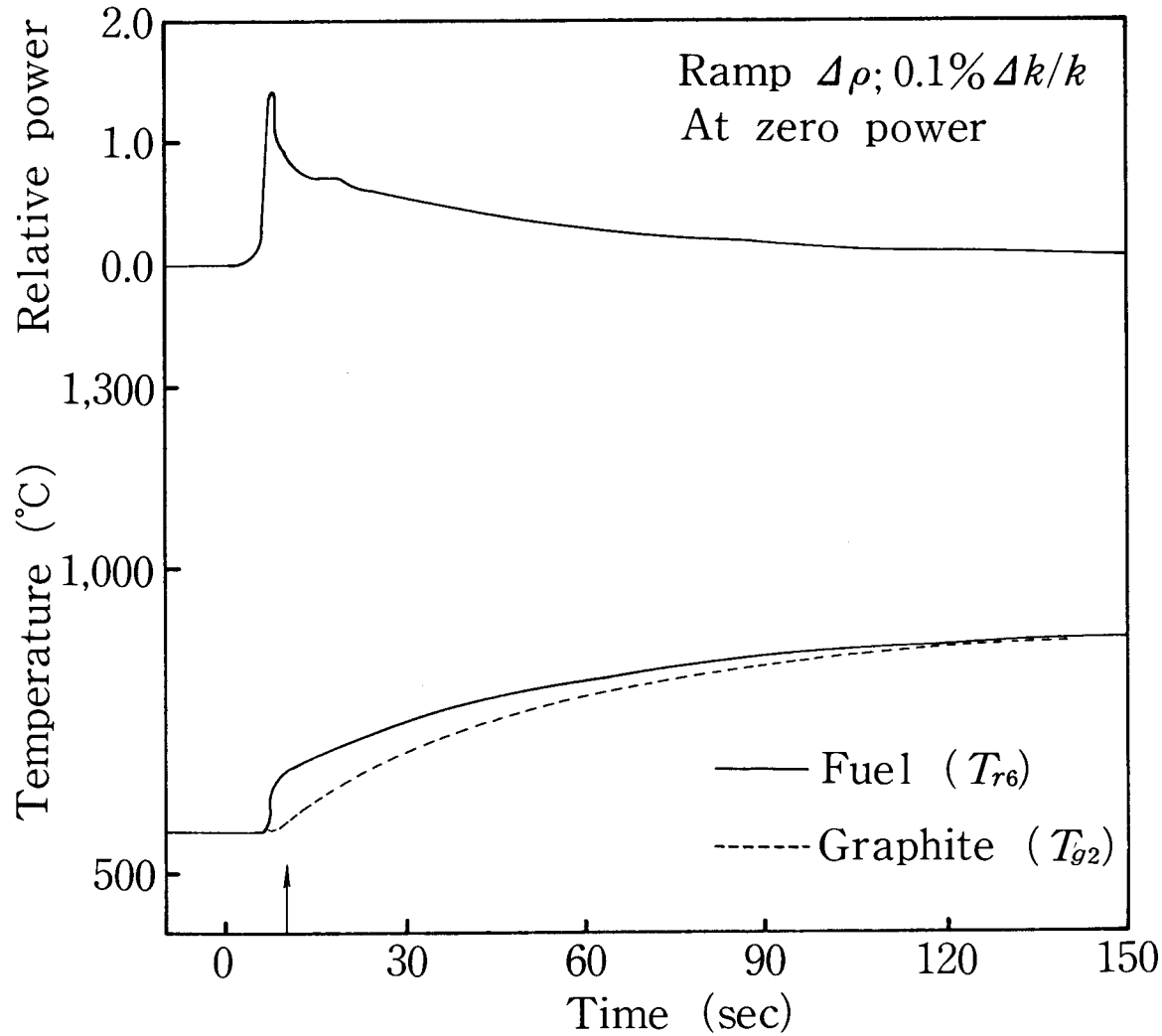


Fig. 4-8 Reactor transient after ramp reactivity addition; Case B-1

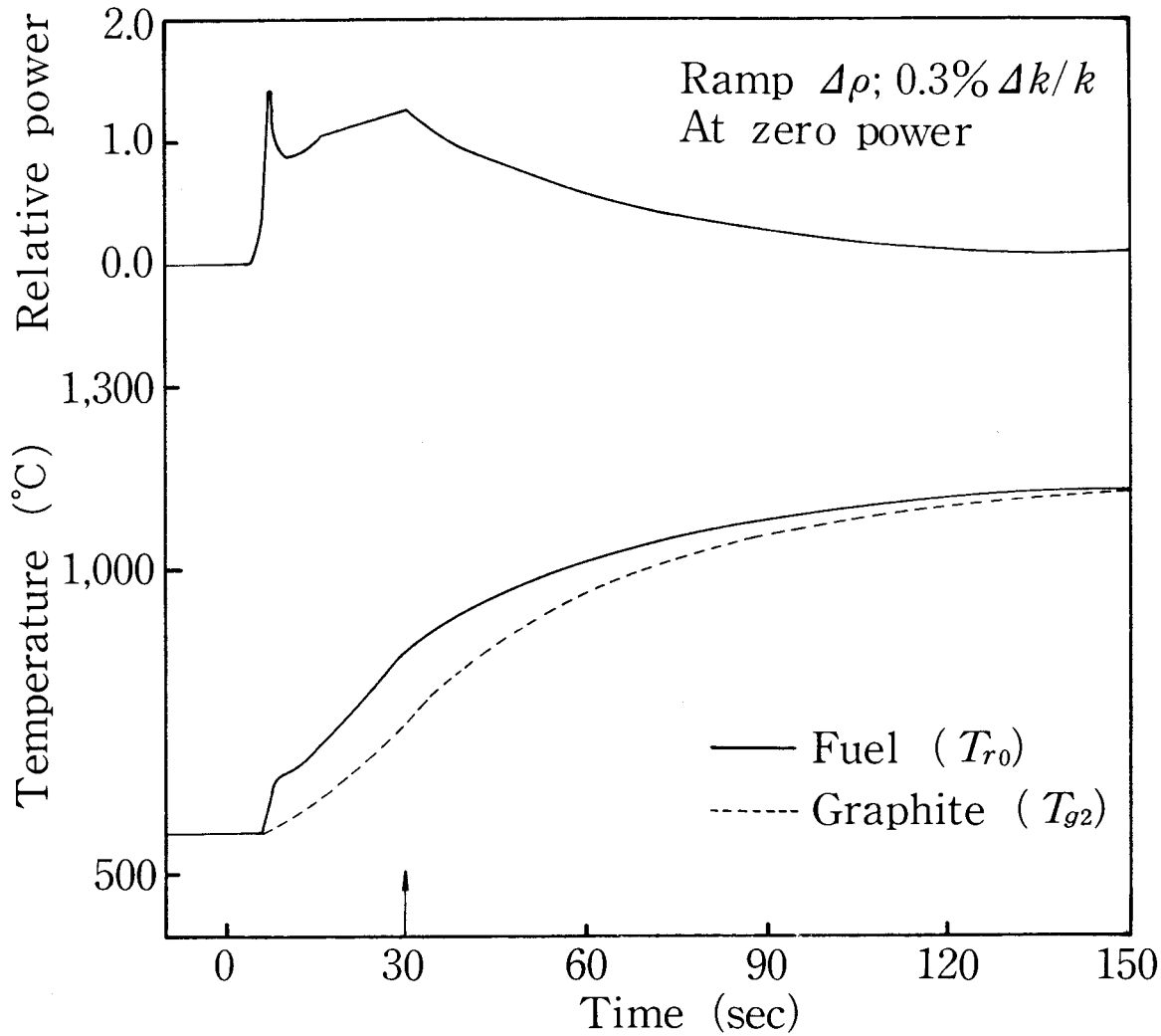


Fig. 4-9 Reactor transient after ramp reactivity addition; Case B-2

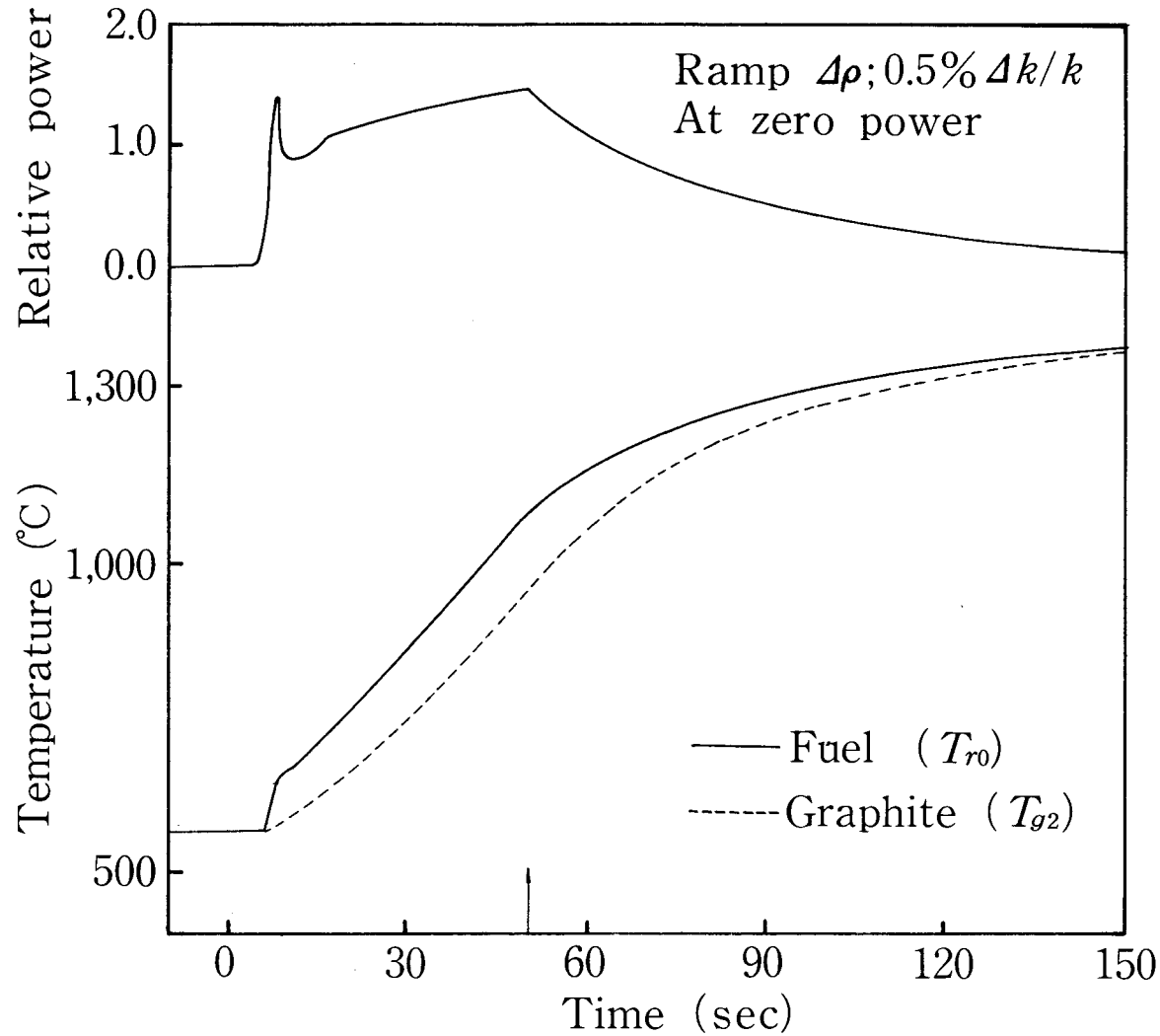


Fig. 4-10 Reactor transient after ramp reactivity addition; Case B-3

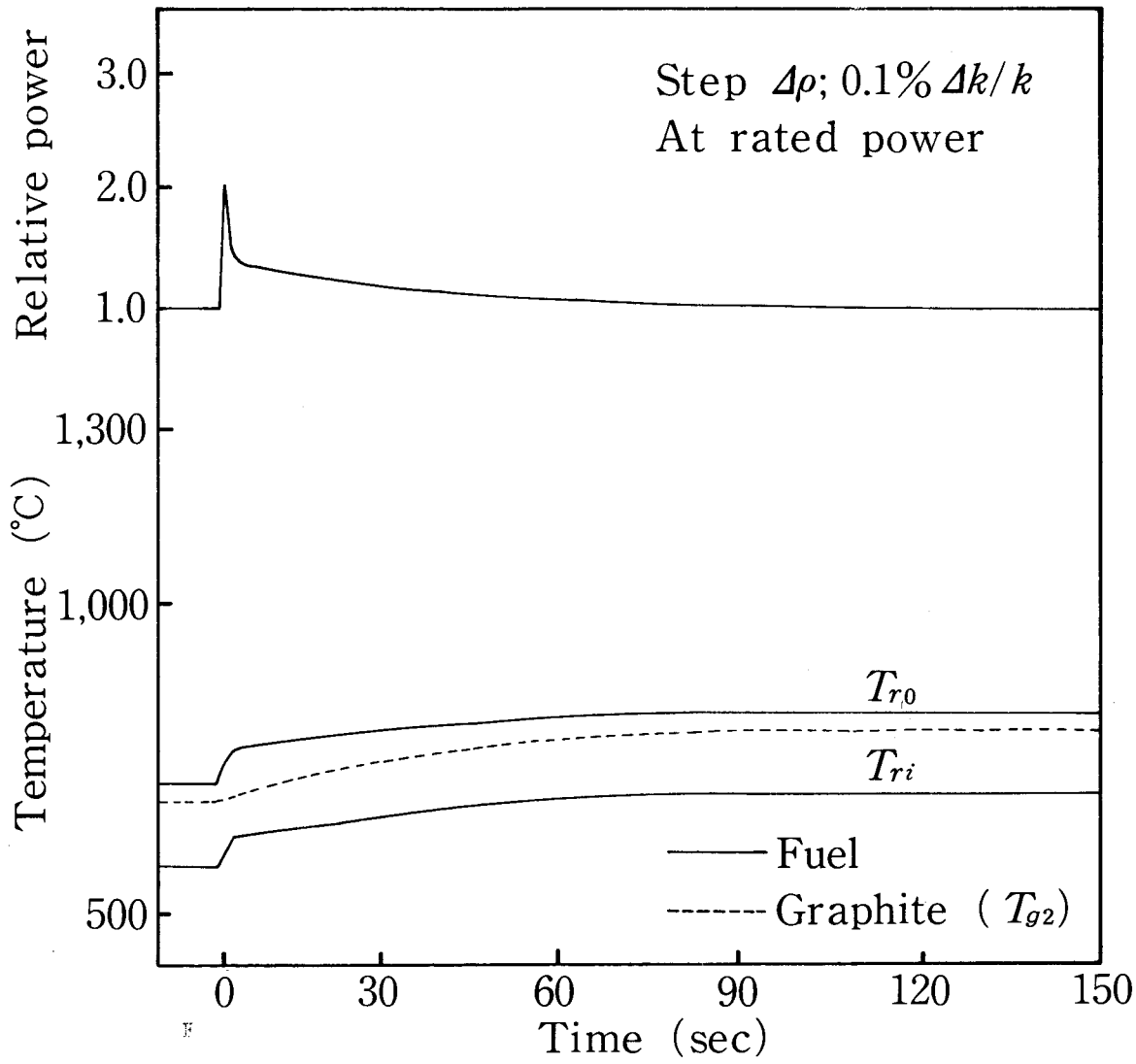


Fig. 4-11 Reactor transient after step reactivity addition; Case C-1

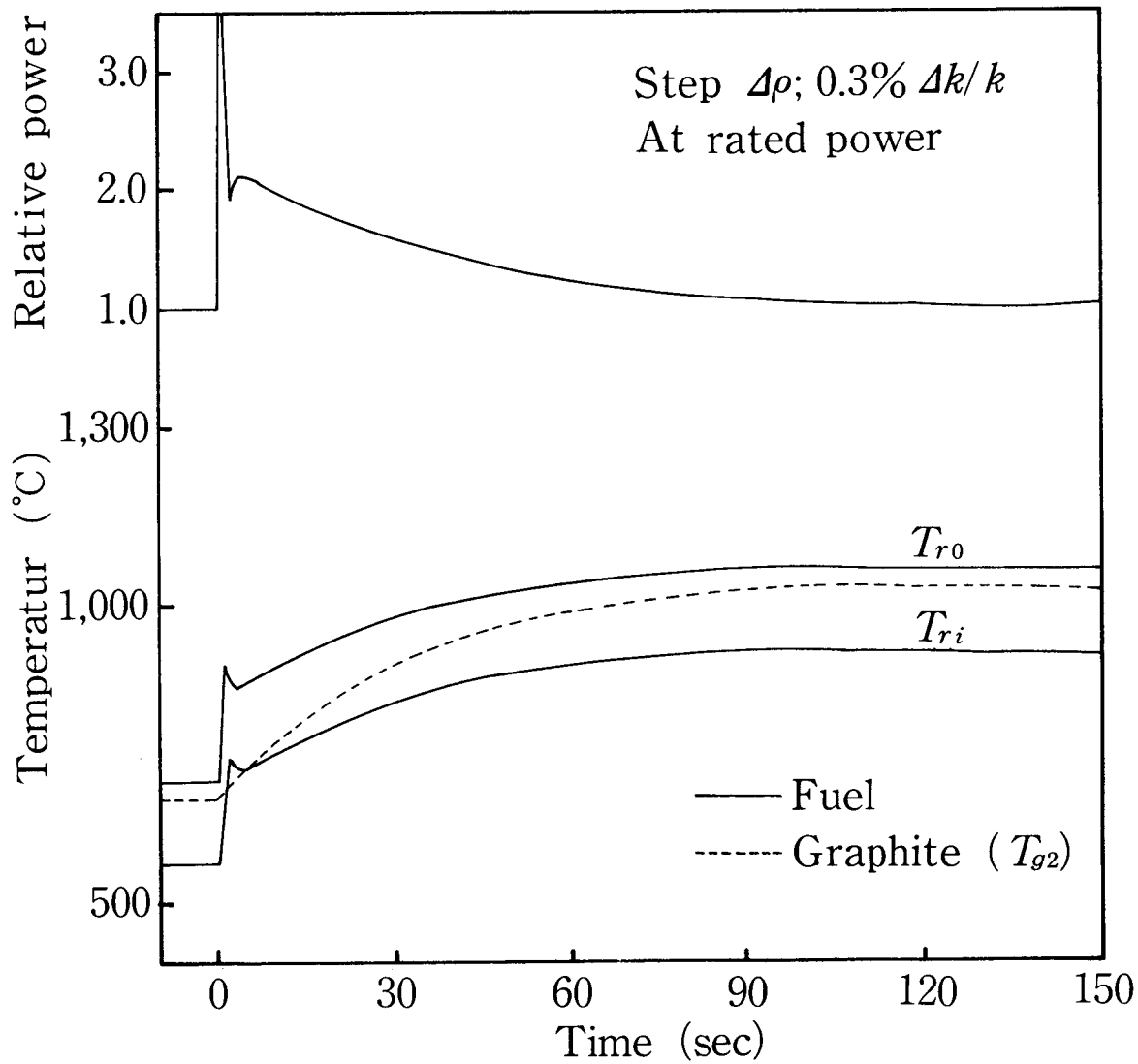


Fig. 4-12 Reactor transient after step reactivity addition; Case C-2

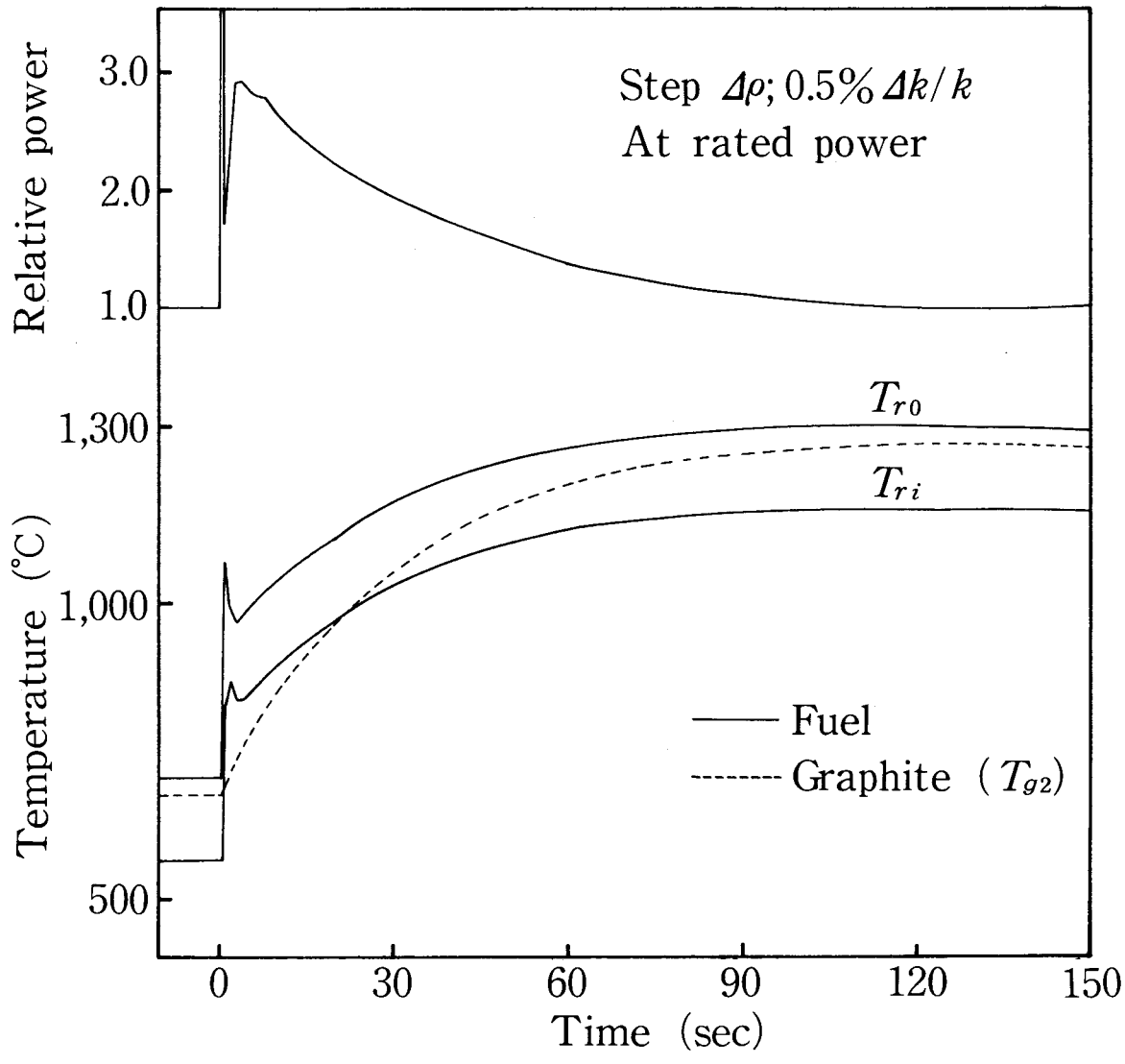


Fig. 4-13 Reactor transient after step reactivity addition; Case C-3

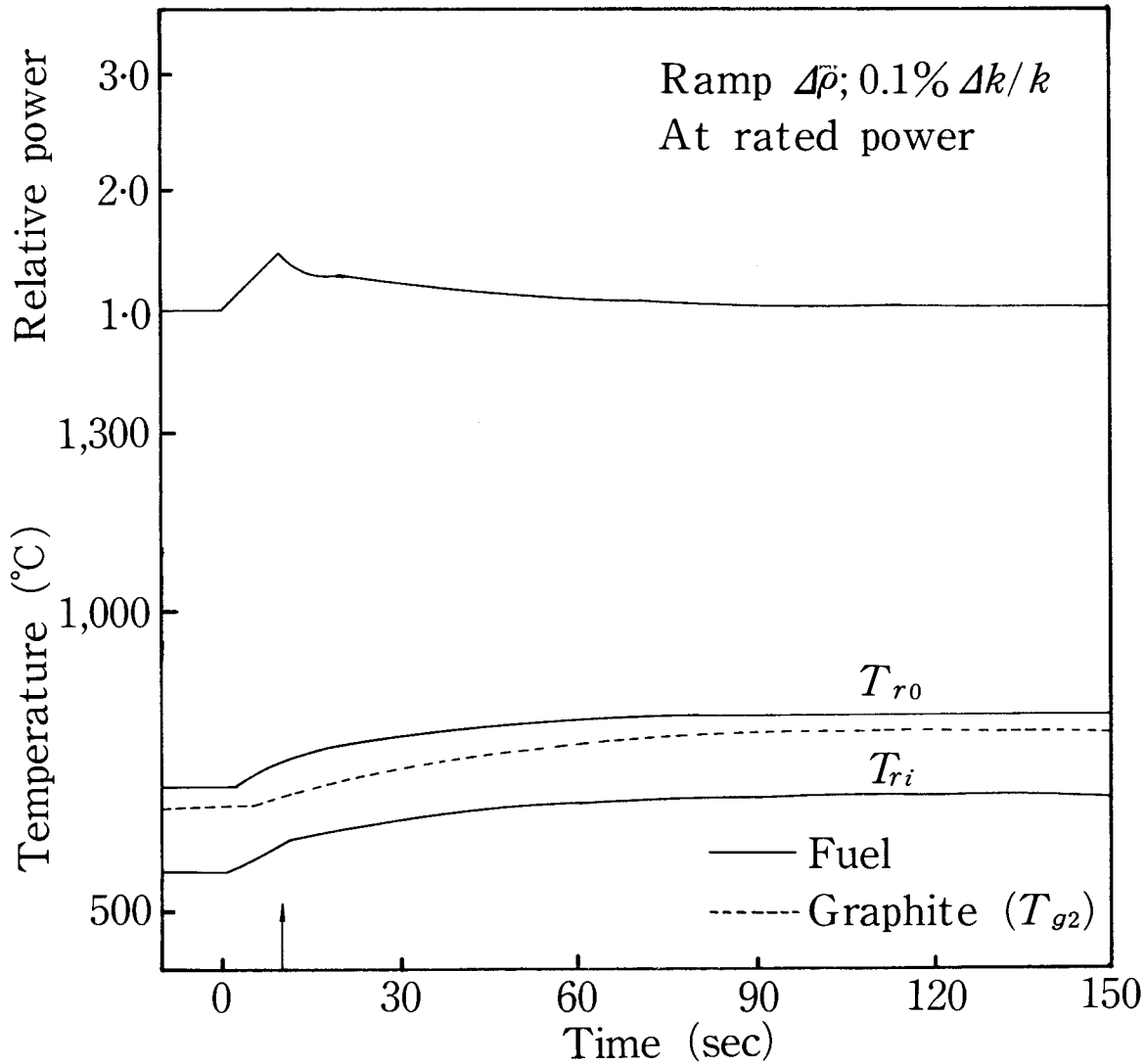


Fig. 4-14 Reactor transient after ramp reactivity addition; Case D-1

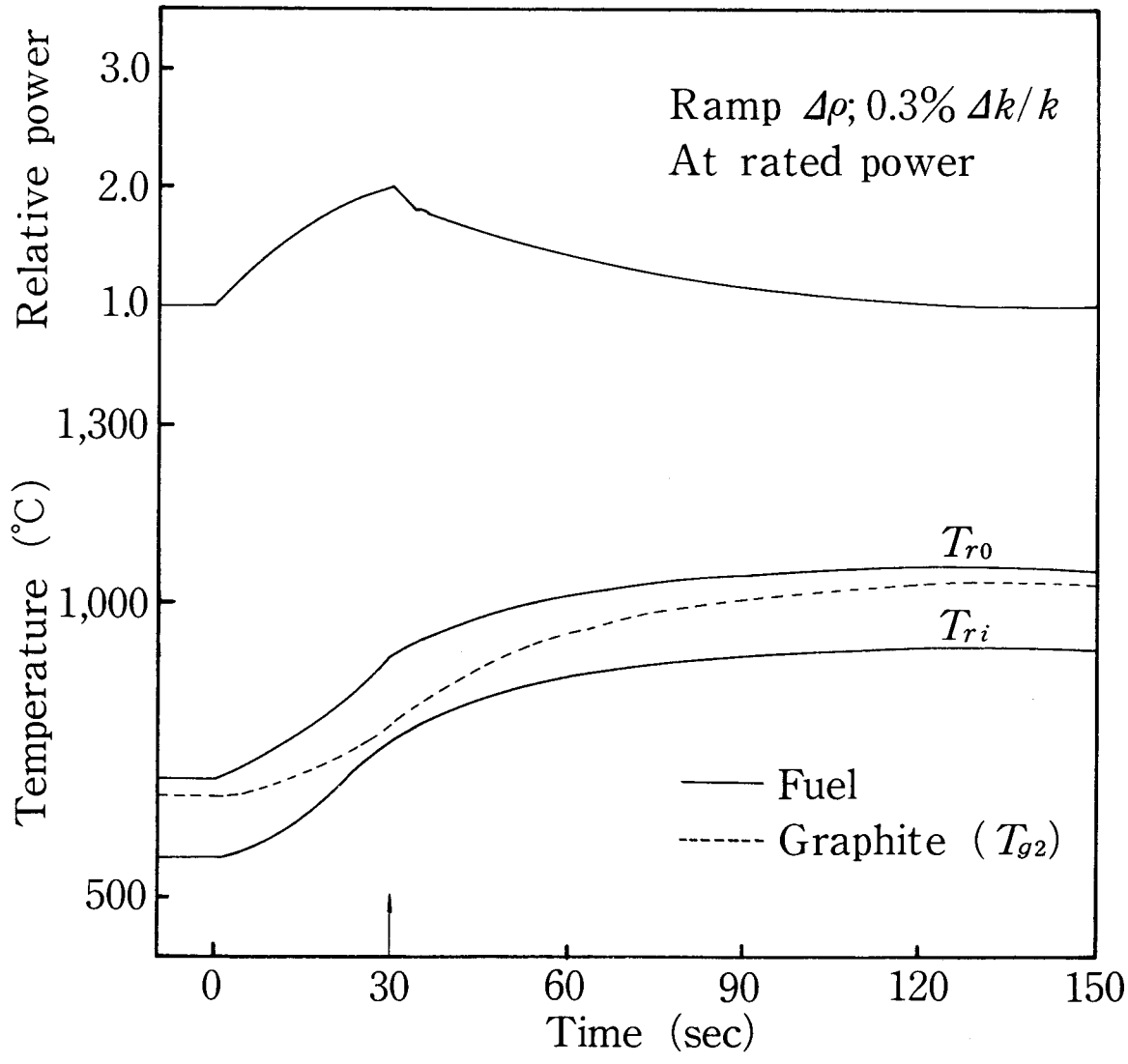


Fig. 4-15 Reactor transient after ramp reactivity addition; Case D-2

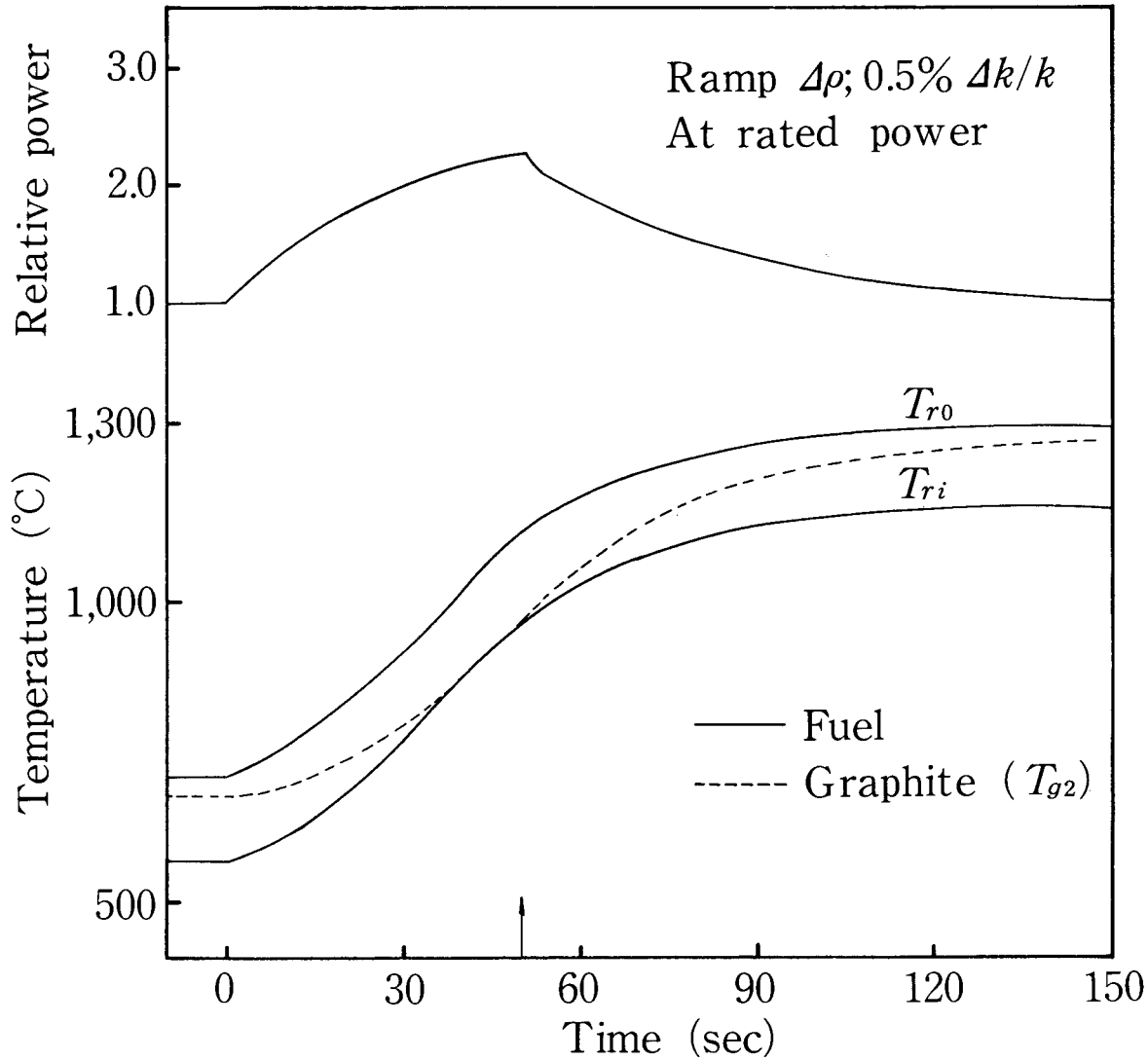


Fig. 4-16 Reactor transient after ramp reactivity addition; Case D-3

the initial reactivity ρ_o, which is 0.00264 in Case B but 0.00140 in Case D due to the presence of delayed-neutron precursors. In the first case, the total delayed neutron fraction being 0.00264, the reactor goes prompt critical as soon as the positive reactivity is added at zero power critical. During the ensuing super prompt critical period, the reactor power rises rapidly until checked by the negative reactivity of temperature feedback. It is this sequence of events that is reflected in the sharp initial power rise seen in Case B. The more moderate second rise traces the progress of reactivity addition, upon the termination of which, the power falls back to settle at a level that is not far removed from the initial state. This latter behavior is common to both Cases B and D. The peak power levels attained are much lower than they were in Cases A and C.

All the quantities are restabilized within a lapse of about 150 sec. The highest fuel temperatures attained are the same between Cases A and B and between Cases C and D for the corresponding amounts of insertion. (see Table 4-3)

We have also analyzed the case of a ramp reactivity addition occuring simultaneously with the reduction of fuel flow rate to 75% of normal flow rate. The results obtained indicate an enhancement of the outlet temperature by about

40°C compared with the corresponding values for normal flow.

It is of particular interest that the highest fuel temperature is determined by the amount of reactivity addition and is independent of the rate of reactivity addition.

These results are compared with the safety criteria selected for the MSBR safety analysis in Section 4.1.2. The fuel temperatures do not violate the limit only in cases for a step and a ramp reactivity addition of 0.1% $\Delta k/k$ at rated power. Fuel temperatures of all other cases reach the limit. The lapse of time in which the fuel temperatures reaches the limit are summarized in Table 4-4.

It is clear that a step reactivity addition results in a more severe transient than a ramp reactivity addition of the same amount. It is also shown that with a same amount of reactivity the resultant transient is more severe for zero power condition than that for rated power condition.

On the other hand, a lapse of time of more than 20 seconds in comparison with a few seconds of PWRs, for example, after the detection of anomalous condition should allow ample time for the automatic protection system to let the prescribed countermeasures come into action. The anomaly could be detected by high neutron flux for nuclear transients. From this point of view, a step reactivity

Table 4-4 Lapse of Time in which fuel temperature reaches the limit

Case		Time (sec)			
Initial Condition	Reactivity (%ΔK/K)	Step		Ramp	
		T_{in}	T_{out}	T_{in}	T_{out}
Zero power (A and B)	0.1	44		46	
	0.3	2		23	
	0.5	1.5		23	
Rated power (C and D)	0.1	-	-	-	-
	0.3	17	16	35	34
	0.5	∿1	∿1	32	31

addition of less than 0.1%Δk/k for zero power condition and for rated power condition could be expected to be terminated safely. It would also be true for both zero power and rated power conditions for a ramp reactivity addition at a rate of 0.01%Δk/k sec.

A step reactivity addition of more than 0.1%Δk/k could possibly occur considering the control rod system of the MSBR. In the MSBR, total control rods are consisted of four graphite rods, each of which has about 0.08%Δk/k reactivity.[20] In order to add possitive reactivity, these control rods are inserted into the center of the core against the bouyancy. Hence more than one control rod mechanism should fail simultaneously to be inserted by a step. This is highly unlikely to happen. This attests the promising nuclear safety characteristics possessed by the reference MSBR, which would render it very highly unlikely to be involved in a reactivity excursion that should endanger the integrity of the fuel containment system. The foregoing analysis would also indicate that there should be no need for a protective system of particularly rapid response.

4.2.5 Conclusion

We have analysed from the results of calculations on transients the expected consequences of nuclear excursions

caused by both step and ramp reactivity addition in the MSBR.

The MSBR being possessed of a very small effective delayed-neutron fraction, a significantly high power pulse is generated by a step reactivity addition. The resulting highest fuel temperature, however, is not higher than caused by ramp insertion of the same amount of reactivity, indicating that the highest temperature attained depends on the amount of the reactivity inserted but not on the rate of reactivity insertion. The prompt pulse generation occasioned immediately after a reactivity insertion can rise to a significant height, but all other transients, including in particular the temperature, are slow enough to permit adequate countermeasures to be taken.

The criteria to assure the integrity of the MSBR, a fine criteria must be established, which are selected as that the inlet and outlet fuel temperatures should not be higher than 790° and 930°C, respectively. Although these limits are reached in most of the cases analysed the lapse of time for each case is long enough to allow ample time for the automatic protection system to let the prescribed countermeasure come into action. In order to assure this lapse of time a quick detection of anormaly by high neutron flux is necessary.

Transients which result in the lapse of time so short

could be highly unlikely to occur. The foregoing analysis attests to the extremely promising nuclear safely characteristics possessed by the MSBR, which would render it very highly unlikely to be involved in a reactivity excusion that should endanger the integrity of its fuel containment system.

4. 3 Mechanical Accident Analysis

4.3.1 Introduction

The MSBR is consisted of reactor primary system, secondary cooling system, steam power system, and fuel processing system. Mechanical accidents should be evaluated for each system.

In the following text, we will determin what is the most severe accident for reactor safety. The accidents of fuel processing system will not directly affect the integrity of reactor system. Also, the accidents of steam power system will not directly affect the integrity of reactor system because the secondary coolant system behave as a buffer.

The abnormal increase or decrease of secondary salt flow can be considered as mechanical accidents of secondary coolant system. In the accidents of salt flow increase, the salt flow will increase to the normal level at most. Hence the reactor transient with power overshoots to some extent caused by this accident would not be more severe than that caused by the accident of salt flow decrease. The salt flow decrease results in the reduction of heat sink so that this would be more severe accident. The same story is true for the accidents of reactor primary system. In the accidents of salt flow decrease of reactor primary system and secondary coolant system, a locked rotor

accident in which salt flow and heat removal capacity are reduced as a step in reactor primary system is the most severe one.

4.3.2 Statistics Consideration on the Initiation of the Accidents

According to Ref. (35), the initiating probability of a reactor coolant pump loss is 0.16/year for Pressurized Water Reactors (PWRs) and 0.32/year for Boiling Water Reactors (BWRs). The probabilities for two, three and four pump loss simultaneously are evaluated as follows. Assuming an accessible time for operators to take corrective actions to be 10 minutes, the probability of one pump loss and in the following 10 minutes another one pump is lost gives the probability of simultaneous loss of two pumps. This is calculated as

$$0.16[\text{year}^{-1}] \times 0.16[\text{year}^{-1}] \times \frac{10\ [\text{min}]}{5.265\text{x}10^{5}[\text{min}]\cdot[\text{year}^{-1}]}$$

$$= 4.9 \times 10^{-1}\ \text{year}^{-1} \qquad \text{for PWRs.}$$

The probabilities of the other cases evaluated in the same manner for both PWRs and BWRs are listed in Table 4-5. We can see from the Table that the probabilities of simultaneous loss of three or four pumps are extremely low. Hence the accidents analysis of such cases

seems to be unnecessary.

On the other hand, the power loss of all pumps can be initiated when the offsite power is lost. The initiating probability of loss of offsite power is estimated to be 0.1/year in Ref. (36). This is much greater than those of simultaneous loss of two or more pumps. The reactor transient for loss of offsite power would result in the same fuel temperatures at the final stage although the transients at the initial stage could be different. This consideration necessiate the analysis of the accident of loss of all pumps. Hence we evaluate all the spectra of locked rator accidents.

Table 4-5 Initiating Probabilities

Number of pump lost simultaneously	Probability* [per year]	
	PWR	BWR
1	0.16	0.32
2	4.9×10^{-8}	1.9×10^{-7}
3	1.5×10^{-14}	1.2×10^{-13}
4	4.5×10^{-21}	7.2×10^{-20}

* Accessible time of 10 minutes

4.3.3 Locked Rotor Accident Analysis

In a reactor with circulating fuel, the reduction or the stoppage of fuel flow caused by locked rotor(s) of the pumps will result not only in adding positive reactivity due to the decrease of the loss of delayed neutron precursors out of the core, but also in loosing heat sink. Such occurrence may be a cause of the loss of reactor system integrity. This is what inspired the present author to undertake an analysis of locked rotor accident. The analysis is made on the basis of a point reactor kinetics model with a simplified heat transfer mechanism.

The following sequence of transients takes place when a locked rotor accident occurs to an MSBR operating at a constant power level: (a) The reduction of fuel salt flow will reduce the loss of delayed neutron precursors out of the core, which gives positive reactivity to the reactor. (b) At the same time, the fuel salt temperature will rise due to the longer stay in the reactor, which gives negative reactivity due to the reactivity feedback of temperature. (c) Fuel salt of higher temperature enters operating loop and after being cooled down comes back to the reactor. (d) In time the reactor will stabilize at a new level where reactivity and heat generation will again balance each other. This sequence of events is straightforward, but analysis of reactor safety demands quantitative examination of the

reactor system behavior, with calculations of fuel salt and graphite temperatures. The model adopted for these calculations is the same that is used in the previous section.

The locked rotor accident is simulated in the following way as adopted in Ref. (24).

(1) The flow rate of fuel salt in the core is reduced to N/4 of the normal value by step, where N is the number of operating pumps.

(2) The heat sink of the primary system is also reduced in the same way.

(3) The transit time of fuel salt through the core in the neutron kinetics equations is increased to 4/N of nominal value in the same way, but the transit time of the fuel salt through the loop external to the core is maintained constant.

In the analysis in Ref. (24) the control rods are expected to move according to the control logic applied to the reference MSBR design. Hence the transients after the reduction of fuel salt flow are terminated around the programmed state. In the present study, however, the control rods motion to counteract the accident is not taken into account in order to obtain more conservative results.

The parameters used in the calculations are listed in Table 4-2.

4.3.4 Results and Discussion

The calculations were made for the following cases. The initial condition is at full power equilibrium state for all the cases.

Case A: Locked rotor accident occurred to one pump out of four

Case B: Locked rator accident occurred to two pumps out of four

Case C: Locked rotor accident occurred to three pumps out of four

Case D: Locked rotor accident occurred to all the pumps

The results obtained with the variation of the heat transfer coefficinet in the reactor core taken into account are plotted in Fig. 4-17 ∿ 4-20 for Cases A ∿ D, respectively, where T_{ro}, T_{ri} and $T_G (= T_{g2})$ denote outlet salt, inlet salt and graphite temperatures in the core. The relation between the heat transfer coefficient and the fuel salt flow is shown in Fig. 4-21.

As can be seen from the figures, the reactor power decreases quite rapidly to the level near the ratio of the actual fuel flow to the nominal. This is caused by the rapid reactivity feedback of temperature of fuel salt. The fuel salt temperature rises rapidly in the beginning of the transient followed by a gradual increase to compensate the

positive reactivity insertion due to the temperature rise of graphite. The fuel salt inlet and outlet temperatures, (T_{in}, T_{out}), for each case reach about (590°C, 730°C), (620°C, 760°C), (650°C, 780°C) and (566°C, 950°C), respectively. The limiting temperatures (790°C, 930°C), are not violated in any cases except the last one.

We also analyzed the same transients with a constant heat transfer coefficient of the fuel salt, the value at the design flow rate. The results for cases A ∿ D are plotted in Fig. 4-22 ∿ 4-25 the reactor system behaviors are similar to those with reduced heat transfer coefficient. The differences are seen in temperatures of fuel salt and graphite. This is explained as follows. A better heat transfer coefficient results in a faster temperature rise of graphite, which inserts more positive reactivity. Hence the reactor power decreases with a slower rate, and the total energy generated during the transient becomes greater. On the other hand, the heat sink is the same in corresponding cases so that the system temperatures rise higher. The fuel salt inlet and outlet temperatures for each case reach about (590°C, 730°C), (625°C, 770°C), (690°C, 835°C) and (566°C, 1500°C), respectively. Also the limiting temperatures are not violated in any cases except the last one. In cases A ∿ C with both variable and constant heat transfer coefficients, the primary

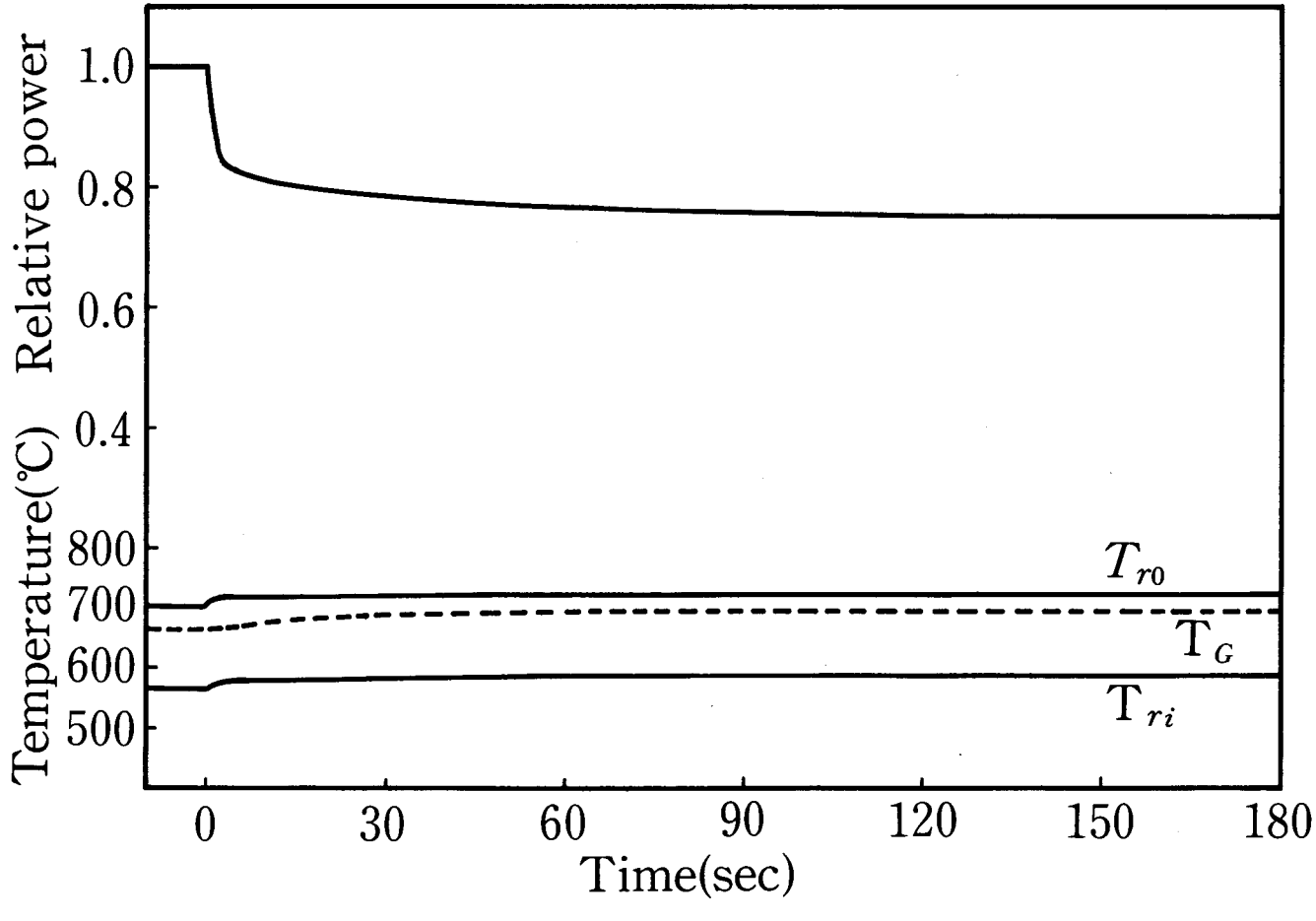


Fig. 4-17 Reactor transient after locked rotor accident of one pump; Variable heat transfer coefficient

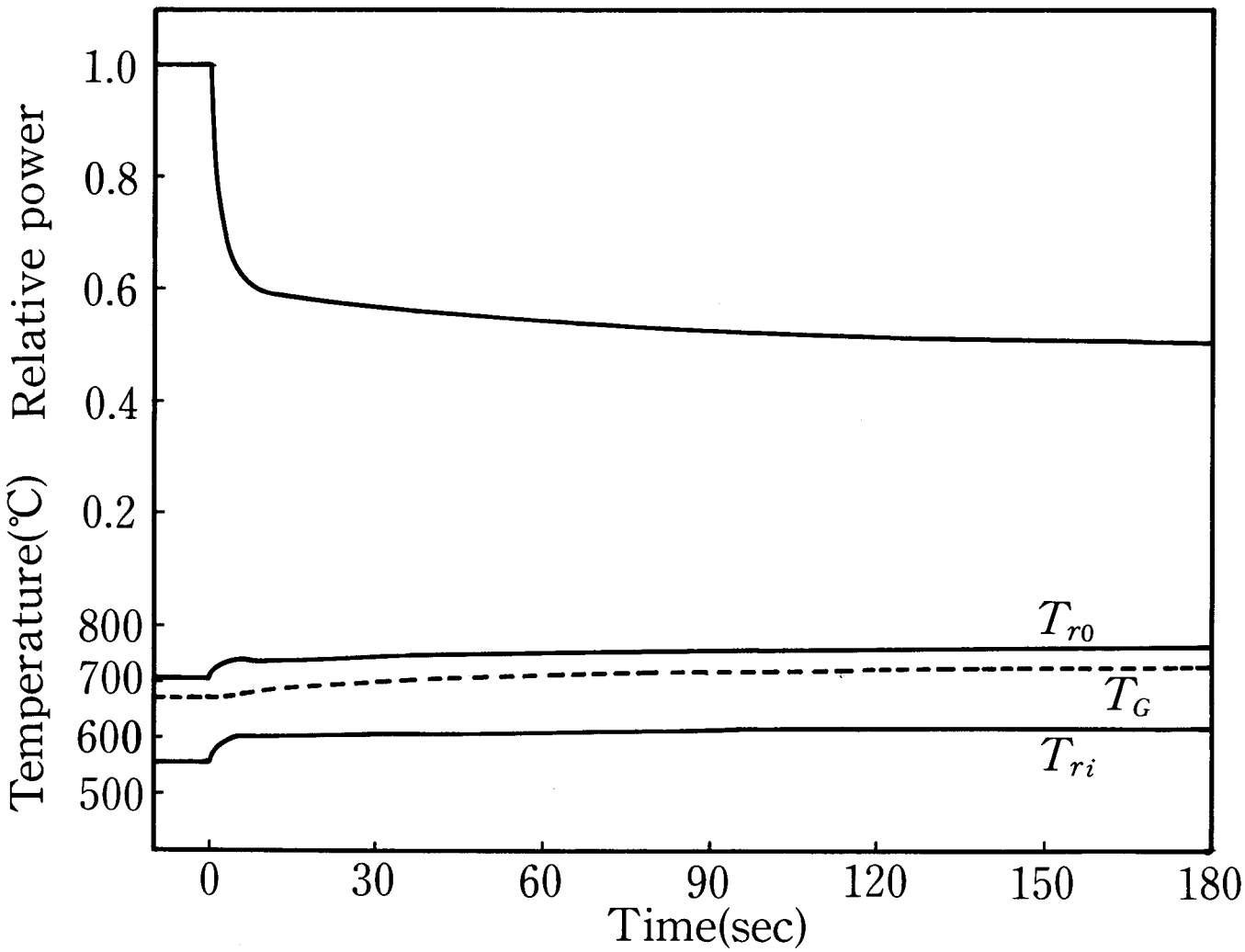


Fig. 4-18 Reactor transient after locked rotor accident of two pumps: Variable heat transfer coefficient

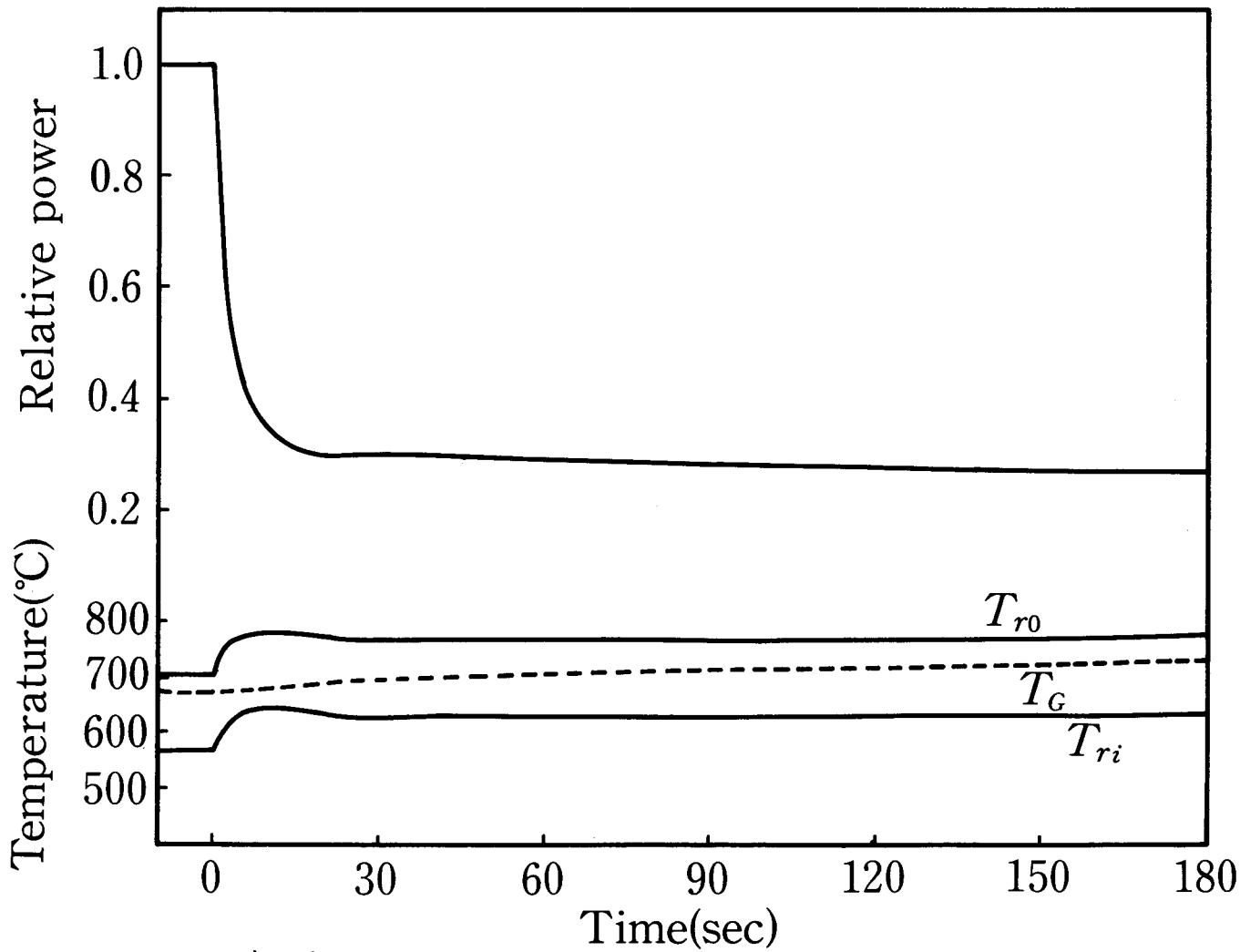


Fig. 4-19 Reactor transient after locked rotor accident of three pumps: Variable heat transfer coefficient

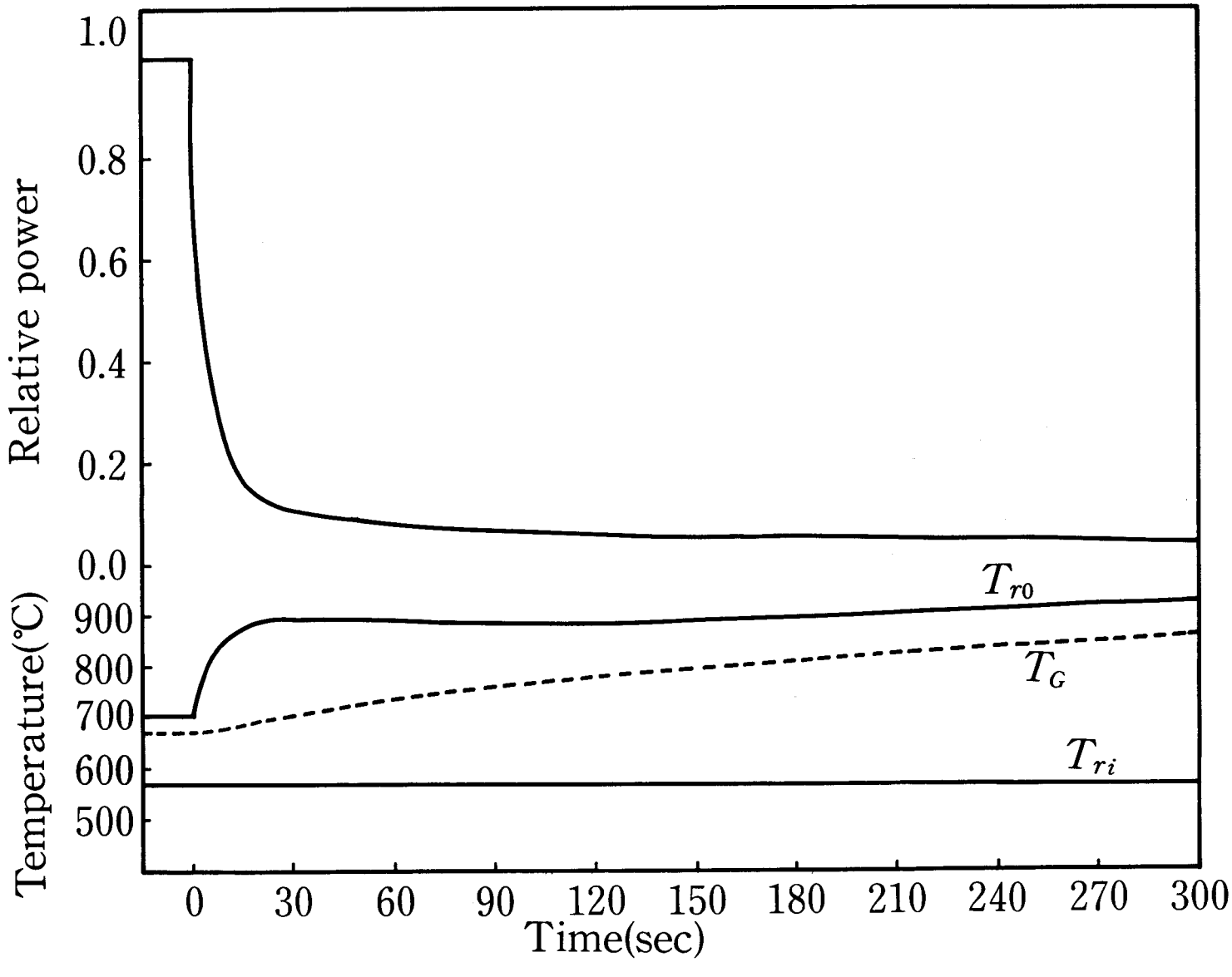


Fig. 4-20 Reactor transient after locked rotor accident of four pumps: Variable heat transfer coefficient

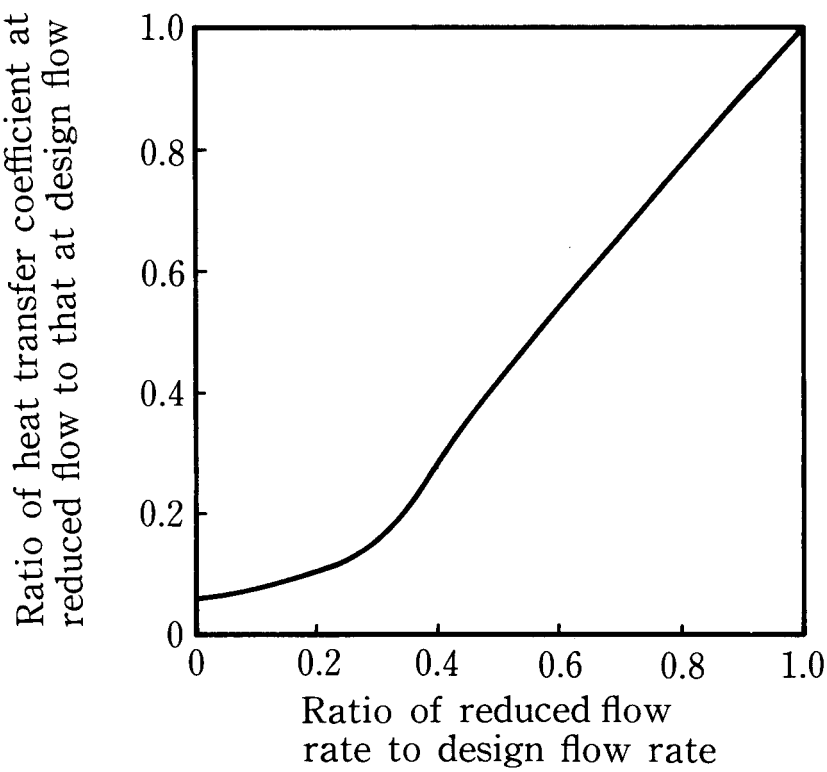


Fig. 4-21 Variation of heat transfer coefficient with primary salt flow rate in reactor core[24)]

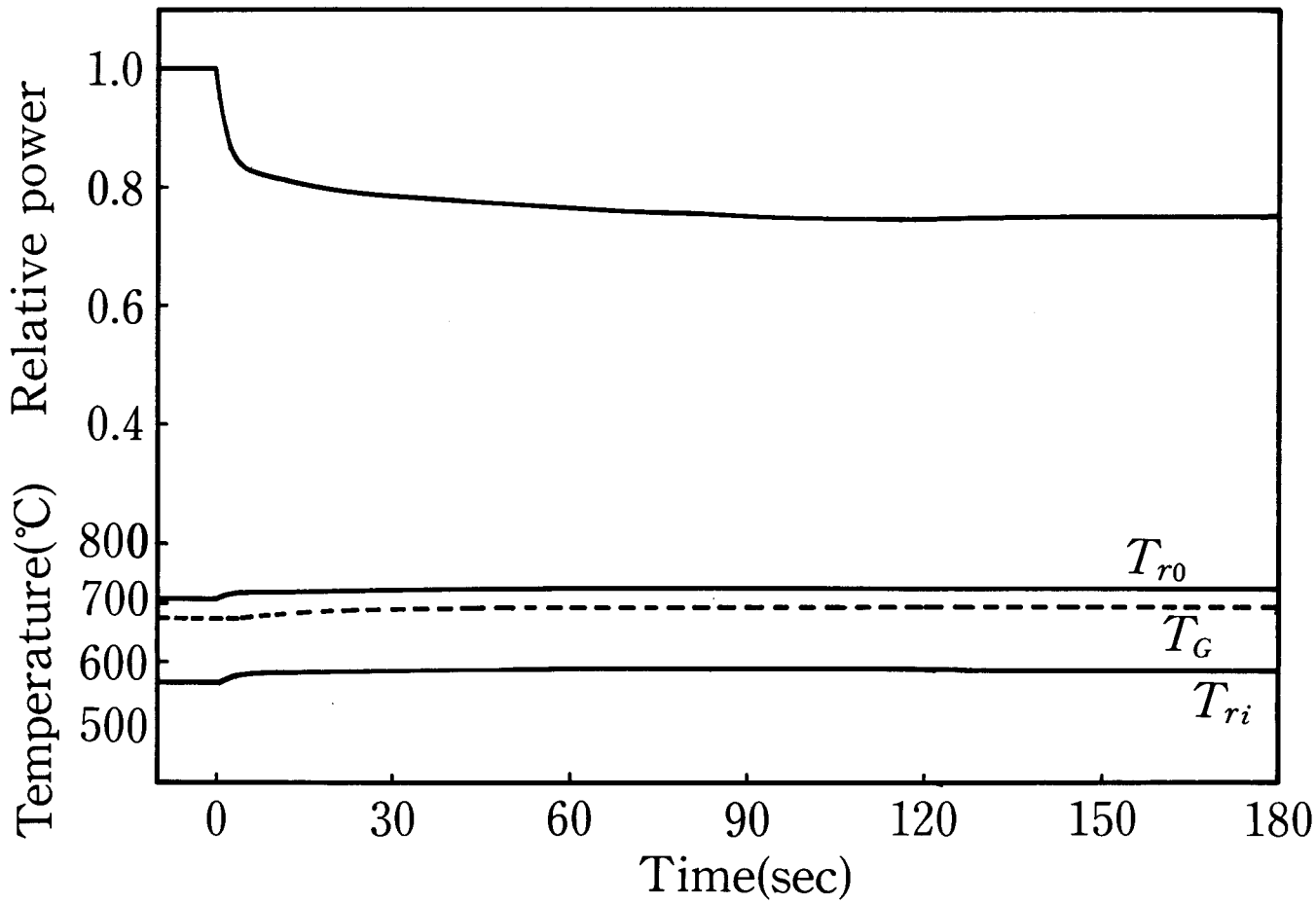


Fig. 4-22 Reactor transient after locked rotor accident of one pump: Constant heat transfer coefficient

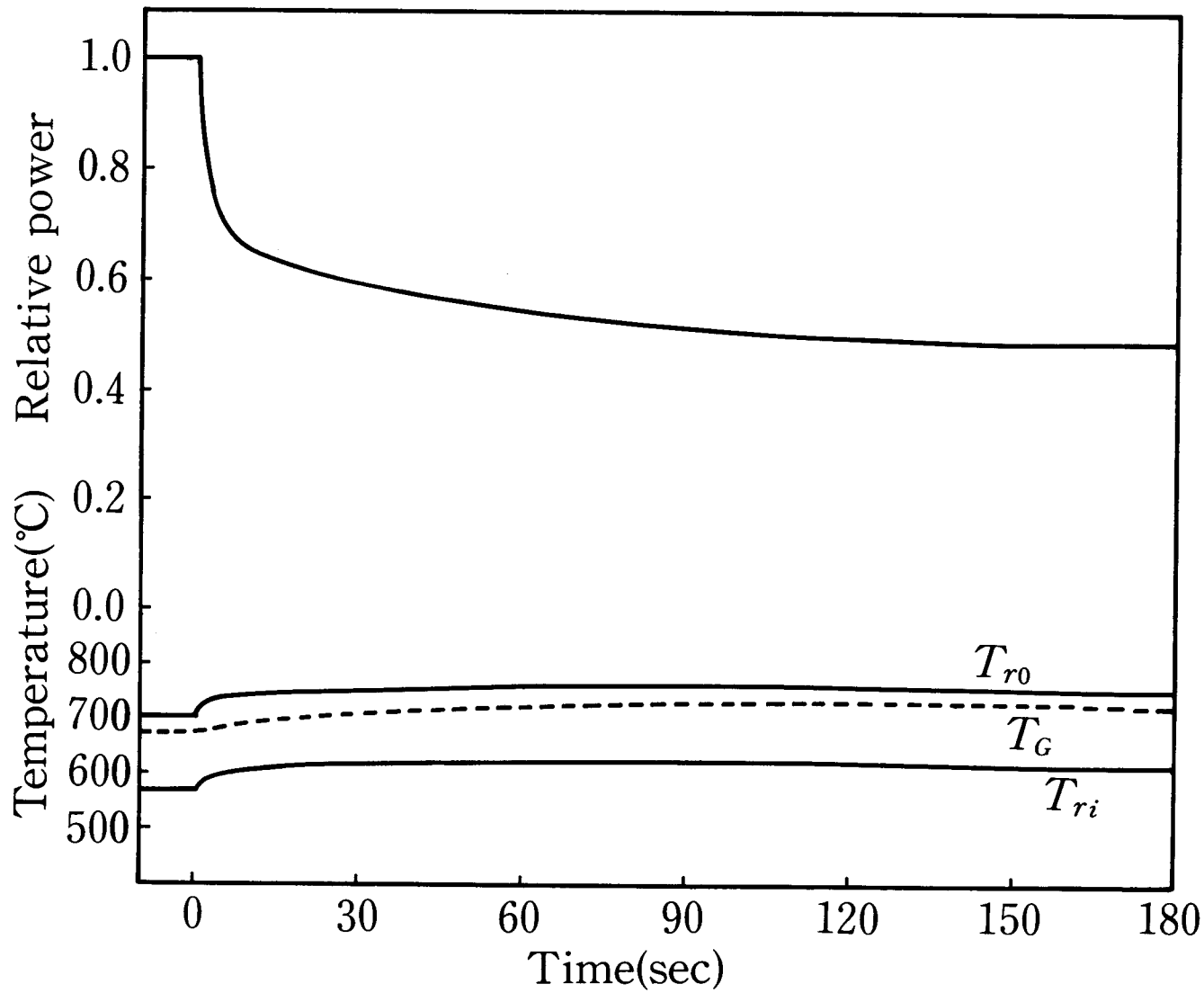


Fig. 4-23 Reactor transient after locked rotor accident of two pumps: Constant heat transfer coefficient

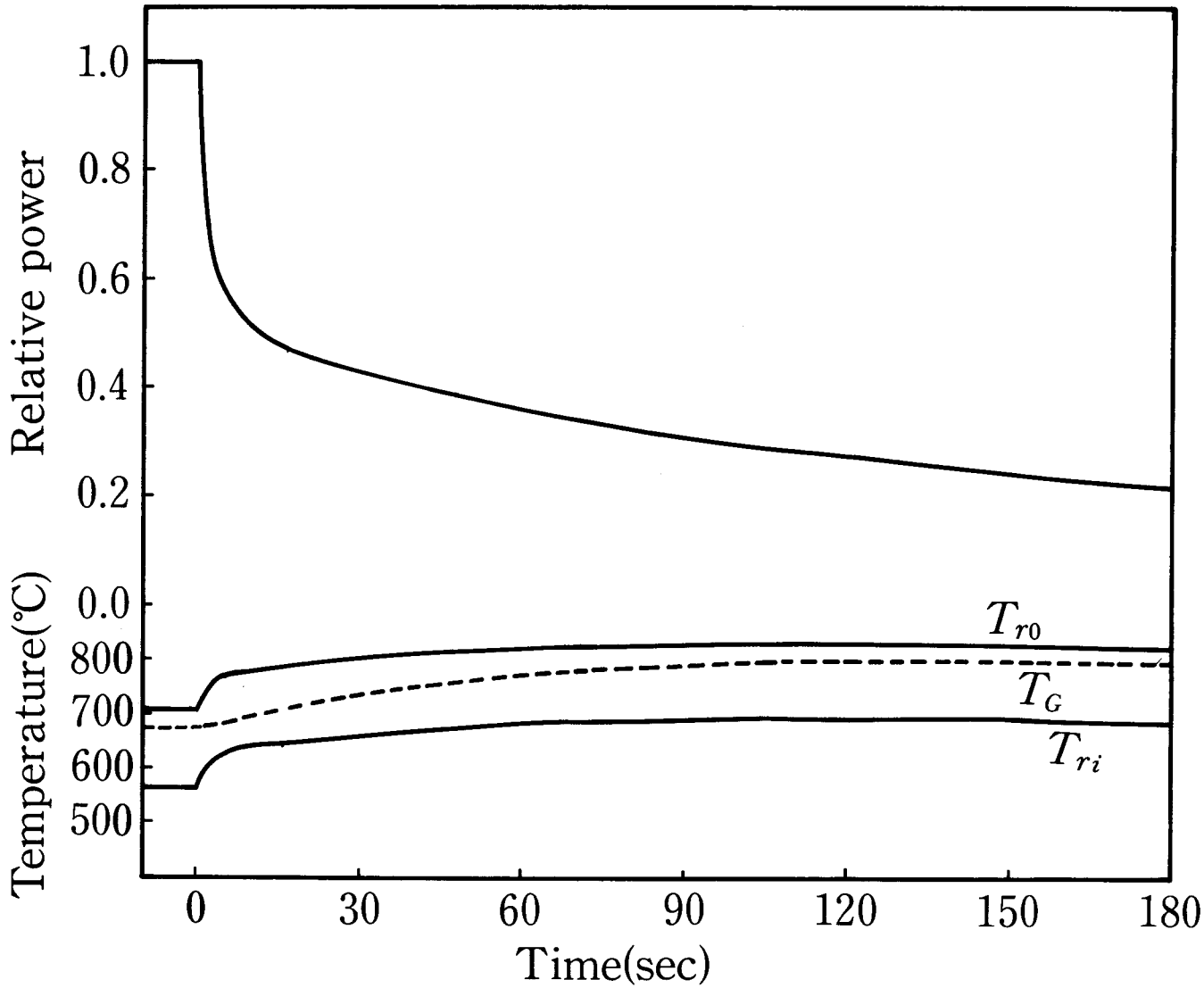


Fig. 4-24 Reactor transient after locked rotor accident of three pumps: Constant heat transfer coefficient

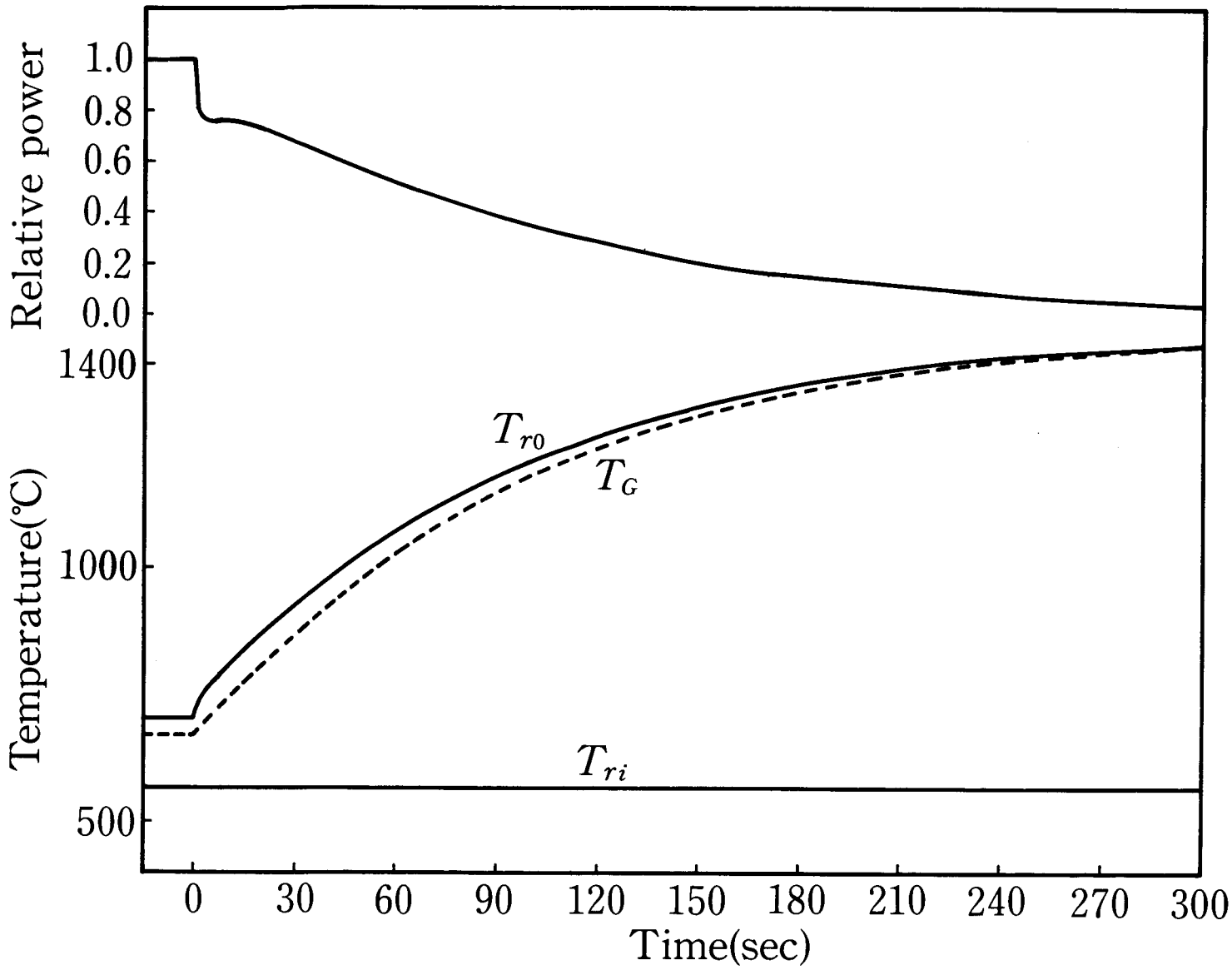


Fig. 4-25 Reactor transient after locked rotor accident of four pumps: Constant heat transfer coefficient

system has a partial flow and heat sink. While in case D the system has no fuel salt flow and heat sink, which makes the fuel salt temperature rise far beyond the limiting temperature. However, it takes 300 seconds and 30 seconds for the fuel salt temperature to reach the limit for variable and constant heat transfer cofficient, respectively. These lapses of time could be long enough for the automatic protection system to detect the anomaly and to come into action to reduse the severity of the accident.

On the other hand, it is shown that a partial flow can effectively keep the fuel temperatures below enough the limiting temperatures. Hence an auxirially system to maintain a partial fuel salt flow of more than 5% of the nominal in case of loss of main flow would be recommended.

4.3.5 Conclusion

We have analyzed locked rator accidents in the MSBR for 1, 2,3 and all fuel salt pump failure out of four. The analysis was made with the assumption that the control rods would not act to reduce the reactor power. As to the heat transfer coefficient of the fuel salt in the reactor, we have analyzed the cases with and without the variation of the coefficient.

The transient behaviors for all the cases are similar:

The reactor power decreases to the level balancing with the available heat sink in a short time after the initiation of the accident. With the variation of the heat transfer coefficient the fuel salt inlet and outlet temperatures for locked rotor accidents of one, two, three and four pumps reach (590°C, 730°C), (620°C, 760°C), (650°C, 780°C) and (566°C, 950°C), respectively. On the other hand, the fuel salt inlet and outlet temperatures with a constant design heat transfer coefficient reach (590°C, 730°C), (625°C, 770°C), (690°C, 835°C) and (566°C, 1500°C), respectively. These temperatures except the last cases are sufficiently below the limiting temperature of (790°C, 930°C).

In the last cases, i.e. the transients with complete loss of fuel salt flow and heat sink, the fuel outlet temperatures reach the limiting temperature in about 300 seconds and 30 seconds with variation and constant heat transfer coefficient, respectively. We could expect, however, the counteraction by the automatic protection system. Or an auxiliary system to miantain a partial fuel salt flow could keep the temperature within the safety range. Hence the transient caused by locked rotors of the primary pumps will not result in a serious condition from the point of view of system integrity. From the above findings we can conclude that the MSBR has

excellent safety characteristics to locked rotor accidents even with the consideration of uncertainty in the heat transfer coefficient of the fuel salt.

4.4 Summary and Recommendations

We have analyzed the most severe transients of nuclear accidents and mechanical accidents without scram to make qualitative safety evaluation of the MSBR.

The criteria is selected on fuel salt temperatures such that the maximum allowable temperatures are 790°C and 930°C for inlet and outlet fuel salt temperature, respectively, which is based on the consideration of the deformation limit of 1% for the reactor vessel at elevated temperature during 1 hour.

The foregoing discussion of the results are summarized as follows:

<u>Requirements of protection/control systems</u>

1) Scram system actuated by the detection of high neutron flux. However the scram system is not required to be as rapid as that of present power reactors.
2) Rapid and reliable fuel drain system.
3) Auxiliary primary salt circulating system of at least 5% of nominal flow when all primary pumps are lost.
4) Independent drive mechanism for each of four

control rods, which has logical circuit to limit the driving speed of the control rods.

Safety assessment of transient without scram

1) Nuclear excursions produced by reactivity addition of up to 0.1%$\Delta k/k$ in both step and ramp at the rate of 0.01%/sec at full power will be terminated within the safety range.

2) Transients initiated by pump failures occurred at full power simultaneously up to three out of four pumps will be terminated within the safety range.

From the findings above and considerations of the MSBR system, we can conclude that the MSBR has excellent safety characteristics in virtue of its nuclear and thermal properties than the other types of reactors.

However, in order to take advantage of this reactor concept and to design more reliable system, the following study would be fruitful.

Recommendations for studies in the future

1) More detailed and analytical stress analysis, including thermal stress, of reactor vessel and nozzles.

2) Precise investigation on mechanical properties at elevated temperatures of Hastelloy-N.

Nomenclature

Chapter 4

A_c	:	heat transfer area of graphite lump	(cm^2)
Cj	:	j-th grope delayed-neutron precursor concentration	(n/cm^3)
C_{pf}	:	specific heat of fuel salt	(J/kg·°k)
C_{pg}	:	specific heat of graphite	(J/kg·°k)
F_l	:	fuel salt mass flow rate in lump	(kg/sec)
h_{fg}	:	graphite to fuel salt heat transfer coefficient	$J/m^2 \cdot sec \cdot °C$
k_g	:	fission heat generation in graphite lump	(MW)
k_r	:	fission heat generation in fuel salt lump	(MW)
ℓ	:	prompt neutron generation time	(sec)
M_g	:	mass of graphite lump	(kg)
M_r	:	mass of fuel salt lump	(kg)
P_r	:	relative power	(-)
Q	:	heat sink in the primary loop	(MW)
T_i	:	inlet temperature to lump	(°C)
T_g	:	graphite temperature	(°C)
T_p	:	fuel salt temperature	(°C)
T_{ro}	:	outlet temperature of fuel salt	(°C)

T^D_{pi}	:	design temperature of fuel salt lump i	(°C)
T^D_{gi}	:	design temperature of graphite lump i	(°C)
α_f	:	temperature coefficient of reactivity of fuel salt	($°C^{-1}$)
α_g	:	temperature coefficient of reactivity of graphite	($°C^{-1}$)
β_j	:	j-th group delayed-neutron fraction	(-)
λ_j	:	j-th group delayed-neutron precursor decay constant	(sec^{-1})
ρ_c	:	control rods reactivity	(-)
ρ_o	:	steady state design point reactivity	(-)
τ_c	:	transit time of fuel salt through core	(sec)
τ_L	:	transit time of fuel salt through external loop	(sec)

Chapter 5 Fuel Cycles and the Cost Analysis

5.1 Introduction

The following list indicates six kinds of fuel cycles that can be considered:[39]

1. Equilibrium fuel cycle with integrated fuel processing plant. This case has been studies in ORNL4541.[20]
2. ^{235}U startup to approach the equilibrium cycle.
3. ^{239}Pu startup to approach the equilibrium cycle.
4. Operation with limited fuel processing.
5. ^{235}U startup without integrated fuel processing, with ^{235}U addition instead of ^{233}U.
6. ^{235}U startup without integrated fuel processing, with ^{235}U addition and continuous removal of fuel salt. The removal salt is processed at a centralized or remote reprocessing facility.

These are summarized in Table 5-1.

The first four cases have been briefly evaluated by Perry & Bauman[39] at ORNL. Now, all these four schemes involve integrated on-site chemical processing, and it should be of interest to determine how much the fuel cycle cost would be affected if this continuous chemical processing were dispensed with.

Granted that such elimination of on-site processing is practicable, the fuel salt would then be processed at a

specialized center off the site, thus relieving the on-site operations of onerous radioactive material handling.

Such fuel cycles devoid of on-site chemical processing are presented in this chapter by schemes C and D. Scheme C is further sub-devided into three cases covering different intervals between batched fuel reprocessing operations, and Scheme D also into three cases for different rates of fuel removal. Cases 1 and 2 above are also examined for the purpose of comparison. The two cases are respectively disignated Schemes A and B.

Table 5-1 Fuel Cycle of Molten Salt Reactors

	Materials Continuously Removed	Materials Continuously Added
Equilibrium Cycle Scheme A	All Fission Products Excess Uranium Isotopes Protactinum Discard Carrier Salt [a]	Fuel: Bred $^{233}UF_4$ [b] Makeup Carrier Salt [a]
Operation with Limited Fuel Processing Scheme B	Gaseous Fission Products	Fuel: Recycled $^{233}UF_4$
No Integrated Fuel Processing, but with ^{235}U Addition Scheme C	Gaseous Fission Products	Fuel: $^{235}UF_4$
No integrated Fuel Processing, with ^{235}U Addition and Continuous Removal of Fuel Salt Scheme D	Gaseous Fission Products/Fraction of all the Salt.	Fuel: $^{235}UF_4$ Makeup Carrier Salt [a]

a ThF_4, LiF, BeF_2

b ^{233}U is produced by the total system but some of it is added to the primary system to maintain criticality.

5.2 Method of Calculation of Fuel Composition Change

5.2.1 Basic Equations

In order to evaluate the fuel cycle cost, we need to know how much fissile material is needed for plant operation and how the composition changes with burnup. Such information can be obtained from burnup calculations, i.e., the solution of a set of differential equations for the fuel composition change and a neutron balance (criticality equation).

According to one-group, point reactor model approxiamtions, the equations for change in fuel composition are apparent from the nature of the ^{232}Th and ^{235}U transmutation shown in Fig. 5-1.

$$P = k(\sigma_{f23}N_{23}\phi + \sigma_{f25}N_{25}\phi) \qquad 5-1$$

$$\frac{dN_{02}}{dt} = -\sigma_{02}N_{02}\phi + aN_{02} \qquad 5-2$$

$$\frac{dN_{13}}{dt} = \sigma_{02}N_{02}\phi - \sigma_{13}N_{13}\phi - \lambda_{13}N_{13} - bN_{13} \qquad 5-3$$

$$\frac{dN_{23}}{dt} = \lambda_{13}N_{13} - \sigma_{23}N_{23}\phi - cN_{23} \qquad 5-4$$

$$\frac{dN_{24}}{dt} = \sigma_{13}N_{13}\phi + \frac{\alpha_{23}}{1+\alpha_{23}}\sigma_{23}N_{23}\phi - \sigma_{24}N_{24}\phi - dN_{24} \qquad 5-5$$

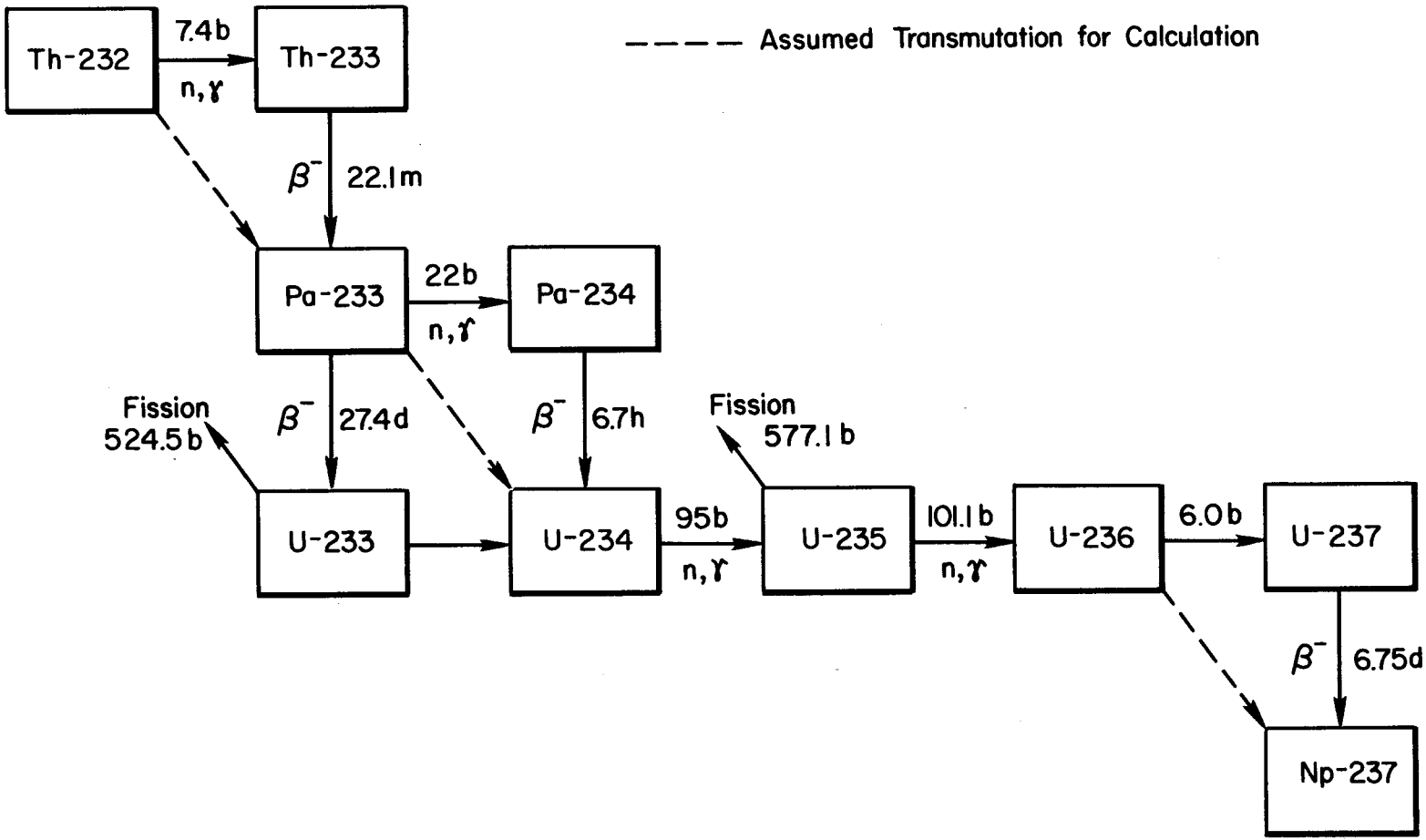


Fig. 5-1 Transmutation scheme of ^{232}Th and ^{235}U

$$\frac{dN_{25}}{dt} = \sigma_{24}N_{24}\phi - \sigma_{25}N_{25}\phi - dN_{25} \qquad 5 - 6$$

$$\frac{dN_{26}}{dt} = \frac{\alpha 25}{1+\alpha_{25}} \sigma_{25}N_{25}\phi - \sigma_{26}N_{26}\phi - dN_{26} \qquad 5 - 7$$

$$\frac{dN_{37}}{dt} = \sigma_{26}N_{26}\phi - \sigma_{37}N_{37}\phi - eN_{37} \qquad 5 - 8$$

$$\frac{dN_{F.P.23}}{dt} = \frac{1}{1+\alpha_{23}} \sigma_{23}N_{23}\phi - fN_{F.P.23} \qquad 5 - 9$$

$$\frac{dN_{F.P.25}}{dt} = \frac{1}{1+\alpha_{25}} \sigma_{25}N_{25}\phi - fN_{F.P.25} \qquad 5 - 10$$

$$\eta_{23}\varepsilon\sigma_{23}N_{23} + \eta_{25}\varepsilon\ \sigma_{25}N_{25}$$
$$= \sigma_{02}N_{02} + \sigma_{13}N_{13} + \sigma_{23}N_{23} + \sigma_{24}N_{24}$$
$$+ \sigma_{25}N_{25} + \sigma_{26}N_{26} + \sigma_{37}N_{37} + A_{F.P.}$$
$$+ \text{(absorption of Li, Be, F and graphite)}$$
$$+ \text{Leakage.} \qquad 5 - 11$$

where P = thermal output

k = energy/fission

ϕ = effective flux based on total primary system

N_x = total nuclide x in primary system

σ_x = effective microscopic cross section of nuclide x

λ_x = decay constant of nuclide x

α_x = capture to fission ratio

$N_{F.P.x}$ = total of fission product pair from nuclide x

η_x = η of nuclide x

ε = fast fission factor

a = Th fraction of primary system inventory added per unit time

b = Pa fraction of primary system inventory extracted per unit time

c = ^{233}U fraction of primary system inventory extracted per unit time

d = U fraction of primary system inventory extracted per unit time

e = N_p fraction of primary system inventory extracted per unit time

f = F.P. fraction of primary system inventory extracted per unit time

$A_{F.P.}$ = absorption of fission product.

These equations could be solved analytically with much complexity. Usually these equations are solved numerically using a computer, with the assumption that during a time step Δt neutron flux is constant. Essentially, the solutions for the time step are expressed by the combination of exponential terms. These solutions, however, can be approximated quite accurately by expansion of the exponentials. That is, e^{-x} is expanded in infinite series as

$$e^{-x} = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} \cdots\cdots$$

When $x = 0.02$, taking the first two terms leads to the error less than 0.02%, for example. This approximation means the assumption that during the time step the concentration of the composition is constant. If time step, Δt, is chosen small enough for this assumption to be valid, then the solutions of equation (1) - (10) can be expressed in a simpler form, such as

$$\phi = \phi(t) \qquad 5 - 12$$

$$N_{02}(t+\Delta t) = (1-\sigma_{02}\phi\Delta t)N_{02}(t) + a\, N_{02}(t)\Delta t \qquad 5 - 13$$

$$N_{13}(t+\Delta t) = (1-\sigma_{13}\phi\Delta t)N_{13}(t) + \sigma_{02}N_{02}(t)\phi\Delta t - \lambda_{13}N_{13}(t)\Delta t - bN_{13}(t)\Delta t \qquad 5 - 14$$

$$N_{23}(t+\Delta t) = (1-\sigma_{23}\phi\Delta t)\, N_{23}(t) + \lambda_{13}N_{13}(t)\Delta t - c\, N_{23}(t)\Delta t \qquad 5 - 15$$

$$N_{24}(t+\Delta t) = (1-\sigma_{24}\phi\Delta t)\, N_{24}(t) + \sigma_{13}N_{13}\phi\Delta t + \frac{23}{1+\alpha_{23}}\sigma_{23}N_{23}\phi\Delta t - dN_{24}\Delta t \qquad 5 - 16$$

$$N_{25}(t+\Delta t) = (1-\sigma_{25}\phi\Delta t)\, N_{25}(t) + \sigma_{24}N_{24}\phi\Delta t - dN_{25}\Delta t \qquad 5 - 17$$

$$N_{26}(t+\Delta t) = (1-\sigma_{26}\phi\Delta t)\ N_{26}(t) + \frac{\alpha_{25}}{1+\alpha_{25}}\ \sigma_{25}N_{25}\phi\Delta t - dN_{26}\Delta t \qquad 5-18$$

$$N_{37}(t+\Delta t) = (1-\sigma_{37}\phi\Delta t)\ N_{37}(t) + \sigma_{26}\phi\Delta t N_{26}(t) - e\ N_{37}\Delta t \qquad 5-19$$

$$N_{F.P.23}(t+\Delta t) = \frac{1}{1+\alpha_{23}}\ \sigma_{23}\phi N_{23}(t)\Delta t - fN_{F.P.23}(t)\Delta t \qquad 5-20$$

$$N_{F.P.25}(t+\Delta t) = \frac{1}{1+\alpha_{25}}\ \sigma_{25}\phi N_{25}(t)\Delta t - fN_{F.P.25}(t)\Delta t \qquad 5-21$$

These solutions can be rewritten in terms of the mass of each nuclide, neglecting the mass differences of the adjacent (errors are less than 0.4%).

$$M_{02}(t+\Delta t) = (1-\sigma_{02}\phi\Delta t)\ M_{02}(t) + aM_{02}(t)\Delta t \qquad 5-22$$

$$M_{13}(t+\Delta t) = (1-\sigma_{13}\phi\Delta t)\ M_{13}(t) + \sigma_{02}M_{02}(t)\phi\Delta t - \lambda_{13}M_{13}(t)\ \Delta t - bM_{13}\Delta t \qquad 5-23$$

$$M_{23}(t+\Delta t) = (1-\sigma_{23}\phi\Delta t)\ M_{23}(t) + \lambda_{13}M_{13}(t)\Delta t - cM_{23}(t)\Delta t \qquad 5-24$$

$$M_{24}(t+\Delta t) = (1-\sigma_{24}\phi\Delta t)\ M_{24}(t) + \sigma_{13}M_{13}(t)\phi\Delta t + \frac{\alpha_{23}}{1+\alpha_{23}}\ \sigma_{23}M_{23}(t)\phi\Delta t - dM_{24}(t)\Delta t \qquad 5-25$$

$$M_{25}(t+\Delta t) = (1-\sigma_{25}\phi\Delta t)\ M_{25}(t) + \sigma_{24}M_{24}(t)\phi\Delta t - dM_{25}(t)\Delta t \qquad 5-26$$

$$M_{26}(t+\Delta t) = (1-\sigma_{26}\phi\Delta t)\ M_{26}(t) + \frac{\alpha_{25}}{1+\alpha_{25}}\ \sigma_{25}M_{25}(t)\phi\Delta t - dM_{26}(t)\Delta t \qquad 5-27$$

$$M_{37}(t+\Delta t) = (1-\sigma_{37}\phi\Delta t)\ M_{37}(t) - eM_{37}(t)\Delta t \qquad 5-28$$

$$M_{F.P.23}(t+\Delta t) = \frac{1}{1+\alpha_{23}}\ \sigma_{23}M_{23}(t)\phi\Delta t - fM_{F.P.23}(t)dt \qquad 5-29$$

$$M_{F.P.25}(t+\Delta t) = \frac{1}{1+\alpha_{25}}\ \sigma_{25}M_{25}(t)\phi\Delta t - fM_{F.P.25}(t)\Delta t \qquad 5-30$$

Now let us solve the criticality equation to obtain the quantity of ^{233}U necessary for criticality. The equation can be written using the reference design concentration, N*, for each nuclide.

$$\eta_{23}\varepsilon\sigma_{23}N^*_{23}\cdot\frac{N_{23}}{N^*_{23}} + \eta_{25}\varepsilon\sigma_{25}N^*_{25}\cdot\frac{N_{25}}{N^*_{25}}$$

$$= \sigma_{02}N^*_{02}\ \frac{N_{02}}{N^*_{02}} + \sigma_{13}N^*_{13}\ \frac{N_{13}}{N^*_{13}}$$

$$+ \sigma_{23}N^*_{23} \frac{N_{23}}{N^*_{23}} + \sigma_{24}N^*_{24} \frac{N_{24}}{N^*_{24}} + \sigma_{25}N^*_{25} \frac{N_{25}}{N^*_{25}}$$

$$+ \sigma_{26}N^*_{26} \frac{N_{26}}{N^*_{26}} + \sigma_{37}N^*_{37} \frac{N_{37}}{N^*_{37}} + F.\ P. + \kappa$$

where κ = (absorption of Li*, Be* F* and graphite*) + leakage* and assumed time independent, κ = (absorption of Li, Be, F, and graphite) + Leakage.

or

$$\eta_{23}\varepsilon\sigma_{23}N^*_{23} \frac{M_{23}}{M^*_{23}} + \eta_{25}\varepsilon\sigma_{25}N^*_{25} \frac{M_{25}}{M^*_{25}} = \sigma_{02}N^*_{02} \frac{M_{02}}{M^*_{02}}$$

$$+ \sigma_{13}N^*_{13} \frac{M_{13}}{M^*13} + \sigma_{23}N^*_{23} \frac{M_{23}}{M^*23} + \sigma_{24}N^*_{24} \frac{M_{24}}{M^*_{24}}$$

$$+ \sigma_{25}N^*_{25} \frac{M_{25}}{M^*_{25}} + \sigma_{26}N^*_{26} \frac{M_{26}}{M^*_{26}} + \sigma_{37}N^*_{37} \frac{M_{37}}{M^*_{37}} + F.P. + \kappa$$

We get

$$M^c_{23}(t+\Delta t) = \frac{M^*_{23}}{\eta_{23}\varepsilon-1} \left\{ \frac{\sigma_{02}N^*_{02}}{\sigma_{23}N^*_{23}} \frac{M_{02}(t+\Delta t)}{M^*_{02}} \right.$$

$$+ \frac{\sigma_{13}N^*_{13}}{\sigma_{23}N^*_{23}} \frac{M_{13}(t+\Delta t)}{M^*_{13}} + \frac{\sigma_{24}N^*_{24}}{\sigma_{23}N^*_{23}} \frac{M_{24}(t+\Delta t)}{M^*_{24}}$$

$$+ (\eta_{25}\varepsilon-1) \frac{\sigma_{25}N^*_{25}}{\sigma_{23}N^*_{23}} \cdot \frac{M_{25}(t+\Delta t)}{M^*_{25}}$$

$$+ \frac{\sigma_{26}N^*_{26}}{\sigma_{23}N^*_{23}} \frac{M_{26}(t+\Delta t)}{M^*_{26}} + \frac{\sigma_{37}N^*_{37}}{\sigma_{23}N^*_{23}} + \frac{M_{37}(t+\Delta t)}{M^*_{37}}$$

$$\left. + \frac{\kappa}{\sigma_{23}N^*_{23}} + \frac{F.P.(t+\Delta t)}{\sigma_{23}N^*_{23}} \right\}$$

where M* is the total inventory in the system for the reference MSBR.

To get the answer for $M_{23}(t)$ we have to know about $\eta_{23}\varepsilon$, $\eta_{25}\varepsilon$, and F.P.(t). The other terms are known or can be calculated. Knowing the values of $\eta_{23}\varepsilon$, $\eta_{25}\varepsilon$, and F.P., the quantity of uranium-233 to maintain criticality for the time step Δt is obtained by the following equation:

$$M_{23}(t+\Delta t) \text{ required} = M_{23}^{c}(t+\Delta t) - M_{23}(t+\Delta t)$$

Then we repeat these calculation from the beginning to the end of the operation. The block diagram of this procedure is shown in Fig. 5-2. These calculations can be done by a desk calculator that can be programmed. For this calculation the WANG 701 is used.

In order to calculate real values, we must determine the values of $\sigma\phi\Delta t$,M* and other constants. These values can be evaluated from the equations of equilibrium. Thus, we first consider the equilibrium operation of the MSBR reference reactor.

Reactor parameters used in the calculations are listed in Table 5-2.[20)]

5.2.2 Results of Calculations

5.2.2.1 Equilibrium Operation : Scheme A

The fuel and salt inventory for equilibrium operation

Table 5-2 Reference reactor design data (From Ref.20)

Power	1,000MWe 2,250NWt
Plant factor	0.8
Core zone I	
Height	3.96 m
Diameter	4.39 m
Other dimentions	
Axial: Core zone II thickness	0.23 m
Plenum	0.08 m
Reflector thickness	0.61 m
Radial: Core zone II thickness	0.38 m
Annulus	0.05 m
Reflector thickness	0.76 m
Fuel salt	
Primary loop	48.71 m^3
Processing plant	13.59 m^3
Density (at 635°C)	3.33 t/m^3
Performance (Equilibrium breeding cycle on ^{235}U-Th)	
Breeding ratio	1.062
Yield	3.18%/yr
Fissile inventory (a)	1,508 kg
Doubling time (b)	22 yr
Power density	
Average	22.2 W/cm^3
Peak	65.2 W/cm^3

Neutron balance (Equilibrium cycle)

Constituent	Concentration (c)	Absorption (d)	Fission (d)
^{233}U	6.64×10^{-5}	0.9239	0.8239
^{235}U	6.01×10^{-6}	0.0761	0.0619
^{232}Th	3.75×10^{-3}	0.9853	0.0031
^{234}U	2.31×10^{-5}	0.0817	0.0004
^{233}Pa	3.88×10^{-7}	0.0017	
^{236}U	6.21×10^{-6}	0.0088	
^{237}Np	8.59×10^{-7}	0.0061	
^{6}Li	1.95×10^{-7}	0.0049	
^{7}Li	2.24×10^{-2}	0.0159	
^{9}Be	5.00×10^{-3}	0.0071	(0.0046) (e)
^{19}F	4.77×10^{-2}	0.0205	
Graphite		0.0519	
Fission products		0.0196	
Leakage		0.0276	
	Total	2.2311	

(a) Both in primary and integrated processing systems
(b) At 0.8 plant factor, compounded continuously
(c) ORNL-4541 (in fuel salt, atoms/b·cm)
(d) Normalized to one nuetron absorbed in $^{233}U+^{235}U$ (in core: ^{233}U 1,223 kg: ^{235}U 112 kg)
(e) (n, 2n) reaction

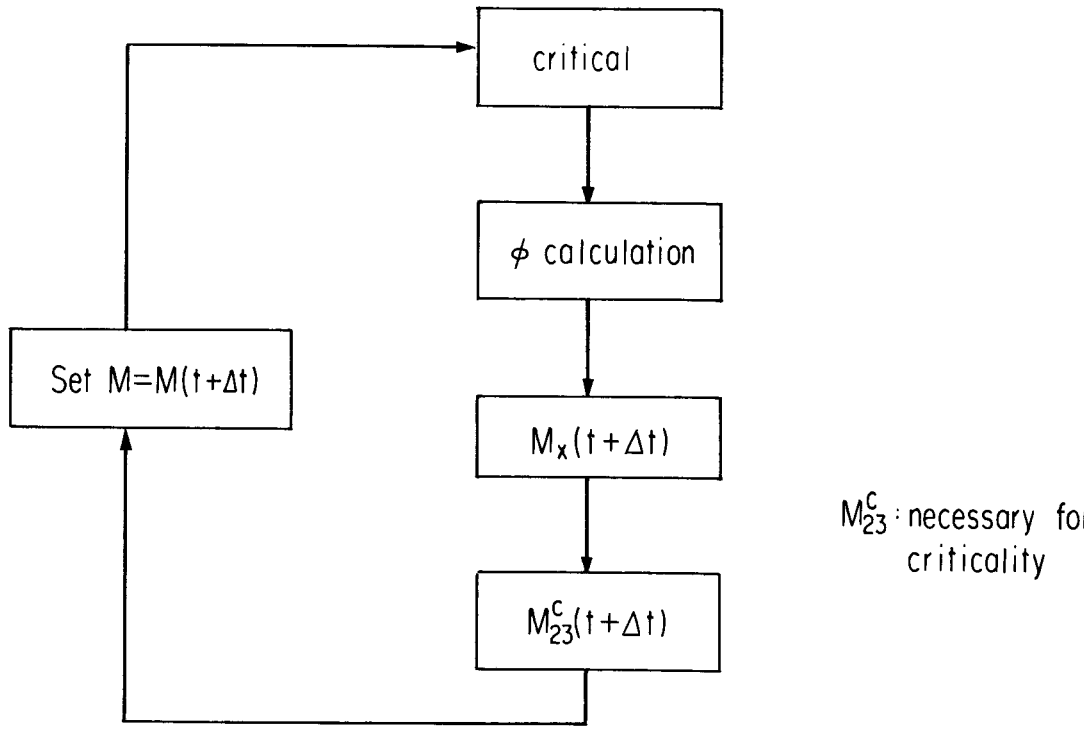


Fig. 5-2 Procedure of calculation

listed on the ORNL-4541 Report is:

Th	68,100	kg
^{233}Pu	7	kg
^{233}U	1,223	kg
^{235}U	112	kg

We can use the concentration data to calculate the other material inventories[a)] and get

^{234}U	427	kg
^{236}U	116	kg
^{237}Np	16.1	kg

Following values are used for the calculation:

M_{02} [b)]	68,800	kg
M_{13} [b)]	7.5	kg
M_{23}	1,223	kg
M_{24}	427	kg
M_{25}	112	kg
M_{26}	116	kg
M_{37}	16.1	kg

---

a Based on ^{233}U inventory

b Calculated in the same manner as ^{234}U, ^{236}U, and ^{237}NP above

Next, we determine $\sigma\phi\Delta t$.

Let us choose Δt = 1 day. [a)]

How much energy, Q, in MWD is produced per gram of ^{235}U fissioned?

$$Q = \frac{1}{235} \times N_a \times k$$

where N_a : Avagadro number 6.023×10^{23}

k : energy/fission 3.2×10^{-11} joule/fission

In MWD, $Q = \frac{1}{235} \times 6.023 \times 10^{23} \times 3.2 \times 10^{-17}/8.64$

$\times 10^{6} = 0.949$ MWD/gr.

Total fissile material fissioned per day, M, is

$$M = \frac{\text{Total Thermal Power, P}}{Q} = \frac{2250 \text{ MWt}\cdot\text{D}}{0.949 \text{ MWD/g}}$$

$= 2{,}371\text{g} = 2.371$ kg.

On the other hand

$$M = \sigma_{f25} N^*_{25} \phi^* \frac{235}{N_a} + \sigma_{f23} N^*_{23} \phi^* \frac{233}{N_a}$$

$$= \sigma_{f25} N^*_{25} \phi^* \left[\frac{235}{N_a} + \frac{\sigma_{f23} N^*_{23} \phi^*}{\sigma_{f25} N^*_{25} \phi^*} \frac{233}{N_a} \right]$$

---

a) This time step is used for every calculation. In order to assure the accuracy of this approximation, calculation was made with Δt=20 days for the case of ^{235}U startup with Integrated Fuel Processing. The results showed good agreement with that of Δt= 1 day.

But $M^*_{25} = \frac{N^*_{25}}{N_a} \cdot 235$ and neglecting mass difference

$$M = \sigma_{f25} M^*_{25} \phi^* \left[1 + \frac{\sigma_{f23} N^*_{23} \phi^*}{\sigma_{f25} N^*_{25} \phi_*}\right]$$

The ratio of $\sigma\phi N$'s are the same as that obtained from the data on Table 5-2.

$$= \sigma_{f25} M^*_{25} \phi^* \left[1 + \frac{0.8239}{0.0619}\right] = 14.310\ \sigma_{f25} M^*_{25} \phi^*$$

Equating the results to get $\sigma_{f25} M^*_{25} \phi^*$

$$\sigma_{f25} M^*_{25} \phi^* = \frac{M}{14.310} = \frac{2.371}{14.310} = 0.1657\ \frac{kg}{day}$$

The other ones are determined as follows:

$$\sigma_x M^*_x \phi^* = \sigma_x N^*_x \phi^* \frac{A}{N_a} \qquad A = \text{mass number}$$

$$\frac{\sigma_x N^*_x \phi^*}{\sigma_{f25} N^*_{25} \phi^*} = \frac{\sigma_x M^*_X \phi^* \left(\frac{N_a}{A}\right)}{\sigma_{f25} M^*_{25} \phi^* \left(\frac{N_a}{235}\right)}$$

that is

$$\sigma_x M^*_x \phi^* = \frac{\sigma_x N^*_x \phi^*}{\sigma_{f25} N^*_{25} \phi^*} \cdot \frac{A}{235} \cdot \sigma_{f25} M^*_{25} \phi^*$$

All values on the right hand side are known. Therefore, we evaluate $\sigma_x M^*_x \phi^*$'s and $\sigma_x \phi^*$'s. The result is tabulated

Nuclide	$\sigma M^*\phi^*$/day	$\sigma\phi^*$/day
Th	2.6039 kg	0.00003785
Pu	0.0045 kg	0.000629
^{233}U	2.4521 kg	0.002005
^{234}U	0.2178 kg	0.000510
^{235}U	0.2037 kg	0.001819
^{236}U	0.0237 kg	0.000204
^{237}Np	0.0165 kg	0.001025
(^{235}U fission	0.1657 kg	0.001479)

Equations for Equilibrium

The equations for equilibrium operation become simple. We do not have to be concerned about fuel and salt concentrations, criticality and fission product accumulation.

Now we can calculate the fuel cycle for this operation. Substitution $M(t) = M(t+\Delta t) = M^*$ into equations (24), (25), and (27) to get

$$bM^*_{13} = -\sigma_{13}M^*_{13}\phi^* + \sigma_{02}M^*_{02}\phi^* - \lambda_{13}M^*_{13} \qquad 5-32$$

$$cM^*_{23} = -\sigma_{23}M^*_{23}\phi^* + \lambda_{13}M^*_{13} \qquad 5-33$$

$$dM^*_{25} = -\sigma_{25}M^*_{25}\phi^* + \sigma_{24}M^*_{24}\phi^* \qquad 5-34$$

Net production of ^{233}U is $bM^*_{13} + cM^*_{23}$ and ^{235}U is dM^*_{25}. To maintain the equilibrium breeding cycle, ^{233}U and ^{235}U must be extracted to maintain criticality.

All the terms on the right hand side are known. Hence,

$$bM^*_{13} + cM^*_{23} = \sigma_{02}M^*_{02}\phi^* - \sigma_{13}M^*_{13}\phi^* - \sigma_{23}M^*_{23}\phi^*$$

$$= 2.6039 - 0.0045 - 2.4521$$

$$= 0.1473 \text{ (kg/day)}.$$

$$dM^*_{25} = -0.2037 + 0.2178 = 0.0141 \text{ (kg/day)}.$$

The breeding ratio is calculated as follows:

$$\text{B.R.} = \frac{(bM^*_{13} + \lambda_{13}M^*_{13}) + \sigma_{24}M^*_{24}\phi^*}{\sigma_{23}M^*_{23}\phi^* + \sigma_{25}M^*_{25}\phi^*}$$

$$= \frac{\sigma_{02}M^*_{02}\phi^* - \sigma_{13}M^*_{13}\phi^* + \sigma_{24}M^*_{24}\phi^*}{\sigma_{23}M^*_{23}\phi^* + \sigma_{25}M^*_{25}\phi^*}$$

$$= \frac{2.0039 - 0.0045 + 0.2178}{2.4521 + 0.2037} = 1.061$$

This value shows a very good agreement with the reference design data of 1.062. This means that $\sigma M^*\phi^*$'s are consistent.

The constants b,c,d, are determined from the equations above.

$b = 0.338$/day $\quad c = -0.00187$/day $\quad d = 0.000126$/day

These constants are used in subsequent studies in the following calculations, except constant c.

The results are listed in Table 5-3.

Table 5-3 Equilibrium breeding cycle-
Startup with equilibrium fuel
Concentration from outset

Initial loading (Primary loop and processing plant)	
Salt	207 t
(Thorium)	(88.6 t)
^{233}Pa	110 kg
^{233}U	1,286 kg
^{235}U	112 kg
Operating characteristics	
Makeup salt required per year (based on 15-efpy cycle)	= 11 t
^{233}U produced per year	43 kg
^{235}U produced per year	4.1 kg
Breeding ratio	1.062
Average thermal flux	$2.6 \times 10^{14} n/cm^2 \cdot sec$
Fuel composition at the end of plant life	
Same as initial loading	

5.2.2.2 ^{235}U Startup with Integrated Fuel Processing: Scheme B

For this calculation the following assumptions are made.

1. The integrated processing plant is operated according to the reference design.
2. With chemical processing the equivalent time constants of fission products and protactinium are very small in comparison to the plant life (∿30 years). Hence, all inventories but uranium isotopes are the same as those in equilibrium operation.

Now we have to calculate fuel composition step by step as described before. For this calculation we need to evaluate $\varepsilon\eta_{23}$ and $\varepsilon\eta_{25}$.

At room temperature $\nu_{23} = 2.48$, $\nu_{25} = 2.43$.

$$\eta_{23} = \frac{\nu_{23}}{1+\alpha_{23}} = \eta_{23} \cdot \frac{\sigma_{23f}N^*_{23}}{\sigma_{23}N^*_{23}} = 2.48 \times \frac{0.8239}{0.9239} = 2.212$$

$$\eta_{25} = \frac{\nu_{25}}{1+\alpha_{25}} = \nu_{25} \frac{\sigma_{25f}N^*_{25}}{\sigma_{25}N^*_{25}} = 2.43 \times \frac{0.0619}{0.0760} = 1.977$$

$$\frac{\eta_{25}}{\eta_{23}} = \frac{1.977}{2.212} = 0.8938$$

$$\sigma_{23}N^*_{23}\varepsilon\eta_{23} + \sigma_{25}N^*_{25}\varepsilon\eta_{25} = \text{(total absorption + leakage)}$$

$$\text{or } \varepsilon\eta_{23} + \frac{\sigma_{25}N^*_{25}}{\sigma_{23}N^*_{23}} \cdot \varepsilon\eta_{25} = \frac{\text{(total absorption + leakage)}}{\sigma_{23}N^*_{23}}$$

$$\varepsilon\eta_{23} + \frac{0.0761}{0.9239}\varepsilon\eta_{25} = \frac{2.2311}{0.9239}$$

Here the normalized values on Table 5-2 have been used. Hence, the weight ratio of $^{233}U/^{235}U$ is equal to 1223/112. Solving the equations for $\varepsilon\eta_{23}$ and $\varepsilon\eta_{25}$ to get

$$\varepsilon\eta_{23} = 2.249$$

$$\varepsilon\eta_{25} = 2.011$$

Calculations for the fuel composition are made and the result is drawn in Figure 4. As we can see, this shows a very good agreement with the finding of Perry and Bauman[39] which is drawn in Figure 3.

For the fuel cycle analysis, the same calculations are made but the plant factor is 0.8. That is equivalent to 292 days of full power operation per year. The result is drawn in Figure 5. The numberical result is listed in Table 5-4.

Table 5-4 Startup with ^{235}U followed by approach to equilibrium cycle

Initial loading (primary loop and processing plant)

Salt	207 t
(Thorium)	(88.6 t)
^{235}U	1,650 kg

Operating characteristics

Makeup salt required per year (based on 15-efpy cycle) = 11 t

Annual fissile materials production

year	^{233}U(kg)	^{235}U(kg)	year	^{233}U(kg)	^{235}U(kg)
1	52.912	46.731	16	42.479	3.683
2	44.118	26.528	17	42.849	3.759
3	37.899	15.131	18	43.161	3.822
4	35.095	8.920	19	43.425	3.875
5	34.319	5.649	20	43.648	3.919
6	34.625	4.005	21	43.834	3.955
7	35.447	3.248	22	43.991	3.985
8	36.468	2.961	23	44.124	4.009
9	37.519	2.915	24	44.235	4.030
10	38.517	2.986	25	44.330	4.046
11	39.425	3.107	26	44.408	4.060
12	40.226	3.240	27	44.476	4.070
13	40.926	3.370	28	44.532	4.080
14	41.527	3.490	29	44.580	4.088
15	42.041	3.594	30	44.621	4.093

Fuel composition at the end of plant life
Same as Table 5-3

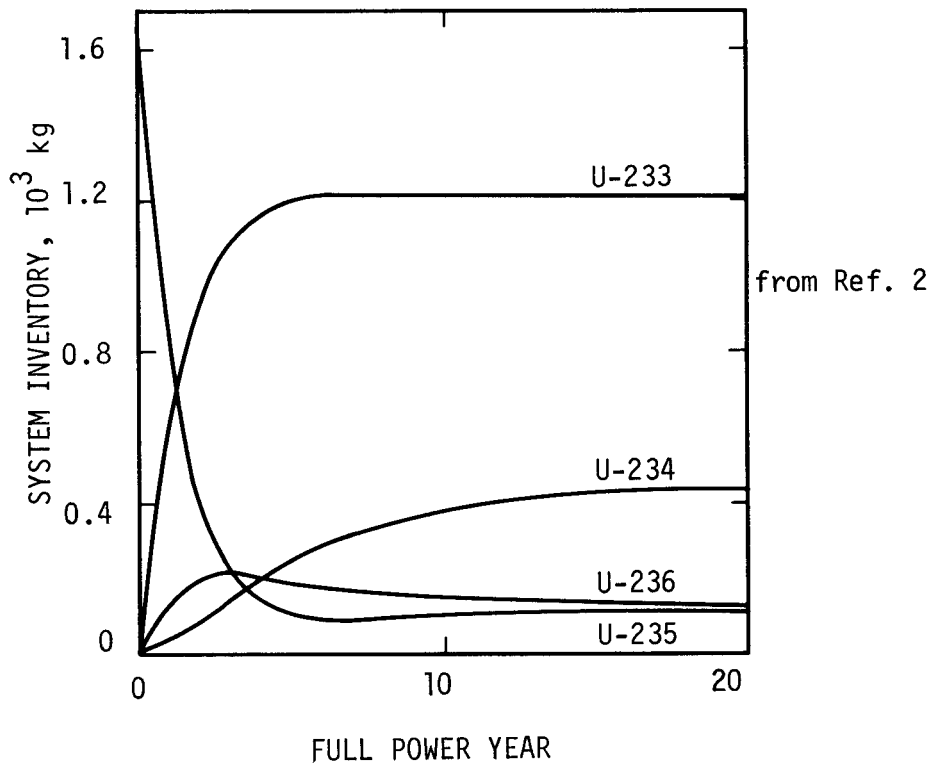


Fig. 5-3 Uranium isotope inventories: ^{235}U startup to approach the equilibrium by Perry and Bauman

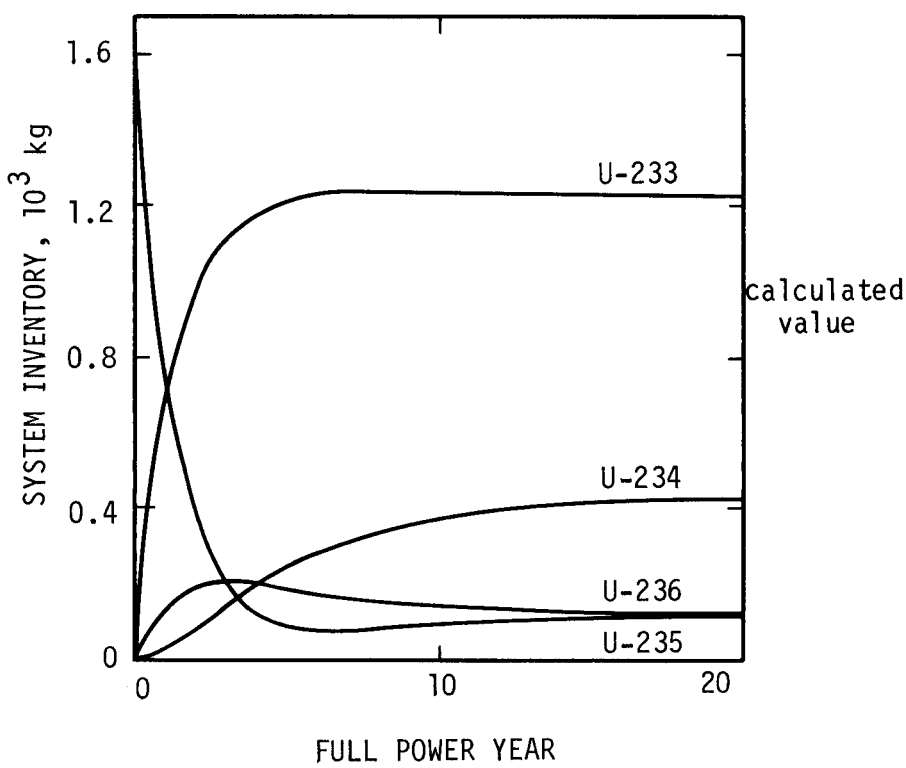
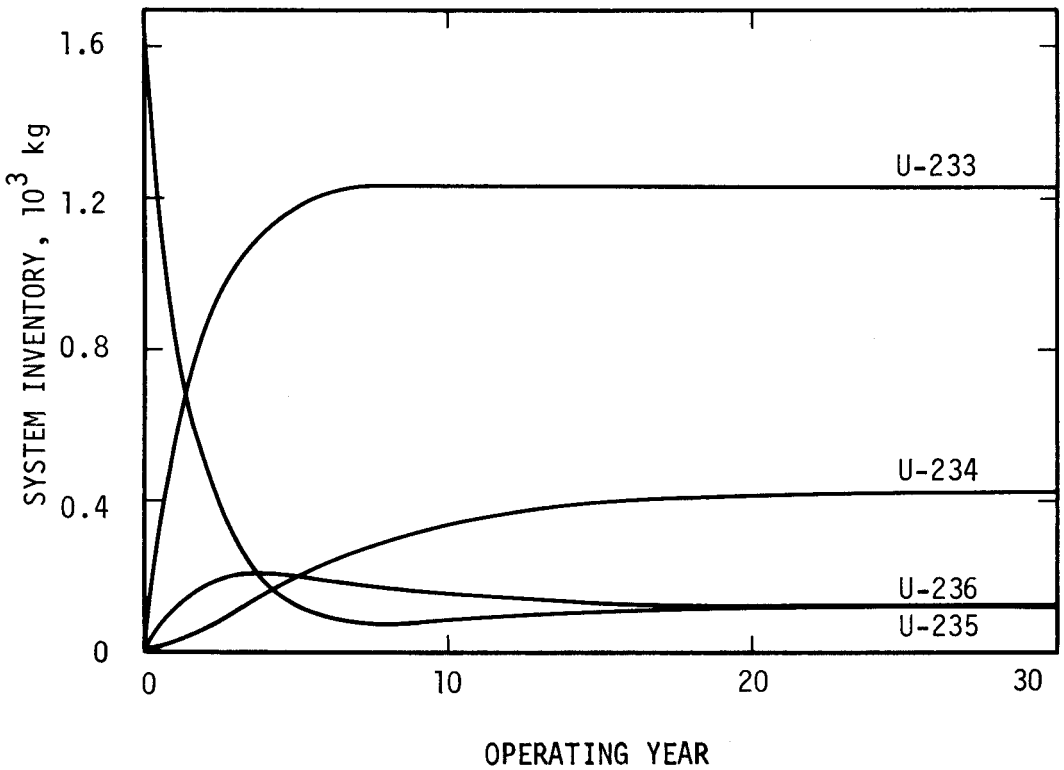


Fig. 5-4 Uranium isotope inventories: ^{235}U startup to approach the equilibrium



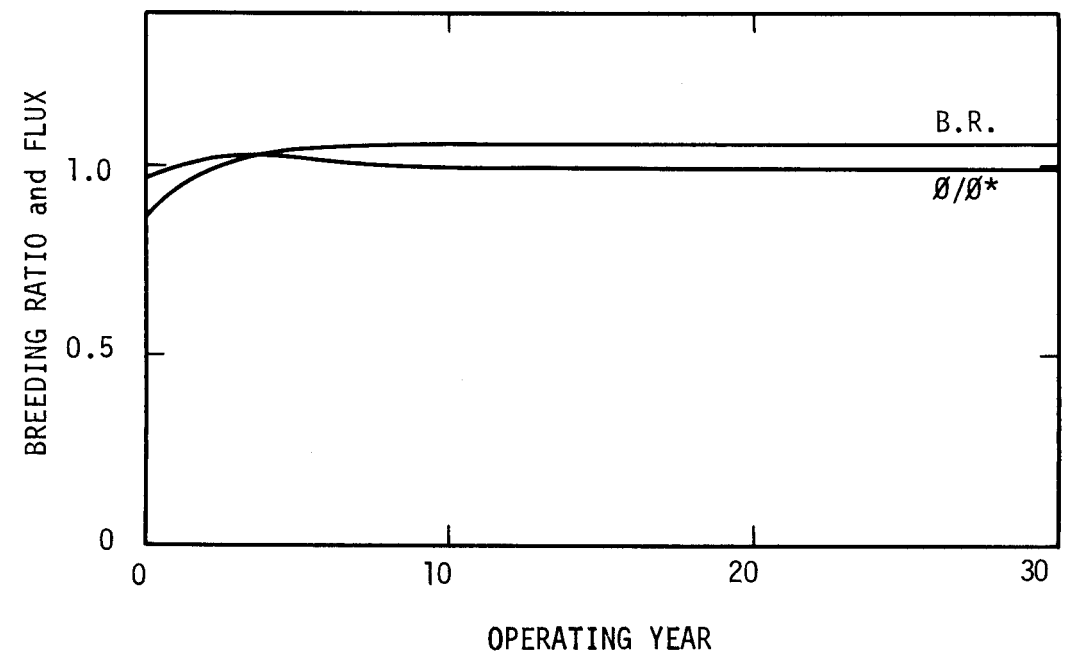


Fig. 5-5 Startup with ^{235}U followed by approach to equilibrium (Scheme B)

5.2.2.3 ^{235}U Startup ^{235}U Addition without Integrated Fuel Processing : Scheme C

For this calculation we have to consider not only uranium inventories but also thorium, protactinium and fission products. At this point we have to evaluate the time-dependent poisoning of fission products.

Since Xe and Kr are stripped out of the system by the gas separator, gaseous fission products need not be considered. Other fission products can be treated in two groups, in one, samarium, and in the other, all other fission products.

First samarium is considered. Since samarium is saturated in a short time in comparision with reactor life, the saturated concentration is used.

The absorption by equilibrium ^{149}Sm from ^{233}U is

$$\Sigma_{as}\phi = \gamma_{s_{23}} \Sigma_{23f} \phi = \gamma_{s_{23}} \sigma_{f23} N_{23} \phi$$

$$= \gamma_{s_{23}} \sigma_{23} N_{23} \phi \left(\frac{\sigma_{f23}}{\sigma_{23}}\right)$$

This term is added to the absorption term of ^{233}U in the criticality equation, which means that the σ_{23} becomes $(1 + \gamma \frac{\sigma_{f23}}{\sigma_{23}})$ times larger. A similar treatment is made for ^{149}Sm from ^{235}U.

The other fission products crosssections are then evaluated from the fission products data of ORNL[40] revised in 1969. Evaluation is made in the following way:

$$\sigma_{th} = \frac{\Sigma \sigma_{th}^{i} Y^{i}}{\Sigma Y^{i}}$$

$$R.I. = \frac{\Sigma R.I.^{i} Y^{i}}{\Sigma Y_{i}}$$

Y^i = fission yield of ith nuclide

σ_{th} = effective thermal absorption

R.I. = effective resonance integral

The results obtained are cross sections per fission product pair:

	σ_{th}*	R.I.
^{233}U	29.6 barns	87.5 barns
^{235}U	36.6 barns	101.9 barns

Then evaluation is made for effective one-group absorption cross section.

Since absoprtion in F.P. = resonance abosprtion + thermal absorption,we have to evaluate resonance absorption.

$$\frac{\text{Resonance absoprtion}}{cm^3 \cdot sec} = (1-p)\eta\Sigma_c \bar{\phi} \varepsilon P$$

where p : resonance escape probability which is approximated by heterogeneous model.

$$p = \exp\left(-\frac{N}{\xi\Sigma_s} \cdot \frac{V_f \bar{\phi}_f}{V_m \phi_m} R.I.\right)$$

N: number density of fission products pairs

R.I.: resonance integral of fission products pairs

$\xi\Sigma_s$: slowing down power of graphite

P: non leakage probability

Assuming $\phi_f/\phi_m \simeq 1$. the left hand side is approximated

$$\frac{\text{Res.Abs.}}{\text{cm}^3\cdot\text{sec}} = \frac{N\ V_f}{\xi\Sigma_S\ V_m}\ \text{R.I.}\eta\ \Sigma_c\ \bar{\phi}\ \varepsilon P$$

which is equated to $N\bar{\phi}\sigma_{a,res}$

$$\frac{V_f\ N\ \text{R.I.}}{V_m\ \xi\Sigma_s}\ \eta\ \Sigma_c\bar{\phi}\ \varepsilon P = N\ \bar{\phi}\sigma_{a,res}$$

$$\sigma_{a,res} = \frac{V_f\varepsilon\eta\Sigma_c}{V_m\xi\ \Sigma_s}\ P\cdot\text{R.I.}$$

$$P = e^{-B^2\tau}$$

$$B^2 = \left(\frac{3.14}{H}\right)^2 + \left(\frac{2.405}{R}\right)^2$$

$$H = 14.5 + \delta\ \text{ft}$$

$$R = 8.5 + \delta\ \text{ft}$$

$$\delta \simeq 0.5\ \text{ft}$$

$$\tau = (18.7)^2\ \text{cm}^2 \quad \text{(at room temperature)}$$

then $P \simeq e^{-0.045} \simeq 0.956$. Assuming $\Sigma_c \approx \Sigma_c^*$ (equilibrium cycle)

$$\frac{\Sigma_c}{\xi\Sigma_s} = \frac{\Sigma_c^*}{\xi\Sigma_s} = \frac{(\sigma_{23}N_{23}^* + \sigma_{25}N_{25}^*)}{\sigma_{a\ \text{graphite}}\ N_c^*\ (\sigma_s/\sigma_{a\ \text{graphite}})}$$

Using the normalized value on Table 5-2 and $\xi = 0.158$[40)]

$$\sigma_s = 4.8b^{(40)} \qquad \sigma_a = 0.004b^{(40)} \quad \text{for 2200 m/sec neutrons}$$

$$\frac{\varepsilon\eta\ \Sigma_{cVf}}{\xi\ \Sigma_s\ V_m} = \frac{2.2311 \times (0.9239 + 0.0761)}{0.158 \times 0.0591 \times (4.8/0.004)} \times 0.38 = 0.076$$

$$\sigma_{a,res} = 0.076 \times 0.956 \times \text{R.I.} = 0.072 \cdot \text{R.I.}$$

Hence,

$$\sigma_{F.P.\ a,\ res23} = 6.3 \text{ barns}$$

$$\sigma_{F.P.\ a,\ res25} = 7.4 \text{ barns}$$

for the operating condition.

The thermal absorption cross section can be evaluated by the equation.

$$\bar{\sigma}_{ta}(T) = \frac{\sigma(T_o)}{1.128} \cdot g(T) \cdot (T_o/T)^{1/2}$$

$\sigma(T_o)$: cross section for neutron of energy kT_o(°k)

$\bar{\sigma}_{th}(T)$: average thermal cross section of temperature T(°k)

$g(T)$: non 1/v factor.

Temperature T is taken as 1250°F. This is about the average graphite temperature at midplane of the core. Assuming $g(T) = 1$, the cross-sections are obtained as

V_f/V_m averaged over entire core except reflector.

$$\bar{\sigma}_{23th} = 14.5 \text{ barns}$$

$$\bar{\sigma}_{25th} = 18.0 \text{ barns}$$

Therefore the effective cross sections are as follows:

$$\sigma_{F.P.\ 23eff} = 6.3 + 14.5 = 20.8 \text{ barns}$$

$$\sigma_{F.P.\ 25eff} = 7.4 + 18.0 = 25.4 \text{ barns}$$

These values are used for the calculation in the following way.

For the same temperature, σ_{25} is calculated as 301 barns. Hence,

$$\frac{\sigma_{F.P.23eff}}{\sigma_{25}} = \frac{20.8}{301} \simeq \frac{1}{15}$$

$$\frac{\sigma_{F.P.25eff}}{\sigma_{25}} = \frac{25.4}{301} \simeq \frac{1}{12}$$

that is

$$\sigma_{F.P.\ 23eff} = \frac{1}{15}\sigma_{25}$$

$$\sigma_{F.P.\ 25eff} = \frac{1}{12}\sigma_{25}$$

The equations for fuel compositions and the solutions are as follows: (These average cross sections are assumed to be independent of irradiation time[41]).

$$\frac{dN_{02}}{dt} = -\sigma_{02}\phi N_{02}$$

$$\frac{dN_{13}}{dt} = -\sigma_{02}\phi N_{02} - \lambda_{13}N_{13} - \sigma_{13}\phi N_{13}$$

$$\frac{dN_{23}}{dt} = \lambda_{13}N_{13} - \sigma_{23}\phi N_{23}$$

$$\frac{dN_{24}}{dt} = \sigma_{13}\phi N_{13} + \frac{\alpha_{23}}{1+\alpha_{23}} \sigma_{23}\phi N_{23} - \sigma_{24}\phi N_{24}$$

$$\frac{dN_{25}}{dt} = \sigma_{24}\phi N_{24} - \sigma_{25}\phi N_{25}$$

$$\frac{dN_{26}}{dt} = \frac{\alpha_{25}}{1+\alpha_{25}} \sigma_{25}\phi N_{25} - \sigma_{26}\phi N_{26}$$

$$\frac{dN_{37}}{dt} = \sigma_{26}\phi N_{26} - \sigma_{37}\phi N_{37}$$

$$\frac{dN_{F.P.23}}{dt} = \frac{1}{1+\alpha_{23}} \sigma_{23}\phi N_{23}$$

$$\frac{dN_{F.P.25}}{dt} = \frac{1}{1+\alpha_{25}} \sigma_{25}\phi N_{25}$$

$$\sigma_{f25}\phi = \frac{\text{BU rate}}{M_{25} + 1.229\ M_{23}}$$

$$M_{02}(t+\Delta t) = (1-\sigma_{02}\phi)M_{02}(t)$$

or

$$M_{13}(t+\Delta t) = \sigma_{02}\phi\Delta t\ M_{02}(t) + (1-\lambda_{13}\Delta t - \sigma_{13}\phi\Delta t)M_{13}(t)$$

$$M_{23}(t+\Delta t) = \lambda_{13}\Delta t\ M_{13}(t) + (1-\sigma_{23}\phi\Delta t)M_{23}\ (t)$$

$$M_{24}(t+\Delta t) = \sigma_{13}\phi\Delta t\ M_{13}(t) + \frac{\alpha_{23}}{1+\alpha_{23}}\ \sigma_{23}\phi\ M_{23}(t)$$

$$+ (1-\sigma_{24}\phi\Delta t)\ M_{24}(t)$$

$$M_{25}(t+\Delta t) = \sigma_{24}\phi\Delta t\ M_{24}(t) + (1-\sigma_{25}\phi\Delta t)\ M_{25}\ (t)$$

$$M_{26}(t+\Delta t) = \frac{\alpha_{25}}{1+\alpha_{25}}\ \sigma_{25}\phi\Delta t\ M_{25}(t) + (1-\sigma_{26}\phi\Delta t)\ M_{26}\ (t)$$

$$M_{37}(t+\Delta t) = \sigma_{26}\phi\Delta t\ M_{26}(t) + (1-\sigma_{37}\phi\Delta t)\ M_{37}(t)$$

$$M_{F.P.23}(t+\Delta t) = \frac{1}{1+\alpha_{23}}\ \sigma_{23}\phi\Delta t\ M_{23}(t)$$

$$M_{F.P.25}(t+\Delta t) = \frac{1}{1+\alpha_{25}}\ \sigma_{25}\phi\Delta t\ M_{25}(t)$$

$$C.R. = \frac{\lambda_{13}M_{13} + \sigma_{24}\phi\ M_{24}}{\sigma_{23}\phi M_{23} + \sigma_{25}\phi M_{25}}$$

$$M_{25}(t+\Delta t) = \frac{M^*_{25}}{\eta_{25}\varepsilon-1-\gamma_s\ \frac{\Sigma f}{\Sigma a}} \cdot \frac{1}{0.0761}\left\{ K+0.9853\frac{M_{02}}{M^*_{02}} + 0.0017\frac{M_{13}}{M^*_{13}}\right.$$

$$- 0.9239(\eta\varepsilon-1-\gamma_s\ \frac{\Sigma f}{\Sigma a})\ \times\ \frac{M_{23}}{M^*_{23}} + 0.0817\frac{M_{24}}{M^*_{24}} + 0.0088\frac{M_{26}}{M^*_{26}}$$

$$\left. + 0.0061\frac{M_{37}}{M^*_{37}} + \sigma_{FP23}\ \frac{M_{F23}}{M^*_{25}} + \sigma_{FP25}\frac{M_{F25}}{M^*_{25}}\right\}$$

The calculation is made with the plant factor 0.8. The results are drawn in Figures 5-6 and listed in Table 5-5.

As we can see, the fission products are accumulated in the system. But, the concentration of rare-earth trifluorides in this salt is limited by solubility to approximately 0.7 mole%[39]. Assuming the total salt content is the same as in the beginning of operation, the weight of rare-earth W_R, is calculated as follows:

Total weight of fuel salt in the system;

$$1720\ ft^3 \times 208 = 357{,}760\ lb$$

Total moles of fuel salt;

$$357{,}760/64 = \sim 5590\ lb\text{-mole}.$$

Total weight of rare earth of 0.7% mole W_R is

$$W_R = 5590 \times 0.007 \times 143\ lb = 5595\ lb.$$
$$= 2535\ kg.$$

The weight of rare earth of F.P.

$$W_i = \frac{\text{Fission} \times Y_i}{N_a} \times M_i$$

M_i: Atomic Mass

N_a: Avagodro Number

Y_i: Fission Yield

W_i: Weight of rare earth

On the other hand,

$$M_{F.P.(pair)} = \frac{\text{Fission}}{N_a} \times 235\ (233)$$

Table 5-5 Startup with ^{235}U followed by ^{235}U addition without continuous processing

Initial loading

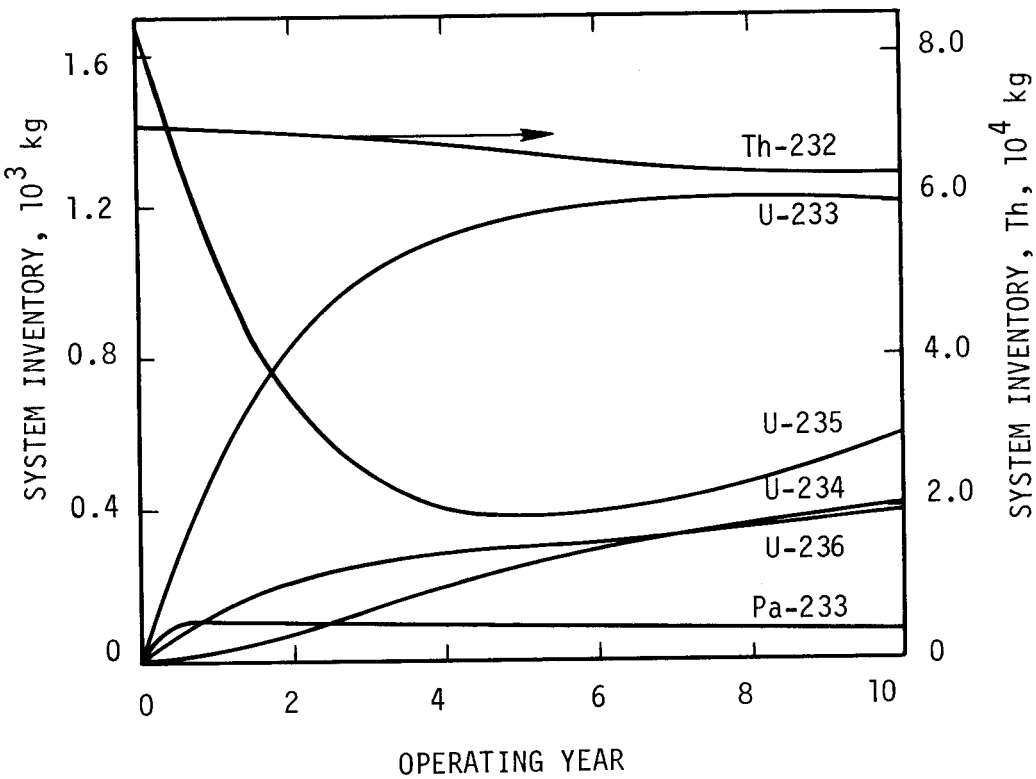
Salt	162 t
(Thorium)	(70.6 t)
^{235}U	1,671 kg

Operating characteristics-Fuel inventories (kg)

year	^{233}Pa	^{233}U	^{235}U	F.P. 233	F.P. 235	235U added /yr
1	96.569	491.883	1,091.595	115.824	574.179	125.724
2	95.148	828.226	690.227	448.158	928.270	27.207
3	92.639	1,015.304	491.138	900.061	1,160.814	72.501
4	89.711	1,117.332	406.207	1,409.633	1,334.735	106.154
5	86.695	1,171.365	384.925	1,942.277	1,485.202	135.393
6	83.743	1,198.321	399.113	2,479.361	1,631.156	159.817
7	80.915	1,209.902	433.162	3,011.096	1,782.548	181.919
8	78.230	1,212.709	478.411	3,532.497	1,944.444	202.532
9	75.688	1,210.496	530.026	4,041.164	2,119.285	222.120
10	73.280	1,205.423	585.301	4,536.090	2,308.095	240.936
11	70.998	1,198.744	642.709	5,017.011	2,511.140	259.118
12	68.830	1,191.195	701.393	5,484.048	2,728.289	276.740

Fuel reprocessing

Total fuel salt (1,720 ft^3) is reprocessed in a bath after a specified period.



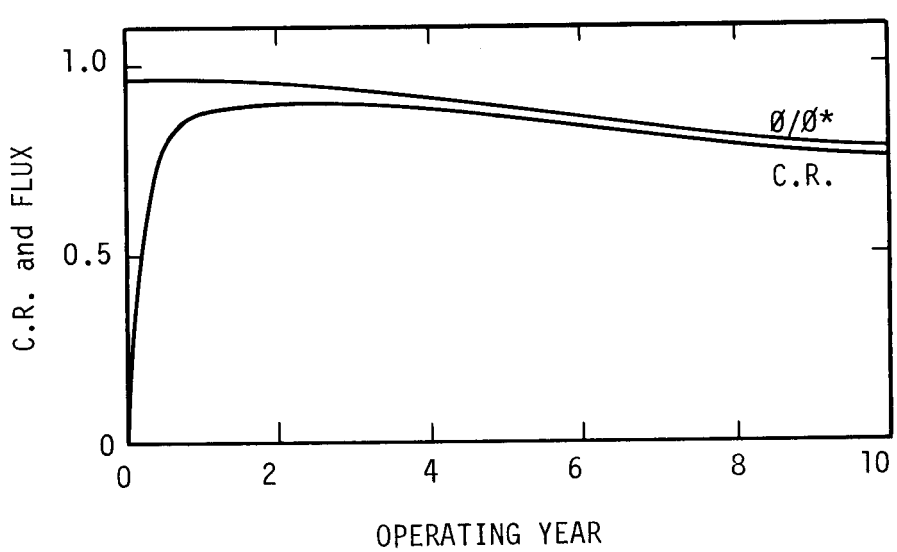


Fig. 5-6 Startup with ^{235}U followed by ^{235}U addition with no integrated fuel processing (Scheme C)

$$W_i = \frac{M_{F.P.}}{235} \times M_i \times Y_i$$

Defining average mass of rare earth fission products as

$$M = \frac{\Sigma M_i Y_i}{Y}$$

where $Y = \Sigma Y_i$

From the data described above, we get:

	U-233	U-235
Y	48.4%	50.7%
M	143	143

then,

$$W = \frac{M_{FP}}{235} \times MY$$

Since rare earth fission products which absorbs neutrons are still rare earths, "burnup" of rare earth need not be considered. Rare earth inventory is thus linearly proportional to power history.

$$\text{Total F.P.} = \frac{2{,}250 \times 365}{949} \times 0.8 = 698 \text{ kg/year.}$$

Rare earth yields of ^{233}U and ^{235}U are close together, about 50%. We shall set $Y_{23} = Y_{25} = 50\%$ to calculate annual production of rare earth.

$$W = \frac{698 \text{ kg}}{235} \times 0.5 \times 143 = 212 \text{ kg/year.}$$

From this result the maximum operational period is calculated to be about 12 years using a plant factor 0.8.

5.2.2.4 ^{235}U Startup and ^{235}U Addition without Integrated Fuel Processing but Continuous Removal of Fuel Salt: Scheme D

The objective of this operation scheme is to prevent fission products from continuously accumulating.

New salt and fuel is added to make up the extracted salt. Hence, carrier salt is maintained constant. The equations and solutions for this operation are as follows:

$$\frac{dN_{13}}{dt} = \sigma_{02}\phi N_{02} - \lambda_{13} N_{13} - \sigma_{13}\phi N_{13} - fN_{13}$$

$$\frac{dN_{23}}{dt} = \lambda_{13}N_{13} - \sigma_{23}\phi N_{23} - fN_{23}$$

$$\frac{dN_{24}}{dt} = \sigma_{13}\phi N_{13} + \frac{\alpha_{23}}{1+\alpha_{23}} \alpha_{23}\phi N_{23} - fN_{23}$$

$$\frac{dN_{25}}{dt} = \sigma_{24}\phi N_{24} - \sigma_{25}\phi N_{25} - fN_{25}$$

$$\frac{dN_{26}}{dt} = \frac{\alpha_{25}}{1+\alpha_{25}} \sigma_{25}\phi N_{25} - \sigma_{26}\phi N_{26} - fN_{26}$$

$$\frac{dN_{37}}{dt} = \sigma_{26}\phi N_{26} - \sigma_{37}\phi N_{37} - fN_{37}$$

$$\frac{dN_{F.P.23}}{dt} = \frac{1}{1+\alpha_{23}} \sigma_{23}\phi N_{23} - fN_{F.P.23}$$

$$\frac{dN_{F.P.25}}{dt} = \frac{1}{1+\alpha_{25}} \sigma_{25}\phi N_{25} - fN_{F.P.25}$$

$$F25 = \frac{BU}{M_{25} + 1.229\ M_{23}}$$

or

$$M_{13}(t+\Delta t) = \sigma_{02}\phi M_{02}(t+\Delta t) + (1-\lambda_{13}\Delta t - \sigma_{13}\phi\Delta t - f\Delta t)M_{13}(t)$$

$$M_{23}(t+\Delta t) = \lambda_{13}\Delta t M_{13}(t) + 1-\sigma_{23}\phi\Delta t - f\Delta t)\ M_{23}(t)$$

$$M_{24}(t+\Delta t) = \sigma_{13}\phi\Delta t M_{13}(t) + \frac{\alpha_{23}}{1+\alpha_{23}} \sigma_{23}\phi\Delta t M_{23}(t)$$

$$+ (1-\sigma_{24}\phi\Delta t - f\Delta t)\ M_{24}(t)$$

$$M_{25}(t+\Delta t) = \sigma_{24}\phi\Delta t M_{24}(t) + (1-\sigma_{25}\phi\Delta t - f\Delta t)\ M_{25}(t)$$

$$M_{26}(t+\Delta t) = \frac{\alpha_{25}}{1+\alpha_{25}} \sigma_{25}\phi\Delta t M_{25}(t) + (1-\sigma_{26}\phi\Delta t - f\Delta t)\ M_{26}(t)$$

$$M_{37}(t+\Delta t) = \sigma_{26}\phi\Delta t M_{26}(t) + (1-\sigma_{37}\phi\Delta t - f\Delta t)\ M37(t)$$

$$M_{F.P.23}(t+\Delta t) = \frac{1}{1+\alpha_{23}} \sigma_{23}\phi\Delta t M_{23}(t) + M_{F23}(t)(1-f\Delta t)$$

$$M_{F.P.25}(t+\Delta t) = \frac{1}{1+\alpha_{25}} \sigma_{25}\phi\Delta t M_{25}(t) + M_{F.P.25}(t)(1-f\Delta t)$$

$$C.R. = \frac{\lambda_{13}M_{13}\Delta t + \sigma_{24}\phi\Delta t M_{24}}{\sigma_{23}\phi\Delta t M_{23} + \sigma_{25}\phi\Delta t M_{25}}$$

Table 5-6 Startup with ^{235}U followed by ^{235}U addition with continuous removal of fuel salt at rate of;

	D-1	D-2	D-3
	1/2 inventory per equivalent full power year	1/4 inventory per equivalent full power year	1/8 inventory per equivalent full power year
Initial loading			
Salt	162 t	162 t	162 t
(Thorium†)	(68.8 t)	(68.8 t)	(68.8 t)
^{235}U	1,634 kg	1,634 kg	1,634 kg
Operating characteristics			
Fuel salt reprocessed per year	688 ft^3	344 ft^3	172 ft^3
Makeup salt required per year	688 ft^3	344 ft^3	172 ft^3

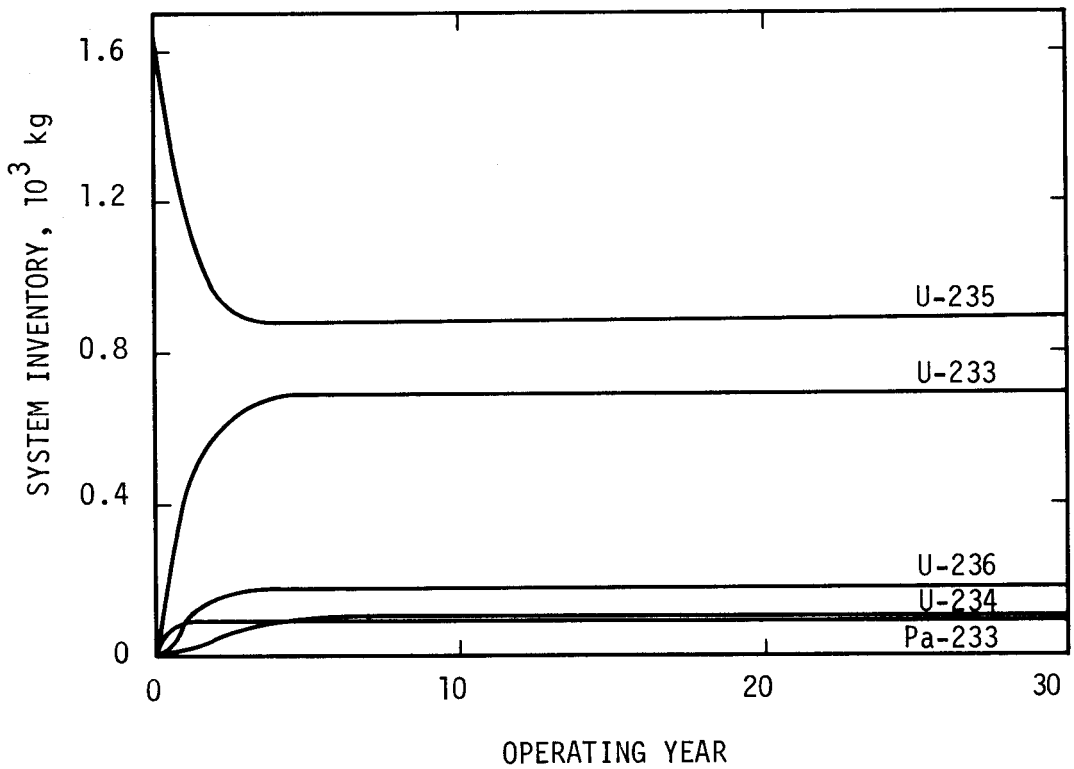
Annual fissile-material balance (kg)

year	^{235}U added	^{233}U produced	^{235}U added	^{233}U produced	^{235}U added	^{233}U produced
1	270.846	113.661	211.046	60.221	178.204	30.974
2	314.448	239.829	196.773	135.176	125.556	71.871
3	386.824	287.181	263.912	169.650	183.729	92.704
4	412.712	304.410	296.093	185.197	217.246	103.187
5	421.430	310.334	311.901	192.002	237.780	108.392
6	424.009	312.121	320.016	194.794	251.389	110.903
7	424.520	312.468	324.470	195.767	261.183	112.036
8	424.419	312.371	327.142	195.940	268.769	112.464
9	424.198	312.179	328.912	195.784	274.994	112.537
10	424.001	312.001	330.199	195.515	280.311	112.436
11	423.856	311.863	331.201	195.228	284.974	112.255
12	423.759	311.763	332.017	194.960	289.131	112.044
13	423.695	311.694	332.699	194.726	292.872	111.827
14	423.654	311.647	333.276	194.527	296.257	111.617
15	423.628	311.615	333.765	194.361	299.330	111.419
16	423.617	311.593	334.180	194.223	302.123	111.236
17	423.602	311.578	334.532	194.109	304.664	111.069
18	423.595	311.569	334.829	194.015	306.976	110.916
19	423.591	311.562	335.080	193.938	309.081	110.777
20	423.588	311.557	335.291	193.874	310.996	110.650
21	423.586	311.554	335.468	193.822	312.739	110.535
22	423.585	311.552	335.616	193.779	314.325	110.431
23	423.585	311.551	335.740	193.743	315.768	110.336
24	423.584	311.550	335.844	193.714	317.081	110.250
25	423.584	311.550	335.930	193.690	318.275	110.171
26	423.584	311.549	336.002	193.670	319.362	110.100
27	423.583	311.549	336.061	193.654	320.350	110.035
28	423.583	311.549	336.111	193.640	321.249	109.976
29	423.583	311.548	336.152	193.629	322.066	109.922
30	423.583	311.548	336.186	193.620	322.810	109.873

Fuel composition at the end of plant life

^{233}Pa (kg)	87.7	83.6	74.6
^{233}U (kg)	691.1	888.3	1,025.4
^{235}U (kg)	898.1	794.9	883.4
F.P. 233 (kg)	827.0	1,936.9	3,909.9
F.P. 235 (kg)	888.9	1,454.3	2,607.9

† Calculated from the fuel concentration of equilibrium breeding cycle.



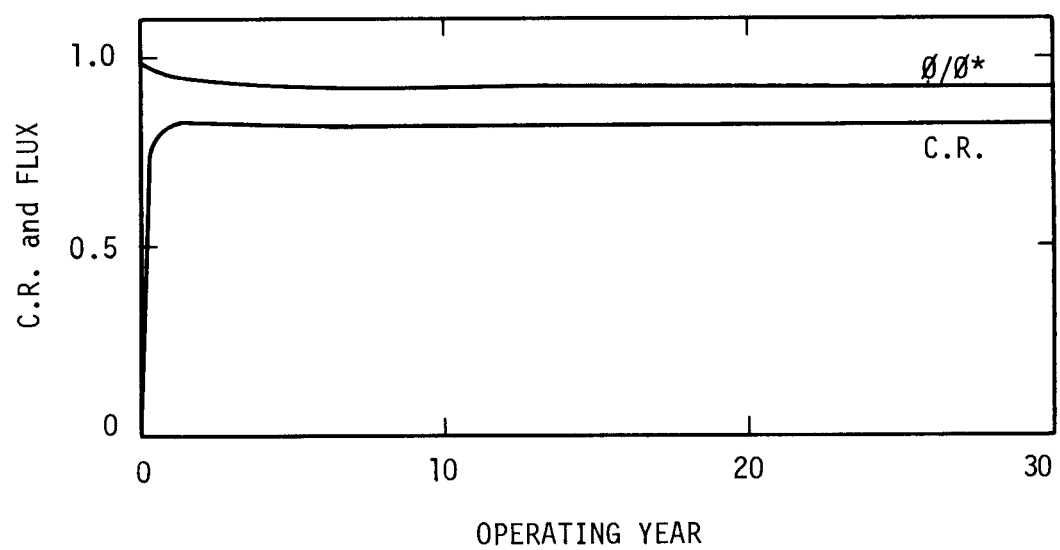
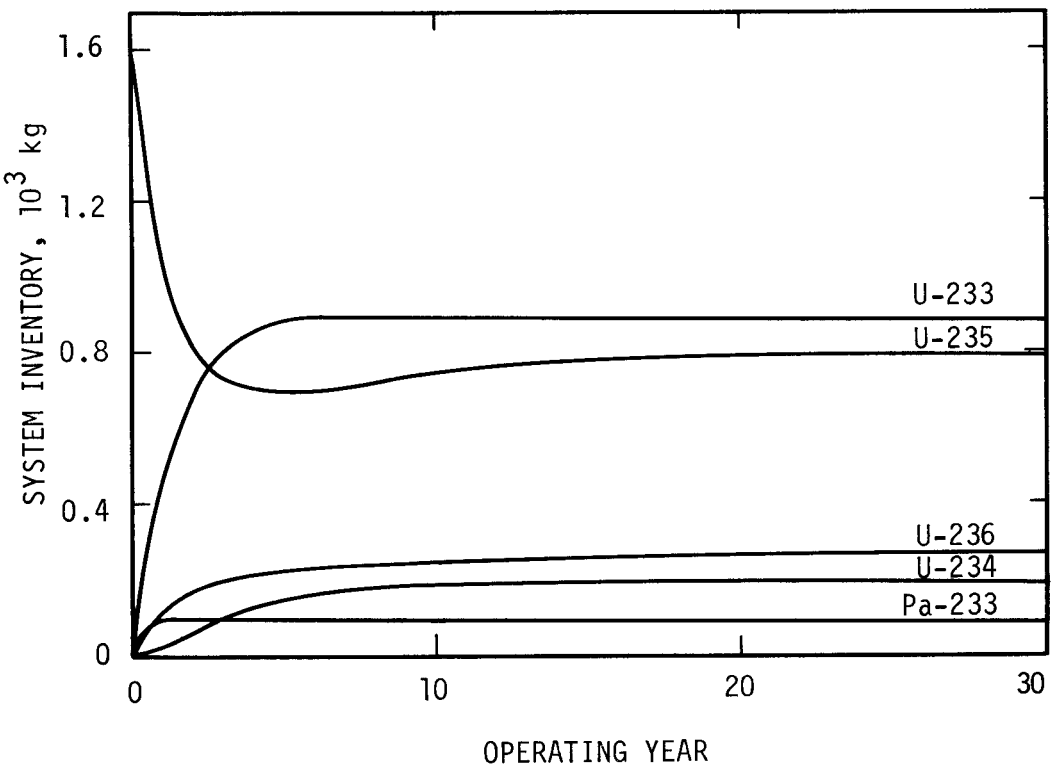


Fig. 5-7 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/2 inventory per equivalent full power year (Scheme D-1)



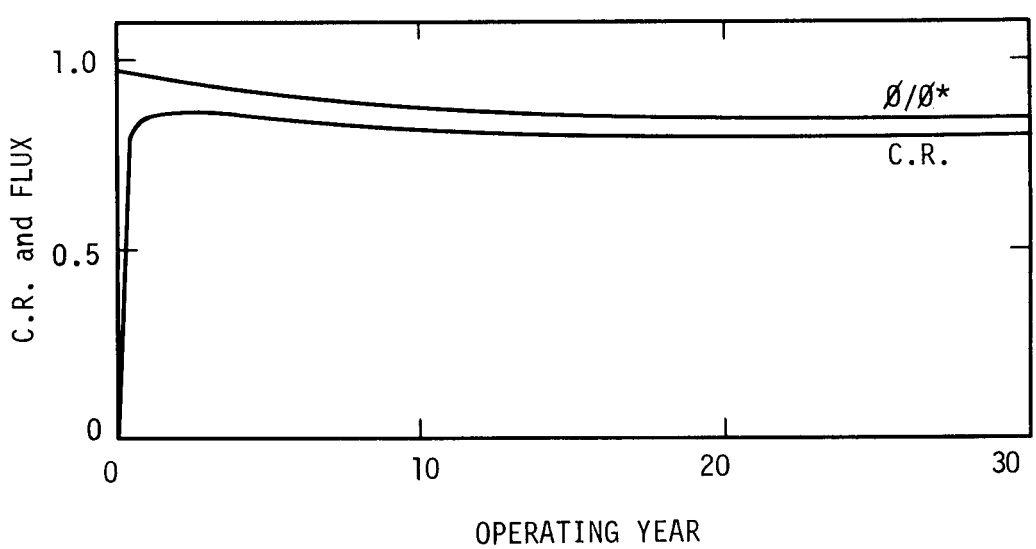
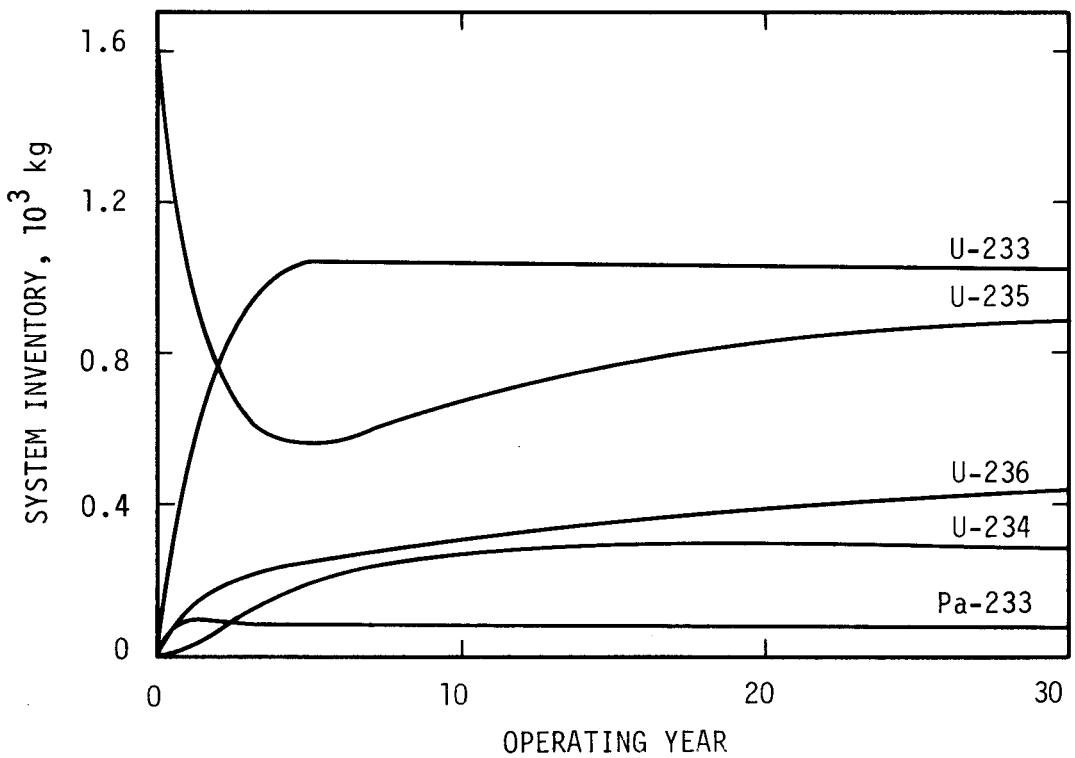


Fig. 5-8 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/4 inventory per equivalent full power year (Scheme D-2)



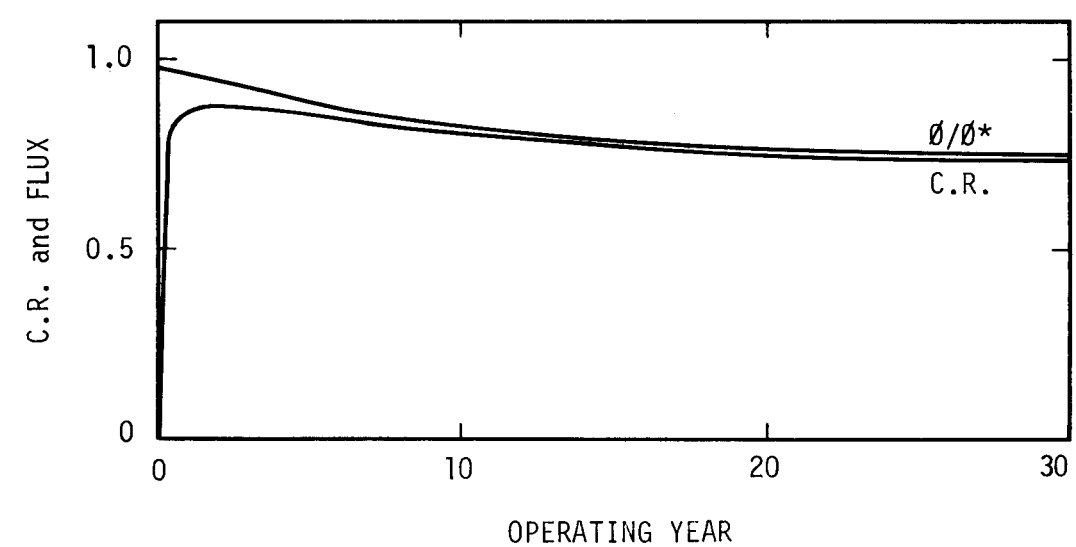


Fig. 5-9 Startup with ^{235}U followed by ^{235}U addition with continuous fuel removal at rate of 1/8 inventory per equivalent full power year (Scheme D-3)

$$M_{25}(t+\Delta t) = \frac{M^*_{25}}{\eta_{25}\varepsilon - 1 - \gamma_s \frac{\Sigma_f}{\Sigma_a}} \quad \frac{1}{0.0761} \left\{ k + 0.0017\frac{M_{13}}{M^*_{13}} \right.$$

$$- 0.9239(\eta\varepsilon - 1 - \gamma_s \frac{\Sigma_f}{\Sigma_a}) \frac{M_{23}}{M^*_{23}} + 0.0817\frac{M_{24}}{M^*_{24}}$$

$$\left. + 0.0088\frac{M_{26}}{M^*_{26}} + 0.0061\frac{M_{37}}{M^*_{37}} + \sigma_{F23}\frac{M_{FP}}{M^*_{23}} + \sigma_{F25}\frac{M_{FP}}{M^*_{25}} \right\}$$

Calculation is made for three different extraction factors with plant factor 0.8. These factors correspond to 2 years, 4 years, and 8 years discrad rate at full power, respectively.

The results are drawn in Figure 5-7～Figure 5-9 and Table 5-6.

5.3 Fuel Cycle Cost Evaluation

5.3.1 Assumptions for Fuel Cycle Cost Analysis

The Present-Worth-Method is used to evaluate the fuel cycle cost of each fuel operation.

The following assumptions are made:

(1) The fuel which is necessary for yearly operation is bought at the beginning of the year.

(2) Fixed charge is 10% annully.

(3) Chemical processing plant and process cost is the same as in ORNL-4541.

(4) U-233 and Pa233 = \$13.0/g[20]

U-235 = \$11.2/g[20]

(5) Fuel salt reprocessing cost is assumed to be \$5,000/ft^3.

This is based on the following considerations:

The density of fuel salt is 208 lb/ft. = 94.23 kg/ft^3 $\simeq$ 100 kg/ft^3.

The reprocessing cost of LWR fuel is about \$32/kgU (^{235}U + ^{238}U)[41].

The processing costs are evaluated[42] for two of the more promising heavy water moderated organic-cooled reactor fuels: ThO_2-UO_2 and Th-U alloy. The costs range from \$48 to \$79 per kilogram of fuel. Considering these data, it is assumed that the salt reprocessing cost is \$50 per kilogram of total fuel salt or \$5,000 per ft^3 of fuel salt.

For comparison, the cost of integrated processing at 1 gpm[20] at the plant site is evaluated on the same basis used in this chapter. It comes out to be \$45 per ft^3 of fuel salt. This is cheaper than our assumption but it is reasonable because the processing at the reactor site includes only extraction of protactinium, a small fraction of uranium and some fission products.

In order to see the effect of fuel reprocessing cost, the fuel cycle costs evaluation is also made for the

reprocessing cost of \$500 per ft^3 of total fuel salt.

5.3.2 Useful Formulae

1. Let capital charge be 10% per year. Then, present worth of \$1. paid after n years is

$$S^{-n} = \frac{1}{S^n} = (1+i)^{-n}; \quad S^n = (1+i)^n.$$

2. Value of investiment to provide \$1. per year

$$a_n = \frac{S^n - 1}{S^n} \qquad \text{for } i = 0.1/\text{year}.$$

year	S^{-n}	year	S^{-n}
1	0.90909	16	0.21762
2	0.82644	17	0.19784
3	0.75131	18	0.17985
4	0.68301	19	0.16350
5	0.62092	20	0.14864
6	0.56447	21	0.13513
7	0.51315	22	0.12284
8	0.46650	23	0.11167
9	0.42409	24	0.10152
10	0.38554	25	0.09229
11	0.35049	26	0.08390
12	0.31863	27	0.07627
13	0.28966	28	0.06934
14	0.26333	29	0.06303
15	0.23939	30	0.05730

5.3.3 Fuel Cycle Cost Formation: Based on 30 years life.

Present worth of total expense E_T

$$E_T = \sum_{i=1}^{30} E_i \, S^{-(i-1)*} + E_O - C_1 S^{-30}$$

Present worth of total income I_T

$$I_T = \sum_{i=1}^{30} (\text{income of ith year}) . \; S^{-i}$$

$$= \sum_{i=1}^{30} (FC \cdot Q + Ci) S^{-i}$$

Since $E_T = I_T$,

$$FC = \frac{\sum_{i=1}^{30} E_i S^{-(i-1)} - \sum_{i=1}^{30} C_i S^{-i} + E_O - C_L S^{-30}}{Q \sum_{i=1}^{30} S^{-i}}$$

where E_o: initial loading cost and equipment

FC: fuel cycle cost

Q : electricity generated annually

E_i: total expense for ith year paid at the beginning of the year

C_i: credit obtained in ith year, namely produced fissile material

---

* $S^{-(i-1)}$ means that this expense is paid at the beginning of the year.

C_L: final fuel credit

It is convenient to consider these costs separately.

The evaluated fuel cycle costs are as follows:

A. Equilibrium cycle.

B. ^{235}U startup to approach equilibrium

C. ^{235}U startup, ^{235}U addition without integrated fuel processing.

C-1: fuel discarded every 3 years completely.

C-2: fuel discarded every 6 years completely.

C-3: fuel descarded every 9 years completely.

D. ^{235}U startup, ^{235}U addition without integrated processing but continuous removal of salt from the system.

D-1: removal rate of 2 years at full power operation.

D-2: removal rate of 4 years at full power operation

D-3: removal rate of 8 years at full power operation

5.3.4 Equilibrium Fuel Cycle Cost: Scheme A

E_o Initial core loading

Salt	Total 5590 lb/mole	
LiF	5590 x 0.72 x 26 x \$15/lb	\$1,570,000
BeF_2	5590 x 0.16 x 47 x \$7.5/lb	315,000
ThF_4	5590 x 0.12 x 308 x \$6.5/lb	1,343,000
		\$3,228,000

Fuel

^{233}Pa	7.15 kg at \$13/g	\$ 93,000
^{233}U	1223 kg at \$13/g	15,899,000
^{235}U	112 kg at \$11.2/g	1,254,000
		\$17,246,000

Chemical processing

Salt inventory: Total 1572 lb-mole

$$\left(\frac{480\ ft^3 \times 207\ lb/ft^3}{63.2} = 1572\ lb\text{-}mole\right)$$

LiF	1572 x 0.72 x 26 x \$15/lb	\$ 441,000
BeF_2	1572 x 0.16 x 47 x \$7.5/lb	89,000
ThF_4	1572 x 0.12 x 308 x \$6.5/lb	378,000
^{233}U	63 kg at \$13/g	815,000
^{233}Pa	103 kg at \$13/g	1,336,000
		\$3,059,000

Plant equipment

Direct construction cost	\$10,000,000
Indirect cost at 35%	3,500,000
	\$13,500,000

For equilibrium operation, E_i and C_i are constant.

$E = E_i$ (i=1,2,...30) (per year)

= chemical plant operation cost + makeup salt cost

Chemical plant operating cost	\$700,000
Makeup salt (based on 15 year cycle)	215,000
	\$915,000

$C = C_i$ (i=1,2,...30)

= ^{233}U and ^{235}U credit

^{233}U 0.1473 kg/day x 0.8 x 365 at \$13/g	\$559,000
^{235}U 0.0141 kg/day x 0.8 x 365 at \$11.2/g	46,000
	\$605,000

C_L: Fuel extraction and fuel credit

Fuel process: (1720 + 480)ft^3 at \$5000/ft^3	\$-11,000,000
Fuel Credit	
^{233}U (1223+7.15+63+103)kg at \$13/g	\$18,150,000
^{235}U (112+7.15+63+103)kg at \$11.2/g	1,254,000
	\$ 8,404,000

Q: (1000 MW x 24hr x 365) x 0.8 = 7008000 MWhr/yr.

$$Q\sum_{i=1}^{30} S^{-i} = 66,060,000 \text{ MWhr/life}$$

$$FC = \frac{1}{Q \sum_{i=1}^{30} S^{-i}} \left(E_o + E \sum_{i=1}^{30} S^{-(i-1)} - C \sum_{i=1}^{30} S^{-i} - C_L S^{-30}\right)$$

5.3.5 ^{235}U Startup to Approach Equilibrium: Scheme B

E_o Initial core loading

Salt is same as Case 1.	\$ 3,228,000
Fuel: ^{235}U/1650kg at \$11.2/g	18,480,000
Chemical processing same as Case 1	16,559,000
	\$38,267,000

$E = E_i$: as Scheme A because ^{233}U is not necessary but produced. \$ 915,000

C_i : This is calculated from the burnup calculation.

$\sum_{i=1}^{30} C_i S^{-i}$	^{233}U equivalent 382.8 kg at 13/g	\$ 4,976,000
	^{235}U equivalent 105.1 kg at \$11.2/g	1,177,000
		\$ 6,153,000

C_L : same as Scheme A \$ 8,404,000

$$FC = \frac{1}{Q \sum_{i=1}^{30} S^{-i}} \left(E_o + E \sum_{i=1}^{30} S^{-(i-1)} - \sum_{i=1}^{30} C_i S^{-i} - C_L S^{-30} \right)$$

5.3.6 ^{235}U Startup ^{235}U Addition Without Integrated Processing: Scheme C

5.3.6.1 3 Year Discard Rate: Scheme C-1

Let the total expense of the first three years be E_f. Since the same operation is repeated during a thirty year core life, the total expense E_T is

$$E_T = E_f \ (1 + S^{-3} + S^{-6} + \ldots\ldots + S^{-27})$$

$$P = \frac{E_T}{I_T} = \frac{E_T}{Q \sum_{i=1}^{30} S^{-1}}$$

But $\sum_{i=1}^{30} S^{-1} = (S^{-1} + S^{-2} + S^{-3})(1 + S^{-3} + \ldots + S^{27})$

$$FC = \frac{E_f(1+S^{-3} + \ldots + S^{-27})}{Q(S^{-1} + S^{-2} + S^{-3})(1+S^{-3} + \ldots\ldots + S^{-27})}$$

$$= \frac{E_f}{Q(S^{-1} + S^{-2} + S^{-3})}$$

This is just the fuel cycle cost of the first 3 years. We can evaluate the fuel cycle cost using only the first cycle of Operation.

E_o:

Initial core loading

Salt	same as Case 1	\$ 3,228,000
Fuel	1671 kg at \$11.2/g	18,715,000
		\$ 21,943,000

No chemical processing.

E_i : Fuel addition

$\sum_{\lambda=1}^{3} E_i S^{-(i-1)}$	equi. 210.4 kg at $11.2/g	$ 2,356,000

C_i : No credit

C_L :	Salt process 1720 ft^3 x $5000/$ft^3$	$ -8,600,000
	^{233}Pa 92.6 kg at $13/g	1,204,000
	^{233}U 1015.3 kg at $13/g	13,199,000
	^{235}U 491.1 kg at $11.2/g	5,500,000

$$FC = \frac{1}{Q \sum_{i=1}^{3} S^{-i}} \left(E_o + \sum_{i=1}^{3} E_i S^{-(i-1)} - C_L S^{-3}\right)$$

5.3.6.2 6 Year Discard Rate: Scheme C-2

For the first 6 years

E_o :	salt	$ 3,228,000
	fuel	18,715,000
E_i :	fuel addition	
	$\sum_{i=1}^{6} E_i S^{-(i-1)}$ equi. 482.6 kg at $11.2/g	$ 5,405,000
C_L :	salt process	$-8,600,000
	^{233}Pa 83,7 kg at $13/g	1,088,000
	^{233}U 1198.3 kg at $13/g	15,578,000

^{235}U 399.1 kg at \$11.2/g \$ 3,798,000

$$FC = \frac{1}{Q \sum_{i=1}^{6} S^{-i}} \left(E_o + \sum_{i=1}^{6} E_i S^{-(i-1)} - C_L S^{-6}\right)$$

5.3.6.3 10 Year Discard Rate: Scheme C-3

E_o :	salt	\$ 3,228,000
	fuel	18,175,000
E_i :	fuel addition	
	$\sum_{i=1}^{10} E_i S^{-(i-1)}$ equi. 895.0 kg at \$11.2/g	\$10,024,000
C_L :	salt	\$-8,600,000
	^{233}pa 73.3 kg at \$13/g	953,000
	^{233}U 1205.4 kg at \$13/g	15,670,000
	^{235}U 585.3 kg at \$11.2/g	6,555,000

$$FC = \frac{1}{Q \sum_{i=1}^{10} S^{-i}} \left(E_o + \sum_{i=1}^{10} E_i S^{-(i-1)} - C_L S^{-10}\right)$$

5.3.7 ^{235}U Startup, ^{235}U Addition with continuous Removal of Fuel Salt: Scheme D

5.3.7.1 Removal Rate of 1/2 Inventory per Equivalent Full Power Year : Scheme D-1

E_o Initial loading

Salt	same as Scheme A	$ 3,228,000
Fuel	^{235}U 1634 kg at $11.2/g	18,301,000
		$21,529,000

No chemical process

E_i : fuel addition (net addition) data are obtained from the result of burnup calculations

$\sum_{i=1}^{30} E_i S^{-(i-1)}$	equiv. 4102.3 kg at $11.2/g	$45,946,000
makeup salt	$\frac{\text{total salt}}{2} \times 0.8 \sum_{i=1}^{30} S^{-(i-1)}$	13,389,000

C_i : fuel credit which is from removed salt

$\sum_{=1}^{30} (^{233}U + ^{233}Pa) S^{-i}$	equ. 2675.7 kg at $13/g	$34,784,000
salt process	$\frac{1720 \times \$5000}{2} \times 0.8 \sum_{i=1}^{30} S^{-i}$	-32,429,000

C_L : salt process 1720 ft^3 x $5000/$ft^3$ $-8,600,000

^{233}Pa	87.7 kg at $13/g	1,140,000
^{233}U	691.1 kg at $13/g	8,984,000
^{235}U	898.1 kg at $11.2 /g	10,059,000

$$FC = \frac{1}{Q \sum_{i=1}^{30} S^{-i}} \left(E_o + \sum_{i=1}^{30} E_i S^{-(i-1)} - \sum_{i=1}^{30} C_i S^{-i} - C_L S^{-30}\right)$$

5.3.7.2 Removal Rate of 1/4 Inventory per Equivalent Full Power Year : Scheme D-2

E_o : same as Case D-1 $21,529,000

E_i : $\sum_{i=1}^{30} F_i S^{-(i-1)}$ equ. 3092.8 kg at $11.2/g 34,639,000

makeup salt

$\frac{\text{total salt}}{4} \times 0.8 \sum_{i=1}^{30} S^{-(i-1)}$ 6,695,000

C_i : $\sum_{i=1}^{30} (^{233}U + ^{233}Pa) S^{-i}$ equ. 1637.6 kg at $13/g $21,289,000

salt process

$\frac{1720 \times 5000}{4} \times 0.8 \sum_{i=1}^{30} S^{-i}$ -16,214,000

C_L : salt process same as Scheme D-1 $-8,600,000

^{233}Pa 83,6 kg at $13/g 1,087,000

^{233}U 884.3 kg at $13/g 11,496,000

^{235}U 794.9 kg at $11.2/g 8,903,000

$$FC = \frac{1}{Q \sum_{i=1}^{30} S^{-i}} \left(E_o + \sum_{i=1}^{30} E_i S^{-(i-1)} - \sum_{i=1}^{30} C_i S^{-i} - C_L S^{-30}\right)$$

5.3.7.3 Removal Rate of 1/8 Inventory per Equivalent Full Power Year : Scheme D-3

E_o : same as case D-1 $21,529,000

E_i : $\sum_{i=1}^{30} F_i S^{-(i-1)}$ equ. 2552.4 at $11.2/g $28,587,000

makeup salt

$$\frac{\text{Total salt}}{8} \times 0.8 \sum_{i=1}^{30} S^{-(i-1)} \qquad \$3,347,000$$

C_i : $\sum_{i=1}^{30} ({}^{233}U + {}^{233}Pa) S^{-i}$ equ. 923.3 at $13/g $12,003,000

salt process

$$\frac{1720 \times 5000}{8} \times 0.8 \sum_{i=1}^{30} S^{-i} \qquad -8,107,000$$

C_L : salt process same as case D-1 $-8,600,000

${}^{233}Pa$	74.6 kg at $13/g	970,000
${}^{233}U$	1025.4 kg at $13/g	13,330,000
${}^{235}U$	883.4 kg at $11.2/g	9,894,000

$$FC = \frac{1}{Q \sum_{i=1}^{30} S^{-i}} \left(E_o + \sum_{i=1}^{30} E_i S^{-(i-1)} - \sum_{i=1}^{30} C_i S^{-i} - C_L S^{-30}\right)$$

5.3.8 Total U-235 Necessary to Complete the Life

For Scheme A we buy pure U-235 in fuel salt.

Scheme B		1650 kg
Scheme C-1		18964 kg (2254 + 16710)
	C-2	11494 kg (3139 + 8355)
	C-3	9439 kg (4426 + 5013)
Scheme D-1		14034 kg (12400 + 1634)
	D-2	11340 kg (9606 + 1634)
	D-3	10094 kg (8460 + 1634)

How much natural uranium is to be mined? Let us consider first how much natural uranium is necessary to get 1 kg of U-235 enriched 93.7%, with the tails stream of uranium depleted to 0.2 w/o in U-235.

The weight, W, of uranium, which contain 1 kg of U-235 enriched to 93.7% is

$$W = \frac{1}{0.937} = 1.067 \text{ kg}$$

uranium balance

$$W_N = W + T$$

uranium-235 balance

$$W_N \times 0.00711 = 1 + T \times 0.002$$

solving these equations to get

$$W_N = 195.28 \text{ kg}$$

Assuming 99% recovery, the total weight of natural uranium, W, is

$$W = 197.2 \text{ kg}$$

Hence, for each fuel cycle the total weight of natural uranium to complete 30 years operation is:

Scheme B	325.4 t
Scheme C-1	3740.4 t
C-2	2267.0 t
C-3	1861.7 t
Scheme D-1	2767.0 t
D-2	2216.9 t
D-3	1990.9 t

5.3.9 Thorium Required for 30 years Operation

At present, little is known about the recycling of thorium of discarded fuel from molten-salt reactors. However, it might be profitable to get an idea how much thorium is necessary for the operation of this reactor.

Calculations are made to estimate the amount of thorium for each fuel cycle discussed above on theoretical basis. Plant factor of 0.8 is also used.

Fuel cycles with integrated fuel processing: Schemes A and B

Initial loading	
primary loop	68,800 kg
processing loop	19,800 kg
makeup 2.604 $[\frac{kg}{day}]$ x 365[day] x 0.8 x 30[year]	22,800 kg
Total thorium required	111,400 kg

Fuel cycles without integrated fuel processing: Scheme C and Scheme D

Scheme C-1 : 3 years fuel life

Initial loading	70,600 kg
Thorium consumed during 3 years operation	
70600 - 68435 = 2165 kg	
for 30 years operation	21,650 kg
Total thorium required	92,250 kg

In a same manner, we get

Scheme C-2: 6 years fuel life

Total thorium required 91,370 kg

Scheme C-3: 10 years fuel life

Total thorium required 90,115 kg

Scheme D-1: Fuel removal rate of 0.00137/day

Initial loading 68,800 kg

Thorium consumed duirng 30 years operation

$$2.604\left[\frac{kg}{day}\right] \times 365[day] \times 0.8 \times \left(\frac{\bar{\phi}}{\phi^*}\right)$$

$$30[years] = 21,100 \text{ kg}$$

where $\left(\frac{\bar{\phi}}{\phi^*}\right)$ is the average flux ratio of actual flux to reference design flux over the 30 years.

$= 0.924$

Total thorium required 89,900 kg

In a same manner,

Scheme D-2: fuel removal factor 0.00068/day

$\left(\frac{\bar{\phi}}{\phi^*}\right) = 0.872$

Total thorium required 88,700 kg

Scheme D-3: fuel removal factor 0.00034/day

$\left(\frac{\bar{\phi}}{\phi^*}\right) = 0.809$

Total thorium required 87,200 kg

As expected, the net thorium required for each fuel cycle differs slightly. We can say that any fuel cycle for

molten-salt reactors required about 90 to 100t of thorium. The complete results of the calculations are listed in Table 5-7.

5.4 Results and Discussion

As is expected, the least natural uranium is necessary for equilibrium operation while quite a large amount of U-233 must be prepared. The relations of all fuel cycle costs are plotted in Figure 5-10. The equilibrium operation results in the lowest fuel cycle cost. This cost might be reduced to a certain extent when we operate the chemical plant with no initial inventory of ^{233}U and ^{233}Pa. These itotopes reach equilibrium values in the system in about two years. But this would occur for only about two years and the resulting cost would be close to that predicted by the "inventory method" of cost accounting and herein.

A little modification could be made on the equilibrium operation. It might be more realistic to start with U-235.

This operation makes a slight difference in fuel cycle cost compared with that of equilibrium operation. Detailed calculations show that no fuel addition is necessary. In less than 10 years, the operating characteristics closely approach equilibrium. But for these two operations, integrated processing is necessary. The cost for it is

Table 5-7 Summary of fuel cycle cost analysis

Unit: mill/kWh

Items	Equilibrium	^{235}U startup to approach equivalent	^{235}U fueled, without continuous processing			^{235}U fueled, with continous fuel removal		
			3 yr batch	6 yr batch	10 yr batch	1/2 inv. /efpy	1/4 inv. /efpy	1/8 inv. /efpy
Operating scheme	A	B	C-1	C-2	C-3	D-1	D-2	D-3
Initial loading								
Salt	0.049	0.049	0.185	0.106	0.075	0.049	0.049	0.049
Fuel	0.261	0.280	1.074	0.613	0.435	0.277	0.277	0.277
Subtotal	0.310	0.329	1.259	0.719	0.510	0.326	0.326	0.326
Chemical processing								
Plant equipment	0.204	0.204						
Salt and fuel	0.046	0.046						
Operating cost	0.110	0.110						
Subtotal	0.360	0.360						
Fuel addition			0.135	0.177	0.233	0.696	0.524	0.433
Fuel credit								
^{233}U and ^{233}Pa	0.080	0.075				0.527	0.322	0.182
^{235}U	0.007	0.018						
Salt process						-0.491†	-0.245†	-0.123†
Subtotal	0.087	0.093				0.036	0.077	0.059
Makeup salt	0.034	0.034				0.203	0.101	0.051
Final salt credit								
Salt process	-0.010	-0.010	-0.371	-0.159	-0.077	-0.007	-0.007	-0.007
^{233}U and ^{233}Pa	0.016	0.016	0.621	0.308	0.149	0.009	0.011	0.012
^{235}U	0.001	0.001	0.237	0.070	0.059	0.009	0.008	0.009
Subtotal	0.007	0.007	0.487	0.219	0.131	0.011	0.012	0.014
Total fuel cycle cost	0.610	0.623	0.907	0.677	0.612	1.178	0.862	0.737
Natural resources††								
Natural uranium (t)	22.1	325.4	3,740.4	2,267.0	1,861.7	2,767.0	2,216.9	1,190.9
^{235}U (kg)	112	1,650	18,964	11,494	9,439	14,034	11,340	10,094
Thorium (t)	111.4	111.4	92.3	91.4	90.1	89.9	88.7	87.2

†Reprocessing cost at remote assumed to be 5,000$/ft^3. ††Required during a plant life of 30 ydears.

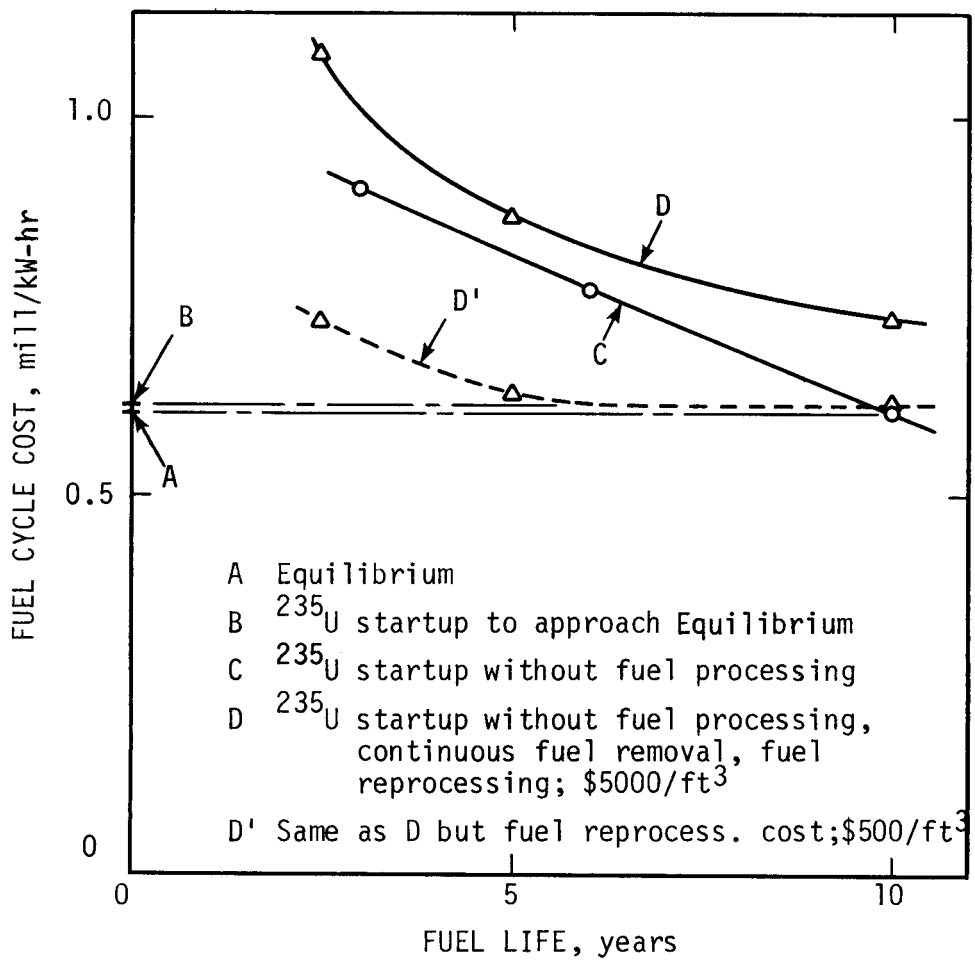


Fig. 5-10 Fuel cycle costs vs. fuel life

still uncertain and even if it is reasonable, a reactor with a chemical plant is quite complex.

The fuel cycle costs without integrated processing are a little higher which, however, have the uncertain factor of fuel reprocessing to assure uranium credit. When the fuel discard period becomes longer, but less than 10-12 years, the fuel cycle cost becomes nearly as low as those discussed above. The fuel cycle cost becomes less sensitive to the fuel reprocessing cost for longer operational periods. Also, it is true that less natural uranium is necessary. The most interesting point is the fact that the cost of operation without integrated processing of 10 years salt discard rate is less than that of the operation with U-235 startup to approach equilibrium. Startup with U-235 is more realistic, and less natural uranium is necessary.

As mentioned earlier, the operation without integrated processing requires concern about the concentration of fission products. Operation with continuous fuel removal could eliminate this limitation. The fuel cycle cost for this operation is quite sensitive to the fuel reprocessing cost, because the amount of removal salt is quite large. On the assumption that the fuel reprocessing cost is $\$5000/ft^3$, the fuel cycle cost for this operation is much higher than for the others, as we can see. But if the

reprocessing cost could be reduced to, for example, to only $500/ft^3, the cost for each removal rate comes down to 0.72989 mill/kW hr, 0.63600 mill/kW hr, and 0.61960 mill/kW hr, respectively. These can be compatible with that of equilibrium fuel cycle cost.

As is seen from the result, the smaller the removal rate becomes, the cheaper the cost is. How small can we reduce this rate? We should consider the fission product accumulation. The upper limit of the total fission product inventory is about 8000 kg according to the discussion earlier. The minimum rate which gives the upper limit fission products inventory at the end of plant life is evaluated as 1/10 inventory which corresponds to fuel life of 10 full power years by extrapolating the results.

The natural uranium necessary for these operations is almost the same as for the operations without integrated processing and fuel removal.

5.5 Conclusion

As we discussed above, molten-salt breeder reactors or molten-salt converter reactors could be operated on many kinds of fuel cycles at a rather low fuel cycle cost. The lower specific inventory of fission materials and breeding or higher conversion ratios make it possible.

Then what kind of scheme should be chosen? We will be albe to choose an appropriate one from these operation schemes considering the circumstances such as the developments of integrated processing at the plant, site, fissile material supplies, and cost of having them reprocessed at an external reprocessing plant.

At present there are many uncertain factors about costs of integrated processing and external fuel reprocessing. But we conclude that the operation on U-235 fuel without integrated processing and a salt discard rate of 10 years is the most practical scheme.

Nomenclature

Chapter 5

$A_{F.P.}$	:	absorption of fission product	(-)
a	:	Th fraction of primary system inventory added per unit time	(min^{-1})
B^2	:	geometrical buckling	(cm^{-2})
b	:	Pa fraction of primary system inventory added per unit time	(min^{-1})
C_i	:	credit obtained in i-th year, namely produced fissile material	($)
C_L	:	final fuel credit	($)
C	:	^{233}U fraction of primary system inventory extracted per unit time	(min^{-1})
d	:	U fraction of primary system inventory extracted per unit time	(min^{-1})
E_i	:	total expense for i-th year paid at the beginning of the year	($)
E_o	:	initial loading cost and equipment cost	($)
E_T	:	present worth of total expense	($)
e	:	Np fraction of primary system inventory extracted per unit time	(min^{-1})
FC	:	fuel cycle cost	mill/kwh
f	:	fission products fraction of primary system extracted per unit time	(min^{-1})

g(T)	:	non 1/v factor	(-)
H	:	reactor height	(cm)
k	:	energy per fission	(Mev)
Mi	:	atomic mass of rare earth i	(-)
N	:	number density of fission product pair	(n/cm^3)
Na	:	Avogadro number	(n)
Nx	:	total number of nuclide x in primary system	(n)
$N_{F.P.X}$	:	total number of fission product from nuclide x	(n)
NLP	:	non leakage probability	(-)
P	:	thermal output	(MW)
p	:	resonance escape probability	(-)
Q	:	electricity generated annually	(kwh)
R	:	reactor radius	(cm)
s	:	1 plus annual interest	(-)
W	:	weight of uranium 235	(kg)
W_i	:	weight of rare earth i	(kg)
W_N	:	weight of natural unanium	(kg)
W_R	:	total weight of rare earths	(kg)

Y_i	:	fission yield of rare earth i	(n/fission)
α_x	:	capture to fission ratio of nuclide x	(-)
δ	:	reflector saving	(cm)
ε	:	fast neutron factor	(-)
ϕ	:	effective neutron flux based on total primary fuel salt volume	$(n/cm^2 \cdot sec)$
$\xi\Sigma_s$	:	slowing down power of graphite	(cm^{-1})
λx	:	decay constant of nuclide x	(sec^{-1})
σx	:	effective micro cross section of nuclide x	(b)
$\sigma(To)$	:	micro cross section for neutron of energy of To°k	(b)
$\sigma_{th}(T)$	:	average thermal cross section at temperature T°k	(b)
η_x	:	η of nuclide x	(-)

Chapter 6 Summary and Conclusion

The MSBR has been being developed at Oak Ridge National Laboratory since 1947 and a conceptual design study of a 1000 MWe power plant was completed in 1971. The reference MSBR is a high-temperature, thermal-neutron breeder reactor that operates on ^{233}U-Th fuel cycle. As the MSBR utilizes fluid fuel, it is expected to have different characteristics in nuclear design, stability, controlability, safety and economy.

In Chapter 1. Introduction, we review previous evaluation studies on the MSBR and make a comparison of nuclear designs between MSBR and LWRs which are currently the nucleus of present-day power reactors, and clarify the characteristics of the MSBR. Based on the findings obtained through the review study that the MSBR could be better in many aspects, the objective of the study is described.

In Chapter 2, Stability Analysis on Normal Operations, we review the result of stability analyses and find that transient xenon analysis has not been performed enough which is indispensable for detailed evaluation of reactivity balance under transient conditions. The results are compared with those of a typical PWR. The xenon behavior does not differ between the two types of reactor to the extent that might be expected from the fact that in the

MSBR, xenon behavior is additionally conditioned by the processes of migration into the circulating bubbles and into the graphite, as well as by diffusion therein.

It is shown that the reactivity transients due to xenon buildup can be held within the range of counteraction by control rod movement for any normal change of reactor output, so long as the reactor is not shut down. After a shutdown, insertion of the control rods will not suffice to override the xenon buildup. Hence complementary systems for reactivity adjustment are favorably required. Then the fuel processing system is expected to be conveniently utilized to increase the quantity of ^{233}U contained in the fuel and regain required reactivity of the core.

In Chapter 3, Reactivity Control Capability of Fuel-Salt Processing System, a different way of utilization of the fuel processing system (FPS) is investigated. The principal functions required of the FPS are: (a) Isolation of ^{233}Pa from regions of high neutron flux during its decay to ^{233}U, and (b) the removal of fission products from the system. The FPS can very usefully serve also to control the primary system reactivity by appropriately utilizing its function of extracting uranium and reconstituting the fuel contained in the salt. The principles of operation are quite similar to the chemical shim control

system currently installed in PWR's whereby the core reactivity, affected by changes in the moderator temperature, fuel burnup and transient xenon, is adjusted by regulating the concentration of boric acid introduced in the moderator as neutron absorber. The present study examines the capability of the FPS to follow transient xenon as in PWRs, and proves that the FPS should effectively serve as a system for adjusting not only long-term changes in reactivity but also short-term transient variations without any accompanying difficulties foreseen in operation.

In Chapter 4, Accident Analysis, both nuclear accidents and mechanical accidents without scram which will result in the most severe transient are quantitatively analyzed to evaluate reactor safety.

The MSBR, operating on ^{233}U-Th with circulating fuel, has a very small effective delayed neutron fraction, which is conductive to a very high power increase induced by reactivity addition, particularly applied sharply.

The analysis proves that the transient phenomena of MSBR initiated by an abnormal reactivity addition do not exceed the bounds of structural safety, in virtue of the very favorable nuclear and thermal characteristics of the MSBR.

In a reactor with circulating fuel such as the MSBR, the reduction or the stoppage of fuel flow caused by locked

rotor of fuel pumps will result not only in adding positive reactivity due to the decrease of the loss of delayed neutron precursors out of the core, but also in loosing heat sink. Locked rator accidents of one, two, three and four pumps out of four fuel salt pumps are evaluated. It is shown that the transients of the reactor system will be within the safety range in virtue of the excellent nuclear and thermal characteristics of the MSBR.

Based on the analyses and discussion, requirements of protection/control system, safety assessment of transients without scram and recommendations for studies in the future are summarized.

In Chapter 5, Fuel Cycles and Cost Analysis, feasibilities of fuel cycles that can be considered in the MSBR and their fuel cycle costs are evaluated with the relation to the fuel processing system (FPS). Though the fuel cycle of the MSBR is accompanied with the FPS , the operating characteristics of FPS is somewhat still unknown. Hence the fuel cycles without FPS are investigated. The calculation indicates that fuel cycles without FPS are feasible and somewhat lower fuel cycle costs can be expected from reactor operation in convertor mode on ^{235}U make-up with fuel reprocessed in batches every 10 years to avoid fission product precipitation, than breeder with continuous reprocessing.

At present the nucleus of power reactors in Japan is Light Water Reactors, which utilize slightly enriched uranium. The reprocessing of irradiated fuels and recycling of plutonium are now under consideration or at developing stage. Fast Breeder Reactor is also under development. Even if the FBR comes into commercial operation, uranium is used as fuel. Hence the needs for uranium resources will increase. Considering these facts, it is quite important for Japan having less natural resources to diversify her energy resources. From this point of view, the MSBR studied here has the advantage of it.

Although the scope of the analyses is limited to the areas of reactor behaviors during normal operation and under accidental conditions and fuel cycle, this is believed to cover an essential part for evaluating a nuclear power reactor system. As far as the results obtained through the study, no negative aspects are found, however, the studies on the other areas such as related materials, fuel processing, heavy component design, protection/control systems, instrumentation systems and so on are required in the future to carry out this concept.

ACKNOWLEDGMENT

I wish to express my sincere gratitude to Professor R. Kiyose as my adviser for helping me to achieve this dissertation and to Professors M. Kanno and S. Kondo for serving on my Dissertation Committee in the Department of Nuclear Engineering of the University of Tokyo.

Professor T.H. Pigford of the Department of Nuclear Engineering in the Graduate Division of the University of California, Berkeley, is acknowledged for initiating me in the study of molten salt breeder reactors and thorium fuel cycles, and for providing valuable guidance.

My thanks also to Dr. M. Ohno who introduced me to Professor R. Kiyose.

REFERENCES

1) Rosenthal, M.W., Kasten, P.R., Brigs, R.B.: Molten-Salt reactors -- History, status and potential, Nucl. Appl. Technol., 8 [1], 107-117 (1970)

2) Haubenreich, P.N., Engel, J.R.: Experience with the molten-salt reactor experiment, Nucl. Appl. Technol., 8 [1], 118-136 (1970)

3) McCoy, H.E., Beatty, R.L., et al: New development in materials for molten-salt reactors, Nucl. Appl. Technol., 8 [1], 156-169 (1970)

4) Whatley, M.E., McNeese, L.E., et al: Engineering development of the MSBR fuel recycle, Nucl. Appl. Technol., 8 [1], 170-178 (1970)

5) Scott, D., Eatherly, W.P.,: Graphite and xenon behaivor and their influence on molten-salt reactor design, Nucl. Appl. Technol., 8 [1], 179-189 (1970)

6) Bettis, E.S., Robertson, R.C.: The design and performance features of a single-fluid molten-salt breeder reactor, Nucl. Appl. Technol., 8 [1], 190-207 (1970)

7) Furukawa, K.: Expectations on molten-salt breeder reactors, Nuclear Engineering, 20 [10], 35-47 (1974)

8) Status of molten-salt breeder reactor development and its future, Journal of the Atomic Energy Society of Japan 16 [5], 249-273 (1974)

9) Wall, I., Fench, H.: Application of dynamic programing to fuel management, N.S.E. 22, 285-297 (1965)

10) Naft, B.N., Sesonske, A.: PWR optimal fuel management, Nucl. Technol. 14 [5], 123-132 (1972)

11) Sauer, T.O.: Application of linear programming to in-core fuel management optimization in LWR, N.S.E. 46, 274-283 (1971)

12) Suzuki, A., Kiyose, R.: Application of linear programming to refueling optimization for light water moderated power reactors, N.S.E., 46, 112-130 (1971)

13) Haling, R.K.: Operating strategy for maitaining an optimum power distribution throughout life, TID-7672, USAEC, 205-210

14) Melice, M.: PWR optimal core management and reactivity profile, N.S.E., 37, 451-477 (1969)

15) Goertzel, G.: Minimum critical mass and flat flux, Journal of Nuclear Energy 2, 193-201 (1956)

16) Anderson, C.I.G.: Semianalitical and semi-numerical calculations of optimum material distributions, Nucleonik, 5 [8], 185-191 (1963)

17) Wade, D.C., Ternney, W.B.: Optimal control of nuclear reactor depletion, N.S.E. 45, 199-217 (1971)

18) Suda, N., Yamagishi, T., Sakurai, Y.: Optimization of nutron flux distribution, Journal of Nuclear Science and Technology, 5 [9], 452-457 (1968)

19) Ternney, W.B.: Analytic solution to the flat flux problem, N.S.E. 45, 226-230 (1971)

20) Robertson, R.C.: Conceptual design study of a single-fluid molten-salt breeder reactor, ORNL-4541, (June 1971)

21) Kerlin, T.W., Ball, S.J., Steffy, R.C.: Theoretical dynamics analysis of the molten-salt reactor experiment, Nucl. Tech., 10, 118-132, Feb. (1971)

22) Kerlin, T.W., Ball, S.J., Steffy, R.C., Buckner, M.R.,: Experiences with dynamic testing methods at the molten-salt reactor experiment, Nucl. Tech., 10, 103-131, Feb. (1970)

23) Sides, W.H.: MSBR control studies, ORNL-TM-2489, (1968)

24) Sides, W.H. Jr.: Control studies of a 1000 MWe MSBR, ORNL-TM-2927, (1969)

25) Corcoran, W.R., et al: Damping of xenon oscillations in the Main Yankee reactor, Nucl. Technol., 22, 252-262 (1972)

26) Rydin, R.A.: Higher flux mode effect in xenon spatial oscillations, Nucl. Sci. Eng., 50, 147-152 (1973)

27) Christie, A.M., Poncelet, C.G.: On the control of spatial xenon oscillations, Nucl. Sci. Eng., 51, 10-24 (1973)

28) El-Bassioni, A.A., Poncelet, C.G.: Minimal time control of spatial xenon oscillation in nuclear power reactors, Nucl. Sci. Eng., 54, 166-176 (1974)

29) Lee, J.C.: Application of an improved time difference method for spatial xenon transient analysis, Nucl. Sci. Eng., 54, 204-214 (1974)

30) Bauer, D.C., Poncelet, C.G.: Practical xenon spatial control, Nucl. Technol., 21, 165-189 (1974)

31) Morita, T. et al: Topical report power distribution control and load following procedures, WCAP-8403, (1974)

32) Kedel, R.J., Houtzeel, A.: Development of a model for Computing ^{135}Xe migration in the MSBR, ORNL-4069, (1967)

33) Grimes, R.: Molten-salt reactor chemistry, Nucl. Appl. Technol., 8 [2], 137-155 (1970)

34) Rosenthal, M.W.: The development status of molten-salt breeder reactors, ORNL-4812, (1972)

35) Lapides, M.E.: Productivity assessment of nuclear generation systems, Nuclear Systems Reliability Engineering and Risk Assessment, 191-218, SIAM, (1977)

36) Joksimovic, V., Houghton, W.J., Emon, D.E.: HTGR risk study, Nuclear Systems Reliability Engineering and Risk Assessment, 167-190, SIAM, (1977)

37) MacPhee, J.: The kinetics of circulating fuel reactors, Nucl. Sci. Eng., 4, 588-597 (1958)

38) Hastelloy alloy N, Stellite Division Cabot Corporation, (August 1967)

39) Perry, A.M., Bauman, H.F.: Reactor physics and fuel cycle analysis, Nucl. Appl. Technol, 8 [2], 208-219 (1970)

40) ORNL printout for PHOBE program, from T.H. Pigford, (Feb. 1972)

41) Pigford, T.H., Benedict, M., Manson, E.A.: "Nuclear chemical engineering," (2nd Ed.), McGraw-Hill Book Co.

42) Moncrief, E.C., Schileo, G.: Recycle of thorium fuel for heavy-water-moderated organic-cooled reactors, "Thorium fuel cycle," AEC symp. Ser. 12, (Feb. 1968)

43) Pardue, W.M. et.al; BCL-NSF-C946-2-1, -2, -3 (1976)

Appendix A Conceptual Design for a 1000 MWe Single Fluid Molten-Salt Breeder Reactor

A.1 History of Development[1)]

The investigation of molten-salt reactors started in the late 1940's as part of the United States' program to develop a nuclear powered airplane. A liquid fuel appeared to offer several advantages, so experiments to establish the feasibility of molten-salt fuels were begun in 1947.

Molten fluorides salts were adopted as the main line effort of the Oak Ridge National Laboratory's Aircraft Nuclear Propulsion Program in 1950.

A small reactor, the Aircraft Reactor Experiment (ARE), was built at ORNL to investigate the use of molten fluoride fuels for aircraft propulsion reactors and particularly to study the nuclear stability of the circulating fuel system. The ARE fuel salt was a mixture of NaF, ZrF_2 and UF_4, the moderator was BeO, and all the piping was Inconel. In 1954 the ARE was operated successfully for 9 days at steady-state outlet temperatures ranging up to 860°C and to 2.5 MWt.

It was recognized from the beginning of ANP program that molten salt reactors might be attractive for civilian power applications. After considering a number of concepts over a period of several years, it was concluded that graphite-moderated thermal reactors operating on a thorium

fuel cycle would be the best molten-salt systems for producing economic power.

Two types of graphite-moderated reactors were considered; single-fluid reactors in which thorium and uranium are contained in the same salt, and two-fluid reactors in which a fertile salt containing thorium is kept separate from the fissile salt which contains uranium. The two-fluid reactor had the advantage that it would operate as a breeder; however, the single-fluid reactor appreared simpler and seemed to offer low power costs, even through the breeding ratio would be below 1.0 using the technology at that time.

By 1960, more complete conceptual designs of molten-salt reactors had emerged. The design of the Molten-Salt Reactor Experiment was begun in 1960. The MSRE fuel salt is a mixture of uranium, lithium-7, beryllium, and zirconium fluorids. Unclad graphite serves as the moderator.

Construction of the MSRE began in 1962, and the reactor was first critical in 1965. Sustained operation at full power began in December 1966. Successful completion of a six month run in March of 1968 brought to a close the first phase of operation during which the initial objectives were achieved.

The second phase of MSRE operation began in August

1968 when a small processing facility attached to the reactor was used to remove the original uranium by treating the fuel salt with fluorine gas. A charge of ^{233}U fuel was added to the same carrier salt, and on October 2 the MSRE was made critical on ^{233}U.

During the years when the MSRE was being built and brought into operation, basic chemistry studies of molten fluorides salts continued throughout this period. One discovery during this time was that the lithium fluoride and beryllium fluoride in a fuel salt can be separated from rare earths by vacum distillation at temperatures near 1000°C. This was a significant descovery, since it provided an inexpensive, on site method for recovering these valuable materials.

In late 1967, new experimental information and an advance in core design caused the molten-salt program at ORNL to change from the two-fluid breeder to a single-fluid breeder. Part of the information influencing this change concerned the behavior of graphite at higher radiation exposures that had been achieved previously, and the other part related to a development in chemical processing.

As a result of the developments cited above, design studies of single-fluid breeders were pursued. The studies indicated that the fuel utilization in single-fluid, two

region molten-salt reactors can be almost as good as in two-fluid reactors and with present limitation on graphite life, the economies probably can be better. Consequently, in 1968 ORNL'S Molten-Salt Reactor Program was directed toward the development of single-fluid breeder reactor.

As a result of the study, a conceptual design study of a 1000 MWe MSBR was completed in 1970.

A.2 General Description[20)]

The reference MSBR operates on the Th-^{233}U cycle, with both fissile and fertile materials incorporated in a single-molten-salt mixture of the fluorides of lithium, beryllium, thorium, and uranium.

The fuel salt is $^{7}LiF-BeF_2-ThF_4-UF_4$ (71.7-16-12-0.3 mole %). The lithium is enriched to 99.995% ^{7}Li. In brief, the fuel salt melts at about 930°F and has a low vapor pressure at operating temperatures. It has low thermal-neutron capture cross sections and is stable throughout the proposed range of application. With a viscosity about twice that of kerosene, a volumetric heat capacity about the same as that of water, and a thermal conductivity more than twice that of water, it has adequate heat transfer characteristics and a reasonable pressure drop due to flow. It is also nonwetting and virtually noncorrosive to graphite and the Hastelloy-N container material.

The reactor vessel is about 22 ft in diameter and 20 ft high and is designed for 75 psig. It has 2-in.-thick walls and 3-in.-thick dished heads at the top and bottom. Salt at about 1050°F enters the central manifold at the bottom through four 16-in.-diam nozzles and flows through the lower plenum and upward through the passages in the graphite to exit at the top at about 1300°F through four equally spaced nozzles which connect to the 20-in.-diam salt-suction lines leading to the circulation pumps. The 6-in.-diam fuel-salt drain line connects to the bottom of the reactor vessel inlet manifold.

The reactor has a central zone in which 13% of the volume is fuel salt, an outer, undermoderated region having 37% salt, and a reflector region containing about 1% salt. There is 2-in.-wide annulus which is 100% salt between the removable core and the reflector blocks to provide clearance when removing and inserting a core assembly.

The central portion, zones 1-A and 1-B, is made up of 4-in. x 4-in. x 13-ft-long graphite elements, as indicated in Figs. A-1 and A-2 and shown in more detail in Figs. A-3.

The undermoderated zone with 37% salt, or radial "blanket," surrounding the more active portion serves to reduce neutron leakage from the core. This zone is made

up of two kinds of elements. 4-in. x 4-in. x 13-ft-long elements like those in the core except for a larger hole size (2.581 in. ID), and 2-in.-thick x 13-ft-long slates arranged radially around the core, as shown in Fig. A-1.

Four 6- by 6-in. graphite elements with a 4-in.-diam hole are shown installed axially at the center line of the reactor in Figs. A-1 and A-2. The holes receive relatively simple graphite control rods which, on insertion, increase the reactivity by displacing some of the fuel salt. Since these rods have a pronounced tendency to float in the salt, they are self-ejecting with respect to decreasing the reactivity, even if the graphite should fracture.

The fission energy release in the reactor is highest at the center of the core, with the power density (in kilowatts per liter) falling off approximately as a cosine function of the core radius. By varying the salt velocity from 8 fps at the center to about 2 fps near the periphery, a uniform temperature rise of 250°F is obtained. The salt velocities are determined by the hole size, by the flow passage dimensions between the graphite elements, and by orificing at the ends of the flow channels.

The reactor vessel is supported from the top by an extension of the outer wall which carries a large flange at the top that rests on the reinforced concrete roof structure. This cylindrical piece extends about 15 ft above the top of the reactor vessel and has walls 2 in. thick. The top head of the reactor vessel also carries a cylindrical extension with a flange at the top to mate with the vessel flange. The flanged joint is thus located outside the high temperature region of the reactor cell, is elevated above the maximum salt level, and is not subjected to high temperature gradients or strong irradiation levels.

The principal design data are listed in Table A-1.

A.3 Nuclear Characteristics

The core of the single-fluid MSBR consists of two zones: a well-moderated inner zone (I) surrounded by an undermoderated outer zone (II). The same fuel salt, containing both fissile and fertile material, is used in both zones and throughout the reactor. The neutron spectrum in each zone is controlled by adjusting the proportion of salt to graphite, from a salt fraction of about 13% in zone I to about 37% in zone II. The overall spectrum is adjusted for the best "performance" associated with a high breeding ratio and a low fissile inventory.

Table A-1 Principal reactor design data

Reactor vessel inside diameter, ft	22.2
Vessel height at center, [a] ft	20
Vessel wall thickness in.	2
Vessel head thickness, in.	3
Vessel design pressure, psig	75
Number of core elements	1412
Length of zone I portion of core elements, ft	13
Overall length of core elements (approx), ft	15
Distance across flats, zone I, [b] ft	14
Outside diameter of undermoderate region, zone II, ft	16.8
Overall height of zone I plus zone II, [b] ft	18
Radial distance between reflector and core, zone II, [b] in.	2
Radial thickness of reflector, in.	30
Average thickness of axial reflectors (approx), in.	22
Volume fraction salt in zone I [b]	0.13
Volume fraction salt in zone II [b]	0.37
Core power density, kW/liter	
Average	22.2
Peak	70.4
Core fuel-salt power density, kW/liter	
Average	74
Peak	492
Core graphite power density, kW/liter	
Average	2.3
Peak	6.3
Core thermal neutron flux, neutrons cm^{-2} sec^{-1}	
Average	2.6×10^{14}
Peak	8.3×10^{14}
Maximum graphite damage flux (>50 KeV), neutrons cm^{-2} sec^{-1}	3.5×10^{14}
Graphite temperature at maxium graphite damage flux region, °F	1307
Estimated useful life of graphite years	4
Total weight of graphite in reactor, [c] lb	669,000
Weight of removable core assembly, [d] lb	600,000
Maximum flow velocity in core, fps	8.5
Pressure drop due to salt flow in core, psi	18
Volume of fuel salt, ft^3	
Total in core	1074
Total in primary system	1720
Fissile-fuel inventory of reactor plant and fuel processing plant, kg	1470
Thorium inventory, kg	68,000
Breeding ratio	1.06
Yield, [e] %/year	3.3
Doubling time, [e] compounded continuously, years	21

[a] Does not include upper extension cylinder.
[b] See Table 5.2 for definition.
[c] Does not include 60,000 lb in alternate head assembly.
[d] Hoist load to be lifted into transport crask.
[e] At 80% plant factor.

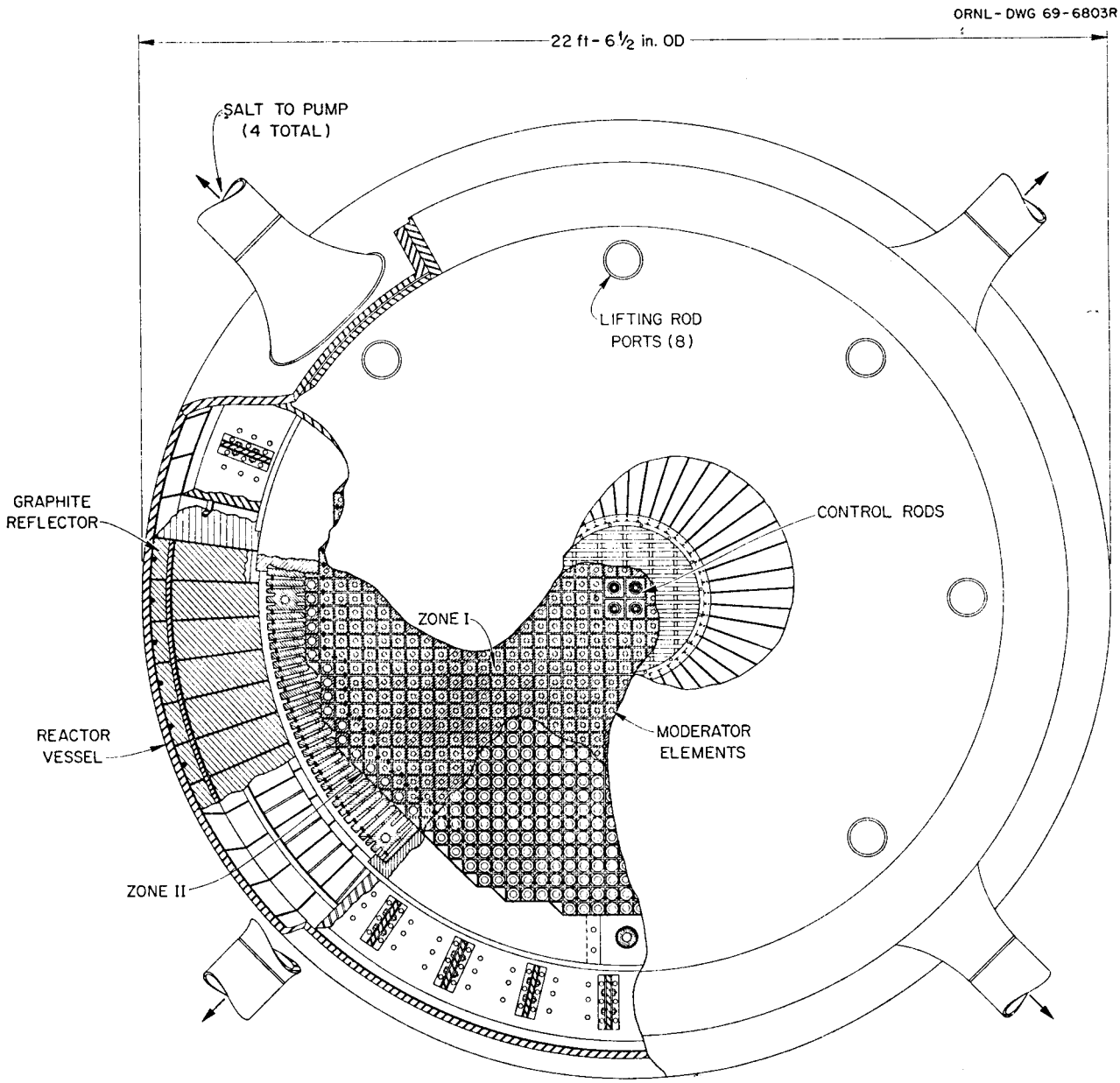


Fig. A-1 Plan view of MSBR vessel

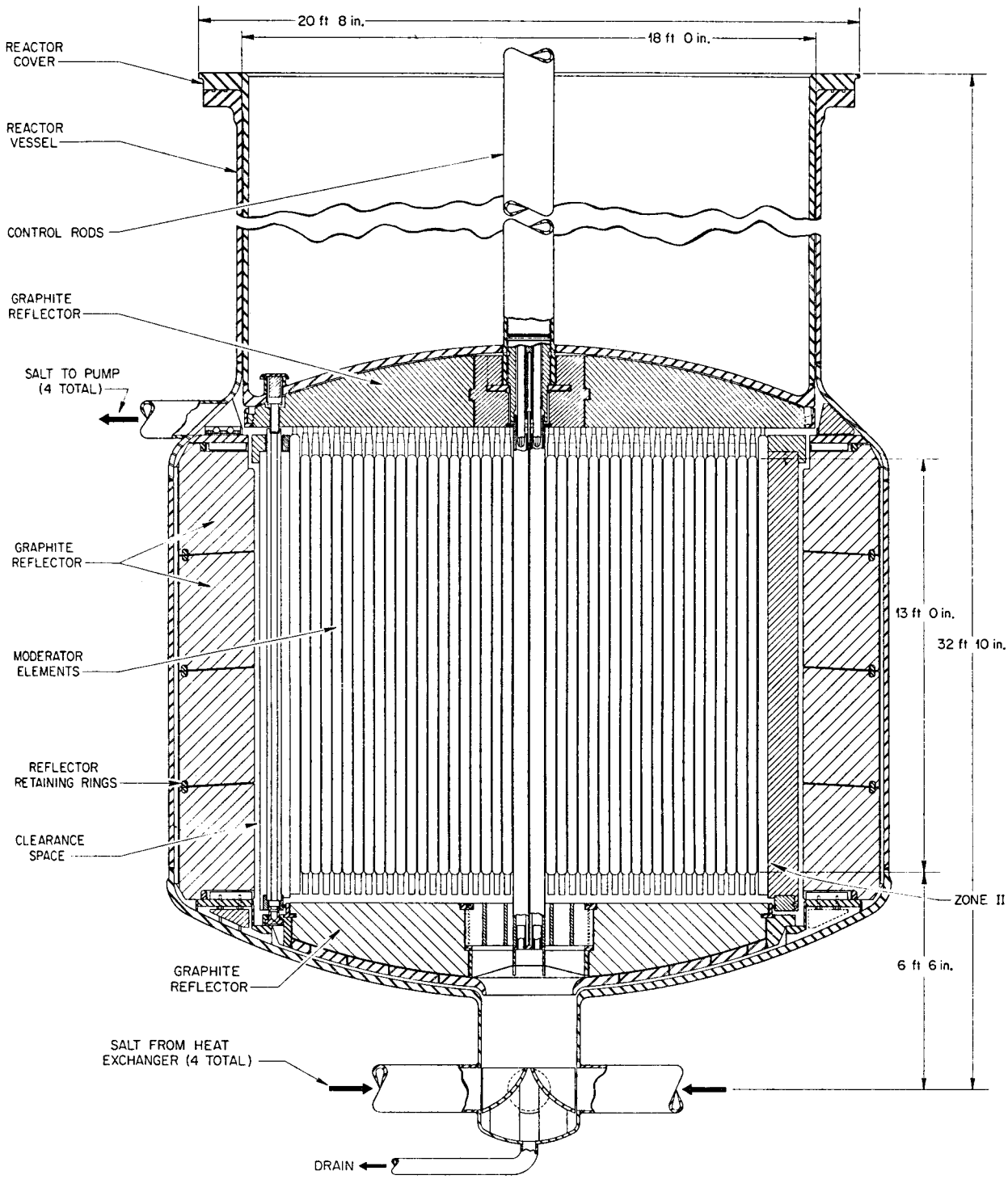


Fig. A-2 Sectional elevation of MSBR vessel

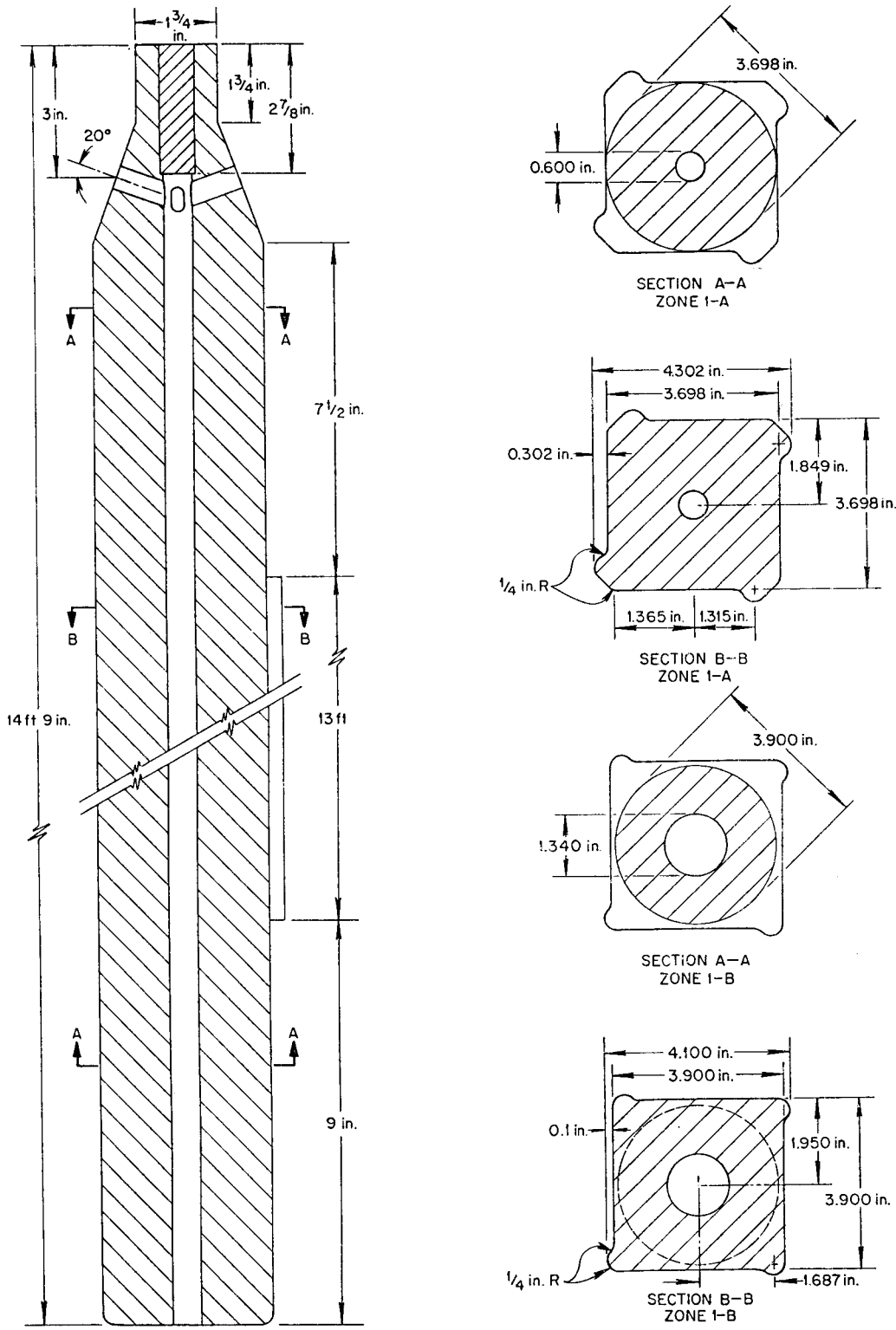


Fig. A-3 Graphite moderator element for zone I

The spectrum in zone II is made harder, to enhance the rate of thorium resonance capture relative to the fission rate, thus depressing the flux in the outer core zone and reducing the neutron leakage. A number of isothermal reactivity coefficients were calculated using the reference reactor geometry. These coefficients are summarized in Table A-2. The Doppler coefficient is primarily that of thorium. The salt and graphite thermal base coefficients are positive because of the competition between thermal captures in fuel, which decrease less rapidly than 1/v, and thermal captures in thorium, which decrease nearly as 1/v, with increasing temperature.

The equilibrium fuel concentration coefficient, $(\Delta k/k)/(\Delta n/n)$, where n is atomic density, was calculated to be 0.42 for ^{233}U and 0.027 for ^{235}U, and 0.39 for total fissile uranium.

Two types of rods are planned for the MSBR core:

(1) control rods, which have both regulating and shimming functions for normal load following and shutdown, and

(2) safety rods, which are primarily for backup to assure adequate negative reactivity for emergency situations.

The control rods are movable graphite cylinders about 9.53 cm in diameter with axial passages through them for a

Table A-2 Isothermal Reactivity Coefficient

Component	Reactivity Coefficinet $\frac{1}{k}\frac{\partial k}{\partial T}$ (per °C) x 10^{-5}
Doppler	-4.37
Salt thermal base	+0.27
Salt density	+0.82
Total salt	-3.22
Graphite thermal base	+2.47
Graphite density	-0.12
Total graphite	+2.35
Total core	-0.87

cooling flow of fuel salt. Withdrawal of the graphite leaves an undermoderated region at the center of the reactor and causes a reduction in reactivity. It may be noted that the graphite has considerable buoyancy in the fuel salt; thus, if a rod should break, the graphite pieces would float out of the core and reduce the reactivity. The total worth of each rod in moving the full core height from fully inserted to the fully withdrawn position is about 0.08%$\Delta k/k$. Based on a higher anticipated worth than this, two control rods and two safety rods were originally planned.

On the basis of later estimates, however, it now appears that a total of four control rods and two safety rods may be required to achieve satisfactory control.

Detailed core parameter is listed in Table 5-2.

A.4 Bubble Generator and Gas Separator[20)]

To enhance the breeding potential of the MSBR, it is necessary to remove as much as possible of the neutron-absorbing fission products form the fuel salt, and dispose of them outside the core. This applies particulary to ^{135}Xe, with its very large absorption cross section. The mechanism chosen for the MSBR utilizes recirculation of helium bubbles. The principle is to utilize the extreme insolubility in fuel salt shown by noble gasses like

helium, which will migrate readily to any available gaseous interface. Since the noble gases form a true solution in salt obeying Henry's law, they will migrate in conformity with the usual law of mass transfer. Consequently, if small helium bubbles are circulated with the fuel salt, they will "soak up" gaseous products like xenon and krypton, and bubbles thus loaded with fission products could then be separated from the salt and rejected into the off-gass-system.

In this work of collecting xenon, the circulating bubbles will be in competition with porous moderator graphite, which has the property of absorbing and holding xenon. This action of graphite can be countered to a large extent by chemical deposition of carbon on its surface to close off the pores. The target value of 0.5% ^{135}Xe poison fraction could be achieved by circulating helium bubbles 0.0508 cm in diameter to occupy about 0.2% average void fraction in the fuel loop. This should be realizable with 10% of the fuel salt from the pump discharge bypassed through a bubble separator to remove the xenon-containing gas, channeling the stream through a clean helium bubble generator for replenishment of the helium bubbles, and returning the fuel back to circulation by injection into the pump suction side.

A conceptual design for the MSBR bubble generator is

shown in Fig. A-4. It consists of a system of linear venturis formed by arranging air foils in parallel. The throat width would be about 0.08 in. The fluid velocity through the throat was established as 40 fps, thus fixing the total throat length. A conceptual cross section of a single air foil is also shown in Fig. A-4. The helium channel is shown as a "controlled crack", that is, one of the mating surfaces is roughened in such a manner that when the two surfaces bear against each other, a crack of controlled dimension is formed through which the helium flow can be regulated. A crack width of only about 0.001 in. will probably be needed. The helium channel dimension is kept small to reduce the likelihood that a pressure surge in the salt system could push salt into the channel and plug it. Since the fuel salt does not wet Hastelloy-N, a considerable pressure would be required to force the salt into a 0.001-in.-wide opening. An alternative to the controlled-crack method would be to install a narrow graphite diffuser in the throat region of the venturi.

A pipeline bubble separator as shown in Fig. A-5 was chosen to remove the gas-rich bubbles from the fuel salt. This type was chosen primarily because of its low volume inventory and high performance. The swirl vanes rotate to develop an artificial gravity field. This causes the bubbles to migrate to the gas-filled core at the center of

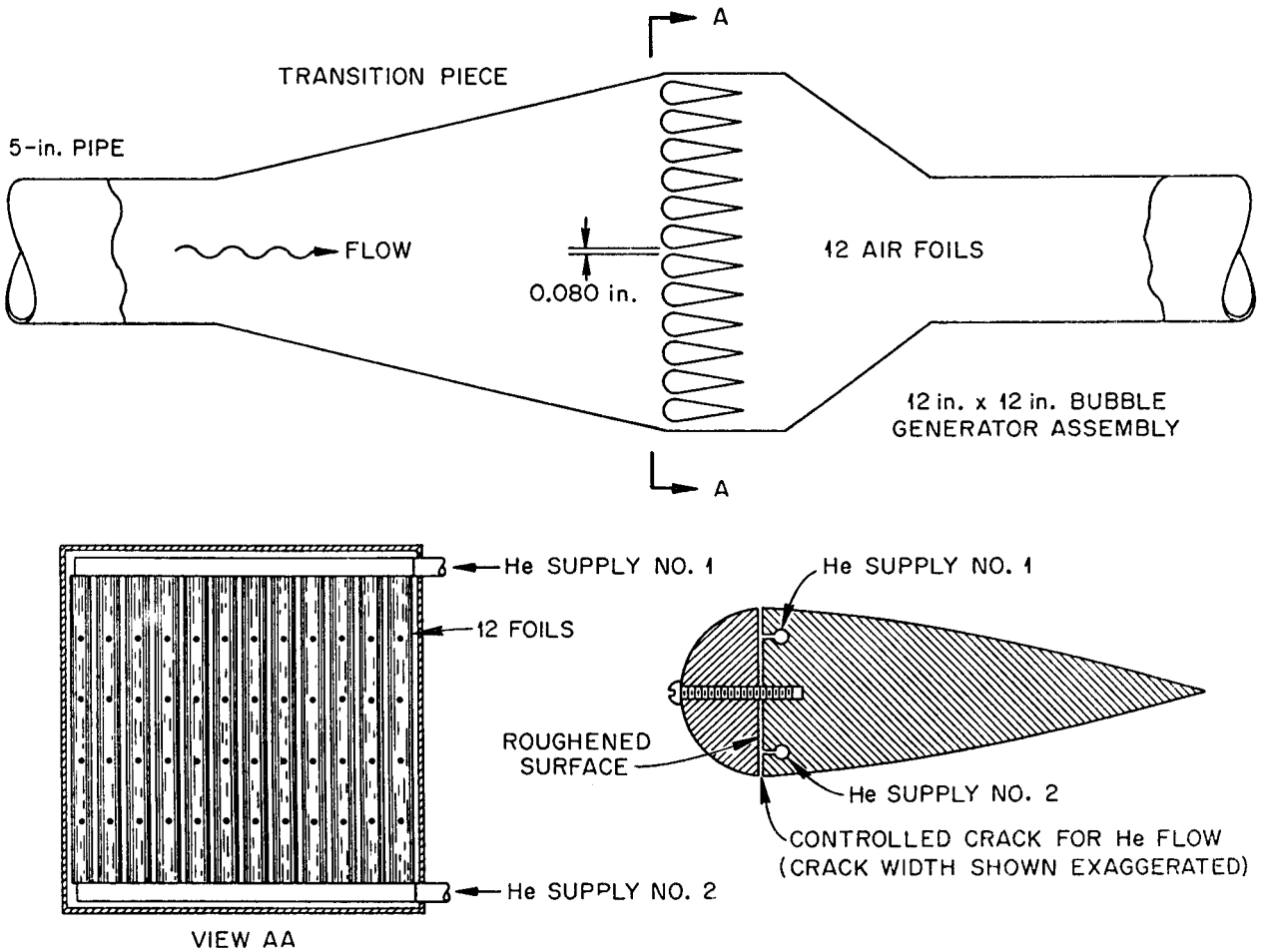


Fig. A-4 Preliminary concept of MSBR bubble generator

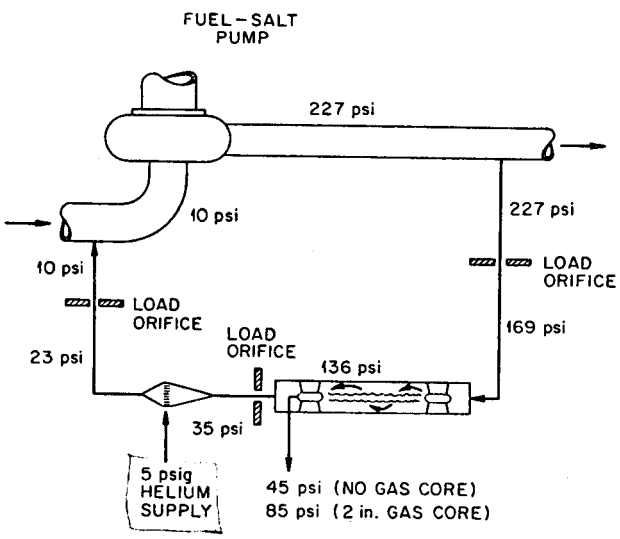


Fig. A-5 Schematic flow diagram of bubble removal and generation bypass in MSBR full salt stream

the pipe. The gas then flows down the core and into the takeoff line which is located in the hub of the recovery vanes. The recovery vanes straighten out the fluid and recover some of its energy.

Figure A-5 shows schematic of the MSBR bubble removal and generation equipment installed in a bypass stream around the fuel pump.

A.5 Fuel Processing System[20)]

The principal objectives of fuel processing are the isolation of ^{233}Pa from regions of high neutron flux during its decay to ^{233}U and the removal of fission products from the system. It is also necessary to remove impurities from the reactor fuel salt which may arise from corrosion or maloperation of the reactor system.

The fuel processing system is an integral part of the reactor system and will be operated continuously. This allows processing of the reactor on a short cycle with acceptably small inventories of salt and fissile materials.

The reactor can continue to operate even if the processing facility is shut down, however, although at a gradual decrease in nuclear performance as the poisons accumulation.

The processing methods are based on reductive extraction, which involves the selective distribution of

materials between salt and bismuth containing reducing agents such as thorium and lithium. The isolation of protactinium by reductive extraction is relatively straightforward since there are significant differences in chemical behavior between protactinium and the other components of the fuel salt (U, Th, Li and Be), as is evidenced by the distribution ratios of these materials between fuel salt and bismuth containing a reductant. Extraction of the protactinium into bismuth requires the prior and complete removal of uranium from the fuel salt.

In the protactinium isolation system only recently devised, fluorination is used for removing most of the uranium from the fuel salt prior to protactinium isolation. With this system, the quantity of reductant required is such that it can be purchased economically, and an electrolytic cell (which presents unusual development problems) is not required.

The removal of the rare-earth fission products from the fuel salt is more difficult because the chemical behavior of the rare-earth fluorides is similar to that of thorium fluoride, which is a major component of the fuel salt.

The rare-earth-removal method, known as the "metal-transfer process", was also devised only recently.

This process exploits the relatively large differences in the extent to which rare earths and thorium distribute between bismuth containing a reductant and lithium chloride. The new process does not require an electrolytic cell; this is an important advantage over the earlier process.

Uranium is removed as UF_6 at two points in the process, and it is necessary to return most of this uranium to the fuel salt returning to the reactor. This is accomplished by absorbing the UF_6 into the processed salt and reducing the resulting mixture with H_2 to produce UF_4. Although the overall reaction is straightforward,

$$UF_6 + H_2 \rightarrow UF_4 + 2HF,$$

it is believed that intermediate uranium fluorides such as UF_5, which are soluble in the salt and nonvolatile, are responsible for the rapid absorption reaction which occurs when UF_6 is contacted with salt containing lower valence uranium fluorides. The rate at which UF_6 must be reduced to UF_4 is about 700 moles/day. It is believed that the reaction can be carried out continuously with the H_2 and UF_6 added either to the same vessel or to different vessels between which the salt is circultated. Conditions in the system are likely to be corrosive, and frozen wall corrosion protection may be required.

The flow sheet of fuel processing system is shown in Fig. 3-1.

A.6 Primary Heat Exchanger and Primary Salt Pump

Four counterflow vertical shell-and-tube-type heat exchangers are used to transfer heat from the fuel salt to the sodium fluoroborate coolant salt. The units are almost 6 ft in diameter and about 24 ft tall, not including the coolant-salt U-bend piping at the top. A cross-sectional drawing is shown in Fig. A-6.

The fuel salt enters the top of each unit at about 1300°F and exits at the bottom at about 1050°F after single-pass flow through the 3/8-in.-OD tubes. The coolant salt enters the shell at the top, flows to the bottom through a 20-in.-diam central downcomer, turns and flows upward through modified disk and doughnut baffling, and exits through a 28-in.-diam pipe concentric with the inlet pipe at the top. The coolant salt is heated from 850°F to 1150°F in the process.

The conceptual layout for the MSBR primary salt pump is shown in Fig. A-7.

The lower portion of the pump (pump tank, impeller, casing, etc.) is located in the reactor cell, and the drive motor is located on the crane bay floor, that is, above the concrete shielding.

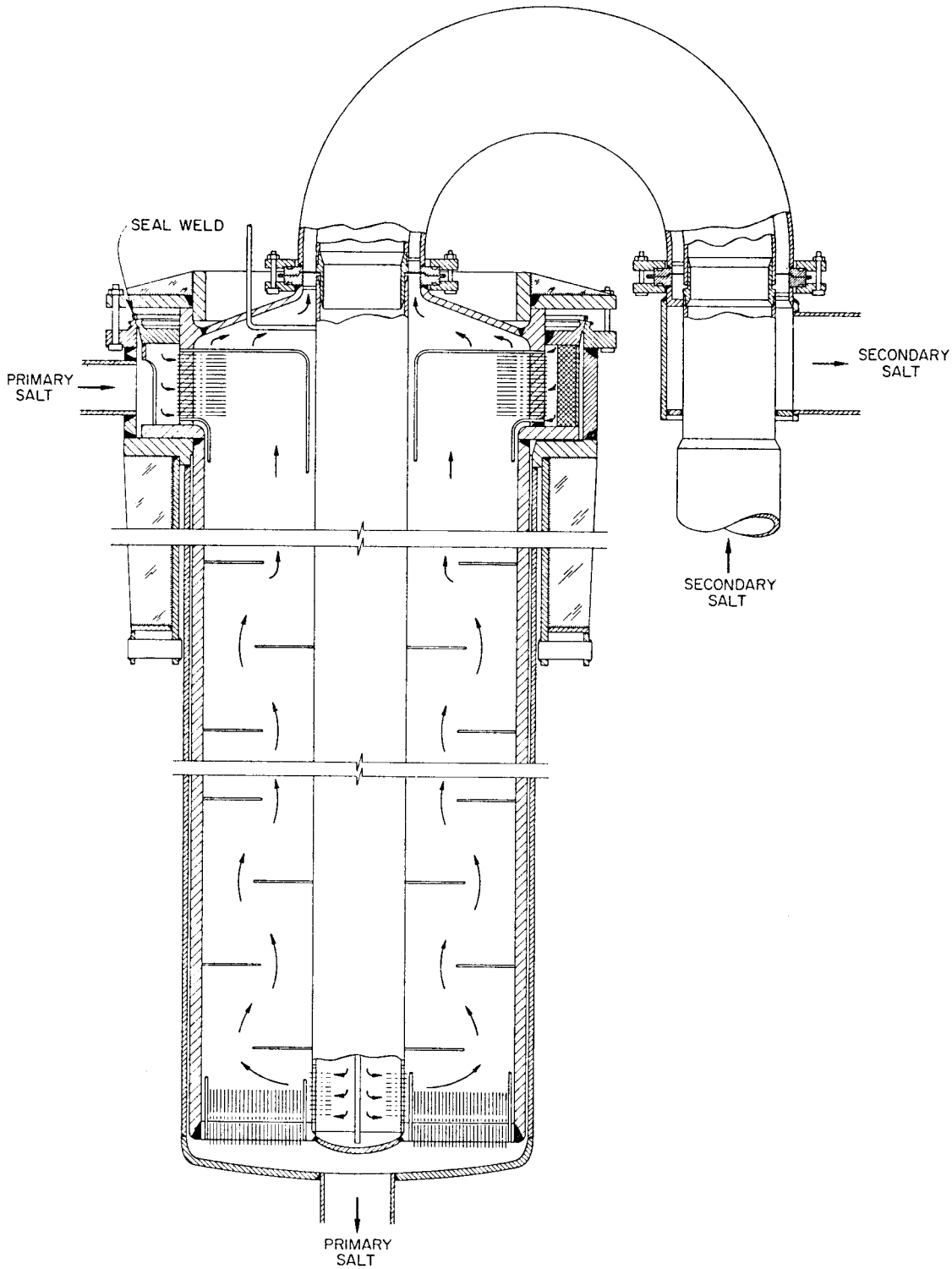


Fig. A-6 Sectional elevation of primary heat exchanger

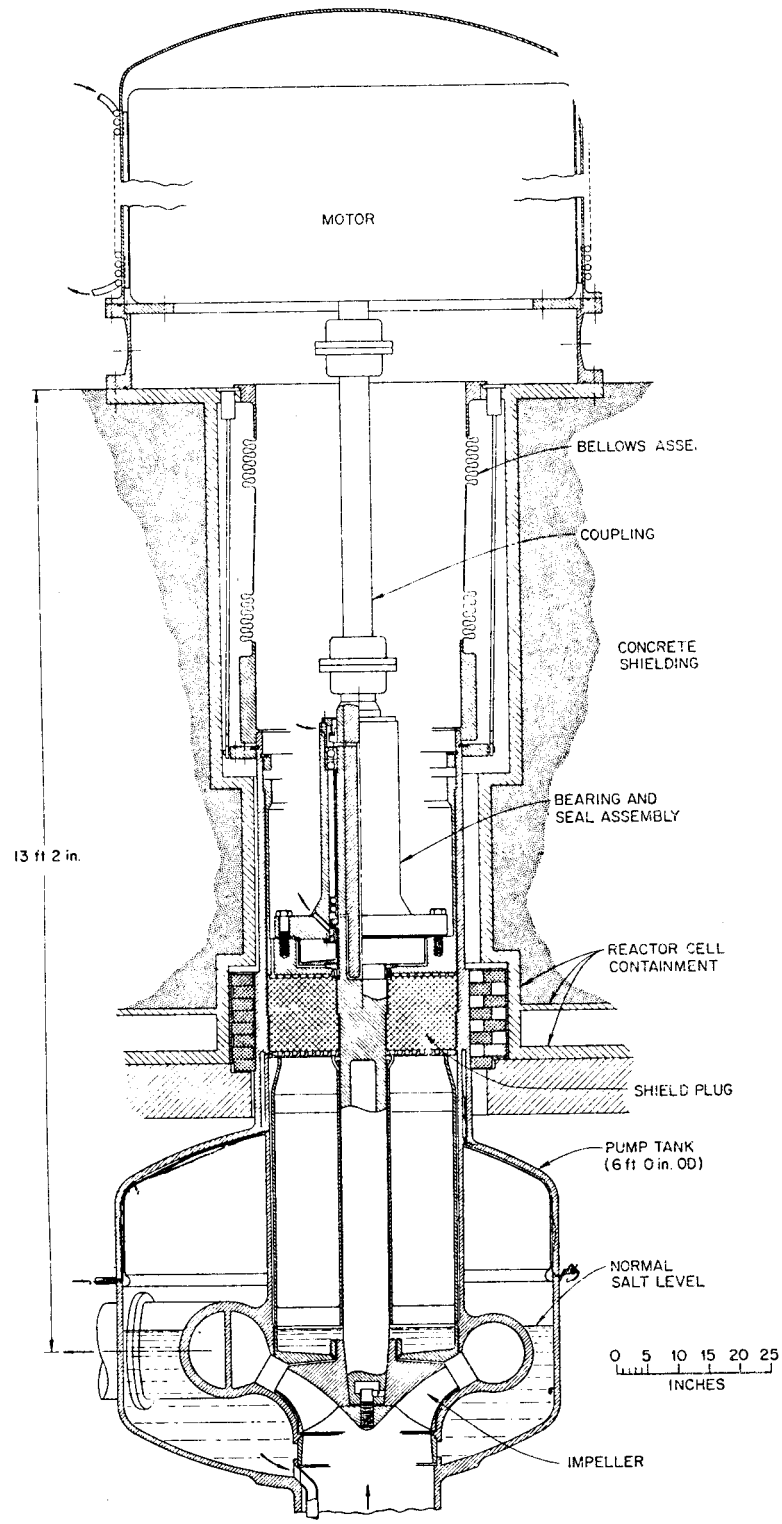


Fig. A-7 Primary salt circulation pump

The pump tank provides a volume to accommodate the anticipated thermal expansion of the fuel salt at off-design conditions.

The specification of the pump is listed in Table A-3.

A.7 Fuel-Salt Drain System

The principal function of the fuel-salt drain system is to provide a place where the salt can be safely contained and cooled under any of the accidental or intentional situations. The drain system must, therefore, have a highly reliable cooling system capable of removing the afterheat even with a sudden drain after long-term operation at full reactor power. Since a storage tank with a convective cooling system was used with good results in the MSRE, it was decided that the above objectives would be best met by storage of the salt in a tank having a coolant circulated by natural convection to a water-cooled heat exchanger.

The drain tank also serves usefully as a surge volume to which salt can be continuously overflowed from the primary pump bowl. The supply and return connections to the chemical processing facility will be made at the drain tank.

Although draining the fuel salt from the reactor is a positive shutdown mechanism, it is not necessary to rely on this as an emergency procedure, and rapid drainage is

Table A-3 Salt pump for the 1000-MW(e) MSBR

	Primary
Number required	4
Design temperature, °F	1300
Capacity, gpm, nominal	16,000
Head, ft	150
Speed, rpm	890
NPSH required,[a] ft	16
Brake horsepower, each	∿2350
Impeller diameter, in.	34
Pump tank diameter, in.	72
Suction diameter, in.	21
Discharge diameter, in.	16

a NPSH: net positive suction head.

not a primary design criterion. The drain tank is connected to the bottom of the reactor vessel by a 6-in. drain line equipped with a freeze-plug type of "valve" which can be thawed to allow gravity drainage of the entire primary circulating system in about 7 min.

The heat removal system based on natural circulation provides a reliable heat sink. And it is not dependent upon a power source.

```
      DIMENSION FL(21), BUD(21)
      DIMENSION  FLUX(1440),  OPTI(5),  CG(20),  CGN(20)
      DIMENSION DG(20), DR(20), RN(20)
    5 READ(5,10) VC, VS, QSP, HM, XEQ, ANN
      READ(5,10) YI, YX, DI, DX, SIGF, SIGA
      READ(5,10) H, R, T, HB, AB, FR
      READ(5,10) DGB,DGS, EPSB, EPSS, DRB, DRS
      READ(5,10) RI, RO, HEIGHT, GNUMB, FLX, DT
      READ(5,20) OPTI
      DG(1)=DGS/EPSS*DT
      DG(2)=DG(1)
      DG(4)=DGB/EPSB*DT
      DG(3)=(DG(1)*DRS+DG(4)*DRB)/(DRS+DRB)
      DG(17)=DG(3)
      DG(18)=DG(1)
      DG(19)=DG(1)
      DO 1000 I=5,16
      DG(I)=DG(4)
 1000 CONTINUE
      RN( 1)=RI+DRS
      RN( 2)=RN(1)+DRS
      RN( 3)=RN(2)+DRS
      RN(19)=RO-DRS
      RN(18)=RN(19)-DRS
      RN(17)=RN(18)-DRS
      DO 1100 I=4,16
      AI=I
      RN(I)=RN(3)+(AI-3.)*DRB
 1100 CONTINUE
      DR( 1)=DRS
      DR( 2)=DRS
      DR( 3)=DRS
      DR(18)=DRS
      DR(19)=DRS
      DR(20)=DRS
      DO 1200 I=4,17
      DR(I)=DRB
 1200 CONTINUE
C  INITIALIZATION
      WRITE(6,60)
      CI=0.
      CS=0.
      CB=0.
      HOUR=0.
      DO 50 I=1,20
      CG(I)=0.
   50 CONTINUE
C  CALCULATION OF CONSTANTS
      PI=YI*SIGF*VC*FLX*DT
      PX=YX*SIGF*VC*FLX*DT
      AX=SIGA*FLX*VC*DT/VS
      VOL=2.*3.1416*GNUMB*HEIGHT
      BM1=HB*AB*DT/VS
      BM2=HB*AB*H*R*T*DT/VS/FR
      GM1=HM*DT/VS
      GM2=HM*H*R*T*DT/EPSS
      BSP=QSP/VS*DT
      DISI=DI*DT
```

```
      DISX=DX*DT
      ABS=SIGA*FLX*DT
      GBC1=(RI+DRS)/DRS*DGS/EPSS
      GBC4=(RO-DRS)/DRS*DGS/EPSS
      GBC2=HM/VS
      GBC3=HM*H*R*T/EPSS
      WRITE(6,65) PI, PX, AX, BM1, BM2
      WRITE(6,65) GM1, GM2, BSP, DISI, DISX
      WRITE(6,65) ABS, GBC1, GBC2, GBC3, GBC4
   65 FORMAT(1H0,6E18.6)
C  CALCULATION OF NEW CONDITION
      DO 600 I=1,5
      OPT=OPTI(I)
      IF(OPT.EQ.0)  GO TO 2400
      IF(OPT.LE.1.) GO TO 100
      IF(OPT.EQ.2.) GO TO 200
      IF(OPT.EQ.3.) GO TO 300
  100 DO 150 II=1,1440
      FLUX(II)=OPT
  150 CONTINUE
      GO TO 500
  200 DO 250 II=1,1440
      AI=II
      IF(II.LE.180) FLUX(II)=(1.-AI/360.)
      IF(II.GT.180.AND.II.LE.540) FLUX(II)=0.5
      IF(II.GT.540.AND.II.LE.720) FLUX(II)=(0.5+(AI-540)/360.)
      IF(II.GT.720)               FLUX(II)=1.
  250 CONTINUE
      GO TO 500
  300 DO 350 II=1,1440
      IF(II.LE.360) FLUX(II)=0.5
      IF(II.GT.360) FLUX(II)=1.
  350 CONTINUE
  500 CONTINUE
      DO 700 K=1,1440
      ALFA=DISX+ABS*FLUX(K)
      CIN=(1.-DISI)*CI+PI*FLUX(K)
      CSN=(1.-DISX-AX*FLUX(K)-BM1-GM1*VOL*(RI+RO))*CS
     1     +BM2*CB+GM2*VOL*(RI*CG(1)+RO*CG(20))+PX*FLUX(K)+DISI*CI
      CBN=BM1*CS+(1.-BM2-DISX-AX*FLUX(K)-BSP)*CB
      CGN(1)=(GBC1*CG(2)+GBC2*CS*RI)/(GBC1+RI*(GBC3+ALFA*DRS/DT))
      CGN(20)=(GBC4*CG(19)+GBC2*CS*RO)/(GBC4+RO*(GBC3+ALFA*DRS/DT))
      NN=ANN
      DO 620 LL=1,NN
      CGN(2)=(RN(1)*4.*(CG(1)-CG(2))*DG(1)/(DR(1)+DR(2))
     1       -RN(2)*4.*(CG(2)-CG(3))*DG(2)/(DR(2)+DR(3)))/ANN/
     2        (RN(2)**2-RN(1)**2)+(1.-ALFA/ANN)*CG(2)
      CGN(3)=(RN(2)*4.*(CG(2)-CG(3))*DG(2)/(DR(2)+DR(3))
     1       -RN(3)*4.*(CG(3)-CG(4))*DG(3)/(DR(3)+DR(4)))/ANN/
     2        (RN(3)**2-RN(2)**2)+(1.-ALFA/ANN)*CG(3)
      CGN(18)=(RN(17)*4.*(CG(17)-CG(18))*DG(17)/(DR(17)+DR(18))
     1       -RN(18)*4.*(CG(18)-CG(19))*DG(18)/(DR(18)+DR(19)))/ANN/
     2        (RN(18)**2-RN(17)**2)+(1.-ALFA/ANN)*CG(18)
      CGN(19)=(RN(18)*4.*(CG(18)-CG(19))*DG(18)/(DR(18)+DR(19))
     1       -RN(19)*4.*(CG(19)-CG(20))*DG(19)/(DR(19)+DR(20)))/ANN/
     2      (RN(19)**2-RN(18)**2)+(1.-ALFA/ANN)*CG(19)
      CG(2)=CGN(2)
      CG(3)=CGN(3)
```

```
      CG(18)=CGN(18)
      CG(19)=CGN(19)
  620  CONTINUE
      DO 650 L=4,17
      CGN(L)=(RN(L-1)*4.*(CG(L-1)-CG(L))*DG(L-1)/(DR(L-1)+DR(L))
     1       -RN(L)*4.*(CG(L)-CG(L+1))*DG(L)/(DR(L)+DR(L+1))
     2      )/(RN(L)**2-RN(L-1)**2)+(1.-ALFA)*CG(L)
  650 CONTINUE
      CI=CIN
      CS=CSN
      CB=CBN
      DO 660 N=1,20
      CG(N)=CGN(N)
  660 CONTINUE
      IF(MOD(K,60).NE.0) GO TO 700
C  XENON FLUX
      XGF=HM*(CS/VS-H*R*T/EPSS*CG(1))*VOL *RI
     1   +HM*(CS/VS-H*R*T/EPSS*CG(20))*VOL*RO
      XBF=AB*HB*(CS/VS-H*R*T*CB/VS/FR)
      XGF=XGF*3600.
      XBF=XBF*3600.
C  XENON CONCENTRATION IN CORE
      TOTX=(CS+CB)*VC/VS+DRS*((RI+DRS/2.)*CG(1)+(RO-DRS/2.)*CG(20))
      DO 800 M=2,19
      TOTX=TOTX+VOL*DR(M)*(RN(M-1)+DR(M)/2.)*CG(M)
  800 CONTINUE
      HOUR=HOUR+1.
      RTOTX=TOTX/XEQ
      WRITE(6,80) HOUR, XGF,XBF, CS, CB, TOTX, RTOTX
   90 FORMAT(1H0,10E12.5)
  700 CONTINUE
  600 CONTINUE
   10 FORMAT(6E12.6)
   20 FORMAT(5F8.4)
   60 FORMAT(1H1,20X,'XENON CALCULATION')
   80 FORMAT(5X,F5.1,6E20.6)
 2000 FL(1)=HM*(CS/VS-H*R*T/EPSS*CG(1))*RI
      FL(2)=RN(1)*(CG(1)-CG(2))*DGS/EPSS/DRS
      FL(3)=RN(2)*(CG(2)-CG(3))*DGS/EPSS/DRS
      FL(4)=RN(3)*(CG(3)-CG(4))/(DRS+DRB)*2.*DG(3)/DT
      DO 2100 L=5,17
      FL(L)=RN(L-1)*(CG(L-1)-CG(L))/DRB*DGB/EPSB
 2100 CONTINUE
      FL(18)=RN(17)*(CG(17)-CG(18))/(DRS+DRB)*2.*DG(3)/DT
      FL(19)=RN(18)*(CG(18)-CG(19))/DRS*DGS/EPSS
      FL(20)=RN(19)*(CG(19)-CG(20))/DRS*DGS/EPSS
      FL(21)=HM*(H*R*T/EPSS*CG(20)-CS/VS)*RO
      BUD(1)=DRS*(RI+DRS/2.)*CG(1)*ALFA/DT
      BUD(20)=DRS*(RO-DRS/2.)*CG(20)*ALFA/DT
      DO 2200 L=2,19
      BUD(L)=DR(L)*(RN(L-1)+DR(L)/2.)*CG(L)*ALFA/DT
 2200 CONTINUE
      BUD(21)=0.
      DO 2300 L=1,20
      BUD(21)=BUD(21)+BUD(L)
 2300 CONTINUE
      WRITE(6,90) CG
      WRITE(6,90) FL
```

```
      WRITE(6,90) BUD
      GO TO  5
 2400 STOP
      END
```

Input for Transient Xenon Analysis

Cord No.	Ident	Interpretation	Value
1	VC	Fuel volume in core	9.452×10^{6} cm^{3}
	VS	Fuel volume in loop	4.01×10^{7} cm^{3}
	QSP	Fuel flow rate to gas sep.	3.639×10^{5} cm^{3}/sec
	HM	Mass-transfer coef.	6.75×10^{-3} cm/sec
	XEQ	Eq. ex. Conc.	0.113532×10^{22} m/cm^{3}
	ANN	Iteration number	30
2	YI	Iodine yield	0.061
	YX	Xenon yield	0.003
	DI	Iodine decay const.	2.88×10^{-5} sec^{-1}
	DX	Xenon decay const.	2.11×10^{-5} sec^{-1}
	SIGF	Macro fission C.S.	0.01845 cm^{-1}
	SIGA	Micro abs. C.S. of xenon	1.05×10^{-18} cm^{-2}
3	H	Henrry's law const.	2.75×10^{-9} mole/atom·cm^{3}
	R	Gas const.	82.5 cm^{3}·atom/°k mole
	T	Temp. (°K)	920 °K
	HB	Mass-transfer coef.	0.01693 cm/sec
	AB	Bubble surface	8.76×10^{6} cm^{2}
	FR	Void fraction	0.002

-con't-

Cord No.	Ident	Interpretation	Value
4	DGB	Difussion coef.bulk G	$0.258 \times 10^{-6} cm^2/sec$
	DGS	Diffusion coef. surf. G	$0.258 \times 10^{-8} cm^2/sec$
	EPSB	Void bulk G.	0.1
	EPSS	Void surf. G	0.0032
	DRB	Space mesh bulk	0.306 cm
	DRS	Space mesh surface	0.007 cm
5	RI	Inner radious	1.028 cm
	RO	Outer radious	5.354 cm
	HEIGHT	Height	442 cm
	GNUMB	Graphite number	0336
	FLX	Neutron flux	$4. \times 10^{14} m/cm^2 \cdot sec$
	DT	Time mesh	60 sec
6		Load Pattern	
7		Load Pattern	

Reactor Transient Analysis

```
C     DIGITAL SIMULATION OF REACTIVITY ACCIDENT
      REAL LAMD1, LAMD2, MR1, MR2, MR3, MG1, MG2, KG1, KG2, KR1, KR2
      DIMENSION  CTL1(12500), CTL2(12500)
    5 READ(5,10,END=99) CPF, CPG, HFG, AC1, AC2
      READ(5,10) MR1, MR2, MR3, MG1, MG2
      READ(5,10) KG1, KG2, KR1, KR2
      READ(5,10) BETA1, BETA2, LAMD1, LAMD2
      READ(5,10) FL1, FL2, GT,TC,TL
      READ(5,10) ALFP, ALFG, RHOD, RHOP, RHOFB
      READ(5,10) QSINK, TMAX, REACR, RMAX, SEC, DT
C     INITIAL CONDITION
      READ(5,10) PR, C1, C2, TG1, TG2, TG3
      READ(5,10) TP1, TP2, TP3, TP4, TP5, TP6
      READ(5,10) TI
   10 FORMAT(6E12.6)
C     CALCULATION OF CONSTANTS
      A1=HFG*AC1/MG1/CPG*DT
      A2=HFG*AC2/MG2/CPG*DT
      B1=KG1*DT/MG1/CPG
      B2=KG2*DT/MG2/CPG
      D1=FL1/MR1*DT
      D2=FL2/MR2*DT
      E1=HFG*AC1/CPF/MR1*DT
      E2=HFG*AC2/CPF/MR2*DT
      F1=KR1*DT/MR1/CPF
      F2=KR2*DT/MR2/CPF
      G=(FL1+FL2)/MR3*DT
      H=QSINK/MR3/CPF*DT
C     PRINT THE TITLE AND HEADING
      WRITE(6,20)
   20 FORMAT(1H1,20X,'REACTIVITY ACCIDENT ANALYSIS IN A MSBR'//
     1'TIME    RHO       RHOP       RHOFB       PR       TI    TRO     C1
     2 C2',10X,'SALT TEMP. IN CORE',10X,'GRAPHITE TEMP.')
      WRITE(6,40) A1, A2, B1, B2, D1, D2
      WRITE(6,40) E1, E2, F1, F2, G, H
   40 FORMAT(1H0,6F20.8)
C     INITIAL CONDITION
      DG1=TG1
      DG2=TG2
      DG3=TG3
      DP1=TP1
      DP2=TP2
      DP3=TP3
      DP4=TP4
      DP5=TP5
      DP6=TP6
      T=0.
      N=0
      L=TL/DT
      BETA=BETA1+BETA2
      DECAY1=(LAMD1+1./TC)*DT
      DECAY2=(LAMD2+1./TC)*DT
      EXP1=EXP(LAMD1*TL*(-1.))*DT/TC
      EXP2=EXP(LAMD2*TL*(-1.))*DT/TC
```

```
C       CONSIDERATION OF DELAYED NEUTRON LAG TIME
        DO 150 I=1,L
        CTL1(I)=C1
        CTL2(I)=C2
  150 CONTINUE
C       SET THE PERTURBATION
   50 RHOP=RHOP+REACR*DT
        N=N+1
        IF(RHOP.GE.RMAX) RHOP=RMAX
        RHO=RHOO+RHOP+RHOFB
C       CALCULATION OF NEW POWER LEVEL
        PRN=PR+(RHO-BETA)*PR/GT*DT+LAMD1*C1*DT+LAMD2*C2*DT
        C1N=C1+BETA1*PR/GT*DT-DECAY1*C1+EXP1*CTL1(1)
        C2N=C2+BETA2*PR/GT*DT-DECAY2*C2+EXP2*CTL2(1)
C       CALCULATION OF NEW TEMPERATURE
        TG1N=TG1+A1*(TP1-TG1)+B1*PR
        TG2N=TG2+A1*(TP3-TG2)+B1*PR
        TG3N=TG3+A2*(TP5-TG3)+B2*PR
        TP1N=TP1+D1*(TI-TP1)+E1*(TG1-TP1)+F1*PR
        TP2N=TP2+D1*(TP1-TP2)+F1*PR
        TP3N=TP3+D1*(TP2-TP3)+E1*(TG2-TP3)+F1*PR
        TP4N=TP4+D1*(TP3-TP4)+F1*PR
        TP5N=TP5+D2*(TI-TP5)+E2*(TG3-TP5)+F2*PR
        TP6N=TP6+D2*(TP5-TP6)+F2*PR
        TRO=0.814*TP4+0.186*TP6
        TIN=TI+G*(TRO-TI)-H
C       NEW RHOO
        DTG=((TG1N+TG2N-DG1-DG2)*MG1+(TG3N-DG3)*MG2)/(MG1*2.+MG2)
        DTP=((TP1N+TP2N+TP3N+TP4N-DP1-DP2-DP3-DP4)*MR1+(TP5N+TP6N-DP5-DP6)
     1     *MR2)/(MR1*4.+MR2*2.)
        RHOFB=DTG*ALFG+DTP*ALFP
C STORE THE HISTORY OF CI
        DO 250 I=2,L
        CTL1(I-1)=CTL1(I)
        CTL2(I-1)=CTL2(I)
  250 CONTINUE
C       REPLACE OLD VALUES BY NEW ONES
        CTL1(L)=C1N
        CTL2(L)=C2N
        PR=PRN
        C1=C1N
        C2=C2N
        TG1=TG1N
        TG2=TG2N
        TG3=TG3N
        TP1=TP1N
        TP2=TP2N
        TP3=TP3N
        TP4=TP4N
        TP5=TP5N
        TP6=TP6N
        TI=TIN
        TPC1=(TP1+TP2)/2.
        TPC2=(TP3+TP4)/2.
```

```
      TPO=(TP5+TP6)/2.
      TP1=TPC1
      TP2=TPC1
      TP3=TPC2
      TP4=TPC2
      TP5=TPO
      TP6=TPO
C     PRINTOUT IN REQUIRED PERIOD
      M=SEC/DT
      IF(MOD(N,M).NE.0) GO TO 50
      T=T+SEC
      WRITE(6,30) T, RHO, RHOP, RHOFB, PR, TI, TRO, C1, C2, TP1, TP2,
     1    TP3, TP4, TP5, TP6, TG1, TG2, TG3
   30 FORMAT(1H0,F4.0,3F10.6,F12.6, 2F5.0,2E15.6,9F5.0)                NU010200
      IF(T.LT.TMAX) GO TO 50
      GO TO 5
   99 STOP
      END
```

Only for four pumps failure

Input for Reactor Transient Analysis

Cord No.	Ident	Interpretation	Value
1	CPF	Specific heat of primary salt	1357 J kg^{-1} °K^{-1}
	CPG	Specific heat of graphite	1760 J kg^{-1} °K^{-1}
	HFG	Graphite-to primary-salt heat tra.coef.	6045.7 J/m^2sec·C
	AC1	Heat transfer area in zone I	1397.1 m^2
	AC2	Heat transfer area in Zone II	131.98 m^2
2	MR1	Mass of primary salt lump in Zone I	6585.4 kg
	MR2	Mass of primary salt lump in Zone II	13931.6 kg
	MR3	Mass of primary salt lump in ext.	5384.1 kg
	MG1	Mass of graphite lump in Zone I	48128.8 kg
	HG2	Mass of graphite lump in Zone II	26364.4 kg
3	KG1	Fraction of fission heat generated in GI	27.45x10^6W
	KG2	Fraction of fission heat generated in G in II	12.6x10^6W
	KR1	Fraction of fission heat generated in salt in I	443.78x10^6W
	KR2	Fraction of fission heat generated in salt in II	203.7x10^6W

-con't-

Cord No.	Ident	Interpretation	Value
4	BETA1	Delayed neutron fraction group 1	0.00102
	BETA2	Delayed neutron fraction group 2	0.00162
	LAMD1	Delayed neutron decay const. 1	0.02446 sec^{-1}
	LAMD2	Delayed neutron decay const. 2	0.2245 sec^{-1}
5	FL1	Mass flow rate in zone I	9720 kg/sec
	FL2	Mass flow rate in zone II	2229 kg/sec
	GT	Thermal neutron generation time	3.6×10^{-4} sec
	TC	Transit time of primary salt through core	3.58 sec
	TL	Transit time of primary salt through ext. Lp	6.048 sec
6	ALFP	Tempe coef. of primary salt	-3.20×10^{-5} °C^{-1}
	ALFG	Tempe coef. of graphite	2.35×10^{-5} °C^{-1}
	RHOD	Steady-state design point Reactivity	0.00140
	RHOP	Perturbation Reactivity	0.
	RHOFB	Feedback Reactivity	0.

-con't-

Cord No.	Ident	Interpretation	Value
7	USINK	Heat Sink	2050×10^6 Watt
	TMAX	Maximum time	60
	REACR	Reactivity addition rate	
	RMAX	Max added reactivity	
	SEC	Print frequency	5
	DT	Time increment	0.01
8	PR	Initial power	1.0
	C1	Initial Concentration	1.74928×10^{-1}
	C2	Initial comcentration	4.65228×10^{-1}
	TG1	Design temperature of T_{G1}	604.54
	TG2	Design temperature of T_{G2}	673.91
	TG3	Design temperature of T_{G3}	638.65
9	TP1	Design temperature of T_{P1}	601.29
	TP2	Design temperature of T_{P2}	634.93
	TP3	Design temperature of T_{P3}	670.66
	TP4	Design temperature of T_{P4}	704.30
	TP5	Design temperature of T_{P5}	637.07
	TP6	Design temperature of T_{p6}	704.41
10	TI	Inlet temperature	566

Program for WANG

LBI: ^{235}U startup with integrated fuel processing to approach the equilibrium.

LBII: ^{235}U startup with ^{235}U addition, no integrated fuel processing.

LBIII: ^{235}U startup, ^{235}U addition, removal of salt.

The codes LBI, LBII, and LBIII, can be used not only for the fuel cycles described earlier, but also for the other burnup calculations. In the latter case, we must prepare a consistent set of data for $\sigma\phi$'s, σN^*'s, M^*'s, Bu rate and other parameters.

Results of each step can be printed out at any interval choosing the appropriate number B.

The procedures to use these codes are described below, followed by the examples of input data and output[a], together with programs for LBI, LBII, and LBIII, respectively.

Procedures to start calculation:

1. Load the program.
2. Key VERIFY PROGRAM to check the verification number.
3. Store the constants as listed on Table B-1.
4. Adjust the line printer so that the output can be printed properly.
5. Turn on the line printer. - Set to Lower Case.
6. Key 00

[a] See Table -4 - Table 5-6

To Stop Calculation:

1. Key PRIME.

To Continue the Calculation:

Same as to start calculation but the initial inventories which are the last values of the previous result.

TABLE B-1

INPUT DATA FOR LBI

Address	Contents	Value	Comment
00	M_{23}	0	Initial Value
1	M_{24}	0	" "
2	M_{25}	1650	" "
3	M_{26}	0	" "
4	M_{37}	0	" "
5	M^*_{23}	1223	
6	M^*_{24}	427	
7	M^*_{25}	112	
8	M^*_{26}	116	
9	M^*_{37}	16.1	
10	ϕ/ϕ^*		
11	$\sigma_{23}\phi^*$	0.002005	
12	$\sigma_{24}\phi^*$	0.000510	
13	$\sigma_{25}\phi^*$	0.001819	
14	$\sigma_{26}\phi^*$	0.000204	
15	$\sigma_{37}\phi^*$	0.001025	

INPUT DATA FOR LBI (continued)

Address	Contents	Value	Comment
16	$\sigma_{25}f\ N^*_{25}f$	0.001479	
17	$\sigma_{23}\ N^*_{23}$	0.9239	
18	$\sigma_{24}\ N^*_{24}$	0.0817	
19	$\sigma_{25}\ N^*_{25}$	0.0761	
20	$\sigma_{26}\ N^*_{26}$	0.0088	
21	$\sigma_{37}\ N^*_{37}$	0.0061	
22	$\sigma_{02}\ M^*_{02}\phi^*$	2.6039	
23	$\lambda_{13}\ M^*_{13}$	0.1809	
24	$\sigma_{13}\ M_{13}\phi$	0.0045	
25	$\alpha_{23}/1+\alpha_{23}$	0.1087	
26	$\alpha_{25}/1+\alpha_{25}$	0.1874	
27	K	1.1345	
28	Bu Rate	2.371	
29	b/λ_{13}	13.4	
30	d	0.000126	
31	$\eta_{23}-1$	1.2489	
32	$\eta_{25}-1$	1.010	
33	M_{23}add	0	
34	M_{23}Prod.	0	
35	M_{25}Prod.	0	
36	A	0	Increase stepwise
37	B	292	Printout IF A=B
38	N	0	
39	C	1.229	

INPUT DATA FOR LBI (continued)

Address	Contents	Value	Comment
40	M_{23}		
41	M_{24}		
42	M_{25}		
43	M_{26}		
44	Temp. memory 1		
45	Temp. memory 2		
46	Temp. memory 3		
47	Temp. memory 4		
48	Temp. memory 5		
49	Temp. memory 6		

700 PROGRAM TITLE: LBI

NO.

Step	Code	Key	Comment
000	04 08	MARK	
1	00 00	00	
2	04 05	RECALL D	
3	03 08	REG 38	
4	04 11	WRITE	
5	02 01	0201	
6	04 05	RECALL D	
7	00 00	REG 00	
8	04 11	WRITE	
9	04 03	0403	
010	04 05	RECALL D	
1	00 01	REG 01	
2	04 11	WRITE	
3	04 03	0403	
4	04 05	RECALL D	
5	00 02	REG 02	
6	04 11	WRITE	
7	04 03	0403	
8	04 05	RECALL D	
9	00 03	REG 03	
020	04 11	WRITE	
1	04 03	0403	
2	04 05	RECALL D	
3	03 03	REG 33	
4	04 11	WRITE	
5	04 03	0403	
6	04 05	RECALL D	
7	03 04	REG 34	
8	04 11	WRITE	
9	04 03	0403	
030	04 05	RECALL D	
1	03 05	REG 35	
2	04 11	WRITE	
3	04 03	0403	
4	07 00	0	
5	04 04	STORE D	
6	03 03	REG 33	
7	04 04	STORE D	
8	03 06	REG 36	
9	04 08	MARK	
040	00 01	01	
1	04 15	RECALL Y	
2	03 09	REG 39	
3	04 05	RECALL D	
4	00 00	REG 00	
5	06 02	X	
6	04 05	RECALL D	
7	00 02	REG 02	
8	06 00	+	
9	04 05	RECALL D	

Step	Code	Key	Comment
050	02 08	REG 28	
1	06 06	↑↓	
2	06 03	÷	
3	04 05	RECALL D	
4	01 06	REG 16	
5	06 03	÷	
6	04 14	STORE Y	
7	00 10	REG 10	
8	04 05	RECALL D	
9	03 06	REG 36	
060	04 12	WRITE a	
1	06 11	LOGeX	
2	04 07	SEARCH	
3	00 02	02	
4	04 15	RECALL Y	
5	02 02	REG 22	
6	04 05	RECALL D	
7	02 04	REG 24	
8	06 01	-	
9	04 14	STORE Y	
070	04 04	REG 44	
1	04 15	RECALL Y	
2	00 12	REG 12	
3	04 05	RECALL D	
4	00 01	REG 01	
5	06 02	X	
6	06 05	↓	
7	04 00	+ DIRECT	
8	04 04	REG 44	
9	04 15	RECALL Y	
080	00 11	REG 11	
1	04 05	RECALL D	
2	00 00	REG 00	
3	06 02	X	
4	04 14	STORE Y	
5	04 05	REG 45	
6	04 15	RECALL Y	
7	00 13	REG 13	
8	04 05	RECALL D	
9	00 02	REG 02	
090	06 02	X	
1	04 05	RECALL D	
2	04 05	REG 45	
3	06 00	+	
4	04 05	RECALL D	
5	04 04	REG 44	
6	06 06	↑↓	
7	06 03	÷	
8	06 05	↓	
9	04 11	WRITE	

Remarks: Verification Number; 3553

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBI

NO.

Step	Code	Key	Comment
100	01 03	0103	
1	04 05	RECALL D	
2	00 10	REG 10	
3	04 11	WRITE	
4	01 04	0104	
5	04 12	WRITE a	
6	01 08	0108	
7	04 13	END a	
8	04 08	MARK	
9	00 02	02	
110	04 15	RECALL Y	
1	00 11	REG 11	
2	04 05	RECALL D	
3	00 10	REG 10	
4	06 02	X	
5	04 05	RECALL D	
6	03 00	REG 30	
7	06 00	+	
8	07 01	1	
9	06 06	↑↓	
120	06 01	-	
1	04 05	RECALL D	
2	00 00	REG 00	
3	06 02	X	
4	04 14	STORE Y	
5	04 06	REG 46	
6	04 15	RECALL Y	
7	02 03	REG 23	
8	04 05	RECALL D	
9	00 10	REG 10	
130	06 02	X	
1	04 05	RECALL D	
2	04 06	REG 46	
3	06 00	+	
4	04 14	STORE Y	
5	04 00	REG 40	
6	04 15	RECALL Y	
7	00 12	REG 12	
8	04 05	RECALL D	
9	00 10	REG 10	
140	06 02	X	
1	04 05	RECALL D	
2	03 00	REG 30	
3	06 00	+	
4	07 01	1	
5	06 06	↑↓	
6	06 01	-	
7	04 05	RECALL D	
8	00 01	REG 01	
9	06 02	X	

Step	Code	Key	Comment
150	04 14	STORE Y	
1	04 07	REG 47	
2	04 15	RECALL Y	
3	02 04	REG 24	
4	04 05	RECALL D	
5	00 10	REG 10	
6	06 02	X	
7	06 05	↓	
8	04 00	+ DIRECT	
9	04 07	REG 47	
160	04 15	RECALL Y	
1	02 05	REG 25	
2	04 05	RECALL D	
3	00 00	REG 00	
4	06 02	X	
5	04 05	RECALL D	
6	00 11	REG 11	
7	06 02	X	
8	04 05	RECALL D	
9	00 10	REG 10	
170	06 02	X	
1	04 05	RECALL D	
2	04 07	REG 47	
3	06 00	+	
4	04 14	STORE Y	
5	04 01	REG 41	
6	04 15	RECALL Y	
7	00 13	REG 13	
8	04 05	RECALL D	
9	00 10	REG 10	
180	06 02	X	
1	04 05	RECALL D	
2	03 00	REG 30	
3	06 00	+	
4	07 01	1	
5	06 06	↑↓	
6	06 01	-	
7	04 05	RECALL D	
8	00 02	REG 02	
9	06 02	X	
190	04 14	STORE Y	
1	04 08	REG 48	
2	04 05	RECALL D	
3	00 10	REG 10	
4	04 15	RECALL Y	
5	00 12	REG 12	
6	06 02	X	
7	04 05	RECALL D	
8	00 01	REG 01	
9	06 02	X	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBI

NO.

Step	Code	Key		Comment
200	04 05	RECALL	D	
1	04 08	REG	48	
2	06 00	+		
3	04 14	STORE	Y	
4	04 02	REG	42	
5	04 15	RECALL	Y	
6	00 14	REG	14	
7	04 05	RECALL	D	
8	00 10	REG	10	
9	06 02	X		
210	04 05	RECALL	D	
1	03 00	REG	30	
2	06 00	+		
3	07 01	1		
4	06 06	↑↓		
5	06 01	-		
6	04 05	RECALL	D	
7	00 03	REG	03	
8	06 02	X		
9	04 14	STORE	Y	
220	04 09	REG	49	
1	04 15	RECALL	Y	
2	02 06	REG	26	
3	04 05	RECALL	D	
4	00 02	REG	02	
5	06 02	X		
6	04 05	RECALL	D	
7	00 13	REG	13	
8	06 02	X		
9	04 05	RECALL	D	
230	00 10	REG	10	
1	06 02	X		
2	04 05	RECALL	D	
3	04 09	REG	49	
4	06 00	+		
5	04 14	STORE	Y	
6	04 03	REG	43	
7	04 15	RECALL	Y	
8	00 15	REG	15	
9	04 05	RECALL	D	
240	00 10	REG	10	
1	06 02	X		
2	04 05	RECALL	D	
3	03 00	REG	30	
4	06 00	+		
5	07 01	1		
6	06 06	↑↓		
7	06 01	-		
8	04 05	RECALL	D	
9	00 04	REG	04	

Step	Code	Key		Comment
250	06 02	X		
1	04 14	STORE	Y	
2	00 04	REG	04	
3	04 05	RECALL	D	
4	00 14	REG	14	
5	04 15	RECALL	Y	
6	00 10	REG	10	
7	06 02	X		
8	04 05	RECALL	D	
9	00 03	REG	03	
260	06 02	X		
1	06 05	↓		
2	04 00	+ DIRECT		
3	00 04	REG	04	
4	04 15	RECALL	Y	
5	03 00	REG	30	
6	04 05	RECALL	D	
7	00 02	REG	02	
8	06 02	X		
9	06 05	↓		
270	04 00	+ DIRECT		
1	03 05	REG	35	
2	04 05	RECALL	D	
3	04 01	REG	41	
4	04 04	STORE	D	
5	00 01	REG	01	
6	04 05	RECALL	D	
7	04 02	REG	42	
8	04 04	STORE	D	
9	00 02	REG	02	
280	04 05	RECALL	D	
1	04 03	REG	43	
2	04 04	STORE	D	
3	00 03	REG	03	
4	04 05	RECALL	D	
5	02 07	REG	27	
6	04 04	STORE	D	
7	04 04	REG	44	
8	04 15	RECALL	Y	
9	01 08	REG	18	
290	04 05	RECALL	D	
1	00 01	REG	01	
2	06 02	X		
3	04 05	RECALL	D	
4	00 06	REG	06	
5	06 03	↑		
6	06 05	↓		
7	04 00	+ DIRECT		
8	04 04	REG	44	
9	04 15	RECALL	Y	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBI

NO.

Step	Code	Key	Comment
300	01 09	REG 19	
1	04 05	RECALL D	
2	00 02	REG 02	
3	06 02	X	
4	04 05	RECALL D	
5	00 07	REG 07	
6	06 03	↑	
7	04 05	RECALL D	
8	03 02	REG 32	
9	06 02	X	
310	06 05	↓	
1	04 01	- DIRECT	
2	04 04	REG 44	
3	04 15	RECALL Y	
4	02 00	REG 20	
5	04 05	RECALL D	
6	00 03	REG 03	
7	06 02	X	
8	04 05	RECALL D	
9	00 08	REG 08	
320	06 03	↑	
1	06 05	↓	
2	04 00	+ DIRECT	
3	04 04	REG 44	
4	04 15	RECALL Y	
5	02 01	REG 21	
6	04 05	RECALL D	
7	00 04	REG 04	
8	06 02	X	
9	04 05	RECALL D	
330	00 09	REG 09	
1	06 03	↑	
2	04 05	RECALL D	
3	04 04	REG 44	
4	06 00	+	
5	04 05	RECALL D	
6	01 07	REG 17	
7	06 03	↑	
8	04 05	RECALL D	
9	00 05	REG 05	
340	06 02	X	
1	04 05	RECALL D	
2	03 01	REG 31	
3	06 03	↑	
4	04 14	STORE Y	
5	04 05	REG 45	
6	04 05	RECALL D	
7	04 00	REG 40	
8	06 01	-	
9	06 05	↓	

Step	Code	Key	Comment
350	04 00	+ DIRECT	
1	03 03	REG 33	
2	04 01	- DIRECT	
3	03 04	REG 34	
4	04 15	RECALL Y	
5	02 09	REG 29	
6	04 05	RECALL D	
7	02 03	REG 23	
8	06 02	X	
9	04 05	RECALL D	
360	00 10	REG 10	
1	06 02	X	
2	06 05	↓	
3	04 00	+ DIRECT	
4	03 04	REG 34	
5	04 15	RECALL Y	
6	03 00	REG 30	
7	04 05	RECALL D	
8	00 00	REG 00	
9	06 02	X	
370	06 05	↓	
1	04 00	+ DIRECT	
2	03 04	REG 34	
3	04 05	RECALL D	
4	04 05	REG 45	
5	04 04	STORE D	
6	00 00	REG 00	
7	07 01	1	
8	04 00	+ DIRECT	
9	03 06	REG 36	
380	04 15	RECALL Y	
1	03 06	REG 36	
2	04 05	RECALL D	
3	03 07	REG 37	
4	06 01	-	
5	06 05	↓	
6	04 12	WRITE a	
7	06 11	LOGeX	
8	04 07	SEARCH	
9	00 01	01	
390	07 01	1	
1	04 00	+ DIRECT	
2	03 08	REG 38	
3	04 07	SEARCH	
4	00 00	00	
5	05 12	END PROGRAM	

Remarks:

© Wang Laboratories, Inc. 1970

TABLE B-2

INPUT DATA FOR LBII

Address	Contents	Value	Comments
0	M_{02}	70600	Initial Value
1	M_{13}	0	" "
2	M_{23}	0	" "
3	M_{24}	0	" "
4	M_{25}	1671	" "
5	M_{26}	0	" "
6	M_{37}	0	" "
7	$M_{F.P.23}$	0	" "
8	$M_{F.P.25}$	0	" "
9	M^*_{02}	68800	
10	M^*_{13}	7.15	
11	M^*_{23}	1223	
12	M^*_{24}	427	
13	M^*_{25}	112	
14	M^*_{26}	116	
15	M^*_{37}	16.1	
16	$\sigma_{02}\phi^*$	0.00003785	
17	$\sigma_{13}\phi^*$	0.000629	
18	$\sigma_{23}\phi^*$	0.002005	
19	$\sigma_{24}\phi^*$	0.000510	
20	$\sigma_{25}\phi^*$	0.001819	
21	$\sigma_{26}\phi^*$	0.000204	
22	$\sigma_{37}\phi^*$	0.001025	

INPUT DATA FOR LBII (Continued)

Address	Contents	Value	Comments
23	$\sigma_{f25}\phi^*$	0.001479	
24	$\sigma_{02}N^*_{C2}$	0.9853	
25	$\sigma_{13}N^*_{13}$	0.0017	
26	$\sigma_{23}N^*_{23}$	0.9239	
27	$\sigma_{24}N^*_{24}$	0.0817	
28	$\sigma_{25}N^*_{25}$	0.0761	
29	$\sigma_{26}N^*_{26}$	0.0088	
30	$\sigma_{37}N^*_{37}$	0.0061	
31	λ_{13}	0.0253	
32	$\alpha_{23}/1+\alpha_{23}$	0.1087	
33	$\alpha_{25}/1+\alpha_{25}$	0.1874	
34	K	0.1279	
35	Bu Rate	2.371	
36	C	1.229	
37	$\eta_{23}\varepsilon-1-(\gamma_p{}^{\Sigma}f/\Sigma_a)23$	1.2426	
38	$\eta_{25}\varepsilon-1-(\gamma_p{}^{\Sigma}f/\Sigma_a)25$	1.0028	
39	A	0	
40	B	292	
41	N	0	
42	M_{25}added	0	
43	ϕ/ϕ^*	0	
44	Temp. memory 1	0	
45	Temp. memory 2		
46	Temp. memory 3		
47	Temp. memory 4		
48	Temp. memory 5		
49	Temp. memory 6		

700 PROGRAM TITLE LBII

NO.

Step	Code	Key	Comment
000	04 08	MARK	
1	00 00	00	
2	04 05	RECALL D	
3	04 01	REG 41	
4	04 11	WRITE	
5	02 01	0201	
6	04 05	RECALL D	
7	00 00	REG 00	
8	04 11	WRITE	
9	05 03	0503	
010	04 05	RECALL D	
1	00 01	REG 01	
2	04 11	WRITE	
3	04 03	0403	
4	04 05	RECALL D	
5	00 02	REG 02	
6	04 11	WRITE	
7	04 03	0403	
8	04 05	RECALL D	
9	00 03	REG 03	
020	04 11	WRITE	
1	04 03	0403	
2	04 05	RECALL D	
3	00 04	REG 04	
4	04 11	WRITE	
5	04 03	0403	
6	04 05	RECALL D	
7	00 05	REG 05	
8	04 11	WRITE	
9	05 03	0503	
030	04 05	RECALL D	
1	00 07	REG 07	
2	04 11	WRITE	
3	05 03	0503	
4	04 05	RECALL D	
5	00 08	REG 08	
6	04 11	WRITE	
7	05 03	0503	
8	04 05	RECALL D	
9	04 02	REG 42	
040	04 11	WRITE	
1	04 03	0403	
2	07 00	0	
3	04 04	STORE D	
4	03 09	REG 39	
5	04 04	STORE D	
6	04 02	REG 42	
7	04 08	MARK	
8	00 01	01	
9	04 15	RECALL Y	

Step	Code	Key	Comment
050	03 06	REG 36	
1	04 05	RECALL D	
2	00 02	REG 02	
3	06 02	X	
4	04 05	RECALL D	
5	00 04	REG 04	
6	06 00	+	
7	04 05	RECALL D	
8	03 05	REG 35	
9	06 06	↑↓	
060	06 03	↑	
1	04 05	RECALL D	
2	02 03	REG 23	
3	06 03	↑	
4	04 14	STORE Y	
5	04 03	REG 43	
6	04 05	RECALL D	
7	03 09	REG 39	
8	04 12	WRITE a	
9	06 11	LOGeX	
070	04 07	SEARCH	
1	00 02	02	
2	04 15	RECALL Y	
3	03 01	REG 31	
4	04 05	RECALL D	
5	00 01	REG 01	
6	06 02	X	
7	04 14	STORE Y	
8	04 04	REG 44	
9	04 15	RECALL Y	
080	04 03	REG 43	
1	04 05	RECALL D	
2	01 09	REG 19	
3	06 02	X	
4	04 05	RECALL D	
5	00 03	REG 03	
6	06 02	X	
7	06 05	↓	
8	04 00	+ DIRECT	
9	04 04	REG 44	
090	04 15	RECALL Y	
1	01 08	REG 18	
2	04 05	RECALL D	
3	00 02	REG 02	
4	06 02	X	
5	04 14	STORE Y	
6	04 05	REG 45	
7	04 15	RECALL Y	
8	02 00	REG 20	
9	04 05	RECALL D	

Remarks: Verification Number; 4424

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBII

NO.

Step	Code	Key	Comment
100	00 04	REG 04	
1	06 02	X	
2	04 05	RECALL D	
3	04 05	REG 45	
4	06 00	+	
5	04 05	RECALL D	
6	04 03	REG 43	
7	06 02	X	
8	04 05	RECALL D	
9	04 04	REG 44	
110	06 06	↑↓	
1	06 03	÷	
2	06 05	↓	
3	04 11	WRITE	
4	01 03	0103	
5	04 05	RECALL D	
6	04 03	REG 43	
7	04 11	WRITE	
8	01 04	0104	
9	04 12	WRITE a	
120	01 08	0108	
1	04 13	END a	
2	04 08	MARK	
3	00 02	02	
4	04 15	RECALL Y	
5	04 03	REG 43	
6	04 05	RECALL D	
7	01 06	REG 16	
8	06 02	X	
9	04 05	RECALL D	
130	00 00	REG 00	
1	06 02	X	
2	04 14	STORE Y	
3	04 04	REG 44	
4	04 15	RECALL Y	
5	04 03	REG 43	
6	04 05	RECALL D	
7	01 07	REG 17	
8	06 02	X	
9	04 05	RECALL D	
140	03 01	REG 31	
1	06 00	+	
2	07 01	1	
3	06 06	↑↓	
4	06 01	-	
5	04 05	RECALL D	
6	00 01	REG 01	
7	06 02	X	
8	04 05	RECALL D	
9	04 04	REG 44	

Step	Code	Key	Comment
150	04 01	= DIRECT	
1	00 00	REG 00	
2	06 00	+	
3	04 14	STORE Y	
4	04 04	REG 44	
5	04 15	RECALL Y	
6	04 03	REG 43	
7	04 05	RECALL D	
8	01 08	REG 18	
9	06 02	X	
160	07 01	1	
1	06 06	↑↓	
2	06 01	-	
3	04 05	RECALL D	
4	00 02	REG 02	
5	06 02	X	
6	04 14	STORE Y	
7	04 05	REG 45	
8	04 15	RECALL Y	
9	03 01	REG 31	
170	04 05	RECALL D	
1	00 01	REG 01	
2	06 02	X	
3	04 05	RECALL D	
4	04 05	REG 45	
5	06 00	+	
6	04 14	STORE Y	
7	04 05	REG 45	
8	04 15	RECALL Y	
9	04 03	REG 43	
180	04 05	RECALL D	
1	01 09	REG 19	
2	06 02	X	
3	07 01	1	
4	06 06	↑↓	
5	06 01	-	
6	04 05	RECALL D	
7	00 03	REG 03	
8	06 02	X	
9	04 14	STORE Y	
190	04 06	REG 46	
1	04 15	RECALL Y	
2	04 03	REG 43	
3	04 05	RECALL D	
4	03 02	REG 32	
5	06 02	X	
6	04 05	RECALL D	
7	01 08	REG 18	
8	06 02	X	
9	04 05	RECALL D	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBII

NO.

Step	Code	Key	Comment
200	00 02	REG 02	
1	06 02	X	
2	06 05	↓	
3	04 00	+ DIRECT	
4	04 06	REG 46	
5	04 15	RECALL Y	
6	04 03	REG 43	
7	04 05	RECALL D	
8	01 07	REG 17	
9	06 02	X	
210	04 05	RECALL D	
1	00 01	REG 01	
2	06 02	X	
3	04 05	RECALL D	
4	04 06	REG 46	
5	06 00	+	
6	04 14	STORE Y	
7	04 06	REG 46	
8	04 15	RECALL Y	
9	04 03	REG 43	
220	04 05	RECALL D	
1	02 00	REG 20	
2	06 02	X	
3	07 01	1	
4	06 06	↑↓	
5	06 01	-	
6	04 05	RECALL D	
7	00 04	REG 04	
8	06 02	X	
9	04 14	STORE Y	
230	04 07	REG 47	
1	04 15	RECALL Y	
2	04 03	REG 43	
3	04 05	RECALL D	
4	01 09	REG 19	
5	06 02	X	
6	04 05	RECALL D	
7	00 03	REG 03	
8	06 02	X	
9	04 05	RECALL D	
240	04 07	REG 47	
1	06 00	+	
2	04 14	STORE Y	
3	04 07	REG 47	
4	04 15	RECALL Y	
5	04 03	REG 43	
6	04 05	RECALL D	
7	02 01	REG 21	
8	06 02	X	
9	07 01	1	

Step	Code	Key	Comment
250	06 06	↑↓	
1	06 01	-	
2	04 05	RECALL D	
3	00 05	REG 05	
4	06 02	X	
5	04 14	STORE Y	
6	04 08	REG 48	
7	04 15	RECALL Y	
8	04 03	REG 43	
9	04 05	RECALL D	
260	02 00	REG 20	
1	06 02	X	
2	04 05	RECALL D	
3	03 03	REG 33	
4	06 02	X	
5	04 05	RECALL D	
6	00 04	REG 04	
7	06 02	X	
8	04 05	RECALL D	
9	04 08	REG 48	
270	06 00	+	
1	04 14	STORE Y	
2	04 08	REG 48	
3	04 15	RECALL Y	
4	04 03	REG 43	
5	04 05	RECALL D	
6	02 02	REG 22	
7	06 02	X	
8	07 01	1	
9	06 06	↑↓	
280	06 01	-	
1	04 05	RECALL D	
2	00 06	REG 06	
3	06 02	X	
4	04 14	STORE Y	
5	04 09	REG 49	
6	04 15	RECALL Y	
7	04 03	REG 43	
8	04 05	RECALL D	
9	02 01	REG 21	
290	06 02	X	
1	04 05	RECALL D	
2	00 05	REG 05	
3	06 02	X	
4	04 05	RECALL D	
5	04 09	REG 49	
6	06 00	+	
7	04 14	STORE Y	
8	00 06	REG 06	
9	07 01	1	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBII

NO.

Step	Code	Key	Comment
300	06 04	↑	
1	04 05	RECALL D	
2	03 02	REG 32	
3	06 01	-	
4	04 05	RECALL D	
5	04 03	REG 43	
6	06 02	X	
7	04 05	RECALL D	
8	01 08	REG 18	
9	06 02	X	
310	04 05	RECALL D	
1	00 02	REG 02	
2	06 02	X	
3	06 05	↓	
4	04 00	+ DIRECT	
5	00 07	REG 07	
6	07 01	1	
7	06 04	↑	
8	04 05	RECALL D	
9	03 03	REG 33	
320	06 01	-	
1	04 05	RECALL D	
2	04 03	REG 43	
3	06 02	X	
4	04 05	RECALL D	
5	02 00	REG 20	
6	06 02	X	
7	04 05	RECALL D	
8	00 04	REG 04	
9	06 02	X	
330	06 05	↓	
1	04 00	+ DIRECT	
2	00 08	REG 08	
3	04 05	RECALL D	
4	04 04	REG 44	
5	04 04	STORE D	
6	00 01	REG 01	
7	04 05	RECALL D	
8	04 05	REG 45	
9	04 04	STORE D	
340	00 02	REG 02	
1	04 05	RECALL D	
2	04 06	REG 46	
3	04 04	STORE D	
4	00 03	REG 03	
5	04 05	RECALL D	
6	04 07	REG 47	
7	04 04	STORE D	
8	00 04	REG 04	
9	04 05	RECALL D	

Step	Code	Key	Comment
350	04 08	REG 48	
1	04 04	STORE D	
2	00 05	REG 05	
3	04 05	RECALL D	
4	03 04	REG 34	
5	04 04	STORE D	
6	04 09	REG 49	
7	04 15	RECALL Y	
8	02 04	REG 24	
9	04 05	RECALL D	
360	00 00	REG 00	
1	06 02	X	
2	04 05	RECALL D	
3	00 09	REG 09	
4	06 03	↑	
5	06 05	↓	
6	04 00	+ DIRECT	
7	04 09	REG 49	
8	04 15	RECALL Y	
9	02 05	REG 25	
370	04 05	RECALL D	
1	00 01	REG 01	
2	06 02	X	
3	04 05	RECALL D	
4	00 10	REG 10	
5	06 03	↑	
6	06 05	↓	
7	04 00	+ DIRECT	
8	04 09	REG 49	
9	04 15	RECALL Y	
380	02 06	REG 26	
1	04 05	RECALL D	
2	03 07	REG 37	
3	06 02	X	
4	04 05	RECALL D	
5	00 02	REG 02	
6	06 02	X	
7	04 05	RECALL D	
8	00 11	REG 11	
9	06 03	↑	
390	06 05	↓	
1	04 01	- DIRECT	
2	04 09	REG 49	
3	04 15	RECALL Y	
4	02 07	REG 27	
5	04 05	RECALL D	
6	00 03	REG 03	
7	06 02	X	
8	04 05	RECALL D	
9	00 12	REG 12	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM

TITLE: LBII

NO.

Step	Code	Key	Comment
400	06 03	↑	
1	06 05	↓	
2	04 00	+ DIRECT	
3	04 09	REG 49	
4	04 15	RECALL Y	
5	02 09	REG 29	
6	04 05	RECALL D	
7	00 05	REG 05	
8	06 02	X	
9	04 05	RECALL D	
410	00 14	REG 14	
1	06 03	↑	
2	06 05	↓	
3	04 00	+ DIRECT	
4	04 09	REG 49	
5	04 15	RECALL Y	
6	03 00	REG 30	
7	04 05	RECALL D	
8	00 06	REG 06	
9	06 02	X	
420	04 05	RECALL D	
1	00 15	REG 15	
2	06 03	↑	
3	06 05	↓	
4	04 00	+ DIRECT	
5	04 09	REG 49	
6	04 15	RECALL Y	
7	02 08	REG 28	
8	07 01	1	
9	07 05	5	
430	06 03	↑	
1	04 05	RECALL D	
2	00 07	REG 07	
3	06 02	X	
4	04 05	RECALL D	
5	00 13	REG 13	
6	06 03	↑	
7	06 05	↓	
8	04 00	+ DIRECT	
9	04 09	REG 49	
440	04 15	RECALL Y	
1	02 08	REG 28	
2	07 01	1	
3	07 02	2	
4	06 03	↑	
5	04 05	RECALL D	
6	00 08	REG 08	
7	06 02	X	
8	04 05	RECALL D	
9	00 13	REG 13	
450	06 03	↑	
1	04 05	RECALL D	
2	04 09	REG 49	
3	06 00	+	
4	04 05	RECALL D	
5	02 08	REG 28	
6	06 03	↑	
7	04 05	RECALL D	
8	03 08	REG 38	
9	06 03	↑	
460	04 05	RECALL D	
1	00 13	REG 13	
2	06 02	X	
3	04 14	STORE Y	
4	04 06	REG 46	
5	04 05	RECALL D	
6	00 04	REG 04	
7	06 01	-	
8	06 05	↓	
9	04 00	+ DIRECT	
470	04 02	REG 42	
1	04 05	RECALL D	
2	04 06	REG 46	
3	04 04	STORE D	
4	00 04	REG 04	
5	07 01	1	
6	04 00	+ DIRECT	
7	03 09	REG 39	
8	04 15	RECALL Y	
9	03 09	REG 39	
480	04 05	RECALL D	
1	04 00	REG 40	
2	05 09	IF X=Y	
3	04 07	SEARCH	
4	00 01	01	
5	07 01	1	
6	04 00	+ DIRECT	
7	04 01	REG 41	
8	04 07	SEARCH	
9	00 00	00	
490	05 12	END PROGRAM	

Remarks:

© Wang Laboratories, Inc. 1970

TABLE B-3

INPUT DATA FOR LBIII

Address	Contents	Value	Comment
00	M_{13}	0	Initial value
1	M_{23}	0	" "
2	M_{24}	0	" "
3	M_{25}	1634	" "
4	M_{26}	0	" "
5	M_{37}	0	" "
6	$M_{F.P.23}$	0	" "
7	$M_{F.P.25}$	0	" "
8	M^*_{13}	7.15	
9	M^*_{23}	1223	
10	M^*_{24}	427	
11	M^*_{25}	112	
12	M^*_{26}	116	
13	M^*_{37}	16.1	
14	$\sigma_{13}\phi^*$	0.000629	
15	$\sigma_{23}\phi^*$	0.002005	
16	$\sigma_{24}\phi^*$	0.000510	
17	$\sigma_{25}\phi^*$	0.001819	
18	$\sigma_{26}\phi^*$	0.000204	
19	$\sigma_{37}\phi^*$	0.001025	
20	$\sigma_{f25}\phi^*$	0.001479	
21	$\sigma_{13}N^*_{13}$	0.0017	
22	$\sigma_{23}N^*_{23}$	0.9239	
23	$\sigma_{24}N^*_{24}$	0.0817	
24	$\sigma_{25}N^*_{25}$	0.0761	
25	$\sigma_{26}N^*_{26}$	0.0088	

INPUT DATA FOR LBIII (Continued)

Address	Contents	Value	Comments
26	$\sigma_{37}N^*_{37}$	0.0061	
27	$\sigma_{02}M^*_{02}\phi^*$	2.6039	
28	λ_{13}	0.0253	
29	$\alpha_{23}/1+\alpha_{23}$	0.1087	
30	$\alpha_{25}/1+\alpha_{25}$	0.1874	
31	K	1.1132	
32	Bu Rate	2.371	
33	C	1.229	
34	$\eta_{23}\varepsilon-1(\gamma_p{}^{\Sigma}f/\Sigma_a)_{23}$	1.2426	
35	$\eta_{25}\varepsilon-1-(\gamma_p{}^{\Sigma}f/\Sigma_a)_{25}$	1.0028	
36	A	0	
37	B	183	
38	N	0	
39	M_{25} added	0	
40	f	0.00067	
41	ϕ/ϕ^*	0	
42	M_{13}	M_{13}	Temporary Storage
43	M_{23}	M_{23}	" "
44	M_{24}	M_{24}	" "
45	M_{25}	M_{25}	" "
46	M_{26}	M_{26}	" "
47			" "
48			" "
49	$\sum(M_{13}+M_{23})f$	0	

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
000	04 08	MARK	
1	00 00	00	
2	04 05	RECALL D	
3	03 08	REG 38	
4	04 11	WRITE	
5	02 01	0201	
6	04 05	RECALL D	
7	00 00	REG 00	
8	04 11	WRITE	
9	04 03	0403	
010	04 05	RECALL D	
1	00 01	REG 01	
2	04 11	WRITE	
3	04 03	0403	
4	04 05	RECALL D	
5	00 02	REG 02	
6	04 11	WRITE	
7	04 03	0403	
8	04 05	RECALL D	
9	00 03	REG 03	
020	04 11	WRITE	
1	04 03	0403	
2	04 05	RECALL D	
3	00 04	REG 04	
4	04 11	WRITE	
5	04 03	0403	
6	04 05	RECALL D	
7	00 06	REG 06	
8	04 11	WRITE	
9	05 03	0503	
030	04 05	RECALL D	
1	00 07	REG 07	
2	04 11	WRITE	
3	05 03	0503	
4	04 05	RECALL D	
5	03 09	REG 39	
6	04 11	WRITE	
7	04 03	0403	
8	04 05	RECALL D	
9	04 09	REG 49	
040	04 11	WRITE	
1	04 03	0403	
2	07 00	0	
3	04 04	STORE D	
4	03 06	REG 36	
5	04 04	STORE D	
6	03 09	REG 39	
7	04 04	STORE D	
8	04 09	REG 49	
9	04 08	MARK	

Step	Code	Key	Comment
050	00 01	01	
1	04 15	RECALL Y	
2	03 03	REG 33	
3	04 05	RECALL D	
4	00 01	REG 01	
5	06 02	X	
6	04 05	RECALL D	
7	00 03	REG 03	
8	06 00	+	
9	04 05	RECALL D	
060	03 02	REG 32	
1	06 06	↑↓	
2	06 03	↑	
3	04 05	RECALL D	
4	02 00	REG 20	
5	06 03	↑	
6	04 14	STORE Y	
7	04 01	REG 41	
8	04 05	RECALL D	
9	03 06	REG 36	
070	04 12	WRITE a	
1	06 11	LOGeX	
2	04 07	SEARCH	
3	00 02	02	
4	04 15	RECALL Y	
5	02 08	REG 28	
6	04 05	RECALL D	
7	00 00	REG 00	
8	06 02	X	
9	04 14	STORE Y	
080	04 02	REG 42	
1	04 15	RECALL Y	
2	04 01	REG 41	
3	04 05	RECALL D	
4	00 02	REG 02	
5	06 02	X	
6	04 05	RECALL D	
7	01 06	REG 16	
8	06 02	X	
9	06 05	↓	
090	04 00	+ DIRECT	
1	04 02	REG 42	
2	04 15	RECALL Y	
3	00 15	REG 15	
4	04 05	RECALL D	
5	00 01	REG 01	
6	06 02	X	
7	04 14	STORE Y	
8	04 03	REG 43	
9	04 15	RECALL Y	

Remarks: Verification Number; 4759

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
100	01 07	REG 17	
1	04 05	RECALL D	
2	00 03	REG 03	
3	06 02	X	
4	04 05	RECALL D	
5	04 03	REG 43	
6	06 00	+	
7	04 05	RECALL D	
8	04 01	REG 41	
9	06 02	X	
110	04 05	RECALL D	
1	04 02	REG 42	
2	06 06	↑↓	
3	06 03	+	
4	06 05	↓	
5	04 11	WRITE	
6	01 03	0103	
7	04 05	RECALL D	
8	04 01	REG 41	
9	04 11	WRITE	
120	01 04	0104	
1	04 12	WRITE a	
2	01 08	0108	
3	04 13	END a	
4	04 08	MARK	
5	00 02	02	
6	04 15	RECALL Y	
7	04 01	REG 41	
8	04 05	RECALL D	
9	00 14	REG 14	
130	06 02	X	
1	04 05	RECALL D	
2	02 08	REG 28	
3	06 00	+	
4	04 05	RECALL D	
5	04 00	REG 40	
6	06 00	+	
7	07 01	1	
8	06 06	↑↓	
9	06 01	−	
140	04 05	RECALL D	
1	00 00	REG 00	
2	06 02	X	
3	04 14	STORE Y	
4	04 02	REG 42	
5	04 15	RECALL Y	
6	04 01	REG 41	
7	04 05	RECALL D	
8	02 07	REG 27	
9	06 02	X	

Step	Code	Key	Comment
150	04 05	RECALL D	
1	04 02	REG 42	
2	06 00	+	
3	04 14	STORE Y	
4	04 02	REG 42	
5	04 15	RECALL Y	
6	04 01	REG 41	
7	04 05	RECALL D	
8	00 15	REG 15	
9	06 02	X	
160	04 05	RECALL D	
1	04 00	REG 40	
2	06 00	+	
3	07 01	1	
4	06 06	↑↓	
5	06 01	−	
6	04 05	RECALL D	
7	00 01	REG 01	
8	06 02	X	
9	04 14	STORE Y	
170	04 03	REG 43	
1	04 15	RECALL Y	
2	02 08	REG 28	
3	04 05	RECALL D	
4	00 00	REG 00	
5	06 02	X	
6	04 05	RECALL D	
7	04 03	REG 43	
8	06 00	+	
9	04 14	STORE Y	
180	04 03	REG 43	
1	04 15	RECALL Y	
2	04 01	REG 41	
3	04 05	RECALL D	
4	01 06	REG 16	
5	06 02	X	
6	04 05	RECALL D	
7	04 00	REG 40	
8	06 00	+	
9	07 01	1	
190	06 06	↑↓	
1	06 01	−	
2	04 05	RECALL D	
3	00 02	REG 02	
4	06 02	X	
5	04 14	STORE Y	
6	04 04	REG 44	
7	04 15	RECALL Y	
8	04 01	REG 41	
9	04 05	RECALL D	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
200	00 15	REG 15	
1	06 02	X	
2	04 05	RECALL D	
3	02 09	REG 29	
4	06 02	X	
5	04 05	RECALL D	
6	00 01	REG 01	
7	06 02	X	
8	06 05	↓	
9	04 00	+ DIRECT	
210	04 04	REG 44	
1	04 15	RECALL Y	
2	04 01	REG 41	
3	04 05	RECALL D	
4	00 14	REG 14	
5	06 02	X	
6	04 05	RECALL D	
7	00 00	REG 00	
8	06 02	X	
9	04 05	RECALL D	
220	04 04	REG 44	
1	06 00	+	
2	04 14	STORE Y	
3	04 04	REG 44	
4	04 15	RECALL Y	
5	04 01	REG 41	
6	04 05	RECALL D	
7	01 07	REG 17	
8	06 02	X	
9	04 05	RECALL D	
230	04 00	REG 40	
1	06 00	+	
2	07 01	1	
3	06 06	↑↓	
4	06 01	-	
5	04 05	RECALL D	
6	00 03	REG 03	
7	06 02	X	
8	04 14	STORE Y	
9	04 05	REG 45	
240	04 15	RECALL Y	
1	04 01	REG 41	
2	04 05	RECALL D	
3	01 06	REG 16	
4	06 02	X	
5	04 05	RECALL D	
6	00 02	REG 02	
7	06 02	X	
8	04 05	RECALL D	
9	04 05	REG 45	

Step	Code	Key	Comment
250	06 00	+	
1	04 14	STORE Y	
2	04 05	REG 45	
3	04 15	RECALL Y	
4	04 01	REG 41	
5	04 05	RECALL D	
6	01 08	REG 18	
7	06 02	X	
8	04 05	RECALL D	
9	04 00	REG 40	
260	06 00	+	
1	07 01	1	
2	06 06	↑↓	
3	06 01	-	
4	04 05	RECALL D	
5	00 04	REG 04	
6	06 02	X	
7	04 14	STORE Y	
8	04 06	REG 46	
9	04 15	RECALL Y	
270	04 01	REG 41	
1	04 05	RECALL D	
2	01 07	REG 17	
3	06 02	X	
4	04 05	RECALL D	
5	03 00	REG 30	
6	06 02	X	
7	04 05	RECALL D	
8	00 03	REG 03	
9	06 02	X	
280	04 05	RECALL D	
1	04 06	REG 46	
2	06 00	+	
3	04 14	STORE Y	
4	04 06	REG 46	
5	04 15	RECALL Y	
6	04 01	REG 41	
7	04 05	RECALL D	
8	01 09	REG 19	
9	06 02	X	
290	04 05	RECALL D	
1	04 00	REG 40	
2	06 00	+	
3	07 01	1	
4	06 06	↑↓	
5	06 01	-	
6	04 05	RECALL D	
7	00 05	REG 05	
8	06 02	X	
9	04 14	STORE Y	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
300	04 07	REG 47	
1	04 15	RECALL Y	
2	04 01	REG 41	
3	04 05	RECALL D	
4	01 08	REG 18	
5	06 02	X	
6	04 05	RECALL D	
7	00 04	REG 04	
8	06 02	X	
9	04 05	RECALL D	
310	04 07	REG 47	
1	06 00	+	
2	04 14	STORE Y	
3	00 05	REG 05	
4	07 01	1	
5	06 04	↑	
6	04 05	RECALL D	
7	02 09	REG 29	
8	06 01	-	
9	04 05	RECALL D	
320	04 01	REG 41	
1	06 02	X	
2	04 05	RECALL D	
3	00 15	REG 15	
4	06 02	X	
5	04 05	RECALL D	
6	00 01	REG 01	
7	06 02	X	
8	04 14	STORE Y	
9	04 07	REG 47	
330	04 15	RECALL Y	
1	04 00	REG 40	
2	07 01	1	
3	06 06	↑↓	
4	06 01	-	
5	04 05	RECALL D	
6	00 06	REG 06	
7	06 02	X	
8	04 05	RECALL D	
9	04 07	REG 47	
340	06 00	+	
1	04 14	STORE Y	
2	00 06	REG 06	
3	07 01	1	
4	06 04	↑	
5	04 05	RECALL D	
6	03 00	REG 30	
7	06 01	-	
8	04 05	RECALL D	
9	04 01	REG 41	

Step	Code	Key	Comment
350	06 02	X	
1	04 05	RECALL D	
2	01 07	REG 17	
3	06 02	X	
4	04 05	RECALL D	
5	00 03	REG 03	
6	06 02	X	
7	04 14	STORE Y	
8	04 07	REG 47	
9	04 15	RECALL Y	
360	04 00	REG 40	
1	07 01	1	
2	06 06	↑↓	
3	06 01	-	
4	04 05	RECALL D	
5	00 07	REG 07	
6	06 02	X	
7	04 05	RECALL D	
8	04 07	REG 47	
9	06 00	+	
370	04 14	STORE Y	
1	00 07	REG 07	
2	04 05	RECALL D	
3	04 02	REG 42	
4	04 04	STORE D	
5	00 00	REG 00	
6	04 05	RECALL D	
7	04 03	REG 43	
8	04 04	STORE D	
9	00 01	REG 01	
380	04 05	RECALL D	
1	04 04	REG 44	
2	04 04	STORE D	
3	00 02	REG 02	
4	04 05	RECALL D	
5	04 06	REG 46	
6	04 04	STORE D	
7	00 04	REG 04	
8	04 05	RECALL D	
9	03 01	REG 31	
390	04 04	STORE D	
1	04 08	REG 48	
2	04 15	RECALL Y	
3	02 01	REG 21	
4	04 05	RECALL D	
5	00 00	REG 00	
6	06 02	X	
7	04 05	RECALL D	
8	00 08	REG 08	
9	06 03	÷	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
400	06 05	↓	
1	04 00	+ DIRECT	
2	04 08	REG 48	
3	04 15	RECALL Y	
4	02 02	REG 22	
5	04 05	RECALL D	
6	03 04	REG 34	
7	06 02	X	
8	04 05	RECALL D	
9	00 01	REG 01	
410	06 02	X	
1	04 05	RECALL D	
2	00 09	REG 09	
3	06 03	↑	
4	06 05	↓	
5	04 01	- DIRECT	
6	04 08	REG 48	
7	04 15	RECALL Y	
8	02 03	REG 23	
9	04 05	RECALL D	
420	00 02	REG 02	
1	06 02	X	
2	04 05	RECALL D	
3	00 10	REG 10	
4	06 03	↑	
5	06 05	↓	
6	04 00	+ DIRECT	
7	04 08	REG 48	
8	04 15	RECALL Y	
9	02 05	REG 25	
430	04 05	RECALL D	
1	00 04	REG 04	
2	06 02	X	
3	04 05	RECALL D	
4	00 12	REG 12	
5	06 02	↑	
6	06 05	↓	
7	04 00	+ DIRECT	
8	04 08	REG 48	
9	04 15	RECALL Y	
440	02 06	REG 26	
1	04 05	RECALL D	
2	00 05	REG 05	
3	06 02	X	
4	04 05	RECALL D	
5	00 13	REG 13	
6	06 03	↑	
7	06 05	↓	
8	04 00	+ DIRECT	
9	04 08	REG 48	

Step	Code	Key	Comment
450	04 15	RECALL Y	
1	02 04	REG 24	
2	07 01	1	
3	07 05	5	
4	06 03	↑	
5	04 05	RECALL D	
6	00 06	REG 06	
7	06 02	X	
8	04 05	RECALL D	
9	00 11	REG 11	
460	06 03	↑	
1	06 05	↓	
2	04 00	+ DIRECT	
3	04 08	REG 48	
4	04 15	RECALL Y	
5	02 04	REG 24	
6	07 01	1	
7	07 02	2	
8	06 03	↑	
9	04 05	RECALL D	
470	00 07	REG 07	
1	06 02	X	
2	04 05	RECALL D	
3	00 11	REG 11	
4	06 03	↑	
5	04 05	RECALL D	
6	04 08	REG 48	
7	06 00	+	
8	04 05	RECALL D	
9	02 04	REG 24	
480	06 03	↑	
1	04 05	RECALL D	
2	03 05	REG 35	
3	06 03	↑	
4	04 05	RECALL D	
5	00 11	REG 11	
6	06 02	X	
7	04 14	STORE Y	
8	04 08	REG 48	
9	04 05	RECALL D	
490	04 05	REG 45	
1	06 01	-	
2	06 05	↓	
3	04 00	+ DIRECT	
4	03 09	REG 39	
5	04 15	RECALL Y	
6	04 00	REG 40	
7	04 05	RECALL D	
8	00 03	REG 03	
9	06 02	X	

Remarks:

© Wang Laboratories, Inc. 1970

700 PROGRAM TITLE: LBIII

NO.

Step	Code	Key	Comment
500	06 05	↓	
1	04 01	- DIRECT	
2	03 09	REG 39	
3	04 15	RECALL Y	
4	00 00	REG 00	
5	04 05	RECALL D	
6	00 01	REG 01	
7	06 00	+	
8	04 05	RECALL D	
9	04 00	REG 40	
510	06 02	X	
1	06 05	↓	
2	04 00	+ DIRECT	
3	04 09	REG 49	
4	04 05	RECALL D	
5	04 08	REG 48	
6	04 04	STORE D	
7	00 03	REG 03	
8	07 01	1	
9	04 00	+ DIRECT	
520	03 06	REG 36	
1	04 15	RECALL Y	
2	03 06	REG 36	
3	04 05	RECALL D	
4	03 07	REG 37	
5	05 09	IF X=Y	
6	04 07	SEARCH	
7	00 01	01	
8	07 01	1	
9	04 00	+ DIRECT	
530	03 08	REG 38	
1	04 07	SEARCH	
2	00 00	00	
3	05 12	END PROGRAM	

Step	Code	Key	Comment

Remarks:

© Wang Laboratories, Inc. 1970

B.4 Output lists

Power Pattern for Transient Xe

(1) 100%(4 days) -- 0%(1 day) with variations in Diffusion Coefficents and He volume fractions B39

(2) 100%(4 days) -- 75%(4 days) -- 100%(4 days) -- 50%(4 days) B48

(3) 100%(4 days) -- 25%(4 days) -- 100%(4 days) -- Variation of Loads (Pattern A, 5 days) B51

(4) 75%(4 days) -- 100%(4 days) -- Variation of Loads (Pattern B, 5 days) B55

(5) 50%(4 days) -- 100%(4 days B58

(6) 100%(4 days) -- 0%(4 days) -- 75%(4 days -- 0%(4 days) B60

(7) 50%(4 days) -- 0%(4 days) -- 25%(4 days) -- 0%(4 days) B63

Accident Analysis

(1) Power pulses produced by step insertion of 0.1, 0.3 and 0.5%Δk/k; At zero power critical condition (Cases A-1, A-2, and A-3) B66

(2) Power pulses produced by step insertion of 0.1, 0.3 and 0.5%Δk/k; At rated power (Cases C-1, C-2 and C-3) B70

(3) Reactor transient after step reactivity addition; Case A-1 B73

(4) Reactor transient after step reactivity addition; Case A-2 B76

(5) Reactor transient after step reactivity addition; Case A-3 B79

(6) Reactor transient after ramp reactivity addition; Case B-1 B82

(7) Reactor transient after ramp reactivity addition; Case B-2 B85

(8) Reactor transient after ramp reactivity addition; Case B-3 B88

(9) Reactor transient after step reactivity addition; Case C-1 B91

(10) Reactor transient after step reactivity addition; Case C-2 B94

(11) Reactor transient after step reactivity addition; Case C-3 B97

(12) Reactor transient after ramp reactivity addition; Case D-1 B100

(13) Reactor transient after ramp reactivity addition; Case D-2 B103

(14) Reactor transient after ramp reactivity addition; Case D-3 B106

(15) Reactor transient after locked rotor accident of one pump; Variable heat transfer coefficinet B110

(16) Reactor transient after locked rotor accident of two pumps: Variable heat transfer coefficient B111

(17) Reactor transient after locked rotor accident of three pumps: Variable heat transfer coefficient B112

(18) Reactor transient after locked rotor accident of four pumps: Variable heat transfer coefficient B113

(19) Reactor transient after locked rotor accident of one pump: Constant heat transfer coefficient B115

(20) Reactor transient after locked rotor accident of two pumps: Constant heat transfer coefficient B116

(21) Reactor transient after locked rotor accident of three pumps: Constant heat transfer coefficient B117

(22) Reactor transient after locked rotor accident of four pumps: Constant heat transfer coefficient B118

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		Sensitivity study (1)
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.677639E+20	0.188474E+22	0.147377E+21	0.557630E+20	0.111905E+21	0.985668E-01
2.0	0.102695E+21	0.310467E+22	0.242860E+21	0.927328E+20	0.211376E+21	0.186182E+00
3.0	0.134177E+21	0.420434E+22	0.328932E+21	0.126058E+21	0.302205E+21	0.266185E+00
4.0	0.162553E+21	0.519563E+22	0.406520E+21	0.156099E+21	0.384300E+21	0.338495E+00
5.0	0.188133E+21	0.608923E+22	0.476461E+21	0.183180E+21	0.458347E+21	0.403716E+00
6.0	0.211190E+21	0.689475E+22	0.539510E+21	0.207591E+21	0.525105E+21	0.462517E+00
7.0	0.231973E+21	0.762085E+22	0.596341E+21	0.229595E+21	0.585282E+21	0.515522E+00
8.0	0.250700E+21	0.827520E+22	0.647557E+21	0.249426E+21	0.639519E+21	0.563294E+00
9.0	0.267588E+21	0.886507E+22	0.693726E+21	0.267301E+21	0.688404E+21	0.606353E+00
10.0	0.282806E+21	0.939678E+22	0.735344E+21	0.283415E+21	0.732473E+21	0.645168E+00
11.0	0.296527E+21	0.987610E+22	0.772859E+21	0.297940E+21	0.772196E+21	0.680157E+00
12.0	0.308894E+21	0.103081E+23	0.806676E+21	0.311034E+21	0.806004E+21	0.711697E+00
13.0	0.320042E+21	0.106976E+23	0.837159E+21	0.322836E+21	0.836282E+21	0.740128E+00
14.0	0.330092E+21	0.110487E+23	0.864639E+21	0.333476E+21	0.869379E+21	0.765757E+00
15.0	0.339153E+21	0.113652E+23	0.889410E+21	0.343067E+21	0.895609E+21	0.788860E+00
16.0	0.347320E+21	0.116505E+23	0.911739E+21	0.351712E+21	0.919253E+21	0.809686E+00
17.0	0.354679E+21	0.119076E+23	0.931867E+21	0.359506E+21	0.940564E+21	0.828457E+00
18.0	0.361315E+21	0.121394E+23	0.950008E+21	0.366530E+21	0.959773E+21	0.845377E+00
19.0	0.367293E+21	0.123484E+23	0.966364E+21	0.372863E+21	0.977091E+21	0.860630E+00
20.0	0.372687E+21	0.125367E+23	0.981108E+21	0.378571E+21	0.992702E+21	0.874381E+00
21.0	0.377545E+21	0.127065E+23	0.994398E+21	0.383717E+21	0.100678E+22	0.886777E+00
22.0	0.381926E+21	0.128596E+23	0.100638E+22	0.388356E+21	0.101946E+22	0.897951E+00
23.0	0.385880E+21	0.129976E+23	0.101718E+22	0.392537E+21	0.103090E+22	0.908023E+00
24.0	0.389441E+21	0.131220E+23	0.102691E+22	0.396306E+21	0.104121E+22	0.917104E+00
25.0	0.392649E+21	0.132341E+23	0.103569E+22	0.399705E+21	0.105050E+22	0.925289E+00
26.0	0.395540E+21	0.133352E+23	0.104360E+22	0.402768E+21	0.105888E+22	0.932667E+00
27.0	0.398154E+21	0.134263E+23	0.105073E+22	0.405529E+21	0.106643E+22	0.939317E+00
28.0	0.400501E+21	0.135084E+23	0.105716E+22	0.408017E+21	0.107323E+22	0.945312E+00
29.0	0.402625E+21	0.135824E+23	0.106295E+22	0.410261E+21	0.107937E+22	0.950716E+00
30.0	0.404551E+21	0.136492E+23	0.106818E+22	0.412283E+21	0.108490E+22	0.955588E+00
31.0	0.406291E+21	0.137093E+23	0.107289E+22	0.414106E+21	0.108988E+22	0.959979E+00
32.0	0.407803E+21	0.137635E+23	0.107713E+22	0.415749E+21	0.109438E+22	0.963937E+00
33.0	0.409202E+21	0.138124E+23	0.108096E+22	0.417231E+21	0.109843E+22	0.967506E+00
34.0	0.410467E+21	0.138565E+23	0.108441E+22	0.418566E+21	0.110208E+22	0.970723E+00
35.0	0.411603E+21	0.138962E+23	0.108751E+22	0.419770E+21	0.110537E+22	0.973622E+00
36.0	0.412625E+21	0.139320E+23	0.109032E+22	0.420855E+21	0.110834E+22	0.976236E+00
37.0	0.413551E+21	0.139643E+23	0.109284E+22	0.421833E+21	0.111102E+22	0.978592E+00
38.0	0.414381E+21	0.139934E+23	0.109512E+22	0.422714E+21	0.111343E+22	0.980715E+00
39.0	0.415138E+21	0.140196E+23	0.109717E+22	0.423510E+21	0.111560E+22	0.982630E+00
40.0	0.415814E+21	0.140433E+23	0.109902E+22	0.424226E+21	0.111756E+22	0.984355E+00
41.0	0.416422E+21	0.140646E+23	0.110069E+22	0.424872E+21	0.111933E+22	0.985912E+00
42.0	0.416969E+21	0.140838E+23	0.110220E+22	0.425454E+21	0.112092E+22	0.987314E+00
43.0	0.417465E+21	0.141011E+23	0.110355E+22	0.425979E+21	0.112235E+22	0.988578E+00
44.0	0.417912E+21	0.141167E+23	0.110477E+22	0.426452E+21	0.112365E+22	0.989717E+00
45.0	0.418315E+21	0.141308E+23	0.110587E+22	0.426878E+21	0.112481E+22	0.990745E+00
46.0	0.418676E+21	0.141435E+23	0.110667E+22	0.427262E+21	0.112586E+22	0.991670E+00
47.0	0.419010E+21	0.141549E+23	0.110776E+22	0.427609E+21	0.112681E+22	0.992506E+00
48.0	0.419302E+21	0.141652E+23	0.110857E+22	0.427922E+21	0.112767E+22	0.993258E+00
49.0	0.419565E+21	0.141745E+23	0.110929E+22	0.428203E+21	0.112844E+22	0.993936E+00
50.0	0.419807E+21	0.141829E+23	0.110995E+22	0.428457E+21	0.112913E+22	0.994547E+00
51.0	0.420023E+21	0.141904E+23	0.111054E+22	0.428686E+21	0.112976E+22	0.995098E+00
52.0	0.420214E+21	0.141972E+23	0.111107E+22	0.428892E+21	0.113032E+22	0.995596E+00
53.0	0.420392E+21	0.142034E+23	0.111155E+22	0.429078E+21	0.113083E+22	0.996043E+00
54.0	0.420551E+21	0.142089E+23	0.111199E+22	0.429245E+21	0.113129E+22	0.996447E+00
55.0	0.420693E+21	0.142139E+23	0.111238E+22	0.429396E+21	0.113170E+22	0.996811E+00
56.0	0.420824E+21	0.142184E+23	0.111273E+22	0.429533E+21	0.113207E+22	0.997139E+00
57.0	0.420939E+21	0.142224E+23	0.111305E+22	0.429655E+21	0.113241E+22	0.997434E+00
58.0	0.421046E+21	0.142261E+23	0.111333E+22	0.429766E+21	0.113271E+22	0.997700E+00
59.0	0.421135E+21	0.142293E+23	0.111359E+22	0.429865E+21	0.113298E+22	0.997940E+00
60.0	0.421220E+21	0.142323E+23	0.111382E+22	0.429955E+21	0.113323E+22	0.998157E+00
61.0	0.421297E+21	0.142350E+23	0.111403E+22	0.430037E+21	0.113345E+22	0.998353E+00
62.0	0.421364E+21	0.142374E+23	0.111422E+22	0.430109E+21	0.113365E+22	0.998528E+00
63.0	0.421430E+21	0.142396E+23	0.111439E+22	0.430175E+21	0.113383E+22	0.998687E+00
64.0	0.421486E+21	0.142416E+23	0.111454E+22	0.430235E+21	0.113399E+22	0.998830E+00
65.0	0.421535E+21	0.142433E+23	0.111468E+22	0.430287E+21	0.113414E+22	0.998958E+00
66.0	0.421583E+21	0.142449E+23	0.111480E+22	0.430335E+21	0.113427E+22	0.999072E+00
67.0	0.421622E+21	0.142464E+23	0.111492E+22	0.430381E+21	0.113439E+22	0.999162E+00
68.0	0.421660E+21	0.142476E+23	0.111501E+22	0.430417E+21	0.113449E+22	0.999272E+00
69.0	0.421692E+21	0.142487E+23	0.111511E+22	0.430453E+21	0.113459E+22	0.999356E+00
70.0	0.421724E+21	0.142499E+23	0.111520E+22	0.430489E+21	0.113468E+22	0.999439E+00
71.0	0.421751E+21	0.142507E+23	0.111526E+22	0.430513E+21	0.113476E+22	0.999503E+00
72.0	0.421771E+21	0.142515E+23	0.111532E+22	0.430537E+21	0.113482E+22	0.999560E+00
73.0	0.271352E+21	0.129611E+23	0.101646E+22	0.397534E+21	0.201273E+22	0.177283E+01
74.0	0.213660E+21	0.118142E+23	0.925093E+21	0.361852E+21	0.298376E+22	0.227580E+01
75.0	0.173770E+21	0.107178E+23	0.839246E+21	0.328293E+21	0.296102E+22	0.260809E+01
76.0	0.143829E+21	0.970756E+22	0.760141E+21	0.297360E+21	0.320208E+22	0.282042E+01
77.0	0.120374E+21	0.878409E+22	0.687829E+21	0.269079E+21	0.334215E+22	0.294468E+01
78.0	0.101497E+21	0.794338E+22	0.621999E+21	0.243330E+21	0.340928E+22	0.300292E+01
79.0	0.860292E+20	0.718003E+22	0.562226E+21	0.219948E+21	0.341872E+22	0.301124E+01
80.0	0.731796E+20	0.648808E+22	0.508043E+21	0.198753E+21	0.338526E+22	0.298177E+01
81.0	0.623887E+20	0.586136E+22	0.458969E+21	0.179556E+21	0.331946E+22	0.292381E+01
82.0	0.532546E+20	0.529419E+22	0.414557E+21	0.162182E+21	0.322953E+22	0.284460E+01
83.0	0.454740E+20	0.478122E+22	0.374390E+21	0.146468E+21	0.312197E+22	0.274986E+01
84.0	0.388135E+20	0.431746E+22	0.338075E+21	0.132262E+21	0.300189E+22	0.264409E+01
85.0	0.330941E+20	0.389833E+22	0.305255E+21	0.119422E+21	0.287336E+22	0.253088E+01
86.0	0.281696E+20	0.351964E+22	0.275603E+21	0.107822E+21	0.273964E+22	0.241310E+01
87.0	0.239222E+20	0.317755E+22	0.248816E+21	0.973422E+20	0.260329E+22	0.229300E+01
88.0	0.202569E+20	0.286859E+22	0.224622E+21	0.878773E+20	0.246037E+22	0.217240E+01
89.0	0.170922E+20	0.258956E+22	0.202774E+21	0.793297E+20	0.233047E+22	0.205270E+01
90.0	0.143615E+20	0.233761E+22	0.183045E+21	0.716114E+20	0.219687E+22	0.193503E+01
91.0	0.120065E+20	0.211013E+22	0.165232E+21	0.646426E+20	0.206653E+22	0.182022E+01
92.0	0.997803E+19	0.190474E+22	0.149149E+21	0.583508E+20	0.194019E+22	0.170894E+01
93.0	0.823414E+19	0.171933E+22	0.134630E+21	0.526706E+20	0.181838E+22	0.160165E+01
94.0	0.673739E+19	0.155194E+22	0.121523E+21	0.475428E+20	0.170149E+22	0.149869E+01
95.0	0.545581E+19	0.140084E+22	0.109692E+21	0.429140E+20	0.158978E+22	0.140029E+01
96.0	0.436112E+19	0.126444E+22	0.990113E+20	0.387356E+20	0.148339E+22	0.130658E+01
97.0	0.342906E+19	0.114132E+22	0.893705E+20	0.349638E+20	0.138238E+22	0.121761E+01
98.0	0.263785E+19	0.103019E+22	0.806684E+20	0.315594E+20	0.128675E+22	0.113338E+01
99.0	0.196983E+19	0.929884E+21	0.728139E+20	0.284865E+20	0.119643E+22	0.105383E+01
100.0	0.140770E+19	0.839345E+21	0.657243E+20	0.257129E+20	0.111133E+22	0.978871E+00
101.0	0.937457E+18	0.757627E+21	0.593254E+20	0.232095E+20	0.103131E+22	0.908385E+00
102.0	0.545874E+18	0.683871E+21	0.535500E+20	0.209500E+20	0.956209E+21	0.842237E+00
103.0	0.222642E+18	0.617302E+21	0.483374E+20	0.189107E+20	0.885847E+21	0.780262E+00
104.0	-0.437424E+17	0.557226E+21	0.436332E+20	0.170703E+20	0.820035E+21	0.722294E+00
105.0	-0.258815E+18	0.503004E+21	0.393873E+20	0.154092E+20	0.758560E+21	0.668147E+00
106.0	-0.430092E+18	0.454085E+21	0.355568E+20	0.139106E+20	0.701205E+21	0.617628E+00
107.0	-0.564734E+18	0.409944E+21	0.321003E+20	0.125583E+20	0.647760E+21	0.570553E+00
108.0	-0.668380E+18	0.370105E+21	0.289808E+20	0.113379E+20	0.598015E+21	0.526737E+00
109.0	-0.745885E+18	0.334150E+21	0.261654E+20	0.102364E+20	0.551764E+21	0.485999E+00
110.0	-0.801451E+18	0.301701E+21	0.236245E+20	0.924237E+19	0.508805E+21	0.448160E+00
111.0	-0.838386E+18	0.272417E+21	0.213314E+20	0.834526E+19	0.468941E+21	0.413047E+00
112.0	-0.860053E+18	0.245988E+21	0.192619E+20	0.753562E+19	0.431981E+21	0.380493E+00
113.0	-0.868911E+18	0.222137E+21	0.173942E+20	0.680494E+19	0.397743E+21	0.350336E+00
114.0	-0.867416E+18	0.200611E+21	0.157087E+20	0.614552E+19	0.366050E+21	0.322420E+00
115.0	-0.857489E+18	0.181185E+21	0.141875E+20	0.555041E+19	0.336736E+21	0.296600E+00
116.0	-0.840797E+18	0.163654E+21	0.128148E+20	0.501334E+19	0.309640E+21	0.272734E+00
117.0	-0.818805E+18	0.147833E+21	0.115759E+20	0.452866E+19	0.284612E+21	0.250688E+00
118.0	-0.792688E+18	0.133555E+21	0.104579E+20	0.409126E+19	0.261507E+21	0.230338E+00
119.0	-0.763493E+18	0.120670E+21	0.944694E+19	0.369654E+19	0.240192E+21	0.211563E+00
120.0	-0.732088E+18	0.109042E+21	0.853841E+19	0.334032E+19	0.220538E+21	0.194252E+00

0.33315E+13 0.35640E+13 0.37909E+13 0.39476E+13 0.41469E+13 0.42786E+13 0.43674E+13 0.44264E+13 0.44636E+13 0.44822E+13

0.44819E+13 0.44603E+13 0.44129E+13 0.43341E+13 0.42175E+13 0.40566E+13 0.38453E+13 0.37119E+13 0.35188E+13 0.33218E+13

XENON CALCULATION

Sensitivity study (2)

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		
0.100997E-07	0.845335E-02	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.381471E-03	0.168329E-09	0.140889E-03	0.197075E-02		
1.0	0.198867E+21	0.150303E+22	0.117527E+21	0.444534E+20	0.235647E+21	0.207560E+00
2.0	0.309481E+21	0.249231E+22	0.194958E+21	0.744337E+20	0.480907E+21	0.423587E+00
3.0	0.409146E+21	0.338423E+22	0.264769E+21	0.101463E+21	0.706456E+21	0.622253E+00
4.0	0.498969E+21	0.418830E+22	0.327703E+21	0.125830E+21	0.910815E+21	0.802078E+00
5.0	0.579937E+21	0.491313E+22	0.384436E+21	0.147796E+21	0.109481E+22	0.964319E+00
6.0	0.652923E+21	0.556649E+22	0.435574E+21	0.167596E+21	0.126087E+22	0.111059E+01
7.0	0.718720E+21	0.615546E+22	0.481672E+21	0.185445E+21	0.141056E+22	0.124244E+01
8.0	0.778005E+21	0.668623E+22	0.523216E+21	0.201530E+21	0.154549E+22	0.136128E+01
9.0	0.831456E+21	0.716467E+22	0.560663E+21	0.216029E+21	0.166708E+22	0.146838E+01
10.0	0.879637E+21	0.759596E+22	0.594421E+21	0.229099E+21	0.177671E+22	0.156494E+01
11.0	0.923063E+21	0.798475E+22	0.624851E+21	0.240881E+21	0.187553E+22	0.165198E+01
12.0	0.962211E+21	0.833520E+22	0.652281E+21	0.251502E+21	0.196461E+22	0.173044E+01
13.0	0.997499E+21	0.865113E+22	0.677008E+21	0.261076E+21	0.204491E+22	0.180117E+01
14.0	0.102931E+22	0.893591E+22	0.699298E+21	0.269706E+21	0.211730E+22	0.186493E+01
15.0	0.105799E+22	0.919262E+22	0.719391E+21	0.277486E+21	0.218255E+22	0.192241E+01
16.0	0.108383E+22	0.942402E+22	0.737502E+21	0.284499E+21	0.224136E+22	0.197421E+01
17.0	0.110713E+22	0.963261E+22	0.753829E+21	0.290820E+21	0.229438E+22	0.202091E+01
18.0	0.112814E+22	0.982061E+22	0.768544E+21	0.296517E+21	0.234217E+22	0.206301E+01
19.0	0.114707E+22	0.999012E+22	0.781811E+21	0.301654E+21	0.238526E+22	0.210095E+01
20.0	0.116413E+22	0.101429E+23	0.793770E+21	0.306284E+21	0.242410E+22	0.213516E+01
21.0	0.117952E+22	0.102807E+23	0.804551E+21	0.310458E+21	0.245910E+22	0.216600E+01
22.0	0.119339E+22	0.104048E+23	0.814269E+21	0.314221E+21	0.249066E+22	0.219380E+01
23.0	0.120589E+22	0.105167E+23	0.823029E+21	0.317613E+21	0.251911E+22	0.221886E+01
24.0	0.121716E+22	0.106176E+23	0.830926E+21	0.320670E+21	0.254475E+22	0.224144E+01
25.0	0.122732E+22	0.107086E+23	0.838045E+21	0.323427E+21	0.256787E+22	0.226180E+01
26.0	0.123648E+22	0.107906E+23	0.844462E+21	0.325911E+21	0.258871E+22	0.228016E+01
27.0	0.124473E+22	0.108645E+23	0.850246E+21	0.328151E+21	0.260750E+22	0.229671E+01
28.0	0.125218E+22	0.109311E+23	0.855460E+21	0.330170E+21	0.262443E+22	0.231162E+01
29.0	0.125888E+22	0.109911E+23	0.860160E+21	0.331989E+21	0.263969E+22	0.232506E+01
30.0	0.126493E+22	0.110452E+23	0.864396E+21	0.333630E+21	0.265345E+22	0.233718E+01
31.0	0.127038E+22	0.110940E+23	0.868214E+21	0.335108E+21	0.266585E+22	0.234811E+01
32.0	0.127530E+22	0.111380E+23	0.871658E+21	0.336441E+21	0.267703E+22	0.235795E+01
33.0	0.127972E+22	0.111777E+23	0.874761E+21	0.337643E+21	0.268711E+22	0.236683E+01
34.0	0.128372E+22	0.112134E+23	0.877559E+21	0.338726E+21	0.269619E+22	0.237483E+01
35.0	0.128732E+22	0.112456E+23	0.880081E+21	0.339702E+21	0.270438E+22	0.238204E+01
36.0	0.129056E+22	0.112747E+23	0.882354E+21	0.340583E+21	0.271177E+22	0.238855E+01
37.0	0.129346E+22	0.113009E+23	0.884403E+21	0.341376E+21	0.271842E+22	0.239441E+01
38.0	0.129612E+22	0.113245E+23	0.886249E+21	0.342091E+21	0.272442E+22	0.239969E+01
39.0	0.129849E+22	0.113457E+23	0.887914E+21	0.342736E+21	0.272983E+22	0.240446E+01
40.0	0.130063E+22	0.113649E+23	0.889416E+21	0.343317E+21	0.273470E+22	0.240875E+01
41.0	0.130257E+22	0.113822E+23	0.890769E+21	0.343841E+21	0.273910E+22	0.241262E+01
42.0	0.130431E+22	0.113978E+23	0.891989E+21	0.344313E+21	0.274306E+22	0.241611E+01
43.0	0.130588E+22	0.114118E+23	0.893087E+21	0.344739E+21	0.274662E+22	0.241925E+01
44.0	0.130729E+22	0.114245E+23	0.894078E+21	0.345122E+21	0.274984E+22	0.242208E+01
45.0	0.130857E+22	0.114359E+23	0.894972E+21	0.345468E+21	0.275274E+22	0.242464E+01
46.0	0.130972E+22	0.114462E+23	0.895777E+21	0.345780E+21	0.275533E+22	0.242694E+01
47.0	0.131075E+22	0.114555E+23	0.896503E+21	0.346061E+21	0.275771E+22	0.242902E+01
48.0	0.131169E+22	0.114638E+23	0.897157E+21	0.346314E+21	0.275983E+22	0.243089E+01
49.0	0.131253E+22	0.114714E+23	0.897747E+21	0.346543E+21	0.276175E+22	0.243257E+01
50.0	0.131329E+22	0.114781E+23	0.898279E+21	0.346749E+21	0.276348E+22	0.243410E+01
51.0	0.131397E+22	0.114843E+23	0.898758E+21	0.346934E+21	0.276503E+22	0.243546E+01
52.0	0.131459E+22	0.114898E+23	0.899190E+21	0.347101E+21	0.276643E+22	0.243670E+01
53.0	0.131515E+22	0.114948E+23	0.899580E+21	0.347252E+21	0.276769E+22	0.243781E+01
54.0	0.131565E+22	0.114993E+23	0.899931E+21	0.347388E+21	0.276884E+22	0.243882E+01
55.0	0.131610E+22	0.115033E+23	0.900246E+21	0.347510E+21	0.276985E+22	0.243971E+01
56.0	0.131651E+22	0.115069E+23	0.900532E+21	0.347621E+21	0.277079E+22	0.244054E+01
57.0	0.131688E+22	0.115102E+23	0.900789E+21	0.347721E+21	0.277162E+22	0.244126E+01
58.0	0.131722E+22	0.115132E+23	0.901021E+21	0.347810E+21	0.277238E+22	0.244193E+01
59.0	0.131752E+22	0.115158E+23	0.901228E+21	0.347890E+21	0.277304E+22	0.244252E+01
60.0	0.131777E+22	0.115182E+23	0.901417E+21	0.347964E+21	0.277367E+22	0.244307E+01
61.0	0.131802E+22	0.115204E+23	0.901587E+21	0.348030E+21	0.277421E+22	0.244355E+01
62.0	0.131823E+22	0.115224E+23	0.901740E+21	0.348089E+21	0.277470E+22	0.244398E+01
63.0	0.131843E+22	0.115241E+23	0.901876E+21	0.348141E+21	0.277516E+22	0.244438E+01
64.0	0.131861E+22	0.115257E+23	0.902003E+21	0.348190E+21	0.277556E+22	0.244473E+01
65.0	0.131876E+22	0.115271E+23	0.902113E+21	0.348233E+21	0.277593E+22	0.244506E+01
66.0	0.131891E+22	0.115284E+23	0.902214E+21	0.348272E+21	0.277624E+22	0.244534E+01
67.0	0.131904E+22	0.115296E+23	0.902308E+21	0.348309E+21	0.277655E+22	0.244561E+01
68.0	0.131916E+22	0.115306E+23	0.902383E+21	0.348338E+21	0.277680E+22	0.244583E+01
69.0	0.131927E+22	0.115316E+23	0.902459E+21	0.348367E+21	0.277704E+22	0.244604E+01
70.0	0.131937E+22	0.115325E+23	0.902534E+21	0.348396E+21	0.277728E+22	0.244625E+01
71.0	0.131944E+22	0.115332E+23	0.902587E+21	0.348416E+21	0.277747E+22	0.244642E+01
72.0	0.131951E+22	0.115338E+23	0.902637E+21	0.348436E+21	0.277764E+22	0.244657E+01
73.0	0.912444E+21	0.109977E+23	0.861111E+21	0.336393E+21	0.566341E+22	0.500600E+01
74.0	0.716096E+21	0.103056E+23	0.806941E+21	0.315425E+21	0.761076E+22	0.670363E+01
75.0	0.580686E+21	0.952650E+22	0.745947E+21	0.291661E+21	0.890454E+22	0.784320E+01
76.0	0.479462E+21	0.874728E+22	0.684936E+21	0.267846E+21	0.974909E+22	0.858708E+01
77.0	0.400433E+21	0.799992E+22	0.626421E+21	0.244987E+21	0.102624E+23	0.903918E+01
78.0	0.337031E+21	0.729753E+22	0.571421E+21	0.223491E+21	0.105266E+23	0.927193E+01
79.0	0.285202E+21	0.664490E+22	0.520319E+21	0.203513E+21	0.106019E+23	0.933826E+01
80.0	0.242232E+21	0.604285E+22	0.473177E+21	0.185080E+21	0.105537E+23	0.929818E+01
81.0	0.206208E+21	0.549000E+22	0.429887E+21	0.168152E+21	0.103568E+23	0.912233E+01
82.0	0.175755E+21	0.498403E+22	0.390268E+21	0.152658E+21	0.100983E+23	0.889465E+01
83.0	0.149841E+21	0.452211E+22	0.354098E+21	0.138511E+21	0.977962E+22	0.861397E+01
84.0	0.127678E+21	0.410114E+22	0.321135E+21	0.125619E+21	0.941777E+22	0.829525E+01
85.0	0.108655E+21	0.371804E+22	0.291136E+21	0.113885E+21	0.902621E+22	0.795037E+01
86.0	0.922852E+20	0.336976E+22	0.263865E+21	0.103218E+21	0.861567E+22	0.758876E+01
87.0	0.781748E+20	0.305344E+22	0.239096E+21	0.935299E+20	0.819475E+22	0.721801E+01
88.0	0.660136E+20	0.276626E+22	0.216609E+21	0.847337E+20	0.777020E+22	0.684406E+01
89.0	0.555263E+20	0.250569E+22	0.196205E+21	0.767524E+20	0.734737E+22	0.647163E+01
90.0	0.464872E+20	0.226935E+22	0.177699E+21	0.695134E+20	0.693050E+22	0.610445E+01
91.0	0.387023E+20	0.205508E+22	0.160921E+21	0.629501E+20	0.652287E+22	0.574540E+01
92.0	0.320079E+20	0.186086E+22	0.145713E+21	0.570011E+20	0.612097E+22	0.539669E+01
93.0	0.262604E+20	0.168486E+22	0.131931E+21	0.516100E+20	0.574467E+22	0.505996E+01
94.0	0.213367E+20	0.152540E+22	0.119445E+21	0.467255E+20	0.537731E+22	0.473638E+01
95.0	0.171294E+20	0.138094E+22	0.108133E+21	0.423006E+20	0.502580E+22	0.442677E+01
96.0	0.135450E+20	0.125010E+22	0.978677E+20	0.382928E+20	0.469070E+22	0.413161E+01
97.0	0.105007E+20	0.113160E+22	0.886087E+20	0.346629E+20	0.437127E+22	0.385113E+01
98.0	0.792566E+19	0.102429E+22	0.802059E+20	0.313759E+20	0.407057E+22	0.358539E+01
99.0	0.575701E+19	0.927122E+21	0.725974E+20	0.283995E+20	0.378545E+22	0.333426E+01
100.0	0.393985E+19	0.839146E+21	0.657084E+20	0.257046E+20	0.351064E+22	0.309749E+01
101.0	0.242580E+19	0.759496E+21	0.594715E+20	0.232648E+20	0.326374E+22	0.287473E+01
102.0	0.117286E+19	0.687389E+21	0.538253E+20	0.210561E+20	0.302626E+22	0.266556E+01
103.0	0.144835E+18	0.622117E+21	0.487142E+20	0.190567E+20	0.280366E+22	0.246949E+01
104.0	-0.690703E+18	0.563032E+21	0.440877E+20	0.172468E+20	0.259533E+22	0.228599E+01
105.0	-0.136148E+19	0.509553E+21	0.399000E+20	0.156087E+20	0.240066E+22	0.211452E+01
106.0	-0.188996E+19	0.461164E+21	0.361110E+20	0.141264E+20	0.221900E+22	0.195451E+01
107.0	-0.229911E+19	0.417377E+21	0.326823E+20	0.127851E+20	0.204969E+22	0.180539E+01
108.0	-0.260824E+19	0.377748E+21	0.295792E+20	0.115712E+20	0.189209E+22	0.166657E+01
109.0	-0.283274E+19	0.341885E+21	0.267710E+20	0.104726E+20	0.174555E+22	0.153750E+01
110.0	-0.298594E+19	0.309431E+21	0.242297E+20	0.947849E+19	0.160943E+22	0.141760E+01
111.0	-0.308001E+19	0.280064E+21	0.219301E+20	0.857889E+19	0.148311E+22	0.130634E+01
112.0	-0.312530E+19	0.253489E+21	0.198492E+20	0.776484E+19	0.136599E+22	0.120318E+01
113.0	-0.313027E+19	0.229442E+21	0.179662E+20	0.702825E+19	0.125750E+22	0.110762E+01
114.0	-0.310280E+19	0.207684E+21	0.162625E+20	0.636175E+19	0.115708E+22	0.101917E+01
115.0	-0.304889E+19	0.187997E+21	0.147209E+20	0.575869E+19	0.106420E+22	0.937354E+00
116.0	-0.297522E+19	0.170187E+21	0.133263E+20	0.521313E+19	0.978352E+21	0.861741E+00
117.0	-0.288532E+19	0.154074E+21	0.120646E+20	0.471956E+19	0.899074E+21	0.791912E+00
118.0	-0.278309E+19	0.139496E+21	0.109231E+20	0.427298E+19	0.825924E+21	0.727481E+00
119.0	-0.267188E+19	0.126306E+21	0.989029E+19	0.386896E+19	0.758452E+21	0.668051E+00
120.0	-0.255450E+19	0.114374E+21	0.895594E+19	0.350344E+19	0.696247E+21	0.613260E+00

0.11452E+14 0.11718E+14 0.11966E+14 0.12519E+14 0.13220E+14 0.13679E+14 0.13982E+14 0.14177E+14 0.14291E+14 0.14339E+14

0.14320E+14 0.14230E+14 0.14055E+14 0.13779E+14 0.13382E+14 0.12845E+14 0.12148E+14 0.11712E+14 0.11516E+14 0.11305E+14

XENON CALCULATION

0.255306E+21	0.125960E+20	0.593990E-02	0.221905E+00	0.231586E-01		Sensitivity study (3)
0.100997E-07	0.845335E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.381471E-04	0.168329E-09	0.140889E-02	0.197075E-03		
1.0	0.183061E+20	0.202855E+22	0.138623E+21	0.600208E+20	0.616056E+20	0.542627E-01
2.0	0.237799E+20	0.333859E+22	0.261159E+21	0.997213E+20	0.106052E+21	0.934113E-01
3.0	0.287147E+20	0.451948E+22	0.353587E+21	0.135508E+21	0.146351E+21	0.128907E+00
4.0	0.331609E+20	0.558396E+22	0.436904E+21	0.167767E+21	0.182724E+21	0.160945E+00
5.0	0.371685E+20	0.654354E+22	0.512010E+21	0.196847E+21	0.215521E+21	0.189833E+00
6.0	0.407828E+20	0.740853E+22	0.579713E+21	0.223061E+21	0.245087E+21	0.215875E+00
7.0	0.440366E+20	0.818827E+22	0.640743E+21	0.246691E+21	0.271139E+21	0.239350E+00
8.0	0.469724E+20	0.889094E+22	0.695741E+21	0.267985E+21	0.295758E+21	0.260506E+00
9.0	0.496176E+20	0.952435E+22	0.745318E+21	0.287181E+21	0.317408E+21	0.279576E+00
10.0	0.520030E+20	0.100953E+23	0.790009E+21	0.304484E+21	0.336926E+21	0.296767E+00
11.0	0.541540E+20	0.106100E+23	0.830294E+21	0.320082E+21	0.354518E+21	0.312263E+00
12.0	0.560917E+20	0.110740E+23	0.866609E+21	0.334142E+21	0.370376E+21	0.326230E+00
13.0	0.578388E+20	0.114922E+23	0.899344E+21	0.346817E+21	0.384671E+21	0.338821E+00
14.0	0.594119E+20	0.118692E+23	0.928851E+21	0.358242E+21	0.397556E+21	0.350171E+00
15.0	0.608293E+20	0.122091E+23	0.955452E+21	0.368541E+21	0.409172E+21	0.360402E+00
16.0	0.621105E+20	0.125154E+23	0.979430E+21	0.377825E+21	0.419643E+21	0.369625E+00
17.0	0.632646E+20	0.127916E+23	0.100104E+22	0.386194E+21	0.429082E+21	0.377939E+00
18.0	0.643068E+20	0.130405E+23	0.102052E+22	0.393736E+21	0.437589E+21	0.385432E+00
19.0	0.652416E+20	0.132649E+23	0.103809E+22	0.400537E+21	0.445259E+21	0.392188E+00
20.0	0.660902E+20	0.134672E+23	0.105392E+22	0.406667E+21	0.452174E+21	0.398279E+00
21.0	0.668481E+20	0.136495E+23	0.106819E+22	0.412193E+21	0.458406E+21	0.403768E+00
22.0	0.675348E+20	0.138139E+23	0.108106E+22	0.417174E+21	0.464025E+21	0.408717E+00
23.0	0.681520E+20	0.139620E+23	0.109266E+22	0.421669E+21	0.469089E+21	0.413178E+00
24.0	0.687116E+20	0.140956E+23	0.110311E+22	0.425712E+21	0.473655E+21	0.417199E+00
25.0	0.692123E+20	0.142160E+23	0.111253E+22	0.429361E+21	0.477771E+21	0.420825E+00
26.0	0.696676E+20	0.143246E+23	0.112103E+22	0.432650E+21	0.481480E+21	0.424092E+00
27.0	0.700775E+20	0.144224E+23	0.112869E+22	0.435615E+21	0.484824E+21	0.427038E+00
28.0	0.704421E+20	0.145106E+23	0.113559E+22	0.438288E+21	0.487839E+21	0.429693E+00
29.0	0.707794E+20	0.145901E+23	0.114181E+22	0.440697E+21	0.490556E+21	0.432086E+00
30.0	0.710774E+20	0.146617E+23	0.114742E+22	0.442869E+21	0.493006E+21	0.434244E+00
31.0	0.713436E+20	0.147263E+23	0.115248E+22	0.444826E+21	0.495213E+21	0.436188E+00
32.0	0.715887E+20	0.147846E+23	0.115703E+22	0.446590E+21	0.497204E+21	0.437942E+00
33.0	0.718065E+20	0.148371E+23	0.116114E+22	0.448181E+21	0.498998E+21	0.439522E+00
34.0	0.720062E+20	0.148844E+23	0.116485E+22	0.449615E+21	0.500616E+21	0.440947E+00
35.0	0.721831E+20	0.149270E+23	0.116818E+22	0.450908E+21	0.502074E+21	0.442231E+00
36.0	0.723450E+20	0.149655E+23	0.117119E+22	0.452073E+21	0.503388E+21	0.443388E+00
37.0	0.724902E+20	0.150001E+23	0.117391E+22	0.453123E+21	0.504571E+21	0.444431E+00
38.0	0.726188E+20	0.150314E+23	0.117635E+22	0.454070E+21	0.505639E+21	0.445372E+00
39.0	0.727383E+20	0.150595E+23	0.117856E+22	0.454924E+21	0.506602E+21	0.446220E+00
40.0	0.728457E+20	0.150849E+23	0.118054E+22	0.455693E+21	0.507470E+21	0.446984E+00
41.0	0.729379E+20	0.151078E+23	0.118233E+22	0.456386E+21	0.508252E+21	0.447673E+00
42.0	0.730272E+20	0.151284E+23	0.118395E+22	0.457012E+21	0.508958E+21	0.448295E+00
43.0	0.731043E+20	0.151470E+23	0.118540E+22	0.457575E+21	0.509594E+21	0.448855E+00
44.0	0.731739E+20	0.151638E+23	0.118672E+22	0.458083E+21	0.510167E+21	0.449359E+00
45.0	0.732359E+20	0.151789E+23	0.118790E+22	0.458541E+21	0.510683E+21	0.449814E+00
46.0	0.732934E+20	0.151925E+23	0.118896E+22	0.458954E+21	0.511148E+21	0.450224E+00
47.0	0.733403E+20	0.152046E+23	0.118993E+22	0.459326E+21	0.511569E+21	0.450594E+00
48.0	0.733887E+20	0.152159E+23	0.119079E+22	0.459661E+21	0.511946E+21	0.450927E+00
49.0	0.734311E+20	0.152259E+23	0.119157E+22	0.459964E+21	0.512288E+21	0.451228E+00
50.0	0.734689E+20	0.152348E+23	0.119228E+22	0.460236E+21	0.512594E+21	0.451497E+00
51.0	0.735022E+20	0.152429E+23	0.119291E+22	0.460482E+21	0.512870E+21	0.451741E+00
52.0	0.735324E+20	0.152502E+23	0.119348E+22	0.460703E+21	0.513122E+21	0.451963E+00
53.0	0.735611E+20	0.152568E+23	0.119400E+22	0.460903E+21	0.513346E+21	0.452160E+00
54.0	0.735854E+20	0.152628E+23	0.119446E+22	0.461083E+21	0.513549E+21	0.452339E+00
55.0	0.736126E+20	0.152681E+23	0.119488E+22	0.461245E+21	0.513733E+21	0.452500E+00
56.0	0.736307E+20	0.152730E+23	0.119526E+22	0.461391E+21	0.513898E+21	0.452646E+00
57.0	0.736489E+20	0.152773E+23	0.119560E+22	0.461523E+21	0.514047E+21	0.452777E+00
58.0	0.736610E+20	0.152812E+23	0.119591E+22	0.461642E+21	0.514180E+21	0.452894E+00
59.0	0.736761E+20	0.152847E+23	0.119618E+22	0.461748E+21	0.514300E+21	0.453000E+00
60.0	0.736928E+20	0.152879E+23	0.119643E+22	0.461845E+21	0.514409E+21	0.453096E+00
61.0	0.737018E+20	0.152908E+23	0.119666E+22	0.461933E+21	0.514508E+21	0.453183E+00
62.0	0.737139E+20	0.152934E+23	0.119666E+22	0.462010E+21	0.514595E+21	0.453260E+00
63.0	0.737200E+20	0.152957E+23	0.119704E+22	0.462081E+21	0.514675E+21	0.453330E+00
64.0	0.737351E+20	0.152979E+23	0.119721E+22	0.462145E+21	0.514747E+21	0.453394E+00
65.0	0.737396E+20	0.152997E+23	0.119735E+22	0.462202E+21	0.514812E+21	0.453451E+00
66.0	0.737487E+20	0.153014E+23	0.119749E+22	0.462253E+21	0.514870E+21	0.453502E+00
67.0	0.737533E+20	0.153030E+23	0.119761E+22	0.462302E+21	0.514924E+21	0.453549E+00
68.0	0.737593E+20	0.153043E+23	0.119771E+22	0.462341E+21	0.514967E+21	0.453588E+00
69.0	0.737669E+20	0.153056E+23	0.119781E+22	0.462380E+21	0.515011E+21	0.453626E+00
70.0	0.737684E+20	0.153068E+23	0.119791E+22	0.462418E+21	0.515054E+21	0.453665E+00
71.0	0.737729E+20	0.153077E+23	0.119798E+22	0.462444E+21	0.515085E+21	0.453691E+00
72.0	0.737759E+20	0.153085E+23	0.119805E+22	0.462470E+21	0.515113E+21	0.453716E+00
73.0	0.398323E+20	0.137025E+23	0.107296E+22	0.419772E+21	0.627308E+21	0.552539E+00
74.0	0.331071E+20	0.123619E+23	0.967990E+21	0.378707E+21	0.704490E+21	0.620521E+00
75.0	0.279581E+20	0.111501E+23	0.873105E+21	0.341587E+21	0.755877E+21	0.665784E+00
76.0	0.238240E+20	0.100560E+23	0.787429E+21	0.308069E+21	0.787647E+21	0.693766E+00
77.0	0.204151E+20	0.906857E+22	0.710108E+21	0.277819E+21	0.804182E+21	0.708331E+00
78.0	0.175615E+20	0.817766E+22	0.640346E+21	0.250526E+21	0.808792E+21	0.712391E+00
79.0	0.151469E+20	0.737412E+22	0.577426E+21	0.225909E+21	0.804066E+21	0.708229E+00
80.0	0.130909E+20	0.664954E+22	0.520688E+21	0.203712E+21	0.792065E+21	0.697658E+00
81.0	0.113248E+20	0.599602E+22	0.469514E+21	0.183691E+21	0.774442E+21	0.682135E+00
82.0	0.980275E+19	0.540665E+22	0.423364E+21	0.165635E+21	0.752541E+21	0.662845E+00
83.0	0.848420E+19	0.487515E+22	0.381746E+21	0.149353E+21	0.727458E+21	0.640752E+00
84.0	0.734415E+19	0.439589E+22	0.344217E+21	0.134670E+21	0.700086E+21	0.616642E+00
85.0	0.635062E+19	0.396370E+22	0.310375E+21	0.121430E+21	0.671152E+21	0.591157E+00
86.0	0.548729E+19	0.357400E+22	0.279859E+21	0.109491E+21	0.641255E+21	0.564823E+00
87.0	0.473352E+19	0.322260E+22	0.252343E+21	0.987257E+20	0.610672E+21	0.538061E+00
88.0	0.407647E+19	0.290575E+22	0.227533E+21	0.890189E+20	0.580398E+21	0.511220E+00
89.0	0.350289E+19	0.262005E+22	0.205161E+21	0.802665E+20	0.550145E+21	0.484573E+00
90.0	0.300249E+19	0.236245E+22	0.184990E+21	0.723749E+20	0.520360E+21	0.458338E+00
91.0	0.256581E+19	0.213019E+22	0.166803E+21	0.652594E+20	0.491240E+21	0.432689E+00
92.0	0.218548E+19	0.192077E+22	0.150405E+21	0.588437E+20	0.462937E+21	0.407759E+00
93.0	0.185412E+19	0.173195E+22	0.135619E+21	0.530591E+20	0.435564E+21	0.383648E+00
94.0	0.156643E+19	0.156170E+22	0.122288E+21	0.478434E+20	0.409205E+21	0.360432E+00
95.0	0.131637E+19	0.140820E+22	0.110268E+21	0.431408E+20	0.383919E+21	0.338160E+00
96.0	0.109950E+19	0.126980E+22	0.994307E+20	0.389008E+20	0.359744E+21	0.316866E+00
97.0	0.911838E+18	0.114501E+22	0.896593E+20	0.350779E+20	0.336699E+21	0.296567E+00
98.0	0.749986E+18	0.103250E+22	0.808492E+20	0.316310E+20	0.314788E+21	0.277268E+00
99.0	0.610066E+18	0.931057E+21	0.729058E+20	0.285233E+20	0.294006E+21	0.258963E+00
100.0	0.490095E+18	0.839593E+21	0.657437E+20	0.257212E+20	0.274336E+21	0.241638E+00
101.0	0.387141E+18	0.757126E+21	0.592862E+20	0.231948E+20	0.255756E+21	0.225272E+00
102.0	0.299219E+18	0.682772E+21	0.534641E+20	0.209170E+20	0.238236E+21	0.209840E+00
103.0	0.224438E+18	0.615735E+21	0.482147E+20	0.188632E+20	0.221743E+21	0.195313E+00
104.0	0.161096E+18	0.555292E+21	0.434817E+20	0.170115E+20	0.206239E+21	0.181657E+00
105.0	0.107622E+18	0.500795E+21	0.392144E+20	0.153420E+20	0.191686E+21	0.168839E+00
106.0	0.630758E+17	0.451679E+21	0.353684E+20	0.138373E+20	0.178044E+21	0.156823E+00
107.0	0.258035E+17	0.407404E+21	0.319015E+20	0.124809E+20	0.165270E+21	0.145571E+00
108.0	-0.486288E+16	0.367484E+21	0.287756E+20	0.112579E+20	0.153322E+21	0.135048E+00
109.0	-0.299750E+17	0.331491E+21	0.259572E+20	0.101553E+20	0.142159E+21	0.125215E+00
110.0	-0.504607E+17	0.299040E+21	0.234161E+20	0.916109E+19	0.131739E+21	0.116037E+00
111.0	-0.667688E+17	0.269781E+21	0.211250E+20	0.826472E+19	0.122022E+21	0.107478E+00
112.0	-0.794844E+17	0.243400E+21	0.190592E+20	0.745652E+19	0.112967E+21	0.995019E-01
113.0	-0.891630E+17	0.219614E+21	0.171967E+20	0.672783E+19	0.104536E+21	0.920759E-01
114.0	-0.963125E+17	0.198167E+21	0.155174E+20	0.607081E+19	0.966922E+20	0.851673E-01
115.0	-0.101299E+18	0.178831E+21	0.140032E+20	0.547842E+19	0.894000E+20	0.787442E-01
116.0	-0.104407E+18	0.161396E+21	0.126380E+20	0.494430E+19	0.826251E+20	0.727769E-01
117.0	-0.106038E+18	0.145677E+21	0.114071E+20	0.446272E+19	0.763349E+20	0.672364E-01
118.0	-0.106369E+18	0.131503E+21	0.102973E+20	0.402851E+19	0.704980E+20	0.620953E-01
119.0	-0.105684E+18	0.118724E+21	0.929659E+19	0.363702E+19	0.650850E+20	0.573275E-01
120.0	-0.104189E+18	0.107202E+21	0.839437E+19	0.328404E+19	0.600982E+20	0.529086E-01

0.10052E+13 0.10305E+13 0.10540E+13 0.10584E+13 0.10641E+13 0.10684E+13 0.10738E+13 0.10815E+13 0.10917E+13 0.11042E+13

0.11181E+13 0.11322E+13 0.11447E+13 0.11536E+13 0.11570E+13 0.11524E+13 0.11379E+13 0.11256E+13 0.10667E+13 0.10062E+13

XENON CALCULATION

Sensitivity study (4)

0.255306E+21	0.125560E+20	0.593990E-02	0.110953E+00	0.231586E-01
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03

1.0	0.116649E+21	0.160326E+22	0.250719E+21	0.473661E+20	0.175890E+21	0.154926E+00
2.0	0.179938E+21	0.270906E+22	0.423822E+21	0.808812E+20	0.347575E+21	0.306148E+00
3.0	0.236990E+21	0.370542E+22	0.579791E+21	0.111076E+21	0.504921E+21	0.444738E+00
4.0	0.288412E+21	0.460361E+22	0.720394E+21	0.138295E+21	0.647254E+21	0.570107E+00
5.0	0.334766E+21	0.541327E+22	0.847138E+21	0.162832E+21	0.775951E+21	0.683201E+00
6.0	0.376549E+21	0.614314E+22	0.961391E+21	0.184950E+21	0.891412E+21	0.785163E+00
7.0	0.414213E+21	0.680105E+22	0.106438E+22	0.204888E+21	0.995762E+21	0.877076E+00
8.0	0.448154E+21	0.739396E+22	0.115719E+22	0.222857E+21	0.108981E+22	0.959917E+00
9.0	0.478765E+21	0.792838E+22	0.124085E+22	0.239052E+21	0.117457E+22	0.103457E+01
10.0	0.506346E+21	0.841016E+22	0.131627E+22	0.253652E+21	0.125098E+22	0.110187E+01
11.0	0.531210E+21	0.884444E+22	0.138425E+22	0.266813E+21	0.131986E+22	0.116255E+01
12.0	0.553618E+21	0.923592E+22	0.144553E+22	0.278677E+21	0.138196E+22	0.121724E+01
13.0	0.573821E+21	0.958881E+22	0.150078E+22	0.289371E+21	0.143793E+22	0.126654E+01
14.0	0.592031E+21	0.990692E+22	0.155057E+22	0.299011E+21	0.148838E+22	0.131098E+01
15.0	0.608453E+21	0.101937E+23	0.159546E+22	0.307702E+21	0.153387E+22	0.135104E+01
16.0	0.623247E+21	0.104522E+23	0.163592E+22	0.315535E+21	0.157487E+22	0.138716E+01
17.0	0.636583E+21	0.106852E+23	0.167240E+22	0.322596E+21	0.161183E+22	0.141971E+01
18.0	0.648615E+21	0.108952E+23	0.170528E+22	0.328960E+21	0.164514E+22	0.144905E+01
19.0	0.659447E+21	0.110845E+23	0.173491E+22	0.334699E+21	0.167517E+22	0.147550E+01
20.0	0.669224E+21	0.112552E+23	0.176163E+22	0.339871E+21	0.170224E+22	0.149935E+01
21.0	0.678030E+21	0.114091E+23	0.178572E+22	0.344536E+21	0.172664E+22	0.152084E+01
22.0	0.685966E+21	0.115477E+23	0.180743E+22	0.348736E+21	0.174864E+22	0.154022E+01
23.0	0.693124E+21	0.116728E+23	0.182700E+22	0.352525E+21	0.176847E+22	0.155768E+01
24.0	0.699574E+21	0.117855E+23	0.184464E+22	0.355940E+21	0.178635E+22	0.157343E+01
25.0	0.705393E+21	0.118871E+23	0.186054E+22	0.359019E+21	0.180246E+22	0.158762E+01
26.0	0.710638E+21	0.119787E+23	0.187488E+22	0.361795E+21	0.181699E+22	0.160042E+01
27.0	0.715362E+21	0.120612E+23	0.188780E+22	0.364296E+21	0.183008E+22	0.161195E+01
28.0	0.719621E+21	0.121356E+23	0.189945E+22	0.366552E+21	0.184188E+22	0.162235E+01
29.0	0.723460E+21	0.122027E+23	0.190995E+22	0.368584E+21	0.185252E+22	0.163172E+01
30.0	0.726920E+21	0.122632E+23	0.191942E+22	0.370417E+21	0.186211E+22	0.164017E+01
31.0	0.730043E+21	0.123177E+23	0.192795E+22	0.372068E+21	0.187076E+22	0.164778E+01
32.0	0.732852E+21	0.123668E+23	0.193564E+22	0.373557E+21	0.187855E+22	0.165464E+01
33.0	0.735391E+21	0.124111E+23	0.194257E+22	0.374899E+21	0.188557E+22	0.166083E+01
34.0	0.737676E+21	0.124510E+23	0.194882E+22	0.376109E+21	0.189191E+22	0.166641E+01
35.0	0.739738E+21	0.124870E+23	0.195446E+22	0.377200E+21	0.189762E+22	0.167144E+01
36.0	0.741598E+21	0.125194E+23	0.195954E+22	0.378183E+21	0.190276E+22	0.167597E+01
37.0	0.743268E+21	0.125487E+23	0.196411E+22	0.379069E+21	0.190740E+22	0.168005E+01
38.0	0.744775E+21	0.125750E+23	0.196824E+22	0.379868E+21	0.191158E+22	0.168374E+01
39.0	0.746133E+21	0.125988E+23	0.197196E+22	0.380588E+21	0.191535E+22	0.168706E+01
40.0	0.747364E+21	0.126202E+23	0.197531E+22	0.381237E+21	0.191875E+22	0.169005E+01
41.0	0.748463E+21	0.126395E+23	0.197834E+22	0.381823E+21	0.192181E+22	0.169275E+01
42.0	0.749464E+21	0.126570E+23	0.198106E+22	0.382351E+21	0.192457E+22	0.169518E+01
43.0	0.750361E+21	0.126726E+23	0.198352E+22	0.382826E+21	0.192706E+22	0.169737E+01
44.0	0.751170E+21	0.126868E+23	0.198573E+22	0.383259E+21	0.192931E+22	0.169935E+01
45.0	0.751907E+21	0.126995E+23	0.198772E+22	0.383641E+21	0.193133E+22	0.170113E+01
46.0	0.752560E+21	0.127110E+23	0.198952E+22	0.383989E+21	0.193315E+22	0.170273E+01
47.0	0.753158E+21	0.127214E+23	0.199115E+22	0.384303E+21	0.193479E+22	0.170418E+01
48.0	0.753666E+21	0.127307E+23	0.199261E+22	0.384586E+21	0.193627E+22	0.170549E+01
49.0	0.754170E+21	0.127391E+23	0.199392E+22	0.384841E+21	0.193761E+22	0.170666E+01
50.0	0.754605E+21	0.127467E+23	0.199511E+22	0.385071E+21	0.193881E+22	0.170772E+01
51.0	0.755002E+21	0.127536E+23	0.199618E+22	0.385278E+21	0.193989E+22	0.170868E+01
52.0	0.755351E+21	0.127597E+23	0.199715E+22	0.385465E+21	0.194088E+22	0.170954E+01
53.0	0.755678E+21	0.127653E+23	0.199802E+22	0.385633E+21	0.194175E+22	0.171031E+01
54.0	0.755958E+21	0.127703E+23	0.199880E+22	0.385785E+21	0.194255E+22	0.171101E+01
55.0	0.756217E+21	0.127748E+23	0.199951E+22	0.385922E+21	0.194326E+22	0.171164E+01
56.0	0.756451E+21	0.127789E+23	0.200015E+22	0.386045E+21	0.194391E+22	0.171221E+01
57.0	0.756663E+21	0.127826E+23	0.200072E+22	0.386157E+21	0.194449E+22	0.171272E+01
58.0	0.756853E+21	0.127858E+23	0.200124E+22	0.386257E+21	0.194501E+22	0.171318E+01
59.0	0.757020E+21	0.127888E+23	0.200170E+22	0.386347E+21	0.194548E+22	0.171360E+01
60.0	0.757174E+21	0.127915E+23	0.200213E+22	0.386429E+21	0.194592E+22	0.171398E+01
61.0	0.757313E+21	0.127939E+23	0.200251E+22	0.386502E+21	0.194629E+22	0.171431E+01
62.0	0.757434E+21	0.127961E+23	0.200284E+22	0.386568E+21	0.194664E+22	0.171462E+01
63.0	0.757552E+21	0.127981E+23	0.200315E+22	0.386628E+21	0.194696E+22	0.171490E+01
64.0	0.757653E+21	0.127999E+23	0.200344E+22	0.386682E+21	0.194724E+22	0.171515E+01
65.0	0.757743E+21	0.128014E+23	0.200368E+22	0.386729E+21	0.194748E+22	0.171536E+01
66.0	0.757827E+21	0.128029E+23	0.200390E+22	0.386773E+21	0.194771E+22	0.171556E+01
67.0	0.757903E+21	0.128042E+23	0.200412E+22	0.386814E+21	0.194793E+22	0.171575E+01
68.0	0.757966E+21	0.128053E+23	0.200429E+22	0.386847E+21	0.194811E+22	0.171591E+01
69.0	0.758032E+21	0.128064E+23	0.200446E+22	0.386879E+21	0.194827E+22	0.171605E+01
70.0	0.758088E+21	0.128075E+23	0.200462E+22	0.386912E+21	0.194844E+22	0.171620E+01
71.0	0.758131E+21	0.128082E+23	0.200474E+22	0.386934E+21	0.194857E+22	0.171631E+01
72.0	0.758171E+21	0.128089E+23	0.200485E+22	0.386955E+21	0.194867E+22	0.171640E+01
73.0	0.517319E+21	0.122142E+23	0.191279E+22	0.373898E+21	0.362875E+22	0.319623E+01
74.0	0.411097E+21	0.112225E+23	0.175751E+22	0.343651E+21	0.474171E+22	0.417654E+01
75.0	0.336556E+21	0.102442E+23	0.160432E+22	0.313736E+21	0.549093E+22	0.483646E+01
76.0	0.280020E+21	0.932150E+22	0.145981E+22	0.285498E+21	0.598095E+22	0.526807E+01
77.0	0.235362E+21	0.846583E+22	0.132591E+22	0.259303E+21	0.627660E+22	0.553025E+01
78.0	0.199207E+21	0.767911E+22	0.120261E+22	0.235214E+21	0.643073E+22	0.566424E+01
79.0	0.169419E+21	0.695946E+22	0.108991E+22	0.213175E+21	0.647188E+22	0.570049E+01
80.0	0.144557E+21	0.630336E+22	0.987156E+21	0.193081E+21	0.642833E+22	0.566213E+01
81.0	0.123606E+21	0.570637E+22	0.893663E+21	0.174797E+21	0.632031E+22	0.556699E+01
82.0	0.105814E+21	0.516401E+22	0.808726E+21	0.158185E+21	0.616372E+22	0.542906E+01
83.0	0.906237E+20	0.467185E+22	0.731650E+21	0.143110E+21	0.597114E+22	0.525943E+01
84.0	0.775868E+20	0.422562E+22	0.661767E+21	0.129442E+21	0.575258E+22	0.506692E+01
85.0	0.663652E+20	0.382132E+22	0.598449E+21	0.117058E+21	0.551603E+22	0.485957E+01
86.0	0.566791E+20	0.345519E+22	0.541111E+21	0.105843E+21	0.526793E+22	0.464004E+01
87.0	0.483110E+20	0.312378E+22	0.489210E+21	0.956908E+20	0.501338E+22	0.441583E+01
88.0	0.410701E+20	0.282390E+22	0.442246E+21	0.865048E+20	0.475649E+22	0.418956E+01
89.0	0.348046E+20	0.255261E+22	0.399759E+21	0.781944E+20	0.450048E+22	0.396406E+01
90.0	0.293864E+20	0.230723E+22	0.361330E+21	0.706777E+20	0.424790E+22	0.374159E+01
91.0	0.247036E+20	0.208533E+22	0.326580E+21	0.638803E+20	0.400074E+22	0.352389E+01
92.0	0.206580E+20	0.188469E+22	0.295158E+21	0.577342E+20	0.376053E+22	0.331230E+01
93.0	0.171710E+20	0.170330E+22	0.266750E+21	0.521776E+20	0.352839E+22	0.310783E+01
94.0	0.141697E+20	0.153931E+22	0.241068E+21	0.471541E+20	0.330514E+22	0.291120E+01
95.0	0.115909E+20	0.139108E+22	0.217854E+21	0.426133E+20	0.309136E+22	0.272290E+01
96.0	0.938148E+19	0.125709E+22	0.196871E+21	0.385090E+20	0.288740E+22	0.254325E+01
97.0	0.749305E+19	0.113600E+22	0.177906E+21	0.347994E+20	0.269344E+22	0.237240E+01
98.0	0.588464E+19	0.102655E+22	0.160766E+21	0.314468E+20	0.250952E+22	0.221040E+01
99.0	0.451901E+19	0.927644E+21	0.145277E+21	0.284169E+20	0.233556E+22	0.205718E+01
100.0	0.336468E+19	0.838261E+21	0.131279E+21	0.256788E+20	0.217142E+22	0.191261E+01
101.0	0.239328E+19	0.757487E+21	0.118629E+21	0.232044E+20	0.201687E+22	0.177648E+01
102.0	0.157976E+19	0.684497E+21	0.107198E+21	0.209685E+20	0.187162E+22	0.164854E+01
103.0	0.902856E+18	0.618543E+21	0.968689E+20	0.189481E+20	0.173536E+22	0.152852E+01
104.0	0.344125E+18	0.558946E+21	0.875356E+20	0.171224E+20	0.160773E+22	0.141610E+01
105.0	-0.113353E+18	0.505096E+21	0.791023E+20	0.154728E+20	0.148836E+22	0.131096E+01
106.0	-0.483383E+18	0.456455E+21	0.714847E+20	0.139828E+20	0.137688E+22	0.121277E+01
107.0	-0.778726E+18	0.412516E+21	0.646034E+20	0.126367E+20	0.127289E+22	0.112117E+01
108.0	-0.101129E+19	0.372815E+21	0.583859E+20	0.114206E+20	0.117601E+22	0.103584E+01
109.0	-0.118969E+19	0.336946E+21	0.527665E+20	0.103217E+20	0.108584E+22	0.956422E+00
110.0	-0.132365E+19	0.304537E+21	0.476931E+20	0.932897E+19	0.100202E+22	0.882588E+00
111.0	-0.141994E+19	0.275260E+21	0.431079E+20	0.843208E+19	0.924167E+21	0.814014E+00
112.0	-0.148418E+19	0.248809E+21	0.389656E+20	0.762181E+19	0.851956E+21	0.750410E+00
113.0	-0.152135E+19	0.224912E+21	0.352230E+20	0.688973E+19	0.785010E+21	0.691444E+00
114.0	-0.153651E+19	0.203321E+21	0.318417E+20	0.622832E+19	0.722987E+21	0.636813E+00
115.0	-0.153345E+19	0.183814E+21	0.287868E+20	0.563077E+19	0.665268E+21	0.586239E+00
116.0	-0.151565E+19	0.166192E+21	0.260270E+20	0.509094E+19	0.612450E+21	0.539451E+00
117.0	-0.148613E+19	0.150271E+21	0.235337E+20	0.460323E+19	0.563344E+21	0.496198E+00
118.0	-0.144726E+19	0.135888E+21	0.212812E+20	0.416262E+19	0.517975E+21	0.456237E+00
119.0	-0.140119E+19	0.122895E+21	0.192463E+20	0.376459E+19	0.476086E+21	0.419341E+00
120.0	-0.134976E+19	0.111157E+21	0.174080E+20	0.340500E+19	0.437432E+21	0.385294E+00

0.67776E+13 0.71962E+13 0.76040E+13 0.78849E+13 0.82398E+13 0.84726E+13 0.86293E+13 0.87354E+13 0.88051E+13 0.88441E+13

0.88516E+13 0.88221E+13 0.87463E+13 0.86127E+13 0.84080E+13 0.81189E+13 0.77326E+13 0.74860E+13 0.71285E+13 0.67629E+13

XENON CALCULATION

Sensitivity study (5)

0.255306E+21	0.125560E+20	0.593990E-02	0.110953E+00	0.231586E-01		
0.100997E-07	0.845335E-02	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.381471E-03	0.168329E-09	0.140889E-03	0.197075E-02		
1.0	0.297962E+21	0.111866E+22	0.174936E+21	0.330467E+20	0.336253E+21	0.296174E+00
2.0	0.471846E+21	0.189521E+22	0.296496E+21	0.565797E+20	0.712775E+21	0.627819E+00
3.0	0.628443E+21	0.259573E+22	0.406156E+21	0.778086E+20	0.106149E+22	0.934971E+00
4.0	0.769577E+21	0.322734E+22	0.505028E+21	0.969493E+20	0.137759E+22	0.121339E+01
5.0	0.896794E+21	0.379673E+22	0.594160E+21	0.114205E+21	0.166287E+22	0.146467E+01
6.0	0.101147E+22	0.431002E+22	0.674510E+21	0.129760E+21	0.192011E+22	0.169125E+01
7.0	0.111483E+22	0.477271E+22	0.746940E+21	0.143782E+21	0.215202E+22	0.189552E+01
8.0	0.120798E+22	0.518968E+22	0.812213E+21	0.156418E+21	0.236104E+22	0.207963E+01
9.0	0.129195E+22	0.556555E+22	0.871053E+21	0.167809E+21	0.254944E+22	0.224557E+01
10.0	0.136765E+22	0.590437E+22	0.924091E+21	0.178077E+21	0.271927E+22	0.239515E+01
11.0	0.143588E+22	0.620980E+22	0.971902E+21	0.187333E+21	0.287235E+22	0.252999E+01
12.0	0.149739E+22	0.648512E+22	0.101500E+22	0.195676E+21	0.301034E+22	0.265154E+01
13.0	0.155283E+22	0.673329E+22	0.105385E+22	0.203197E+21	0.313474E+22	0.276110E+01
14.0	0.160281E+22	0.695701E+22	0.108887E+22	0.209977E+21	0.324687E+22	0.285987E+01
15.0	0.164787E+22	0.715867E+22	0.112044E+22	0.216088E+21	0.334795E+22	0.294890E+01
16.0	0.168848E+22	0.734047E+22	0.114890E+22	0.221597E+21	0.343905E+22	0.302914E+01
17.0	0.172509E+22	0.750433E+22	0.117455E+22	0.226563E+21	0.352116E+22	0.310147E+01
18.0	0.175808E+22	0.765203E+22	0.119767E+22	0.231039E+21	0.359519E+22	0.316667E+01
19.0	0.178783E+22	0.778518E+22	0.121851E+22	0.235074E+21	0.366493E+22	0.322546E+01
20.0	0.181465E+22	0.790521E+22	0.123730E+22	0.238712E+21	0.372209E+22	0.327845E+01
21.0	0.183882E+22	0.801342E+22	0.125424E+22	0.241991E+21	0.377631E+22	0.332621E+01
22.0	0.186061E+22	0.811095E+22	0.126951E+22	0.244947E+21	0.382521E+22	0.336928E+01
23.0	0.188026E+22	0.819888E+22	0.128327E+22	0.247611E+21	0.386928E+22	0.340809E+01
24.0	0.189796E+22	0.827814E+22	0.129568E+22	0.250013E+21	0.390900E+22	0.344308E+01
25.0	0.191392E+22	0.834958E+22	0.130686E+22	0.252179E+21	0.394481E+22	0.347463E+01
26.0	0.192831E+22	0.841400E+22	0.131695E+22	0.254131E+21	0.397710E+22	0.350306E+01
27.0	0.194128E+22	0.847205E+22	0.132603E+22	0.255890E+21	0.400620E+22	0.352870E+01
28.0	0.195297E+22	0.852438E+22	0.133423E+22	0.257476E+21	0.403243E+22	0.355180E+01
29.0	0.196351E+22	0.857155E+22	0.134161E+22	0.258905E+21	0.405607E+22	0.357262E+01
30.0	0.197301E+22	0.861408E+22	0.134827E+22	0.260194E+21	0.407738E+22	0.359139E+01
31.0	0.198157E+22	0.865241E+22	0.135427E+22	0.261356E+21	0.409659E+22	0.360831E+01
32.0	0.198930E+22	0.868696E+22	0.135968E+22	0.262403E+21	0.411391E+22	0.362357E+01
33.0	0.199625E+22	0.871811E+22	0.136455E+22	0.263347E+21	0.412952E+22	0.363732E+01
34.0	0.200253E+22	0.874619E+22	0.136895E+22	0.264198E+21	0.414359E+22	0.364971E+01
35.0	0.200818E+22	0.877150E+22	0.137291E+22	0.264965E+21	0.415628E+22	0.366089E+01
36.0	0.201328E+22	0.879431E+22	0.137648E+22	0.265656E+21	0.416771E+22	0.367096E+01
37.0	0.201788E+22	0.881488E+22	0.137970E+22	0.266279E+21	0.417802E+22	0.368004E+01
38.0	0.202202E+22	0.883341E+22	0.138260E+22	0.266841E+21	0.418731E+22	0.368822E+01
39.0	0.202575E+22	0.885012E+22	0.138522E+22	0.267347E+21	0.419568E+22	0.369559E+01
40.0	0.202912E+22	0.886519E+22	0.138758E+22	0.267804E+21	0.420323E+22	0.370224E+01
41.0	0.203215E+22	0.887878E+22	0.138970E+22	0.268216E+21	0.421004E+22	0.370824E+01
42.0	0.203489E+22	0.889102E+22	0.139162E+22	0.268587E+21	0.421618E+22	0.371365E+01
43.0	0.203735E+22	0.890205E+22	0.139335E+22	0.268921E+21	0.422171E+22	0.371852E+01
44.0	0.203957E+22	0.891200E+22	0.139490E+22	0.269223E+21	0.422670E+22	0.372292E+01
45.0	0.204158E+22	0.892096E+22	0.139631E+22	0.269494E+21	0.423120E+22	0.372688E+01
46.0	0.204338E+22	0.892905E+22	0.139757E+22	0.269739E+21	0.423524E+22	0.373044E+01
47.0	0.204501E+22	0.893634E+22	0.139871E+22	0.269960E+21	0.423889E+22	0.373366E+01
48.0	0.204648E+22	0.894291E+22	0.139974E+22	0.270159E+21	0.424219E+22	0.373656E+01
49.0	0.204780E+22	0.894881E+22	0.140067E+22	0.270338E+21	0.424515E+22	0.373916E+01
50.0	0.204899E+22	0.895416E+22	0.140150E+22	0.270500E+21	0.424782E+22	0.374152E+01
51.0	0.205007E+22	0.895896E+22	0.140225E+22	0.270645E+21	0.425023E+22	0.374364E+01
52.0	0.205104E+22	0.896329E+22	0.140293E+22	0.270777E+21	0.425240E+22	0.374555E+01
53.0	0.205191E+22	0.896721E+22	0.140355E+22	0.270895E+21	0.425436E+22	0.374727E+01
54.0	0.205270E+22	0.897073E+22	0.140410E+22	0.271002E+21	0.425612E+22	0.374883E+01
55.0	0.205341E+22	0.897390E+22	0.140459E+22	0.271098E+21	0.425772E+22	0.375023E+01
56.0	0.205405E+22	0.897677E+22	0.140504E+22	0.271185E+21	0.425915E+22	0.375150E+01
57.0	0.205463E+22	0.897935E+22	0.140545E+22	0.271264E+21	0.426044E+22	0.375263E+01
58.0	0.205515E+22	0.898168E+22	0.140581E+22	0.271334E+21	0.426161E+22	0.375366E+01
59.0	0.205561E+22	0.898376E+22	0.140614E+22	0.271397E+21	0.426265E+22	0.375458E+01
60.0	0.205603E+22	0.898564E+22	0.140643E+22	0.271454E+21	0.426360E+22	0.375541E+01
61.0	0.205641E+22	0.898737E+22	0.140670E+22	0.271507E+21	0.426446E+22	0.375617E+01
62.0	0.205676E+22	0.898889E+22	0.140694E+22	0.271552E+21	0.426522E+22	0.375685E+01
63.0	0.205706E+22	0.899027E+22	0.140716E+22	0.271595E+21	0.426592E+22	0.375746E+01
64.0	0.205735E+22	0.899152E+22	0.140735E+22	0.271632E+21	0.426654E+22	0.375801E+01
65.0	0.205759E+22	0.899263E+22	0.140753E+22	0.271666E+21	0.426710E+22	0.375850E+01
66.0	0.205782E+22	0.899365E+22	0.140768E+22	0.271697E+21	0.426761E+22	0.375894E+01
67.0	0.205803E+22	0.899459E+22	0.140783E+22	0.271726E+21	0.426807E+22	0.375935E+01
68.0	0.205820E+22	0.899537E+22	0.140795E+22	0.271749E+21	0.426848E+22	0.375972E+01
69.0	0.205838E+22	0.899612E+22	0.140807E+22	0.271772E+21	0.426885E+22	0.376004E+01
70.0	0.205855E+22	0.899665E+22	0.140819E+22	0.271794E+21	0.426919E+22	0.376034E+01
71.0	0.205866E+22	0.899738E+22	0.140827E+22	0.271810E+21	0.426948E+22	0.376060E+01
72.0	0.205877E+22	0.899789E+22	0.140835E+22	0.271825E+21	0.426974E+22	0.376082E+01
73.0	0.153250E+22	0.903929E+22	0.141548E+22	0.276211E+21	0.901225E+22	0.793807E+01
74.0	0.124297E+22	0.869393E+22	0.136146E+22	0.265924E+21	0.123452E+23	0.108737E+02
75.0	0.103107E+22	0.818284E+22	0.128145E+22	0.250404E+21	0.146694E+23	0.129385E+02
76.0	0.866347E+21	0.761792E+22	0.119299E+22	0.233177E+21	0.162973E+23	0.143548E+02
77.0	0.734022E+21	0.704547E+22	0.110335E+22	0.215689E+21	0.173931E+23	0.152759E+02
78.0	0.625470E+21	0.648766E+22	0.101600E+22	0.198635E+21	0.179540E+23	0.158141E+02
79.0	0.535134E+21	0.595573E+22	0.932700E+21	0.182363E+21	0.182268E+23	0.160544E+02
80.0	0.459122E+21	0.545518E+22	0.854313E+21	0.167046E+21	0.182367E+23	0.160630E+02
81.0	0.394601E+21	0.498816E+22	0.781180E+21	0.152753E+21	0.180427E+23	0.158922E+02
82.0	0.339471E+21	0.455517E+22	0.713369E+21	0.139498E+21	0.176919E+23	0.155832E+02
83.0	0.292115E+21	0.415545E+22	0.650771E+21	0.127261E+21	0.172221E+23	0.151694E+02
84.0	0.251281E+21	0.378772E+22	0.593181E+21	0.116001E+21	0.166938E+23	0.146776E+02
85.0	0.215962E+21	0.345024E+22	0.540331E+21	0.105668E+21	0.160414E+23	0.141294E+02
86.0	0.185349E+21	0.314116E+22	0.491926E+21	0.962031E+20	0.153749E+23	0.135424E+02
87.0	0.158787E+21	0.285852E+22	0.447964E+21	0.875478E+20	0.146804E+23	0.129306E+02
88.0	0.135716E+21	0.260037E+22	0.407236E+21	0.796423E+20	0.139709E+23	0.123057E+02
89.0	0.115679E+21	0.236482E+22	0.370347E+21	0.724286E+20	0.132268E+23	0.116767E+02
90.0	0.982809E+20	0.215006E+22	0.336714E+21	0.658516E+20	0.125465E+23	0.110511E+02
91.0	0.831836E+20	0.195439E+22	0.306071E+21	0.598589E+20	0.118465E+23	0.104345E+02
92.0	0.700973E+20	0.177620E+22	0.278166E+21	0.544017E+20	0.111620E+23	0.983160E+01
93.0	0.587554E+20	0.161401E+22	0.252765E+21	0.494343E+20	0.104970E+23	0.924588E+01
94.0	0.489589E+20	0.146647E+22	0.229660E+21	0.449157E+20	0.985453E+22	0.867996E+01
95.0	0.405102E+20	0.133224E+22	0.208638E+21	0.408044E+20	0.923657E+22	0.813565E+01
96.0	0.332390E+20	0.121015E+22	0.189518E+21	0.370652E+20	0.864460E+22	0.761424E+01
97.0	0.269964E+20	0.109915E+22	0.172134E+21	0.336653E+20	0.807958E+22	0.711657E+01
98.0	0.216509E+20	0.998235E+21	0.156331E+21	0.305747E+20	0.754499E+22	0.664305E+01
99.0	0.170881E+20	0.906519E+21	0.141967E+21	0.277656E+20	0.703493E+22	0.619379E+01
100.0	0.132066E+20	0.823171E+21	0.128915E+21	0.252128E+20	0.654923E+22	0.576862E+01
101.0	0.991790E+19	0.747440E+21	0.117055E+21	0.228933E+20	0.609346E+22	0.536717E+01
102.0	0.714382E+19	0.678638E+21	0.106280E+21	0.207860E+20	0.566401E+22	0.498891E+01
103.0	0.481624E+19	0.616138E+21	0.964918E+20	0.188717E+20	0.526011E+22	0.463315E+01
104.0	0.287392E+19	0.559368E+21	0.876012E+20	0.171329E+20	0.488092E+22	0.429915E+01
105.0	0.126504E+19	0.507809E+21	0.795266E+20	0.155537E+20	0.452048E+22	0.398608E+01
106.0	-0.538876E+17	0.460996E+21	0.721953E+20	0.141199E+20	0.419279E+22	0.369305E+01
107.0	-0.112616E+19	0.418492E+21	0.655390E+20	0.128181E+20	0.388183E+22	0.341915E+01
108.0	-0.198808E+19	0.379900E+21	0.594952E+20	0.116360E+20	0.359454E+22	0.316346E+01
109.0	-0.267047E+19	0.344880E+21	0.540077E+20	0.105628E+20	0.332087E+22	0.292505E+01
110.0	-0.319923E+19	0.313049E+21	0.490259E+20	0.958846E+19	0.306875E+22	0.270299E+01
111.0	-0.359809E+19	0.284171E+21	0.445033E+20	0.870392E+19	0.283417E+22	0.249636E+01
112.0	-0.388735E+19	0.257956E+21	0.403977E+20	0.790097E+19	0.261611E+22	0.230429E+01
113.0	-0.408463E+19	0.234159E+21	0.366711E+20	0.717210E+19	0.241358E+22	0.212590E+01
114.0	-0.420492E+19	0.212560E+21	0.332884E+20	0.651053E+19	0.222364E+22	0.196037E+01
115.0	-0.426123E+19	0.192956E+21	0.302183E+20	0.591007E+19	0.205138E+22	0.180688E+01
116.0	-0.426518E+19	0.175164E+21	0.274319E+20	0.536511E+19	0.188993E+22	0.166467E+01
117.0	-0.422659E+19	0.159016E+21	0.249031E+20	0.487052E+19	0.174044E+22	0.153300E+01
118.0	-0.415320E+19	0.144363E+21	0.226082E+20	0.442168E+19	0.160213E+22	0.141117E+01
119.0	-0.405253E+19	0.131065E+21	0.205257E+20	0.401439E+19	0.147425E+22	0.129853E+01
120.0	-0.393043E+19	0.118999E+21	0.186361E+20	0.364482E+19	0.135607E+22	0.119444E+01

0.23376E+14 0.23757E+14 0.24107E+14 0.24878E+14 0.25830E+14 0.26434E+14 0.26827E+14 0.27090E+14 0.27266E+14 0.27372E+14

0.27408E+14 0.27356E+14 0.27187E+14 0.26864E+14 0.26346E+14 0.25589E+14 0.24552E+14 0.23881E+14 0.23577E+14 0.23244E+14

XENON CALCULATION

Sensitivity study (6)

0.255306E+21	0.125560E+20	0.593990E-02	0.110953E+00	0.231586E-01		
0.100997E-07	0.845335E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.381471E-04	0.168329E-09	0.140889E-02	0.197075E-03		
1.0	0.341014E+20	0.182249E+22	0.285001E+21	0.538337E+20	0.973094E+20	0.857109E-01
2.0	0.445757E+20	0.308642E+22	0.482657E+21	0.921444E+20	0.173897E+21	0.153170E+00
3.0	0.540862E+20	0.422466E+22	0.661038E+21	0.126639E+21	0.243432E+21	0.214417E+00
4.0	0.626580E+20	0.525071E+22	0.821655E+21	0.157733E+21	0.306217E+21	0.269719E+00
5.0	0.703846E+20	0.617563E+22	0.966442E+21	0.185763E+21	0.362834E+21	0.319588E+00
6.0	0.773488E+20	0.700939E+22	0.109696E+22	0.211030E+21	0.413872E+21	0.364542E+00
7.0	0.836263E+20	0.776096E+22	0.121461E+22	0.233806E+21	0.459881E+21	0.405067E+00
8.0	0.892835E+20	0.843826E+22	0.132063E+22	0.254332E+21	0.501347E+21	0.441591E+00
9.0	0.943841E+20	0.904880E+22	0.141621E+22	0.272834E+21	0.538724E+21	0.474513E+00
10.0	0.989611E+20	0.959916E+22	0.150236E+22	0.289512E+21	0.572416E+21	0.504189E+00
11.0	0.103127E+21	0.100953E+23	0.158002E+22	0.304546E+21	0.602787E+21	0.530940E+00
12.0	0.106863E+21	0.105425E+23	0.165003E+22	0.318099E+21	0.630165E+21	0.555055E+00
13.0	0.110229E+21	0.109456E+23	0.171313E+22	0.330316E+21	0.654843E+21	0.576792E+00
14.0	0.113263E+21	0.113090E+23	0.177001E+22	0.341328E+21	0.677090E+21	0.596387E+00
15.0	0.116000E+21	0.116366E+23	0.182129E+22	0.351255E+21	0.697144E+21	0.614051E+00
16.0	0.118468E+21	0.119318E+23	0.186752E+22	0.360204E+21	0.715220E+21	0.629972E+00
17.0	0.120689E+21	0.121980E+23	0.190918E+22	0.368270E+21	0.731516E+21	0.644326E+00
18.0	0.122695E+21	0.124379E+23	0.194674E+22	0.375541E+21	0.746203E+21	0.657262E+00
19.0	0.124504E+21	0.126542E+23	0.198060E+22	0.382096E+21	0.759443E+21	0.668924E+00
20.0	0.126131E+21	0.128492E+23	0.201112E+22	0.388004E+21	0.771379E+21	0.679438E+00
21.0	0.127599E+21	0.130249E+23	0.203863E+22	0.393330E+21	0.782138E+21	0.688914E+00
22.0	0.128922E+21	0.131834E+23	0.206343E+22	0.398131E+21	0.791836E+21	0.697456E+00
23.0	0.130114E+21	0.133262E+23	0.208579E+22	0.402460E+21	0.800579E+21	0.705157E+00
24.0	0.131191E+21	0.134549E+23	0.210594E+22	0.406361E+21	0.808459E+21	0.712098E+00
25.0	0.132159E+21	0.135710E+23	0.212411E+22	0.409879E+21	0.815566E+21	0.718358E+00
26.0	0.133034E+21	0.136756E+23	0.214049E+22	0.413049E+21	0.821969E+21	0.723998E+00
27.0	0.133823E+21	0.137699E+23	0.215525E+22	0.415907E+21	0.827743E+21	0.729084E+00
28.0	0.134533E+21	0.138549E+23	0.216856E+22	0.418483E+21	0.832946E+21	0.733666E+00
29.0	0.135174E+21	0.139315E+23	0.218055E+22	0.420805E+21	0.837637E+21	0.737798E+00
30.0	0.135749E+21	0.140006E+23	0.219136E+22	0.422898E+21	0.841866E+21	0.741523E+00
31.0	0.136272E+21	0.140629E+23	0.220111E+22	0.424785E+21	0.845678E+21	0.744880E+00
32.0	0.136736E+21	0.141190E+23	0.220989E+22	0.426486E+21	0.849114E+21	0.747907E+00
33.0	0.137160E+21	0.141696E+23	0.221782E+22	0.428019E+21	0.852211E+21	0.750635E+00
34.0	0.137543E+21	0.142152E+23	0.222496E+22	0.429401E+21	0.855004E+21	0.753095E+00
35.0	0.137885E+21	0.142563E+23	0.223139E+22	0.430647E+21	0.857521E+21	0.755312E+00
36.0	0.138195E+21	0.142934E+23	0.223719E+22	0.431770E+21	0.859789E+21	0.757310E+00
37.0	0.138471E+21	0.143268E+23	0.224242E+22	0.432782E+21	0.861834E+21	0.759111E+00
38.0	0.138723E+21	0.143569E+23	0.224713E+22	0.433695E+21	0.863677E+21	0.760734E+00
39.0	0.138953E+21	0.143840E+23	0.225138E+22	0.434517E+21	0.865339E+21	0.762199E+00
40.0	0.139152E+21	0.144085E+23	0.225521E+22	0.435259E+21	0.866836E+21	0.763517E+00
41.0	0.139340E+21	0.144306E+23	0.225867E+22	0.435928E+21	0.868188E+21	0.764708E+00
42.0	0.139506E+21	0.144505E+23	0.226178E+22	0.436531E+21	0.869405E+21	0.765780E+00
43.0	0.139654E+21	0.144684E+23	0.226459E+22	0.437073E+21	0.870502E+21	0.766746E+00
44.0	0.139792E+21	0.144845E+23	0.226712E+22	0.437563E+21	0.871490E+21	0.767616E+00
45.0	0.139912E+21	0.144991E+23	0.226940E+22	0.438005E+21	0.872382E+21	0.768402E+00
46.0	0.140020E+21	0.145122E+23	0.227145E+22	0.438402E+21	0.873186E+21	0.769110E+00
47.0	0.140117E+21	0.145241E+23	0.227330E+22	0.438761E+21	0.873911E+21	0.769748E+00
48.0	0.140211E+21	0.145346E+23	0.227497E+22	0.439084E+21	0.874564E+21	0.770324E+00
49.0	0.140290E+21	0.145444E+23	0.227648E+22	0.439376E+21	0.875153E+21	0.770843E+00
50.0	0.140364E+21	0.145530E+23	0.227784E+22	0.439639E+21	0.875684E+21	0.771310E+00
51.0	0.140429E+21	0.145608E+23	0.227906E+22	0.439875E+21	0.876162E+21	0.771731E+00
52.0	0.140483E+21	0.145679E+23	0.228016E+22	0.440089E+21	0.876594E+21	0.772111E+00
53.0	0.140542E+21	0.145742E+23	0.228116E+22	0.440281E+21	0.876983E+21	0.772454E+00
54.0	0.140586E+21	0.145800E+23	0.228205E+22	0.440455E+21	0.877333E+21	0.772763E+00
55.0	0.140633E+21	0.145851E+23	0.228286E+22	0.440611E+21	0.877647E+21	0.773039E+00
56.0	0.140672E+21	0.145898E+23	0.228359E+22	0.440752E+21	0.877932E+21	0.773291E+00
57.0	0.140707E+21	0.145940E+23	0.228424E+22	0.440879E+21	0.878189E+21	0.773517E+00
58.0	0.140737E+21	0.145977E+23	0.228483E+22	0.440993E+21	0.878420E+21	0.773720E+00
59.0	0.140766E+21	0.146011E+23	0.228537E+22	0.441096E+21	0.878628E+21	0.773903E+00
60.0	0.140790E+21	0.146042E+23	0.228585E+22	0.441189E+21	0.878815E+21	0.774068E+00
61.0	0.140813E+21	0.146070E+23	0.228628E+22	0.441274E+21	0.878987E+21	0.774220E+00
62.0	0.140831E+21	0.146095E+23	0.228667E+22	0.441349E+21	0.879138E+21	0.774352E+00
63.0	0.140852E+21	0.146117E+23	0.228702E+22	0.441417E+21	0.879276E+21	0.774474E+00
64.0	0.140874E+21	0.146137E+23	0.228734E+22	0.441479E+21	0.879400E+21	0.774583E+00
65.0	0.140884E+21	0.146156E+23	0.228762E+22	0.441533E+21	0.879511E+21	0.774681E+00
66.0	0.140901E+21	0.146172E+23	0.228788E+22	0.441583E+21	0.879611E+21	0.774769E+00
67.0	0.140913E+21	0.146188E+23	0.228812E+22	0.441630E+21	0.879707E+21	0.774854E+00
68.0	0.140923E+21	0.146200E+23	0.228832E+22	0.441667E+21	0.879782E+21	0.774919E+00
69.0	0.140933E+21	0.146212E+23	0.228851E+22	0.441705E+21	0.879856E+21	0.774985E+00
70.0	0.140946E+21	0.146224E+23	0.228870E+22	0.441741E+21	0.879929E+21	0.775050E+00
71.0	0.140949E+21	0.146233E+23	0.228883E+22	0.441767E+21	0.879984E+21	0.775098E+00
72.0	0.140955E+21	0.146241E+23	0.228896E+22	0.441792E+21	0.880034E+21	0.775142E+00
73.0	0.796662E+20	0.136024E+23	0.213025E+22	0.416681E+21	0.113757E+22	0.100198E+01
74.0	0.660781E+20	0.122645E+23	0.192386E+22	0.376329E+21	0.130258E+22	0.114732E+01
75.0	0.558088E+20	0.110876E+23	0.173042E+22	0.339666E+21	0.141497E+22	0.124631E+01
76.0	0.475680E+20	0.100049E+23	0.156685E+22	0.306499E+21	0.148731E+22	0.131003E+01
77.0	0.407717E+20	0.902650E+22	0.141363E+22	0.276527E+21	0.152844E+22	0.134626E+01
78.0	0.350826E+20	0.814292E+22	0.127525E+22	0.249459E+21	0.154502E+22	0.136086E+01
79.0	0.302709E+20	0.734538E+22	0.115035E+22	0.225026E+21	0.154228E+22	0.135845E+01
80.0	0.261686E+20	0.662574E+22	0.103765E+22	0.202980E+21	0.152440E+22	0.134270E+01
81.0	0.226442E+20	0.597634E+22	0.935947E+21	0.183086E+21	0.149974E+22	0.131658E+01
82.0	0.196098E+20	0.539041E+22	0.844186E+21	0.165136E+21	0.146901E+22	0.128247E+01
83.0	0.169809E+20	0.486181E+22	0.761402E+21	0.148943E+21	0.141047E+22	0.124235E+01
84.0	0.147045E+20	0.438496E+22	0.686722E+21	0.134334E+21	0.135992E+22	0.119783E+01
85.0	0.127247E+20	0.395482E+22	0.619358E+21	0.121157E+21	0.130587E+22	0.115023E+01
86.0	0.109948E+20	0.356682E+22	0.558595E+21	0.109270E+21	0.124954E+22	0.110060E+01
87.0	0.949238E+19	0.321687E+22	0.503790E+21	0.985497E+20	0.119191E+22	0.104985E+01
88.0	0.818177E+19	0.290124E+22	0.454359E+21	0.888801E+20	0.113381E+22	0.998670E+00
89.0	0.703282E+19	0.261659E+22	0.409780E+21	0.801598E+20	0.107588E+22	0.947646E+00
90.0	0.603184E+19	0.235985E+22	0.369573E+21	0.722946E+20	0.101865E+22	0.897236E+00
91.0	0.515961E+19	0.212830E+22	0.333311E+21	0.652011E+20	0.962228E+21	0.847803E+00
92.0	0.439875E+19	0.191950E+22	0.300610E+21	0.588043E+20	0.907843E+21	0.799636E+00
93.0	0.373707E+19	0.173118E+22	0.271117E+21	0.530351E+20	0.854841E+21	0.752951E+00
94.0	0.315962E+19	0.156134E+22	0.244519E+21	0.478320E+20	0.803707E+21	0.707912E+00
95.0	0.265931E+19	0.140817E+22	0.220532E+21	0.431397E+20	0.754571E+21	0.664633E+00
96.0	0.222443E+19	0.127005E+22	0.198900E+21	0.389081E+20	0.707524E+21	0.623194E+00
97.0	0.184731E+19	0.114548E+22	0.179392E+21	0.350919E+20	0.662618E+21	0.583640E+00
98.0	0.152171E+19	0.103314E+22	0.161799E+21	0.316505E+20	0.619870E+21	0.545987E+00
99.0	0.124074E+19	0.931836E+21	0.145934E+21	0.285470E+20	0.579277E+21	0.510232E+00
100.0	0.999571E+18	0.840475E+21	0.131626E+21	0.257481E+20	0.540814E+21	0.476354E+00
101.0	0.792528E+18	0.758084E+21	0.118722E+21	0.232240E+20	0.504445E+21	0.444320E+00
102.0	0.615455E+18	0.683783E+21	0.107086E+21	0.209478E+20	0.470120E+21	0.414086E+00
103.0	0.464947E+18	0.616778E+21	0.965927E+20	0.188950E+20	0.437778E+21	0.385599E+00
104.0	0.337224E+18	0.556352E+21	0.871295E+20	0.170439E+20	0.407353E+21	0.358800E+00
105.0	0.229354E+18	0.501858E+21	0.785953E+20	0.153745E+20	0.378772E+21	0.333626E+00
106.0	0.139068E+18	0.452734E+21	0.709021E+20	0.138695E+20	0.351960E+21	0.310010E+00
107.0	0.635309E+17	0.408443E+21	0.639657E+20	0.125126E+20	0.326839E+21	0.287883E+00
108.0	0.113446E+16	0.368501E+21	0.577104E+20	0.112890E+20	0.303328E+21	0.267174E+00
109.0	-0.499171E+17	0.332480E+21	0.520692E+20	0.101855E+20	0.281348E+21	0.247814E+00
110.0	-0.915146E+17	0.299996E+21	0.469819E+20	0.919032E+19	0.260819E+21	0.229732E+00
111.0	-0.124739E+18	0.270701E+21	0.423941E+20	0.829286E+19	0.241064E+21	0.212860E+00
112.0	-0.150850E+18	0.244283E+21	0.382568E+20	0.748352E+19	0.223806E+21	0.197130E+00
113.0	-0.170940E+18	0.220458E+21	0.345255E+20	0.675364E+19	0.207171E+21	0.182478E+00
114.0	-0.185931E+18	0.198972E+21	0.311607E+20	0.609541E+19	0.191687E+21	0.168840E+00
115.0	-0.196306E+18	0.179595E+21	0.281261E+20	0.550180E+19	0.177286E+21	0.156155E+00
116.0	-0.203125E+18	0.162122E+21	0.253896E+20	0.496650E+19	0.163901E+21	0.144365E+00
117.0	-0.206977E+18	0.146363E+21	0.229217E+20	0.448372E+19	0.151467E+21	0.133414E+00
118.0	-0.208041E+18	0.132151E+21	0.206960E+20	0.404834E+19	0.139926E+21	0.123248E+00
119.0	-0.207102E+18	0.119335E+21	0.186889E+20	0.365572E+19	0.129219E+21	0.113817E+00
120.0	-0.204384E+18	0.107777E+21	0.168788E+20	0.330163E+19	0.119291E+21	0.105073E+00

0.20211E+13 0.20665E+13 0.21084E+13 0.21161E+13 0.21259E+13 0.21336E+13 0.21437E+13 0.21586E+13 0.21789E+13 0.22040E+13

0.22322E+13 0.22609E+13 0.22866E+13 0.23055E+13 0.23134E+13 0.23057E+13 0.22780E+13 0.22543E+13 0.21403E+13 0.20230E+13

XENON CALCULATION

Sensitivity study (7)

0.255306E+21	0.129560E+20	0.593990E-02	0.444824E+00	0.232114E-01		
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.367168E+20	0.205953E+22	0.803484E+20	0.609791E+20	0.688286E+20	0.606249E-01
2.0	0.550991E+20	0.334630E+22	0.130596E+21	0.999745E+20	0.125866E+21	0.110863E+00
3.0	0.716669E+20	0.450624E+22	0.175891E+21	0.135127E+21	0.177830E+21	0.156635E+00
4.0	0.865997E+20	0.555187E+22	0.216722E+21	0.166814E+21	0.224780E+21	0.197988E+00
5.0	0.100060E+21	0.649443E+22	0.253329E+21	0.195378E+21	0.267122E+21	0.235283E+00
6.0	0.112194E+21	0.734409E+22	0.286707E+21	0.221127E+21	0.305293E+21	0.268905E+00
7.0	0.123131E+21	0.810997E+22	0.316615E+21	0.244337E+21	0.339701E+21	0.299212E+00
8.0	0.132987E+21	0.880017E+22	0.343566E+21	0.265254E+21	0.370112E+21	0.326526E+00
9.0	0.141873E+21	0.942236E+22	0.367862E+21	0.284109E+21	0.398665E+21	0.351148E+00
10.0	0.149882E+21	0.998321E+22	0.389763E+21	0.301105E+21	0.423663E+21	0.373342E+00
11.0	0.157102E+21	0.104888E+23	0.409505E+21	0.316427E+21	0.446577E+21	0.393349E+00
12.0	0.163611E+21	0.109445E+23	0.427301E+21	0.330237E+21	0.467052E+21	0.411384E+00
13.0	0.169477E+21	0.113553E+23	0.443343E+21	0.342687E+21	0.485508E+21	0.427640E+00
14.0	0.174767E+21	0.117256E+23	0.457804E+21	0.353909E+21	0.502146E+21	0.442294E+00
15.0	0.179534E+21	0.120595E+23	0.470840E+21	0.364026E+21	0.517144E+21	0.455505E+00
16.0	0.183831E+21	0.123604E+23	0.482590E+21	0.373145E+21	0.530663E+21	0.467413E+00
17.0	0.187705E+21	0.126316E+23	0.493182E+21	0.381365E+21	0.542850E+21	0.478147E+00
18.0	0.191196E+21	0.128761E+23	0.502729E+21	0.388774E+21	0.553835E+21	0.487822E+00
19.0	0.194344E+21	0.130965E+23	0.511336E+21	0.395459E+21	0.563737E+21	0.496544E+00
20.0	0.197182E+21	0.132952E+23	0.519094E+21	0.401475E+21	0.572663E+21	0.504407E+00
21.0	0.199738E+21	0.134743E+23	0.526089E+21	0.406903E+21	0.580710E+21	0.511495E+00
22.0	0.202044E+21	0.136358E+23	0.532393E+21	0.411795E+21	0.587964E+21	0.517884E+00
23.0	0.204123E+21	0.137813E+23	0.538077E+21	0.416206E+21	0.594503E+21	0.523643E+00
24.0	0.205995E+21	0.139125E+23	0.543199E+21	0.420182E+21	0.600396E+21	0.528834E+00
25.0	0.207686E+21	0.140308E+23	0.547818E+21	0.423766E+21	0.605710E+21	0.533515E+00
26.0	0.209206E+21	0.141374E+23	0.551981E+21	0.426997E+21	0.610500E+21	0.537734E+00
27.0	0.210580E+21	0.142335E+23	0.555733E+21	0.429909E+21	0.614817E+21	0.541536E+00
28.0	0.211816E+21	0.143201E+23	0.559116E+21	0.432534E+21	0.618709E+21	0.544964E+00
29.0	0.212932E+21	0.143982E+23	0.562169E+21	0.434901E+21	0.622217E+21	0.548054E+00
30.0	0.213937E+21	0.144686E+23	0.564914E+21	0.437034E+21	0.625379E+21	0.550839E+00
31.0	0.214843E+21	0.145320E+23	0.567391E+21	0.438957E+21	0.628229E+21	0.553349E+00
32.0	0.215659E+21	0.145892E+23	0.569625E+21	0.440690E+21	0.630799E+21	0.555613E+00
33.0	0.216396E+21	0.146408E+23	0.571638E+21	0.442252E+21	0.633116E+21	0.557654E+00
34.0	0.217061E+21	0.146873E+23	0.573453E+21	0.443661E+21	0.635204E+21	0.559494E+00
35.0	0.217659E+21	0.147292E+23	0.575090E+21	0.444931E+21	0.637086E+21	0.561151E+00
36.0	0.218197E+21	0.147669E+23	0.576564E+21	0.446075E+21	0.638784E+21	0.562646E+00
37.0	0.218684E+21	0.148010E+23	0.577893E+21	0.447107E+21	0.640311E+21	0.563992E+00
38.0	0.219122E+21	0.148316E+23	0.579091E+21	0.448037E+21	0.641691E+21	0.565207E+00
39.0	0.219515E+21	0.148593E+23	0.580172E+21	0.448875E+21	0.642934E+21	0.566302E+00
40.0	0.219873E+21	0.148843E+23	0.581146E+21	0.449631E+21	0.644054E+21	0.567288E+00
41.0	0.220194E+21	0.149067E+23	0.582024E+21	0.450312E+21	0.645064E+21	0.568178E+00
42.0	0.220484E+21	0.149270E+23	0.582815E+21	0.450926E+21	0.645974E+21	0.568980E+00
43.0	0.220744E+21	0.149453E+23	0.583528E+21	0.451480E+21	0.646795E+21	0.569703E+00
44.0	0.220979E+21	0.149617E+23	0.584171E+21	0.451979E+21	0.647535E+21	0.570354E+00
45.0	0.221190E+21	0.149766E+23	0.584750E+21	0.452429E+21	0.648201E+21	0.570941E+00
46.0	0.221384E+21	0.149900E+23	0.585273E+21	0.452834E+21	0.648803E+21	0.571471E+00
47.0	0.221556E+21	0.150020E+23	0.585744E+21	0.453199E+21	0.649345E+21	0.571949E+00
48.0	0.221711E+21	0.150129E+23	0.586169E+21	0.453529E+21	0.649833E+21	0.572378E+00
49.0	0.221850E+21	0.150227E+23	0.586551E+21	0.453826E+21	0.650273E+21	0.572766E+00
50.0	0.221975E+21	0.150315E+23	0.586896E+21	0.454093E+21	0.650670E+21	0.573116E+00
51.0	0.222090E+21	0.150395E+23	0.587207E+21	0.454335E+21	0.651028E+21	0.573431E+00
52.0	0.222192E+21	0.150467E+23	0.587487E+21	0.454552E+21	0.651351E+21	0.573716E+00
53.0	0.222287E+21	0.150531E+23	0.587741E+21	0.454749E+21	0.651641E+21	0.573971E+00
54.0	0.222368E+21	0.150590E+23	0.587968E+21	0.454925E+21	0.651903E+21	0.574202E+00
55.0	0.222443E+21	0.150642E+23	0.588173E+21	0.455084E+21	0.652139E+21	0.574410E+00
56.0	0.222511E+21	0.150690E+23	0.588358E+21	0.455228E+21	0.652353E+21	0.574598E+00
57.0	0.222573E+21	0.150732E+23	0.588226E+21	0.455358E+21	0.652544E+21	0.574766E+00
58.0	0.222629E+21	0.150771E+23	0.588676E+21	0.455475E+21	0.652717E+21	0.574919E+00
59.0	0.222677E+21	0.150805E+23	0.588810E+21	0.455579E+21	0.652873E+21	0.575056E+00
60.0	0.222721E+21	0.150837E+23	0.588932E+21	0.455673E+21	0.653013E+21	0.575179E+00
61.0	0.222762E+21	0.150865E+23	0.589043E+21	0.455760E+21	0.653141E+21	0.575292E+00
62.0	0.222797E+21	0.150890E+23	0.589142E+21	0.455837E+21	0.653254E+21	0.575392E+00
63.0	0.222831E+21	0.150913E+23	0.589231E+21	0.455905E+21	0.653357E+21	0.575482E+00
64.0	0.222862E+21	0.150934E+23	0.589313E+21	0.455969E+21	0.653450E+21	0.575565E+00
65.0	0.222888E+21	0.150952E+23	0.589384E+21	0.456024E+21	0.653533E+21	0.575637E+00
66.0	0.222910E+21	0.150969E+23	0.589450E+21	0.456075E+21	0.653607E+21	0.575703E+00
67.0	0.222930E+21	0.150985E+23	0.589511E+21	0.456123E+21	0.653678E+21	0.575765E+00
68.0	0.222952E+21	0.150997E+23	0.589560E+21	0.456161E+21	0.653735E+21	0.575816E+00
69.0	0.222970E+21	0.151010E+23	0.589610E+21	0.456199E+21	0.653790E+21	0.575864E+00
70.0	0.222986E+21	0.151022E+23	0.589657E+21	0.456237E+21	0.653845E+21	0.575913E+00
71.0	0.222998E+21	0.151031E+23	0.589691E+21	0.456262E+21	0.653886E+21	0.575949E+00
72.0	0.223011E+21	0.151039E+23	0.589724E+21	0.456288E+21	0.653924E+21	0.575982E+00
73.0	0.138648E+21	0.133842E+23	0.522872E+21	0.409956E+21	0.109432E+22	0.963891E+00
74.0	0.108654E+21	0.121228E+23	0.473596E+21	0.371348E+21	0.137906E+22	0.121469E+01
75.0	0.880670E+20	0.109629E+23	0.428282E+21	0.335829E+21	0.156438E+22	0.137792E+01
76.0	0.727000E+20	0.990598E+22	0.386992E+21	0.303457E+21	0.168038E+22	0.148009E+01
77.0	0.607083E+20	0.894660E+22	0.349213E+21	0.274071E+21	0.174982E+22	0.153774E+01
78.0	0.510883E+20	0.807753E+22	0.315561E+21	0.247450E+21	0.177361E+22	0.156221E+01
79.0	0.432274E+20	0.729138E+22	0.284849E+21	0.223368E+21	0.177309E+22	0.156175E+01
80.0	0.367099E+20	0.658080E+22	0.257089E+21	0.201600E+21	0.175127E+22	0.154254E+01
81.0	0.312482E+20	0.593874E+22	0.232006E+21	0.181932E+21	0.171351E+22	0.150927E+01
82.0	0.266318E+20	0.535883E+22	0.209351E+21	0.164167E+21	0.166395E+22	0.146562E+01
83.0	0.227053E+20	0.483520E+22	0.188895E+21	0.148126E+21	0.160385E+22	0.141443E+01
84.0	0.193494E+20	0.436250E+22	0.170428E+21	0.133645E+21	0.154179E+22	0.135803E+01
85.0	0.164698E+20	0.393584E+22	0.153760E+21	0.120574E+21	0.147881E+22	0.129814E+01
86.0	0.139941E+20	0.355078E+22	0.138717E+21	0.108778E+21	0.140549E+22	0.123621E+01
87.0	0.118612E+20	0.320331E+22	0.125142E+21	0.981334E+20	0.133215E+22	0.117336E+01
88.0	0.100220E+20	0.288979E+22	0.112894E+21	0.885287E+20	0.126076E+22	0.111049E+01
89.0	0.843627E+19	0.260691E+22	0.101843E+21	0.798626E+20	0.119014E+22	0.104829E+01
90.0	0.706989E+19	0.235169E+22	0.918725E+20	0.720441E+20	0.112090E+22	0.987295E+00
91.0	0.589296E+19	0.212144E+22	0.828774E+20	0.649904E+20	0.105350E+22	0.927928E+00
92.0	0.488062E+19	0.191372E+22	0.747626E+20	0.586269E+20	0.988290E+21	0.870494E+00
93.0	0.401105E+19	0.172633E+22	0.674420E+20	0.528863E+20	0.925538E+21	0.815222E+00
94.0	0.326560E+19	0.155729E+22	0.608381E+20	0.477077E+20	0.865417E+21	0.762267E+00
95.0	0.262887E+19	0.140481E+22	0.548811E+20	0.430363E+20	0.808042E+21	0.711731E+00
96.0	0.208498E+19	0.126726E+22	0.495074E+20	0.388224E+20	0.753476E+21	0.663669E+00
97.0	0.162258E+19	0.114318E+22	0.446602E+20	0.350214E+20	0.701742E+21	0.618101E+00
98.0	0.123148E+19	0.103126E+22	0.402878E+20	0.315926E+20	0.652615E+21	0.575005E+00
99.0	0.902000E+18	0.930301E+21	0.363437E+20	0.284998E+20	0.606653E+21	0.534346E+00
100.0	0.625683E+18	0.839233E+21	0.327860E+20	0.257099E+20	0.563196E+21	0.496068E+00
101.0	0.395094E+18	0.757089E+21	0.295769E+20	0.231934E+20	0.522366E+21	0.460105E+00
102.0	0.204112E+18	0.682995E+21	0.266823E+20	0.209235E+20	0.484074E+21	0.426377E+00
103.0	0.470335E+17	0.616163E+21	0.240714E+20	0.188761E+20	0.448222E+21	0.394798E+00
104.0	-0.808906E+17	0.555879E+21	0.217163E+20	0.170293E+20	0.414706E+21	0.365277E+00
105.0	-0.183886E+18	0.501505E+21	0.195921E+20	0.153636E+20	0.383416E+21	0.337716E+00
106.0	-0.265232E+18	0.452481E+21	0.176769E+20	0.138617E+20	0.354245E+21	0.312022E+00
107.0	-0.328585E+18	0.408268E+21	0.159497E+20	0.125072E+20	0.327082E+21	0.288096E+00
108.0	-0.376724E+18	0.368390E+21	0.143917E+20	0.112856E+20	0.301816E+21	0.265842E+00
109.0	-0.411958E+18	0.332421E+21	0.129866E+20	0.101836E+20	0.278340E+21	0.245165E+00
110.0	-0.436432E+18	0.299978E+21	0.117191E+20	0.918974E+19	0.256549E+21	0.225970E+00
111.0	-0.451895E+18	0.270715E+21	0.105759E+20	0.829327E+19	0.236339E+21	0.208170E+00
112.0	-0.459878E+18	0.244322E+21	0.954481E+19	0.748469E+19	0.217613E+21	0.191676E+00
113.0	-0.461710E+18	0.220516E+21	0.861478E+19	0.675539E+19	0.200276E+21	0.176405E+00
114.0	-0.458542E+18	0.199043E+21	0.777594E+19	0.609758E+19	0.184236E+21	0.162277E+00
115.0	-0.451351E+18	0.179676E+21	0.701934E+19	0.550427E+19	0.169409E+21	0.149217E+00
116.0	-0.440946E+18	0.162208E+21	0.633692E+19	0.496914E+19	0.155710E+21	0.137151E+00
117.0	-0.428024E+18	0.146453E+21	0.572141E+19	0.448647E+19	0.143064E+21	0.126012E+00
118.0	-0.413234E+18	0.132242E+21	0.516626E+19	0.405113E+19	0.131395E+21	0.115734E+00
119.0	-0.397044E+18	0.119425E+21	0.466554E+19	0.365847E+19	0.120635E+21	0.106257E+00
120.0	-0.379838E+18	0.107865E+21	0.421392E+19	0.330432E+19	0.110719E+21	0.975224E-01

0.16461E+13 0.17660E+13 0.18872E+13 0.19696E+13 0.20747E+13 0.21445E+13 0.21914E+13 0.22224E+13 0.22416E+13 0.22506E+13

0.22494E+13 0.22368E+13 0.22106E+13 0.21681E+13 0.21062E+13 0.20217E+13 0.19117E+13 0.18425E+13 0.17425E+13 0.16406E+13

XENON CALCULATION

Sensitivity study (8)

0.255306E+21	0.125560E+20	0.593990E-02	0.444824E+00	0.232114E-01
0.100997E-07	0.845335E-02	0.544489E+00	0.172800E-02	0.126600E-02

0.252000E-01	0.381471E-03	0.168329E-09	0.140889E-03	0.197075E-02		
1.0	0.118922E+21	0.181019E+22	0.706201E+20	0.535815E+20	0.190047E+21	0.132163E+00
2.0	0.182827E+21	0.295645E+22	0.115381E+21	0.883192E+20	0.296552E+21	0.261206E+00
3.0	0.240426E+21	0.398976E+22	0.155731E+21	0.119633E+21	0.430729E+21	0.379390E+00
4.0	0.292340E+21	0.492124E+22	0.192105E+21	0.147862E+21	0.552083E+21	0.486279E+00
5.0	0.339135E+21	0.576092E+22	0.224894E+21	0.173308E+21	0.661251E+21	0.582700E+00
6.0	0.381317E+21	0.651783E+22	0.254451E+21	0.196247E+21	0.760243E+21	0.669628E+00
7.0	0.419340E+21	0.720013E+22	0.281094E+21	0.216924E+21	0.849209E+21	0.747991E+00
8.0	0.453605E+21	0.781500E+22	0.305104E+21	0.235557E+21	0.929391E+21	0.818616E+00
9.0	0.484494E+21	0.836927E+22	0.326748E+21	0.252354E+21	0.100167E+22	0.882276E+00
10.0	0.512337E+21	0.886890E+22	0.346258E+21	0.267495E+21	0.106681E+22	0.939658E+00
11.0	0.537438E+21	0.931928E+22	0.363846E+21	0.281144E+21	0.112554E+22	0.991384E+00
12.0	0.560064E+21	0.972528E+22	0.379699E+21	0.293448E+21	0.117848E+22	0.103801E+01
13.0	0.580459E+21	0.100914E+23	0.393990E+21	0.304538E+21	0.122620E+22	0.108004E+01
14.0	0.598843E+21	0.104211E+23	0.406872E+21	0.314536E+21	0.126921E+22	0.111793E+01
15.0	0.615418E+21	0.107185E+23	0.418484E+21	0.323547E+21	0.130798E+22	0.115208E+01
16.0	0.630361E+21	0.109866E+23	0.428952E+21	0.331671E+21	0.134293E+22	0.118286E+01
17.0	0.643832E+21	0.112282E+23	0.438388E+21	0.338994E+21	0.137443E+22	0.121061E+01
18.0	0.655971E+21	0.114460E+23	0.446892E+21	0.345594E+21	0.140283E+22	0.123562E+01
19.0	0.666914E+21	0.116424E+23	0.454560E+21	0.351544E+21	0.142843E+22	0.125817E+01
20.0	0.676778E+21	0.118194E+23	0.461472E+21	0.356909E+21	0.145151E+22	0.127850E+01
21.0	0.685670E+21	0.119789E+23	0.467702E+21	0.361744E+21	0.147231E+22	0.129683E+01
22.0	0.693684E+21	0.121227E+23	0.473319E+21	0.366102E+21	0.149107E+22	0.131335E+01
23.0	0.700911E+21	0.122524E+23	0.478382E+21	0.370032E+21	0.150798E+22	0.132824E+01
24.0	0.707426E+21	0.123693E+23	0.482946E+21	0.373574E+21	0.152321E+22	0.134166E+01
25.0	0.713298E+21	0.124746E+23	0.487060E+21	0.376767E+21	0.153695E+22	0.135376E+01
26.0	0.718590E+21	0.125696E+23	0.490769E+21	0.379645E+21	0.154934E+22	0.136467E+01
27.0	0.723362E+21	0.126552E+23	0.494112E+21	0.382239E+21	0.156050E+22	0.137450E+01
28.0	0.727664E+21	0.127324E+23	0.497125E+21	0.384578E+21	0.157056E+22	0.138336E+01
29.0	0.731540E+21	0.128020E+23	0.499842E+21	0.386689E+21	0.157963E+22	0.139135E+01
30.0	0.735033E+21	0.128647E+23	0.502291E+21	0.388587E+21	0.158781E+22	0.139856E+01
31.0	0.738183E+21	0.129212E+23	0.504498E+21	0.390299E+21	0.159518E+22	0.140505E+01
32.0	0.741021E+21	0.129721E+23	0.506487E+21	0.391843E+21	0.160182E+22	0.141090E+01
33.0	0.743581E+21	0.130181E+23	0.508281E+21	0.393235E+21	0.160781E+22	0.141617E+01
34.0	0.745892E+21	0.130595E+23	0.509898E+21	0.394490E+21	0.161321E+22	0.142093E+01
35.0	0.747971E+21	0.130968E+23	0.511356E+21	0.395622E+21	0.161808E+22	0.142522E+01
36.0	0.749846E+21	0.131305E+23	0.512669E+21	0.396641E+21	0.162247E+22	0.142908E+01
37.0	0.751535E+21	0.131608E+23	0.513853E+21	0.397560E+21	0.162642E+22	0.143256E+01
38.0	0.753059E+21	0.131881E+23	0.514920E+21	0.398388E+21	0.162998E+22	0.143570E+01
39.0	0.754437E+21	0.132128E+23	0.515883E+21	0.399135E+21	0.163319E+22	0.143853E+01
40.0	0.755676E+21	0.132349E+23	0.516749E+21	0.399808E+21	0.163607E+22	0.144106E+01
41.0	0.756791E+21	0.132550E+23	0.517531E+21	0.400414E+21	0.163867E+22	0.144336E+01
42.0	0.757801E+21	0.132730E+23	0.518236E+21	0.400961E+21	0.164103E+22	0.144543E+01
43.0	0.758702E+21	0.132893E+23	0.518872E+21	0.401455E+21	0.164315E+22	0.144730E+01
44.0	0.759524E+21	0.133040E+23	0.519444E+21	0.401899E+21	0.164506E+22	0.144898E+01
45.0	0.760262E+21	0.133172E+23	0.519961E+21	0.402300E+21	0.164678E+22	0.145050E+01
46.0	0.760925E+21	0.133291E+23	0.520426E+21	0.402660E+21	0.164834E+22	0.145187E+01
47.0	0.761525E+21	0.133398E+23	0.520845E+21	0.402986E+21	0.164973E+22	0.145310E+01
48.0	0.762065E+21	0.133495E+23	0.521224E+21	0.403280E+21	0.165100E+22	0.145421E+01
49.0	0.762547E+21	0.133583E+23	0.521565E+21	0.403545E+21	0.165214E+22	0.145522E+01
50.0	0.762991E+21	0.133661E+23	0.521871E+21	0.403782E+21	0.165316E+22	0.145611E+01
51.0	0.763384E+21	0.133732E+23	0.522149E+21	0.403998E+21	0.165409E+22	0.145694E+01
52.0	0.763740E+21	0.133796E+23	0.522398E+21	0.404192E+21	0.165492E+22	0.145766E+01
53.0	0.764061E+21	0.133854E+23	0.522624E+21	0.404366E+21	0.165567E+22	0.145833E+01
54.0	0.764352E+21	0.133906E+23	0.522826E+21	0.404523E+21	0.165634E+22	0.145892E+01
55.0	0.764614E+21	0.133952E+23	0.523009E+21	0.404665E+21	0.165695E+22	0.145946E+01
56.0	0.764851E+21	0.133995E+23	0.523174E+21	0.404794E+21	0.165751E+22	0.145995E+01
57.0	0.765064E+21	0.134033E+23	0.523323E+21	0.404909E+21	0.165800E+22	0.146038E+01
58.0	0.765254E+21	0.134067E+23	0.523456E+21	0.405012E+21	0.165844E+22	0.146077E+01
59.0	0.765426E+21	0.134098E+23	0.523577E+21	0.405106E+21	0.165885E+22	0.146113E+01
60.0	0.765579E+21	0.134126E+23	0.523686E+21	0.405190E+21	0.165922E+22	0.146146E+01
61.0	0.765719E+21	0.134151E+23	0.523785E+21	0.405268E+21	0.165956E+22	0.146175E+01
62.0	0.765849E+21	0.134173E+23	0.523872E+21	0.405335E+21	0.165982E+22	0.146199E+01
63.0	0.765959E+21	0.134194E+23	0.523951E+21	0.405396E+21	0.166009E+22	0.146222E+01
64.0	0.766063E+21	0.134212E+23	0.524024E+21	0.405453E+21	0.166034E+22	0.146244E+01
65.0	0.766154E+21	0.134229E+23	0.524088E+21	0.405503E+21	0.166056E+22	0.146264E+01
66.0	0.766237E+21	0.134244E+23	0.524147E+21	0.405548E+21	0.166076E+22	0.146281E+01
67.0	0.766312E+21	0.134258E+23	0.524202E+21	0.405591E+21	0.166095E+22	0.146297E+01
68.0	0.766375E+21	0.134269E+23	0.524245E+21	0.405625E+21	0.166110E+22	0.146311E+01
69.0	0.766441E+21	0.134280E+23	0.524289E+21	0.405658E+21	0.166123E+22	0.146323E+01
70.0	0.766503E+21	0.134291E+23	0.524331E+21	0.405692E+21	0.166137E+22	0.146335E+01
71.0	0.766544E+21	0.134298E+23	0.524360E+21	0.405714E+21	0.166146E+22	0.146343E+01
72.0	0.766586E+21	0.134306E+23	0.524390E+21	0.405737E+21	0.166156E+22	0.146351E+01
73.0	0.499827E+21	0.122773E+23	0.479615E+21	0.375797E+21	0.328417E+22	0.289008E+01
74.0	0.383754E+21	0.113046E+23	0.441624E+21	0.346150E+21	0.431165E+22	0.379774E+01
75.0	0.306732E+21	0.103292E+23	0.403523E+21	0.316334E+21	0.498018E+22	0.438658E+01
76.0	0.250551E+21	0.940277E+22	0.367331E+21	0.287985E+21	0.540030E+22	0.475663E+01
77.0	0.207452E+21	0.854077E+22	0.333656E+21	0.261598E+21	0.564443E+22	0.496902E+01
78.0	0.173320E+21	0.774691E+22	0.302644E+21	0.237291E+21	0.575050E+22	0.506509E+01
79.0	0.145709E+21	0.702017E+22	0.274253E+21	0.215036E+21	0.576096E+22	0.507430E+01
80.0	0.123009E+21	0.635732E+22	0.248358E+21	0.194735E+21	0.569768E+22	0.501857E+01
81.0	0.104118E+21	0.575408E+22	0.224791E+21	0.176260E+21	0.557939E+22	0.491438E+01
82.0	0.882421E+20	0.520605E+22	0.203382E+21	0.159474E+21	0.542055E+22	0.477447E+01
83.0	0.748041E+20	0.470882E+22	0.183957E+21	0.144244E+21	0.523641E+22	0.460876E+01
84.0	0.633659E+20	0.425809E+22	0.166348E+21	0.130437E+21	0.502381E+22	0.442501E+01
85.0	0.535920E+20	0.384980E+22	0.150398E+21	0.117931E+21	0.480469E+22	0.422937E+01
86.0	0.452180E+20	0.348015E+22	0.135957E+21	0.106608E+21	0.457156E+22	0.402667E+01
87.0	0.380308E+20	0.314563E+22	0.122889E+21	0.963608E+20	0.433776E+22	0.382074E+01
88.0	0.318583E+20	0.284300E+22	0.111066E+21	0.870905E+20	0.410370E+22	0.361457E+01
89.0	0.265573E+20	0.256928E+22	0.100373E+21	0.787057E+20	0.387405E+22	0.341053E+01
90.0	0.220075E+20	0.232177E+22	0.907033E+20	0.711236E+20	0.364488E+22	0.321045E+01
91.0	0.181069E+20	0.209798E+22	0.819609E+20	0.642685E+20	0.342379E+22	0.301570E+01
92.0	0.147689E+20	0.189568E+22	0.740578E+20	0.580715E+20	0.320994E+22	0.282734E+01
93.0	0.119175E+20	0.171282E+22	0.669141E+20	0.524699E+20	0.300920E+22	0.264612E+01
94.0	0.948910E+19	0.154756E+22	0.604576E+20	0.474071E+20	0.280716E+22	0.247257E+01
95.0	0.742659E+19	0.139820E+22	0.546226E+20	0.428318E+20	0.261920E+22	0.230701E+01
96.0	0.568138E+19	0.126322E+22	0.493497E+20	0.386971E+20	0.244052E+22	0.214963E+01
97.0	0.421028E+19	0.114126E+22	0.445849E+20	0.349608E+20	0.227418E+22	0.200047E+01
98.0	0.297622E+19	0.103105E+22	0.402795E+20	0.315848E+20	0.211113E+22	0.185951E+01
99.0	0.194677E+19	0.931472E+21	0.363694E+20	0.285344E+20	0.196025E+22	0.172660E+01
100.0	0.109329E+19	0.841503E+21	0.328746E+20	0.257783E+20	0.181830E+22	0.160158E+01
101.0	0.391236E+18	0.760218E+21	0.296991E+20	0.232883E+20	0.168304E+22	0.148420E+01
102.0	-0.181381E+18	0.686782E+21	0.268302E+20	0.210387E+20	0.156016E+22	0.137421E+01
103.0	-0.642859E+18	0.620440E+21	0.242384E+20	0.190064E+20	0.144934E+22	0.127130E+01
104.0	-0.101011E+19	0.560506E+21	0.218970E+20	0.171704E+20	0.133421E+22	0.117518E+01
105.0	-0.129690E+19	0.506364E+21	0.197819E+20	0.155118E+20	0.123242E+22	0.108552E+01
106.0	-0.151445E+19	0.457475E+21	0.178719E+20	0.140141E+20	0.113760E+22	0.100200E+01
107.0	-0.167512E+19	0.413317E+21	0.161469E+20	0.126614E+20	0.104938E+22	0.924303E+00
108.0	-0.178792E+19	0.373430E+21	0.145886E+20	0.114395E+20	0.967398E+21	0.852093E+00
109.0	-0.186256E+19	0.337406E+21	0.131813E+20	0.103359E+20	0.891307E+21	0.785071E+00
110.0	-0.190344E+19	0.304865E+21	0.119100E+20	0.933909E+19	0.820771E+21	0.722942E+00
111.0	-0.191688E+19	0.275472E+21	0.107617E+20	0.843867E+19	0.755415E+21	0.665376E+00
112.0	-0.190800E+19	0.248923E+21	0.972457E+19	0.762538E+19	0.694912E+21	0.612084E+00
113.0	-0.188120E+19	0.224944E+21	0.878776E+19	0.689079E+19	0.638945E+21	0.562788E+00
114.0	-0.184015E+19	0.203285E+21	0.794164E+19	0.622730E+19	0.587217E+21	0.517226E+00
115.0	-0.178797E+19	0.183723E+21	0.717742E+19	0.562804E+19	0.539442E+21	0.475145E+00
116.0	-0.172730E+19	0.166055E+21	0.648720E+19	0.508680E+19	0.495347E+21	0.436306E+00
117.0	-0.166040E+19	0.150098E+21	0.586381E+19	0.459798E+19	0.454877E+21	0.400483E+00
118.0	-0.158909E+19	0.135687E+21	0.530061E+19	0.415650E+19	0.417188E+21	0.367463E+00
119.0	-0.151498E+19	0.122671E+21	0.479233E+19	0.375778E+19	0.382654E+21	0.337045E+00
120.0	-0.143935E+19	0.110917E+21	0.433312E+19	0.339769E+19	0.350857E+21	0.309038E+00

0.56083E+13 0.57619E+13 0.59071E+13 0.62305E+13 0.66450E+13 0.69202E+13 0.71022E+13 0.72178E+13 0.72826E+13 0.73039E+13

0.72837E+13 0.72193E+13 0.71051E+13 0.69333E+13 0.66950E+13 0.63811E+13 0.59835E+13 0.57382E+13 0.56280E+13 0.55106E+13

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.444824E+00	0.232114E-01	Sensitivity study (9)
0.100997E-07	0.845335E-01	0.544489E+00	0.172800E-02	0.126600E-02	

0.252000E-01	0.381471E-04	0.168329E-09	0.140869E-02	0.197075E-03		
1.0	0.948727E+19	0.214208E+22	0.835692E+20	0.634265E+20	0.400528E+20	0.352788E-01
2.0	0.122706E+20	0.347718E+22	0.135704E+21	0.103887E+21	0.674437E+20	0.594050E-01
3.0	0.147791E+20	0.468069E+22	0.182700E+21	0.140359E+21	0.922451E+20	0.812503E-01
4.0	0.170397E+20	0.576557E+22	0.225064E+21	0.173236E+21	0.114623E+21	0.100961E+00
5.0	0.190777E+20	0.674352E+22	0.263253E+21	0.202873E+21	0.134800E+21	0.118733E+00
6.0	0.209153E+20	0.762507E+22	0.297676E+21	0.229588E+21	0.152987E+21	0.134752E+00
7.0	0.225707E+20	0.841972E+22	0.328707E+21	0.253670E+21	0.169383E+21	0.149194E+00
8.0	0.240630E+20	0.913583E+22	0.356671E+21	0.275371E+21	0.184158E+21	0.162208E+00
9.0	0.254086E+20	0.978138E+22	0.381879E+21	0.294935E+21	0.197478E+21	0.173940E+00
10.0	0.266214E+20	0.103633E+23	0.404602E+21	0.312569E+21	0.209484E+21	0.184515E+00
11.0	0.277150E+20	0.108878E+23	0.425065E+21	0.328465E+21	0.220306E+21	0.194048E+00
12.0	0.287023E+20	0.113607E+23	0.443549E+21	0.342795E+21	0.230062E+21	0.202641E+00
13.0	0.295877E+20	0.117869E+23	0.460193E+21	0.355711E+21	0.238857E+21	0.210387E+00
14.0	0.303904E+20	0.121711E+23	0.475197E+21	0.367356E+21	0.246784E+21	0.217370E+00
15.0	0.311107E+20	0.125175E+23	0.488722E+21	0.377852E+21	0.253930E+21	0.223664E+00
16.0	0.317623E+20	0.128297E+23	0.500914E+21	0.387313E+21	0.260372E+21	0.229338E+00
17.0	0.323494E+20	0.131111E+23	0.511903E+21	0.395842E+21	0.266179E+21	0.234453E+00
18.0	0.328793E+20	0.133648E+23	0.521808E+21	0.403529E+21	0.271412E+21	0.239062E+00
19.0	0.333532E+20	0.135935E+23	0.530738E+21	0.410459E+21	0.276131E+21	0.243218E+00
20.0	0.337841E+20	0.137996E+23	0.538788E+21	0.416706E+21	0.280384E+21	0.246965E+00
21.0	0.341706E+20	0.139854E+23	0.546045E+21	0.422338E+21	0.284218E+21	0.250342E+00
22.0	0.345192E+20	0.141530E+23	0.552586E+21	0.427414E+21	0.287674E+21	0.253386E+00
23.0	0.348340E+20	0.143040E+23	0.558483E+21	0.431991E+21	0.290790E+21	0.256131E+00
24.0	0.351185E+20	0.144401E+23	0.563799E+21	0.436116E+21	0.293599E+21	0.258604E+00
25.0	0.353720E+20	0.145628E+23	0.568590E+21	0.439835E+21	0.296131E+21	0.260834E+00
26.0	0.356031E+20	0.146734E+23	0.572910E+21	0.443187E+21	0.298413E+21	0.262845E+00
27.0	0.358130E+20	0.147731E+23	0.576804E+21	0.446208E+21	0.300470E+21	0.264656E+00
28.0	0.359993E+20	0.148630E+23	0.580313E+21	0.448932E+21	0.302324E+21	0.266290E+00
29.0	0.361681E+20	0.149440E+23	0.583477E+21	0.451388E+21	0.303996E+21	0.267762E+00
30.0	0.363189E+20	0.150171E+23	0.586328E+21	0.453601E+21	0.305503E+21	0.269089E+00
31.0	0.364572E+20	0.150829E+23	0.588899E+21	0.455596E+21	0.306861E+21	0.270286E+00
32.0	0.365793E+20	0.151422E+23	0.591216E+21	0.457394E+21	0.308085E+21	0.271364E+00
33.0	0.366919E+20	0.151957E+23	0.593305E+21	0.459015E+21	0.309189E+21	0.272336E+00
34.0	0.367927E+20	0.152440E+23	0.595189E+21	0.460477E+21	0.310184E+21	0.273213E+00
35.0	0.368828E+20	0.152874E+23	0.596886E+21	0.461794E+21	0.311081E+21	0.274003E+00
36.0	0.369637E+20	0.153266E+23	0.598416E+21	0.462982E+21	0.311889E+21	0.274715E+00
37.0	0.370387E+20	0.153619E+23	0.599795E+21	0.464052E+21	0.312618E+21	0.275357E+00
38.0	0.371038E+20	0.153937E+23	0.601038E+21	0.465017E+21	0.313275E+21	0.275935E+00
39.0	0.371634E+20	0.154225E+23	0.602159E+21	0.465887E+21	0.313867E+21	0.276457E+00
40.0	0.372184E+20	0.154483E+23	0.603170E+21	0.466671E+21	0.314401E+21	0.276927E+00
41.0	0.372669E+20	0.154717E+23	0.604081E+21	0.467378E+21	0.314882E+21	0.277351E+00
42.0	0.373103E+20	0.154927E+23	0.604902E+21	0.468015E+21	0.315316E+21	0.277733E+00
43.0	0.373505E+20	0.155116E+23	0.605642E+21	0.468589E+21	0.315707E+21	0.278077E+00
44.0	0.373854E+20	0.155287E+23	0.606308E+21	0.469107E+21	0.316059E+21	0.278388E+00
45.0	0.374173E+20	0.155441E+23	0.606910E+21	0.469573E+21	0.316377E+21	0.278668E+00
46.0	0.374480E+20	0.155580E+23	0.607452E+21	0.469994E+21	0.316663E+21	0.278920E+00
47.0	0.374728E+20	0.155705E+23	0.607941E+21	0.470373E+21	0.316922E+21	0.279147E+00
48.0	0.374974E+20	0.155816E+23	0.608381E+21	0.470715E+21	0.317155E+21	0.279353E+00
49.0	0.375174E+20	0.155920E+23	0.608778E+21	0.471023E+21	0.317364E+21	0.279537E+00
50.0	0.375375E+20	0.156011E+23	0.609136E+21	0.471301E+21	0.317554E+21	0.279704E+00
51.0	0.375544E+20	0.156094E+23	0.609459E+21	0.471551E+21	0.317724E+21	0.279854E+00
52.0	0.375684E+20	0.156168E+23	0.609749E+21	0.471777E+21	0.317878E+21	0.279990E+00
53.0	0.375843E+20	0.156236E+23	0.610013E+21	0.471981E+21	0.318016E+21	0.280112E+00
54.0	0.375960E+20	0.156296E+23	0.610248E+21	0.472164E+21	0.318141E+21	0.280221E+00
55.0	0.376089E+20	0.156350E+23	0.610461E+21	0.472329E+21	0.318253E+21	0.280320E+00
56.0	0.376176E+20	0.156400E+23	0.610653E+21	0.472478E+21	0.318354E+21	0.280409E+00
57.0	0.376271E+20	0.156444E+23	0.610827E+21	0.472613E+21	0.318446E+21	0.280490E+00
58.0	0.376356E+20	0.156484E+23	0.610982E+21	0.472734E+21	0.318529E+21	0.280563E+00
59.0	0.376433E+20	0.156520E+23	0.611122E+21	0.472842E+21	0.318603E+21	0.280628E+00
60.0	0.376493E+20	0.156552E+23	0.611248E+21	0.472940E+21	0.318669E+21	0.280687E+00
61.0	0.376568E+20	0.156582E+23	0.611364E+21	0.473030E+21	0.318730E+21	0.280741E+00
62.0	0.376613E+20	0.156608E+23	0.611466E+21	0.473109E+21	0.318784E+21	0.280788E+00
63.0	0.376647E+20	0.156632E+23	0.611558E+21	0.473181E+21	0.318833E+21	0.280831E+00
64.0	0.376722E+20	0.156653E+23	0.611644E+21	0.473247E+21	0.318878E+21	0.280870E+00
65.0	0.376739E+20	0.156672E+23	0.611717E+21	0.473304E+21	0.318917E+21	0.280905E+00
66.0	0.376774E+20	0.156690E+23	0.611785E+21	0.473357E+21	0.318952E+21	0.280936E+00
67.0	0.376806E+20	0.156706E+23	0.611849E+21	0.473407E+21	0.318986E+21	0.280966E+00
68.0	0.376861E+20	0.156719E+23	0.611900E+21	0.473446E+21	0.319014E+21	0.280990E+00
69.0	0.376867E+20	0.156732E+23	0.611951E+21	0.473486E+21	0.319041E+21	0.281014E+00
70.0	0.376904E+20	0.156745E+23	0.612001E+21	0.473525E+21	0.319067E+21	0.281037E+00
71.0	0.376910E+20	0.156754E+23	0.612035E+21	0.473551E+21	0.319085E+21	0.281052E+00
72.0	0.376953E+20	0.156762E+23	0.612070E+21	0.473577E+21	0.319103E+21	0.281068E+00
73.0	0.198949E+20	0.137506E+23	0.537190E+21	0.421254E+21	0.364918E+21	0.321423E+00
74.0	0.165380E+20	0.124001E+23	0.484431E+21	0.379883E+21	0.398437E+21	0.350946E+00
75.0	0.139650E+20	0.111811E+23	0.436608E+21	0.342539E+21	0.419558E+21	0.369550E+00
76.0	0.118977E+20	0.100814E+23	0.393845E+21	0.308848E+21	0.431521E+21	0.379911E+00
77.0	0.101932E+20	0.908943E+22	0.355093E+21	0.278460E+21	0.435871E+21	0.383919E+00
78.0	0.876993E+19	0.819488E+22	0.320147E+21	0.251055E+21	0.434623E+21	0.382996E+00
79.0	0.756083E+19	0.738840E+22	0.288640E+21	0.226348E+21	0.429439E+21	0.378253E+00
80.0	0.653186E+19	0.666133E+22	0.260236E+21	0.204074E+21	0.420714E+21	0.370569E+00
81.0	0.564990E+19	0.600575E+22	0.234625E+21	0.183990E+21	0.409447E+21	0.360645E+00
82.0	0.488989E+19	0.541467E+22	0.211533E+21	0.165881E+21	0.396283E+21	0.349050E+00
83.0	0.423161E+19	0.488173E+22	0.190713E+21	0.149555E+21	0.381746E+21	0.336245E+00
84.0	0.366106E+19	0.440125E+22	0.171942E+21	0.134835E+21	0.366263E+21	0.322608E+00
85.0	0.316576E+19	0.396804E+22	0.155018E+21	0.121563E+21	0.350176E+21	0.308438E+00
86.0	0.273381E+19	0.357748E+22	0.139760E+21	0.109598E+21	0.333766E+21	0.293984E+00
87.0	0.235783E+19	0.322536E+22	0.126004E+21	0.988107E+20	0.317658E+21	0.279444E+00
88.0	0.202977E+19	0.290791E+22	0.113602E+21	0.890854E+20	0.300833E+21	0.264977E+00
89.0	0.174379E+19	0.262170E+22	0.102421E+21	0.803173E+20	0.284636E+21	0.250710E+00
90.0	0.149420E+19	0.236366E+22	0.923409E+20	0.724126E+20	0.268779E+21	0.236743E+00
91.0	0.127667E+19	0.213106E+22	0.832333E+20	0.652862E+20	0.253350E+21	0.223153E+00
92.0	0.108692E+19	0.192134E+22	0.750604E+20	0.588614E+20	0.238415E+21	0.209998E+00
93.0	0.921954E+18	0.173228E+22	0.676742E+20	0.530692E+20	0.224024E+21	0.197323E+00
94.0	0.778253E+18	0.156183E+22	0.610152E+20	0.478474E+20	0.210211E+21	0.185156E+00
95.0	0.653649E+18	0.140816E+22	0.550121E+20	0.431398E+20	0.196998E+21	0.173518E+00
96.0	0.545779E+18	0.126963E+22	0.496001E+20	0.388957E+20	0.184397E+21	0.162419E+00
97.0	0.452279E+18	0.114473E+22	0.447209E+20	0.350695E+20	0.172413E+21	0.151863E+00
98.0	0.371459E+18	0.103214E+22	0.403222E+20	0.316201E+20	0.161042E+21	0.141847E+00
99.0	0.301931E+18	0.930632E+21	0.363366E+20	0.285104E+20	0.150277E+21	0.132365E+00
100.0	0.242306E+18	0.839119E+21	0.327815E+20	0.257068E+20	0.140106E+21	0.123407E+00
101.0	0.190959E+18	0.756617E+21	0.295585E+20	0.231793E+20	0.130514E+21	0.114958E+00
102.0	0.147246E+18	0.682241E+21	0.266528E+20	0.209007E+20	0.121482E+21	0.107003E+00
103.0	0.110121E+18	0.615189E+21	0.240334E+20	0.188466E+20	0.112992E+21	0.995240E-01
104.0	0.786217E+17	0.554740E+21	0.216718E+20	0.169947E+20	0.105020E+21	0.925028E-01
105.0	0.520797E+17	0.500242E+21	0.195428E+20	0.153251E+20	0.975466E+20	0.859199E-01
106.0	0.299751E+17	0.451134E+21	0.176243E+20	0.138206E+20	0.905484E+20	0.797558E-01
107.0	0.115161E+17	0.406868E+21	0.158949E+20	0.124645E+20	0.840024E+20	0.739900E-01
108.0	-0.371660E+16	0.366961E+21	0.143359E+20	0.112419E+20	0.778658E+20	0.686025E-01
109.0	-0.161782E+17	0.330983E+21	0.129304E+20	0.101397E+20	0.721759E+20	0.635732E-01
110.0	-0.262348E+17	0.298548E+21	0.116633E+20	0.914606E+19	0.668508E+20	0.588827E-01
111.0	-0.342648E+17	0.269307E+21	0.105209E+20	0.825024E+19	0.618893E+20	0.545127E-01
112.0	-0.405576E+17	0.242946E+21	0.949106E+19	0.744264E+19	0.572704E+20	0.504443E-01
113.0	-0.453910E+17	0.219180E+21	0.856262E+19	0.671456E+19	0.529743E+20	0.466602E-01
114.0	-0.489185E+17	0.197755E+21	0.772559E+19	0.605818E+19	0.489803E+20	0.431423E-01
115.0	-0.513293E+17	0.178439E+21	0.697099E+19	0.546642E+19	0.452699E+20	0.398738E-01
116.0	-0.528301E+17	0.161025E+21	0.629069E+19	0.493294E+19	0.418240E+20	0.368390E-01
117.0	-0.535982E+17	0.145326E+21	0.567738E+19	0.445199E+19	0.386268E+20	0.340229E-01
118.0	-0.537223E+17	0.131172E+21	0.512445E+19	0.401839E+19	0.356618E+20	0.314112E-01
119.0	-0.533382E+17	0.118413E+21	0.462598E+19	0.362749E+19	0.329135E+20	0.289905E-01
120.0	-0.525288E+17	0.106910E+21	0.417659E+19	0.327508E+19	0.303675E+20	0.267480E-01

0.50017E+12 0.51345E+12 0.52586E+12 0.52821E+12 0.53123E+12 0.53354E+12 0.53632E+12 0.54018E+12 0.54529E+12 0.55151E+12

0.55842E+12 0.56536E+12 0.57149E+12 0.57586E+12 0.57738E+12 0.57496E+12 0.56749E+12 0.56125E+12 0.53136E+12 0.50063E+12

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.214317E+21	0.188474E+22	0.147377E+21	0.557630E+20	0.111905E+21	0.985668E-01
2.0	0.324062E+21	0.310467E+22	0.242860E+21	0.927328E+20	0.211376E+21	0.186182E+00
3.0	0.422969E+21	0.420434E+22	0.328932E+21	0.126058E+21	0.302205E+21	0.266185E+00
4.0	0.512109E+21	0.519563E+22	0.406520E+21	0.136099E+21	0.384300E+21	0.338495E+00
5.0	0.592471E+21	0.608923E+22	0.476461E+21	0.183180E+21	0.458347E+21	0.403716E+00
6.0	0.664903E+21	0.689475E+22	0.539510E+21	0.207591E+21	0.525105E+21	0.462517E+00
7.0	0.730191E+21	0.762085E+22	0.596341E+21	0.229595E+21	0.585282E+21	0.515522E+00
8.0	0.789025E+21	0.827520E+22	0.647557E+21	0.249426E+21	0.639519E+21	0.563294E+00
9.0	0.842078E+21	0.886507E+22	0.693726E+21	0.267301E+21	0.688404E+21	0.606353E+00
10.0	0.889888E+21	0.939678E+22	0.735344E+21	0.283415E+21	0.732473E+21	0.645168E+00
11.0	0.932990E+21	0.987610E+22	0.772859E+21	0.297940E+21	0.772196E+21	0.680157E+00
12.0	0.971846E+21	0.103081E+23	0.806676E+21	0.311034E+21	0.808004E+21	0.711697E+00
13.0	0.100686E+22	0.106976E+23	0.837159E+21	0.322836E+21	0.840282E+21	0.740128E+00
14.0	0.103844E+22	0.110487E+23	0.864639E+21	0.333476E+21	0.869379E+21	0.765757E+00
15.0	0.106690E+22	0.113652E+23	0.889410E+21	0.343067E+21	0.895609E+21	0.788860E+00
16.0	0.109255E+22	0.116505E+23	0.911739E+21	0.351712E+21	0.919253E+21	0.809686E+00
17.0	0.111567E+22	0.119076E+23	0.931867E+21	0.359506E+21	0.940566E+21	0.828457E+00
18.0	0.113653E+22	0.121394E+23	0.950008E+21	0.366530E+21	0.959773E+21	0.845377E+00
19.0	0.115531E+22	0.123484E+23	0.966364E+21	0.372863E+21	0.977091E+21	0.860630E+00
20.0	0.117225E+22	0.125367E+23	0.981108E+21	0.378571E+21	0.992702E+21	0.874381E+00
21.0	0.118751E+22	0.127065E+23	0.994398E+21	0.383717E+21	0.100678E+22	0.886777E+00
22.0	0.120127E+22	0.128596E+23	0.100638E+22	0.388356E+21	0.101944E+22	0.897951E+00
23.0	0.121370E+22	0.129976E+23	0.101718E+22	0.392537E+21	0.103090E+22	0.908023E+00
24.0	0.122488E+22	0.131220E+23	0.102691E+22	0.396306E+21	0.104121E+22	0.917104E+00
25.0	0.123496E+22	0.132341E+23	0.103569E+22	0.399705E+21	0.105050E+22	0.925289E+00
26.0	0.124404E+22	0.133352E+23	0.104360E+22	0.402768E+21	0.105888E+22	0.932667E+00
27.0	0.125226E+22	0.134263E+23	0.105073E+22	0.405529E+21	0.106643E+22	0.939317E+00
28.0	0.125963E+22	0.135084E+23	0.105716E+22	0.408017E+21	0.107323E+22	0.945312E+00
29.0	0.126630E+22	0.135824E+23	0.106295E+22	0.410261E+21	0.107937E+22	0.950716E+00
30.0	0.127229E+22	0.136492E+23	0.106818E+22	0.412283E+21	0.108490E+22	0.955588E+00
31.0	0.127769E+22	0.137093E+23	0.107289E+22	0.414106E+21	0.108988E+22	0.959979E+00
32.0	0.128257E+22	0.137635E+23	0.107713E+22	0.415749E+21	0.109438E+22	0.963937E+00
33.0	0.128696E+22	0.138124E+23	0.108096E+22	0.417231E+21	0.109843E+22	0.967506E+00
34.0	0.129093E+22	0.138565E+23	0.108441E+22	0.418566E+21	0.110208E+22	0.970723E+00
35.0	0.129450E+22	0.138962E+23	0.108751E+22	0.419770E+21	0.110537E+22	0.973622E+00
36.0	0.129771E+22	0.139320E+23	0.109032E+22	0.420855E+21	0.110834E+22	0.976236E+00
37.0	0.130062E+22	0.139643E+23	0.109284E+22	0.421833E+21	0.111102E+22	0.978592E+00
38.0	0.130324E+22	0.139934E+23	0.109512E+22	0.422714E+21	0.111343E+22	0.980715E+00
39.0	0.130562E+22	0.140196E+23	0.109717E+22	0.423510E+21	0.111560E+22	0.982630E+00
40.0	0.130773E+22	0.140433E+23	0.109902E+22	0.424226E+21	0.111756E+22	0.984355E+00
41.0	0.130965E+22	0.140646E+23	0.110069E+22	0.424872E+21	0.111933E+22	0.985912E+00
42.0	0.131137E+22	0.140838E+23	0.110220E+22	0.425454E+21	0.112092E+22	0.987314E+00
43.0	0.131292E+22	0.141011E+23	0.110355E+22	0.425979E+21	0.112235E+22	0.988578E+00
44.0	0.131433E+22	0.141167E+23	0.110477E+22	0.426452E+21	0.112365E+22	0.989717E+00
45.0	0.131560E+22	0.141308E+23	0.110587E+22	0.426878E+21	0.112481E+22	0.990745E+00
46.0	0.131675E+22	0.141435E+23	0.110687E+22	0.427262E+21	0.112586E+22	0.991670E+00
47.0	0.131778E+22	0.141549E+23	0.110776E+22	0.427609E+21	0.112681E+22	0.992506E+00
48.0	0.131870E+22	0.141652E+23	0.110857E+22	0.427922E+21	0.112767E+22	0.993258E+00
49.0	0.131952E+22	0.141745E+23	0.110929E+22	0.428203E+21	0.112844E+22	0.993926E+00
50.0	0.132028E+22	0.141829E+23	0.110995E+22	0.428457E+21	0.112913E+22	0.994547E+00
51.0	0.132096E+22	0.141904E+23	0.111054E+22	0.428686E+21	0.112976E+22	0.995098E+00
52.0	0.132156E+22	0.141972E+23	0.111107E+22	0.428892E+21	0.113032E+22	0.995596E+00
53.0	0.132212E+22	0.142034E+23	0.111155E+22	0.429078E+21	0.113083E+22	0.996043E+00
54.0	0.132262E+22	0.142089E+23	0.111199E+22	0.429245E+21	0.113129E+22	0.996447E+00
55.0	0.132307E+22	0.142139E+23	0.111238E+22	0.429396E+21	0.113170E+22	0.996811E+00
56.0	0.132348E+22	0.142184E+23	0.111273E+22	0.429533E+21	0.113207E+22	0.997139E+00
57.0	0.132384E+22	0.142224E+23	0.111305E+22	0.429655E+21	0.113241E+22	0.997434E+00
58.0	0.132417E+22	0.142261E+23	0.111333E+22	0.429766E+21	0.113271E+22	0.997700E+00
59.0	0.132445E+22	0.142293E+23	0.111359E+22	0.429865E+21	0.113298E+22	0.997940E+00
60.0	0.132471E+22	0.142323E+23	0.111382E+22	0.429955E+21	0.113323E+22	0.998157E+00
61.0	0.132496E+22	0.142350E+23	0.111403E+22	0.430037E+21	0.113345E+22	0.998353E+00
62.0	0.132517E+22	0.142374E+23	0.111422E+22	0.430109E+21	0.113365E+22	0.998528E+00
63.0	0.132538E+22	0.142396E+23	0.111439E+22	0.430175E+21	0.113383E+22	0.998687E+00
64.0	0.132555E+22	0.142416E+23	0.111454E+22	0.430235E+21	0.113399E+22	0.998830E+00
65.0	0.132571E+22	0.142433E+23	0.111468E+22	0.430287E+21	0.113414E+22	0.998958E+00
66.0	0.132586E+22	0.142449E+23	0.111480E+22	0.430335E+21	0.113427E+22	0.999072E+00
67.0	0.132599E+22	0.142464E+23	0.111492E+22	0.430381E+21	0.113439E+22	0.999182E+00
68.0	0.132610E+22	0.142476E+23	0.111501E+22	0.430417E+21	0.113449E+22	0.999272E+00
69.0	0.132620E+22	0.142487E+23	0.111511E+22	0.430453E+21	0.113459E+22	0.999356E+00
70.0	0.132630E+22	0.142499E+23	0.111520E+22	0.430489E+21	0.113468E+22	0.999439E+00
71.0	0.132639E+22	0.142507E+23	0.111526E+22	0.430513E+21	0.113476E+22	0.999503E+00
72.0	0.132644E+22	0.142515E+23	0.111532E+22	0.430537E+21	0.113482E+22	0.999560E+00
73.0	0.132652E+22	0.142523E+23	0.111538E+22	0.430561E+21	0.113488E+22	0.999616E+00
74.0	0.132659E+22	0.142531E+23	0.111545E+22	0.430585E+21	0.113495E+22	0.999671E+00
75.0	0.132665E+22	0.142538E+23	0.111550E+22	0.430607E+21	0.113501E+22	0.999725E+00
76.0	0.132668E+22	0.142542E+23	0.111553E+22	0.430619E+21	0.113504E+22	0.999757E+00
77.0	0.132673E+22	0.142546E+23	0.111557E+22	0.430631E+21	0.113508E+22	0.999787E+00
78.0	0.132676E+22	0.142550E+23	0.111560E+22	0.430643E+21	0.113511E+22	0.999814E+00
79.0	0.132680E+22	0.142554E+23	0.111563E+22	0.430655E+21	0.113514E+22	0.999843E+00
80.0	0.132683E+22	0.142558E+23	0.111566E+22	0.430667E+21	0.113517E+22	0.999872E+00
81.0	0.132688E+22	0.142562E+23	0.111569E+22	0.430679E+21	0.113520E+22	0.999898E+00
82.0	0.132691E+22	0.142566E+23	0.111572E+22	0.430691E+21	0.113524E+22	0.999927E+00
83.0	0.132696E+22	0.142570E+23	0.111575E+22	0.430703E+21	0.113527E+22	0.999955E+00
84.0	0.132698E+22	0.142574E+23	0.111578E+22	0.430715E+21	0.113530E+22	0.999983E+00
85.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
86.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
87.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
88.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
89.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
90.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
91.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
92.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
93.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
94.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
95.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
96.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
97.0	0.121943E+22	0.139318E+23	0.109045E+22	0.422301E+21	0.126588E+22	0.111499E+01
98.0	0.118744E+22	0.136302E+23	0.106684E+22	0.413146E+21	0.127557E+22	0.112354E+01
99.0	0.116287E+22	0.133535E+23	0.104518E+22	0.404738E+21	0.125853E+22	0.110853E+01
100.0	0.114151E+22	0.131031E+23	0.102558E+22	0.397132E+21	0.123655E+22	0.108917E+01
101.0	0.112243E+22	0.128772E+23	0.100790E+22	0.390268E+21	0.121498E+22	0.107016E+01
102.0	0.110527E+22	0.126736E+23	0.991963E+21	0.384081E+21	0.119506E+22	0.105262E+01
103.0	0.108980E+22	0.124901E+23	0.977595E+21	0.378503E+21	0.117697E+22	0.103669E+01
104.0	0.107587E+22	0.123246E+23	0.964642E+21	0.373475E+21	0.116063E+22	0.102229E+01
105.0	0.106332E+22	0.121754E+23	0.952966E+21	0.368942E+21	0.114589E+22	0.100931E+01
106.0	0.105199E+22	0.120410E+23	0.942441E+21	0.364857E+21	0.113260E+22	0.997608E+00
107.0	0.104178E+22	0.119198E+23	0.932953E+21	0.361173E+21	0.112062E+22	0.987056E+00
108.0	0.103258E+22	0.118105E+23	0.924402E+21	0.357854E+21	0.110983E+22	0.977545E+00
109.0	0.102429E+22	0.117120E+23	0.916692E+21	0.354861E+21	0.110009E+22	0.968971E+00
110.0	0.101682E+22	0.116233E+23	0.909742E+21	0.352163E+21	0.109132E+22	0.961241E+00
111.0	0.101008E+22	0.115432E+23	0.903478E+21	0.349731E+21	0.108341E+22	0.954274E+00
112.0	0.100399E+22	0.114711E+23	0.897830E+21	0.347539E+21	0.107628E+22	0.947993E+00
113.0	0.998536E+21	0.114060E+23	0.892740E+21	0.345563E+21	0.106985E+22	0.942332E+00
114.0	0.993585E+21	0.113474E+23	0.888150E+21	0.343781E+21	0.106405E+22	0.937227E+00
115.0	0.989132E+21	0.112946E+23	0.884013E+21	0.342176E+21	0.105883E+22	0.932627E+00
116.0	0.985128E+21	0.112469E+23	0.880286E+21	0.340728E+21	0.105412E+22	0.928480E+00
117.0	0.981513E+21	0.112040E+23	0.876924E+21	0.339424E+21	0.104988E+22	0.924742E+00
118.0	0.978258E+21	0.111653E+23	0.873895E+21	0.338248E+21	0.104605E+22	0.921373E+00
119.0	0.975314E+21	0.111304E+23	0.871163E+21	0.337187E+21	0.104260E+22	0.918335E+00
120.0	0.972663E+21	0.110990E+23	0.868701E+21	0.336231E+21	0.103949E+22	0.915596E+00
121.0	0.970268E+21	0.110706E+23	0.866481E+21	0.335370E+21	0.103669E+22	0.913128E+00
122.0	0.968124E+21	0.110451E+23	0.864481E+21	0.334593E+21	0.103417E+22	0.910903E+00
123.0	0.966185E+21	0.110220E+23	0.862678E+21	0.333893E+21	0.103189E+22	0.908897E+00

124.0	0.964438E+21	0.110012E+23	0.861052E+21	0.333262E+21	0.102984E+22	0.907090E+00
125.0	0.962868E+21	0.109825E+23	0.859587E+21	0.332694E+21	0.102799E+22	0.905459E+00
126.0	0.961438E+21	0.109656E+23	0.858266E+21	0.332181E+21	0.102632E+22	0.903990E+00
127.0	0.960151E+21	0.109504E+23	0.857075E+21	0.331719E+21	0.102481E+22	0.902666E+00
128.0	0.959011E+21	0.109367E+23	0.856003E+21	0.331302E+21	0.102346E+22	0.901472E+00
129.0	0.957967E+21	0.109244E+23	0.855035E+21	0.330926E+21	0.102224E+22	0.900396E+00
130.0	0.957023E+21	0.109132E+23	0.854163E+21	0.330588E+21	0.102114E+22	0.899427E+00
131.0	0.956175E+21	0.109032E+23	0.853376E+21	0.330282E+21	0.102014E+22	0.898552E+00
132.0	0.955416E+21	0.108941E+23	0.852668E+21	0.330007E+21	0.101925E+22	0.897764E+00
133.0	0.954742E+21	0.108860E+23	0.852029E+21	0.329759E+21	0.101844E+22	0.897054E+00
134.0	0.954110E+21	0.108786E+23	0.851453E+21	0.329536E+21	0.101772E+22	0.896413E+00
135.0	0.953553E+21	0.108720E+23	0.850934E+21	0.329334E+21	0.101706E+22	0.895836E+00
136.0	0.953055E+21	0.108660E+23	0.850467E+21	0.329153E+21	0.101647E+22	0.895316E+00
137.0	0.952600E+21	0.108606E+23	0.850045E+21	0.328989E+21	0.101594E+22	0.894846E+00
138.0	0.952190E+21	0.108557E+23	0.849663E+21	0.328841E+21	0.101546E+22	0.894424E+00
139.0	0.951810E+21	0.108514E+23	0.849321E+21	0.328708E+21	0.101502E+22	0.894041E+00
140.0	0.951479E+21	0.108474E+23	0.849013E+21	0.328589E+21	0.101463E+22	0.893698E+00
141.0	0.951186E+21	0.108439E+23	0.848733E+21	0.328480E+21	0.101428E+22	0.893388E+00
142.0	0.950901E+21	0.108406E+23	0.848480E+21	0.328382E+21	0.101397E+22	0.893110E+00
143.0	0.950678E+21	0.108378E+23	0.848257E+21	0.328296E+21	0.101368E+22	0.892859E+00
144.0	0.950448E+21	0.108352E+23	0.848055E+21	0.328217E+21	0.101342E+22	0.892632E+00
145.0	0.950240E+21	0.108328E+23	0.847866E+21	0.328143E+21	0.101319E+22	0.892426E+00
146.0	0.950076E+21	0.108307E+23	0.847706E+21	0.328081E+21	0.101298E+22	0.892244E+00
147.0	0.949912E+21	0.108288E+23	0.847550E+21	0.328021E+21	0.101279E+22	0.892074E+00
148.0	0.949783E+21	0.108271E+23	0.847423E+21	0.327972E+21	0.101262E+22	0.891929E+00
149.0	0.949627E+21	0.108255E+23	0.847297E+21	0.327923E+21	0.101247E+22	0.891793E+00
150.0	0.949539E+21	0.108241E+23	0.847190E+21	0.327881E+21	0.101233E+22	0.891670E+00
151.0	0.949414E+21	0.108229E+23	0.847096E+21	0.327845E+21	0.101221E+22	0.891564E+00
152.0	0.949314E+21	0.108217E+23	0.847001E+21	0.327808E+21	0.101210E+22	0.891464E+00
153.0	0.949236E+21	0.108207E+23	0.846920E+21	0.327776E+21	0.101199E+22	0.891370E+00
154.0	0.949167E+21	0.108199E+23	0.846857E+21	0.327751E+21	0.101191E+22	0.891297E+00
155.0	0.949109E+21	0.108191E+23	0.846793E+21	0.327727E+21	0.101183E+22	0.891229E+00
156.0	0.949023E+21	0.108183E+23	0.846730E+21	0.327703E+21	0.101175E+22	0.891162E+00
157.0	0.948965E+21	0.108175E+23	0.846668E+21	0.327679E+21	0.101168E+22	0.891096E+00
158.0	0.948915E+21	0.108169E+23	0.846622E+21	0.327660E+21	0.101162E+22	0.891040E+00
159.0	0.948885E+21	0.108165E+23	0.846591E+21	0.327648E+21	0.101157E+22	0.891000E+00
160.0	0.948838E+21	0.108161E+23	0.846559E+21	0.327636E+21	0.101153E+22	0.890967E+00
161.0	0.948818E+21	0.108157E+23	0.846528E+21	0.327624E+21	0.101149E+22	0.890934E+00
162.0	0.948769E+21	0.108153E+23	0.846496E+21	0.327612E+21	0.101146E+22	0.890900E+00
163.0	0.948750E+21	0.108149E+23	0.846465E+21	0.327599E+21	0.101142E+22	0.890866E+00
164.0	0.948709E+21	0.108145E+23	0.846433E+21	0.327587E+21	0.101138E+22	0.890833E+00
165.0	0.948662E+21	0.108141E+23	0.846402E+21	0.327575E+21	0.101134E+22	0.890800E+00
166.0	0.948633E+21	0.108137E+23	0.846370E+21	0.327563E+21	0.101131E+22	0.890768E+00
167.0	0.948603E+21	0.108133E+23	0.846339E+21	0.327550E+21	0.101127E+22	0.890735E+00
168.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890721E+00
169.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890720E+00
170.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
171.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
172.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
173.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
174.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
175.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
176.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
177.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
178.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
179.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
180.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
181.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
182.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
183.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
184.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
185.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
186.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
187.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
188.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
189.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
190.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
191.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
192.0	0.948612E+21	0.108133E+23	0.846338E+21	0.327550E+21	0.101125E+22	0.890719E+00
193.0	0.104521E+22	0.111705E+23	0.874174E+21	0.337176E+21	0.906221E+21	0.798208E+00
194.0	0.107592E+22	0.114716E+23	0.897741E+21	0.346294E+21	0.909203E+21	0.800834E+00
195.0	0.110105E+22	0.117460E+23	0.919215E+21	0.354607E+21	0.928041E+21	0.817427E+00
196.0	0.112341E+22	0.119937E+23	0.938601E+21	0.362113E+21	0.947856E+21	0.834880E+00
197.0	0.114350E+22	0.122170E+23	0.956084E+21	0.368882E+21	0.966235E+21	0.851068E+00
198.0	0.116161E+22	0.124184E+23	0.971842E+21	0.374983E+21	0.982896E+21	0.865744E+00
199.0	0.117792E+22	0.125998E+23	0.986045E+21	0.380483E+21	0.997932E+21	0.878987E+00
200.0	0.119262E+22	0.127634E+23	0.998849E+21	0.385440E+21	0.101149E+22	0.890929E+00
201.0	0.120589E+22	0.129109E+23	0.101039E+22	0.389909E+21	0.102371E+22	0.901693E+00
202.0	0.121784E+22	0.130438E+23	0.102080E+22	0.393938E+21	0.103473E+22	0.911395E+00
203.0	0.122861E+22	0.131636E+23	0.103017E+22	0.397569E+21	0.104466E+22	0.920144E+00
204.0	0.123833E+22	0.132716E+23	0.103863E+22	0.400842E+21	0.105361E+22	0.928029E+00
205.0	0.124709E+22	0.133690E+23	0.104625E+22	0.403793E+21	0.106168E+22	0.935136E+00
206.0	0.125498E+22	0.134568E+23	0.105312E+22	0.406453E+21	0.106895E+22	0.941544E+00
207.0	0.126209E+22	0.135359E+23	0.105931E+22	0.408851E+21	0.107551E+22	0.947319E+00
208.0	0.126852E+22	0.136072E+23	0.106489E+22	0.411012E+21	0.108142E+22	0.952525E+00
209.0	0.127430E+22	0.136715E+23	0.106993E+22	0.412960E+21	0.108675E+22	0.957219E+00
210.0	0.127950E+22	0.137295E+23	0.107446E+22	0.414717E+21	0.109155E+22	0.961450E+00
211.0	0.128420E+22	0.137817E+23	0.107855E+22	0.416300E+21	0.109588E+22	0.965264E+00
212.0	0.128843E+22	0.138288E+23	0.108224E+22	0.417727E+21	0.109979E+22	0.968701E+00
213.0	0.129225E+22	0.138713E+23	0.108556E+22	0.419014E+21	0.110330E+22	0.971799E+00
214.0	0.129570E+22	0.139095E+23	0.108855E+22	0.420173E+21	0.110649E+22	0.974594E+00
215.0	0.129880E+22	0.139440E+23	0.109125E+22	0.421218E+21	0.110933E+22	0.977111E+00
216.0	0.130160E+22	0.139751E+23	0.109369E+22	0.422160E+21	0.111191E+22	0.979381E+00
217.0	0.130411E+22	0.140031E+23	0.109588E+22	0.423010E+21	0.111423E+22	0.981428E+00
218.0	0.130639E+22	0.140284E+23	0.109786E+22	0.423776E+21	0.111633E+22	0.983272E+00
219.0	0.130843E+22	0.140512E+23	0.109964E+22	0.424466E+21	0.111822E+22	0.984935E+00
220.0	0.131028E+22	0.140717E+23	0.110125E+22	0.425088E+21	0.111992E+22	0.986434E+00
221.0	0.131194E+22	0.140902E+23	0.110270E+22	0.425649E+21	0.112145E+22	0.987785E+00
222.0	0.131346E+22	0.141069E+23	0.110400E+22	0.426155E+21	0.112283E+22	0.989002E+00
223.0	0.131480E+22	0.141219E+23	0.110518E+22	0.426610E+21	0.112408E+22	0.990099E+00
224.0	0.131602E+22	0.141355E+23	0.110624E+22	0.427021E+21	0.112520E+22	0.991089E+00
225.0	0.131712E+22	0.141477E+23	0.110720E+22	0.427391E+21	0.112622E+22	0.991981E+00
226.0	0.131811E+22	0.141587E+23	0.110806E+22	0.427725E+21	0.112713E+22	0.992785E+00
227.0	0.131900E+22	0.141687E+23	0.110884E+22	0.428026E+21	0.112795E+22	0.993510E+00
228.0	0.131980E+22	0.141776E+23	0.110954E+22	0.428297E+21	0.112869E+22	0.994163E+00
229.0	0.132053E+22	0.141857E+23	0.111017E+22	0.428542E+21	0.112936E+22	0.994753E+00
230.0	0.132119E+22	0.141930E+23	0.111074E+22	0.428762E+21	0.112997E+22	0.995283E+00
231.0	0.132177E+22	0.141995E+23	0.111125E+22	0.428961E+21	0.113051E+22	0.995762E+00
232.0	0.132231E+22	0.142054E+23	0.111171E+22	0.429140E+21	0.113100E+22	0.996193E+00
233.0	0.132278E+22	0.142107E+23	0.111213E+22	0.429301E+21	0.113144E+22	0.996582E+00
234.0	0.132321E+22	0.142155E+23	0.111251E+22	0.429447E+21	0.113184E+22	0.996933E+00
235.0	0.132360E+22	0.142199E+23	0.111285E+22	0.429578E+21	0.113220E+22	0.997248E+00
236.0	0.132394E+22	0.142238E+23	0.111315E+22	0.429697E+21	0.113252E+22	0.997534E+00
237.0	0.132427E+22	0.142273E+23	0.111343E+22	0.429804E+21	0.113281E+22	0.997791E+00
238.0	0.132456E+22	0.142305E+23	0.111368E+22	0.429900E+21	0.113307E+22	0.998022E+00
239.0	0.132482E+22	0.142333E+23	0.111390E+22	0.429985E+21	0.113331E+22	0.998230E+00
240.0	0.132503E+22	0.142359E+23	0.111410E+22	0.430063E+21	0.113352E+22	0.998418E+00
241.0	0.132527E+22	0.142383E+23	0.111428E+22	0.430135E+21	0.113372E+22	0.998589E+00
242.0	0.132544E+22	0.142403E+23	0.111444E+22	0.430197E+21	0.113389E+22	0.998739E+00
243.0	0.132562E+22	0.142422E+23	0.111460E+22	0.430256E+21	0.113405E+22	0.998880E+00
244.0	0.132576E+22	0.142438E+23	0.111472E+22	0.430305E+21	0.113418E+22	0.999000E+00
245.0	0.132591E+22	0.142454E+23	0.111485E+22	0.430353E+21	0.113431E+22	0.999113E+00
246.0	0.132602E+22	0.142468E+23	0.111495E+22	0.430394E+21	0.113443E+22	0.999215E+00
247.0	0.132613E+22	0.142480E+23	0.111505E+22	0.430430E+21	0.113453E+22	0.999301E+00
248.0	0.132624E+22	0.142492E+23	0.111514E+22	0.430466E+21	0.113462E+22	0.999385E+00
249.0	0.132633E+22	0.142502E+23	0.111522E+22	0.430497E+21	0.113471E+22	0.999463E+00
250.0	0.132640E+22	0.142510E+23	0.111528E+22	0.430522E+21	0.113478E+22	0.999523E+00
251.0	0.132648E+22	0.142518E+23	0.111535E+22	0.430546E+21	0.113484E+22	0.999580E+00
252.0	0.132654E+22	0.142526E+23	0.111541E+22	0.430570E+21	0.113491E+22	0.999635E+00
253.0	0.132662E+22	0.142534E+23	0.111547E+22	0.430594E+21	0.113497E+22	0.999692E+00
254.0	0.132666E+22	0.142540E+23	0.111551E+22	0.430611E+21	0.113502E+22	0.999739E+00
255.0	0.132672E+22	0.142544E+23	0.111555E+22	0.430623E+21	0.113506E+22	0.999768E+00

256.0	0.132674E+22	0.142548E+23	0.111558E+22	0.430635E+21	0.113509E+22	0.999798E+00
257.0	0.132678E+22	0.142552E+23	0.111561E+22	0.430647E+21	0.113512E+22	0.999825E+00
258.0	0.132680E+22	0.142556E+23	0.111564E+22	0.430659E+21	0.113515E+22	0.999853E+00
259.0	0.132684E+22	0.142559E+23	0.111567E+22	0.430671E+21	0.113519E+22	0.999882E+00
260.0	0.132689E+22	0.142564E+23	0.111570E+22	0.430683E+21	0.113522E+22	0.999908E+00
261.0	0.132693E+22	0.142567E+23	0.111573E+22	0.430696E+21	0.113525E+22	0.999937E+00
262.0	0.132696E+22	0.142571E+23	0.111576E+22	0.430707E+21	0.113528E+22	0.999964E+00
263.0	0.132700E+22	0.142575E+23	0.111579E+22	0.430719E+21	0.113531E+22	0.999993E+00
264.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
265.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
266.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
267.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
268.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
269.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
270.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
271.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
272.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
273.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
274.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
275.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
276.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
277.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
278.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
279.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
280.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
281.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
282.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
283.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
284.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
285.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
286.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
287.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
288.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
289.0	0.110350E+22	0.136094E+23	0.106536E+22	0.413932E+21	0.144271E+22	0.127075E+01
290.0	0.103490E+22	0.130068E+23	0.101819E+22	0.395999E+21	0.150555E+22	0.132610E+01
291.0	0.985908E+21	0.124494E+23	0.974554E+21	0.378624E+21	0.148789E+22	0.131054E+01
292.0	0.945192E+21	0.119433E+23	0.934930E+21	0.363304E+21	0.144612E+22	0.127199E+01
293.0	0.909541E+21	0.114859E+23	0.899120E+21	0.349267E+21	0.139384E+22	0.122771E+01
294.0	0.877745E+21	0.110732E+23	0.866813E+21	0.336695E+21	0.134234E+22	0.118402E+01
295.0	0.849216E+21	0.107011E+23	0.837681E+21	0.325355E+21	0.129781E+22	0.114312E+01
296.0	0.823545E+21	0.103656E+23	0.811417E+21	0.315135E+21	0.125525E+22	0.110564E+01
297.0	0.800393E+21	0.100631E+23	0.787741E+21	0.305918E+21	0.121661E+22	0.107160E+01
298.0	0.779534E+21	0.979053E+22	0.766398E+21	0.297411E+21	0.118166E+22	0.104081E+01
299.0	0.760751E+21	0.952472E+22	0.747154E+21	0.290122E+21	0.115010E+22	0.101302E+01
300.0	0.743816E+21	0.932317E+22	0.729810E+21	0.283372E+21	0.112163E+22	0.987944E+00
301.0	0.728553E+21	0.912347E+22	0.714176E+21	0.277287E+21	0.109596E+22	0.965335E+00
302.0	0.714794E+21	0.894347E+22	0.700084E+21	0.271802E+21	0.107282E+22	0.944954E+00
303.0	0.702396E+21	0.878120E+22	0.687381E+21	0.266850E+21	0.105196E+22	0.926579E+00
304.0	0.691215E+21	0.863494E+22	0.675930E+21	0.262401E+21	0.103313E+22	0.910015E+00
305.0	0.681128E+21	0.850307E+22	0.665607E+21	0.258384E+21	0.101621E+22	0.895084E+00
306.0	0.672045E+21	0.838422E+22	0.656302E+21	0.254762E+21	0.100093E+22	0.881624E+00
307.0	0.663853E+21	0.827707E+22	0.647913E+21	0.251497E+21	0.987151E+21	0.869491E+00
308.0	0.656467E+21	0.818048E+22	0.640352E+21	0.248556E+21	0.974733E+21	0.858553E+00
309.0	0.649820E+21	0.809342E+22	0.633537E+21	0.245902E+21	0.963540E+21	0.848694E+00
310.0	0.643818E+21	0.801493E+22	0.627392E+21	0.243510E+21	0.953449E+21	0.839806E+00
311.0	0.638408E+21	0.794417E+22	0.621853E+21	0.241354E+21	0.944354E+21	0.831795E+00
312.0	0.633530E+21	0.788041E+22	0.616860E+21	0.239411E+21	0.936155E+21	0.824573E+00
313.0	0.629133E+21	0.782291E+22	0.612359E+21	0.237659E+21	0.928763E+21	0.818063E+00
314.0	0.625175E+21	0.777108E+22	0.608302E+21	0.236080E+21	0.922100E+21	0.812194E+00
315.0	0.621607E+21	0.772438E+22	0.604645E+21	0.234657E+21	0.916096E+21	0.806905E+00
316.0	0.618383E+21	0.768226E+22	0.601348E+21	0.233374E+21	0.910682E+21	0.802137E+00
317.0	0.615478E+21	0.764431E+22	0.598377E+21	0.232218E+21	0.905802E+21	0.797838E+00
318.0	0.612872E+21	0.761009E+22	0.595698E+21	0.231175E+21	0.901403E+21	0.793964E+00
319.0	0.610511E+21	0.757926E+22	0.593284E+21	0.230235E+21	0.897437E+21	0.790471E+00
320.0	0.608394E+21	0.755145E+22	0.591108E+21	0.229388E+21	0.893863E+21	0.787322E+00
321.0	0.606468E+21	0.752639E+22	0.589146E+21	0.228625E+21	0.890640E+21	0.784484E+00
322.0	0.604746E+21	0.750380E+22	0.587377E+21	0.227936E+21	0.887737E+21	0.781927E+00
323.0	0.603192E+21	0.748344E+22	0.585783E+21	0.227316E+21	0.885119E+21	0.779621E+00
324.0	0.601796E+21	0.746515E+22	0.584351E+21	0.226758E+21	0.882762E+21	0.777545E+00
325.0	0.600564E+21	0.744892E+22	0.583081E+21	0.226264E+21	0.880656E+21	0.775690E+00
326.0	0.599449E+21	0.743434E+22	0.581939E+21	0.225819E+21	0.878772E+21	0.774031E+00
327.0	0.598446E+21	0.742119E+22	0.580910E+21	0.225419E+21	0.877079E+21	0.772539E+00
328.0	0.597540E+21	0.740934E+22	0.579982E+21	0.225058E+21	0.875554E+21	0.771196E+00
329.0	0.596724E+21	0.739866E+22	0.579146E+21	0.224733E+21	0.874180E+21	0.769985E+00
330.0	0.595985E+21	0.738903E+22	0.578392E+21	0.224439E+21	0.872943E+21	0.768896E+00
331.0	0.595322E+21	0.738035E+22	0.577713E+21	0.224175E+21	0.871827E+21	0.767913E+00
332.0	0.594719E+21	0.737253E+22	0.577100E+21	0.223936E+21	0.870821E+21	0.767027E+00
333.0	0.594184E+21	0.736548E+22	0.576548E+21	0.223721E+21	0.869914E+21	0.766228E+00
334.0	0.593705E+21	0.735912E+22	0.576051E+21	0.223528E+21	0.869097E+21	0.765508E+00
335.0	0.593260E+21	0.735339E+22	0.575602E+21	0.223353E+21	0.868360E+21	0.764860E+00
336.0	0.592862E+21	0.734822E+22	0.575197E+21	0.223196E+21	0.867696E+21	0.764274E+00
337.0	0.592518E+21	0.734357E+22	0.574833E+21	0.223054E+21	0.867098E+21	0.763747E+00
338.0	0.592190E+21	0.733937E+22	0.574504E+21	0.222926E+21	0.866555E+21	0.763272E+00
339.0	0.591897E+21	0.733558E+22	0.574208E+21	0.222811E+21	0.866072E+21	0.762844E+00
340.0	0.591636E+21	0.733218E+22	0.573941E+21	0.222707E+21	0.865634E+21	0.762458E+00
341.0	0.591409E+21	0.732910E+22	0.573701E+21	0.222613E+21	0.865238E+21	0.762109E+00
342.0	0.591191E+21	0.732633E+22	0.573483E+21	0.222529E+21	0.864881E+21	0.761794E+00
343.0	0.591005E+21	0.732383E+22	0.573288E+21	0.222452E+21	0.864559E+21	0.761511E+00
344.0	0.590824E+21	0.732158E+22	0.573111E+21	0.222384E+21	0.864270E+21	0.761257E+00
345.0	0.590676E+21	0.731955E+22	0.572953E+21	0.222322E+21	0.864010E+21	0.761028E+00
346.0	0.590533E+21	0.731772E+22	0.572809E+21	0.222266E+21	0.863774E+21	0.760820E+00
347.0	0.590414E+21	0.731608E+22	0.572681E+21	0.222216E+21	0.863562E+21	0.760633E+00
348.0	0.590297E+21	0.731458E+22	0.572564E+21	0.222171E+21	0.863371E+21	0.760465E+00
349.0	0.590189E+21	0.731324E+22	0.572459E+21	0.222130E+21	0.863199E+21	0.760313E+00
350.0	0.590094E+21	0.731203E+22	0.572364E+21	0.222093E+21	0.863043E+21	0.760176E+00
351.0	0.590013E+21	0.731095E+22	0.572279E+21	0.222060E+21	0.862903E+21	0.760052E+00
352.0	0.589940E+21	0.730996E+22	0.572202E+21	0.222030E+21	0.862777E+21	0.759942E+00
353.0	0.589872E+21	0.730908E+22	0.572133E+21	0.222003E+21	0.862664E+21	0.759842E+00
354.0	0.589811E+21	0.730828E+22	0.572070E+21	0.221979E+21	0.862561E+21	0.759751E+00
355.0	0.589757E+21	0.730755E+22	0.572013E+21	0.221957E+21	0.862467E+21	0.759669E+00
356.0	0.589709E+21	0.730692E+22	0.571964E+21	0.221937E+21	0.862385E+21	0.759596E+00
357.0	0.589665E+21	0.730633E+22	0.571918E+21	0.221919E+21	0.862311E+21	0.759531E+00
358.0	0.589623E+21	0.730580E+22	0.571876E+21	0.221903E+21	0.862243E+21	0.759471E+00
359.0	0.589586E+21	0.730533E+22	0.571839E+21	0.221889E+21	0.862183E+21	0.759418E+00
360.0	0.589555E+21	0.730491E+22	0.571806E+21	0.221876E+21	0.862127E+21	0.759369E+00
361.0	0.589527E+21	0.730452E+22	0.571776E+21	0.221864E+21	0.862077E+21	0.759325E+00
362.0	0.589497E+21	0.730416E+22	0.571748E+21	0.221853E+21	0.862031E+21	0.759285E+00
363.0	0.589474E+21	0.730385E+22	0.571724E+21	0.221844E+21	0.861993E+21	0.759251E+00
364.0	0.589452E+21	0.730357E+22	0.571701E+21	0.221835E+21	0.861957E+21	0.759219E+00
365.0	0.589432E+21	0.730332E+22	0.571682E+21	0.221828E+21	0.861925E+21	0.759191E+00
366.0	0.589411E+21	0.730309E+22	0.571664E+21	0.221820E+21	0.861894E+21	0.759166E+00
367.0	0.589396E+21	0.730288E+22	0.571647E+21	0.221814E+21	0.861867E+21	0.759140E+00
368.0	0.589383E+21	0.730269E+22	0.571633E+21	0.221808E+21	0.861844E+21	0.759120E+00
369.0	0.589373E+21	0.730253E+22	0.571621E+21	0.221804E+21	0.861821E+21	0.759100E+00
370.0	0.589361E+21	0.730237E+22	0.571608E+21	0.221799E+21	0.861803E+21	0.759084E+00
371.0	0.589352E+21	0.730224E+22	0.571598E+21	0.221795E+21	0.861786E+21	0.759069E+00
372.0	0.589342E+21	0.730212E+22	0.571588E+21	0.221791E+21	0.861769E+21	0.759053E+00
373.0	0.589331E+21	0.730201E+22	0.571579E+21	0.221787E+21	0.861757E+21	0.759043E+00
374.0	0.589321E+21	0.730191E+22	0.571571E+21	0.221784E+21	0.861746E+21	0.759033E+00
375.0	0.589314E+21	0.730182E+22	0.571564E+21	0.221782E+21	0.861731E+21	0.759020E+00
376.0	0.589310E+21	0.730175E+22	0.571559E+21	0.221780E+21	0.861723E+21	0.759013E+00
377.0	0.589304E+21	0.730165E+22	0.571552E+21	0.221777E+21	0.861713E+21	0.759005E+00
378.0	0.589300E+21	0.730158E+22	0.571546E+21	0.221775E+21	0.861707E+21	0.758999E+00
379.0	0.589298E+21	0.730155E+22	0.571543E+21	0.221773E+21	0.861698E+21	0.758992E+00
380.0	0.589292E+21	0.730149E+22	0.571539E+21	0.221772E+21	0.861690E+21	0.758984E+00
381.0	0.589290E+21	0.730144E+22	0.571535E+21	0.221770E+21	0.861687E+21	0.758981E+00
382.0	0.589286E+21	0.730139E+22	0.571531E+21	0.221769E+21	0.861678E+21	0.758974E+00
383.0	0.589283E+21	0.730135E+22	0.571528E+21	0.221768E+21	0.861673E+21	0.758970E+00
384.0	0.589279E+21	0.730133E+22	0.571526E+21	0.221767E+21	0.861672E+21	0.758968E+00

0.20188E+15 0.14158E+15 0.83659E+14 0.43410E+14 0.16103E+14 0.60877E+13 0.23397E+13 0.92660E+12 0.41221E+12 0.27977E+12

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.214317E+21	0.188474E+22	0.147377E+21	0.557630E+20	0.111905E+21	0.985668E-01
2.0	0.324062E+21	0.310467E+22	0.242860E+21	0.927328E+20	0.211376E+21	0.188182E+00
3.0	0.422969E+21	0.420434E+22	0.328932E+21	0.126058E+21	0.302205E+21	0.266185E+00
4.0	0.512109E+21	0.519563E+22	0.406520E+21	0.156099E+21	0.384300E+21	0.338495E+00
5.0	0.592471E+21	0.608923E+22	0.476461E+21	0.183180E+21	0.458347E+21	0.403716E+00
6.0	0.664903E+21	0.689475E+22	0.539510E+21	0.207591E+21	0.525105E+21	0.462517E+00
7.0	0.730191E+21	0.762085E+22	0.596341E+21	0.229595E+21	0.585282E+21	0.515522E+00
8.0	0.789025E+21	0.827520E+22	0.647557E+21	0.249426E+21	0.639519E+21	0.563294E+00
9.0	0.842078E+21	0.886507E+22	0.693726E+21	0.267301E+21	0.688404E+21	0.606353E+00
10.0	0.889888E+21	0.939678E+22	0.735344E+21	0.283415E+21	0.732473E+21	0.645168E+00
11.0	0.932990E+21	0.987610E+22	0.772859E+21	0.297940E+21	0.772196E+21	0.680157E+00
12.0	0.971846E+21	0.103081E+23	0.806676E+21	0.311034E+21	0.808004E+21	0.711697E+00
13.0	0.100686E+22	0.106976E+23	0.837159E+21	0.322836E+21	0.840282E+21	0.740128E+00
14.0	0.103844E+22	0.110487E+23	0.864639E+21	0.333476E+21	0.869379E+21	0.765757E+00
15.0	0.106690E+22	0.113652E+23	0.889410E+21	0.343067E+21	0.895609E+21	0.788860E+00
16.0	0.109255E+22	0.116505E+23	0.911739E+21	0.351712E+21	0.919253E+21	0.809686E+00
17.0	0.111567E+22	0.119076E+23	0.931867E+21	0.359506E+21	0.940564E+21	0.828457E+00
18.0	0.113653E+22	0.121394E+23	0.950008E+21	0.366530E+21	0.959773E+21	0.845377E+00
19.0	0.115531E+22	0.123484E+23	0.966364E+21	0.372863E+21	0.977091E+21	0.860630E+00
20.0	0.117225E+22	0.125367E+23	0.981108E+21	0.378571E+21	0.992702E+21	0.874381E+00
21.0	0.118751E+22	0.127065E+23	0.994398E+21	0.383717E+21	0.100678E+22	0.886777E+00
22.0	0.120127E+22	0.128596E+23	0.100638E+22	0.388356E+21	0.101946E+22	0.897951E+00
23.0	0.121370E+22	0.129976E+23	0.101718E+22	0.392537E+21	0.103090E+22	0.908023E+00
24.0	0.122488E+22	0.131220E+23	0.102691E+22	0.396306E+21	0.104121E+22	0.917104E+00
25.0	0.123496E+22	0.132341E+23	0.103569E+22	0.399705E+21	0.105050E+22	0.925289E+00
26.0	0.124404E+22	0.133352E+23	0.104360E+22	0.402768E+21	0.105888E+22	0.932667E+00
27.0	0.125226E+22	0.134263E+23	0.105073E+22	0.405529E+21	0.106643E+22	0.939317E+00
28.0	0.125963E+22	0.135084E+23	0.105716E+22	0.408017E+21	0.107323E+22	0.945312E+00
29.0	0.126630E+22	0.135824E+23	0.106295E+22	0.410261E+21	0.107937E+22	0.950716E+00
30.0	0.127229E+22	0.136492E+23	0.106818E+22	0.412283E+21	0.108490E+22	0.955588E+00
31.0	0.127769E+22	0.137093E+23	0.107289E+22	0.414106E+21	0.108988E+22	0.959979E+00
32.0	0.128257E+22	0.137635E+23	0.107713E+22	0.415749E+21	0.109438E+22	0.963937E+00
33.0	0.128696E+22	0.138124E+23	0.108096E+22	0.417231E+21	0.109843E+22	0.967506E+00
34.0	0.129093E+22	0.138565E+23	0.108441E+22	0.418566E+21	0.110208E+22	0.970723E+00
35.0	0.129450E+22	0.138962E+23	0.108751E+22	0.419770E+21	0.110537E+22	0.973622E+00
36.0	0.129771E+22	0.139320E+23	0.109032E+22	0.420855E+21	0.110834E+22	0.976236E+00
37.0	0.130062E+22	0.139643E+23	0.109284E+22	0.421833E+21	0.111102E+22	0.978592E+00
38.0	0.130324E+22	0.139934E+23	0.109512E+22	0.422714E+21	0.111343E+22	0.980715E+00
39.0	0.130562E+22	0.140196E+23	0.109717E+22	0.423510E+21	0.111560E+22	0.982630E+00
40.0	0.130773E+22	0.140433E+23	0.109902E+22	0.424226E+21	0.111756E+22	0.984355E+00
41.0	0.130965E+22	0.140646E+23	0.110069E+22	0.424872E+21	0.111933E+22	0.985912E+00
42.0	0.131137E+22	0.140838E+23	0.110220E+22	0.425454E+21	0.112092E+22	0.987314E+00
43.0	0.131292E+22	0.141011E+23	0.110355E+22	0.425979E+21	0.112235E+22	0.988578E+00
44.0	0.131433E+22	0.141167E+23	0.110477E+22	0.426452E+21	0.112365E+22	0.989717E+00
45.0	0.131560E+22	0.141308E+23	0.110587E+22	0.426878E+21	0.112481E+22	0.990745E+00
46.0	0.131673E+22	0.141435E+23	0.110687E+22	0.427262E+21	0.112586E+22	0.991670E+00
47.0	0.131778E+22	0.141549E+23	0.110776E+22	0.427609E+21	0.112681E+22	0.992506E+00
48.0	0.131870E+22	0.141652E+23	0.110857E+22	0.427922E+21	0.112767E+22	0.993258E+00
49.0	0.131952E+22	0.141745E+23	0.110929E+22	0.428203E+21	0.112844E+22	0.993936E+00
50.0	0.132028E+22	0.141829E+23	0.110995E+22	0.428457E+21	0.112913E+22	0.994547E+00
51.0	0.132096E+22	0.141904E+23	0.111054E+22	0.428686E+21	0.112976E+22	0.995098E+00
52.0	0.132156E+22	0.141972E+23	0.111107E+22	0.428892E+21	0.113032E+22	0.995596E+00
53.0	0.132212E+22	0.142034E+23	0.111155E+22	0.429078E+21	0.113083E+22	0.996043E+00
54.0	0.132262E+22	0.142089E+23	0.111199E+22	0.429245E+21	0.113129E+22	0.996447E+00
55.0	0.132307E+22	0.142139E+23	0.111238E+22	0.429396E+21	0.113170E+22	0.996811E+00
56.0	0.132348E+22	0.142184E+23	0.111273E+22	0.429533E+21	0.113207E+22	0.997139E+00
57.0	0.132384E+22	0.142224E+23	0.111305E+22	0.429655E+21	0.113241E+22	0.997434E+00
58.0	0.132417E+22	0.142261E+23	0.111333E+22	0.429766E+21	0.113271E+22	0.997700E+00
59.0	0.132445E+22	0.142293E+23	0.111359E+22	0.429865E+21	0.113298E+22	0.997940E+00
60.0	0.132471E+22	0.142323E+23	0.111382E+22	0.429955E+21	0.113323E+22	0.998157E+00
61.0	0.132496E+22	0.142350E+23	0.111403E+22	0.430037E+21	0.113345E+22	0.998353E+00
62.0	0.132517E+22	0.142374E+23	0.111422E+22	0.430109E+21	0.113365E+22	0.998528E+00
63.0	0.132538E+22	0.142396E+23	0.111439E+22	0.430175E+21	0.113383E+22	0.998687E+00
64.0	0.132555E+22	0.142416E+23	0.111454E+22	0.430235E+21	0.113399E+22	0.998830E+00
65.0	0.132571E+22	0.142433E+23	0.111468E+22	0.430287E+21	0.113414E+22	0.998958E+00
66.0	0.132586E+22	0.142449E+23	0.111480E+22	0.430335E+21	0.113427E+22	0.999072E+00
67.0	0.132599E+22	0.142464E+23	0.111492E+22	0.430381E+21	0.113439E+22	0.999182E+00
68.0	0.132610E+22	0.142476E+23	0.111501E+22	0.430417E+21	0.113449E+22	0.999272E+00
69.0	0.132620E+22	0.142487E+23	0.111511E+22	0.430453E+21	0.113459E+22	0.999356E+00
70.0	0.132630E+22	0.142499E+23	0.111520E+22	0.430489E+21	0.113468E+22	0.999439E+00
71.0	0.132639E+22	0.142507E+23	0.111526E+22	0.430513E+21	0.113476E+22	0.999503E+00
72.0	0.132644E+22	0.142515E+23	0.111532E+22	0.430537E+21	0.113482E+22	0.999560E+00
73.0	0.132652E+22	0.142523E+23	0.111538E+22	0.430561E+21	0.113488E+22	0.999616E+00
74.0	0.132659E+22	0.142531E+23	0.111545E+22	0.430585E+21	0.113495E+22	0.999671E+00
75.0	0.132665E+22	0.142538E+23	0.111550E+22	0.430607E+21	0.113501E+22	0.999725E+00
76.0	0.132668E+22	0.142542E+23	0.111553E+22	0.430619E+21	0.113504E+22	0.999757E+00
77.0	0.132673E+22	0.142546E+23	0.111557E+22	0.430631E+21	0.113508E+22	0.999787E+00
78.0	0.132676E+22	0.142550E+23	0.111560E+22	0.430643E+21	0.113511E+22	0.999814E+00
79.0	0.132680E+22	0.142554E+23	0.111563E+22	0.430655E+21	0.113514E+22	0.999843E+00
80.0	0.132683E+22	0.142558E+23	0.111566E+22	0.430667E+21	0.113517E+22	0.999872E+00
81.0	0.132688E+22	0.142562E+23	0.111569E+22	0.430679E+21	0.113520E+22	0.999898E+00
82.0	0.132691E+22	0.142566E+23	0.111572E+22	0.430691E+21	0.113524E+22	0.999927E+00
83.0	0.132696E+22	0.142570E+23	0.111575E+22	0.430703E+21	0.113527E+22	0.999955E+00
84.0	0.132698E+22	0.142574E+23	0.111578E+22	0.430715E+21	0.113530E+22	0.999983E+00
85.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
86.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
87.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
88.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
89.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
90.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
91.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
92.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
93.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
94.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
95.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
96.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
97.0	0.976070E+21	0.132930E+23	0.104074E+22	0.405696E+21	0.168367E+22	0.148299E+01
98.0	0.859423E+21	0.123971E+23	0.970599E+21	0.378374E+21	0.189665E+22	0.167058E+01
99.0	0.781110E+21	0.115605E+23	0.905102E+21	0.352831E+21	0.195000E+22	0.171757E+01
100.0	0.720739E+21	0.107956E+23	0.845212E+21	0.329468E+21	0.192322E+22	0.169399E+01
101.0	0.670799E+21	0.101013E+23	0.790853E+21	0.308259E+21	0.185696E+22	0.163563E+01
102.0	0.627897E+21	0.947329E+22	0.741681E+21	0.289073E+21	0.177296E+22	0.156164E+01
103.0	0.590316E+21	0.890608E+22	0.697270E+21	0.271743E+21	0.168305E+22	0.148245E+01
104.0	0.556964E+21	0.839417E+22	0.657190E+21	0.256104E+21	0.159361E+22	0.140367E+01
105.0	0.527205E+21	0.793240E+22	0.621035E+21	0.241996E+21	0.150798E+22	0.132824E+01
106.0	0.500530E+21	0.751601E+22	0.588433E+21	0.229274E+21	0.142778E+22	0.125760E+01
107.0	0.476622E+21	0.714094E+22	0.559067E+21	0.217815E+21	0.135370E+22	0.119235E+01
108.0	0.455110E+21	0.680291E+22	0.532601E+21	0.207487E+21	0.128585E+22	0.113258E+01
109.0	0.435744E+21	0.649816E+22	0.508741E+21	0.198176E+21	0.122403E+22	0.107814E+01
110.0	0.418306E+21	0.622344E+22	0.487231E+21	0.189783E+21	0.116792E+22	0.102871E+01
111.0	0.402591E+21	0.597578E+22	0.467840E+21	0.182216E+21	0.111709E+22	0.983943E+00
112.0	0.388433E+21	0.575252E+22	0.450360E+21	0.175395E+21	0.107112E+22	0.943455E+00
113.0	0.375675E+21	0.555127E+22	0.434603E+21	0.169246E+21	0.102960E+22	0.906890E+00
114.0	0.364168E+21	0.536985E+22	0.420399E+21	0.163704E+21	0.992114E+21	0.873843E+00
115.0	0.353803E+21	0.520631E+22	0.407594E+21	0.158707E+21	0.958288E+21	0.844068E+00
116.0	0.344459E+21	0.505890E+22	0.396052E+21	0.154203E+21	0.927776E+21	0.817193E+00
117.0	0.336037E+21	0.492601E+22	0.385648E+21	0.150143E+21	0.900257E+21	0.792954E+00
118.0	0.328448E+21	0.480624E+22	0.376271E+21	0.146484E+21	0.875445E+21	0.771100E+00
119.0	0.321606E+21	0.469826E+22	0.367816E+21	0.143185E+21	0.853072E+21	0.751394E+00
120.0	0.315434E+21	0.460092E+22	0.360195E+21	0.140211E+21	0.832901E+21	0.733626E+00
121.0	0.309875E+21	0.451318E+22	0.353325E+21	0.137530E+21	0.814717E+21	0.717610E+00
122.0	0.304863E+21	0.443408E+22	0.347132E+21	0.135114E+21	0.798325E+21	0.703172E+00
123.0	0.300343E+21	0.436278E+22	0.341550E+21	0.132935E+21	0.783548E+21	0.690156E+00

124.0	0.296269E+21	0.429851E+22	0.336517E+21	0.130972E+21	0.770226E+21	0.678422E+00
125.0	0.292598E+21	0.424057E+22	0.331981E+21	0.129202E+21	0.758217E+21	0.667844E+00
126.0	0.289288E+21	0.418835E+22	0.327892E+21	0.127606E+21	0.747392E+21	0.658309E+00
127.0	0.286306E+21	0.414127E+22	0.324206E+21	0.126168E+21	0.737633E+21	0.649714E+00
128.0	0.283615E+21	0.409883E+22	0.320883E+21	0.124871E+21	0.728837E+21	0.641966E+00
129.0	0.281193E+21	0.406058E+22	0.317888E+21	0.123702E+21	0.720906E+21	0.634981E+00
130.0	0.279006E+21	0.402609E+22	0.315188E+21	0.122649E+21	0.713758E+21	0.628685E+00
131.0	0.277036E+21	0.399501E+22	0.312754E+21	0.121699E+21	0.707314E+21	0.623008E+00
132.0	0.275263E+21	0.396699E+22	0.310560E+21	0.120843E+21	0.701505E+21	0.617892E+00
133.0	0.273660E+21	0.394173E+22	0.308583E+21	0.120071E+21	0.696269E+21	0.613280E+00
134.0	0.272219E+21	0.391896E+22	0.306800E+21	0.119375E+21	0.691550E+21	0.609123E+00
135.0	0.270918E+21	0.389843E+22	0.305193E+21	0.118748E+21	0.687295E+21	0.605376E+00
136.0	0.269746E+21	0.387993E+22	0.303744E+21	0.118183E+21	0.683460E+21	0.601998E+00
137.0	0.268684E+21	0.386325E+22	0.302438E+21	0.117673E+21	0.680002E+21	0.598952E+00
138.0	0.267735E+21	0.384822E+22	0.301261E+21	0.117214E+21	0.676887E+21	0.596208E+00
139.0	0.266875E+21	0.383466E+22	0.300200E+21	0.116800E+21	0.674077E+21	0.593733E+00
140.0	0.266101E+21	0.382245E+22	0.299244E+21	0.116427E+21	0.671544E+21	0.591502E+00
141.0	0.265400E+21	0.381143E+22	0.298381E+21	0.116090E+21	0.669262E+21	0.589492E+00
142.0	0.264773E+21	0.380151E+22	0.297604E+21	0.115787E+21	0.667203E+21	0.587678E+00
143.0	0.264209E+21	0.379256E+22	0.296903E+21	0.115514E+21	0.665349E+21	0.586045E+00
144.0	0.263693E+21	0.378449E+22	0.296272E+21	0.115267E+21	0.663677E+21	0.584572E+00
145.0	0.263235E+21	0.377722E+22	0.295703E+21	0.115045E+21	0.662170E+21	0.583246E+00
146.0	0.262820E+21	0.377067E+22	0.295189E+21	0.114845E+21	0.660811E+21	0.582048E+00
147.0	0.262447E+21	0.376476E+22	0.294727E+21	0.114664E+21	0.659587E+21	0.580970E+00
148.0	0.262107E+21	0.375944E+22	0.294310E+21	0.114502E+21	0.658483E+21	0.579998E+00
149.0	0.261804E+21	0.375464E+22	0.293934E+21	0.114355E+21	0.657488E+21	0.579121E+00
150.0	0.261529E+21	0.375031E+22	0.293595E+21	0.114223E+21	0.656592E+21	0.578332E+00
151.0	0.261283E+21	0.374641E+22	0.293290E+21	0.114104E+21	0.655782E+21	0.577619E+00
152.0	0.261059E+21	0.374289E+22	0.293015E+21	0.113996E+21	0.655053E+21	0.576977E+00
153.0	0.260859E+21	0.373972E+22	0.292766E+21	0.113899E+21	0.654396E+21	0.576398E+00
154.0	0.260678E+21	0.373686E+22	0.292543E+21	0.113812E+21	0.653804E+21	0.575876E+00
155.0	0.260514E+21	0.373429E+22	0.292341E+21	0.113733E+21	0.653270E+21	0.575406E+00
156.0	0.260368E+21	0.373197E+22	0.292159E+21	0.113662E+21	0.652788E+21	0.574982E+00
157.0	0.260235E+21	0.372987E+22	0.291995E+21	0.113598E+21	0.652355E+21	0.574600E+00
158.0	0.260116E+21	0.372798E+22	0.291848E+21	0.113541E+21	0.651962E+21	0.574254E+00
159.0	0.260007E+21	0.372629E+22	0.291714E+21	0.113489E+21	0.651611E+21	0.573945E+00
160.0	0.259911E+21	0.372475E+22	0.291594E+21	0.113442E+21	0.651292E+21	0.573664E+00
161.0	0.259823E+21	0.372337E+22	0.291486E+21	0.113400E+21	0.651005E+21	0.573411E+00
162.0	0.259744E+21	0.372212E+22	0.291389E+21	0.113362E+21	0.650748E+21	0.573185E+00
163.0	0.259671E+21	0.372100E+22	0.291301E+21	0.113327E+21	0.650516E+21	0.572980E+00
164.0	0.259608E+21	0.371999E+22	0.291221E+21	0.113296E+21	0.650305E+21	0.572795E+00
165.0	0.259550E+21	0.371908E+22	0.291150E+21	0.113269E+21	0.650116E+21	0.572628E+00
166.0	0.259496E+21	0.371825E+22	0.291086E+21	0.113243E+21	0.649947E+21	0.572479E+00
167.0	0.259449E+21	0.371751E+22	0.291028E+21	0.113221E+21	0.649794E+21	0.572344E+00
168.0	0.259408E+21	0.371684E+22	0.290975E+21	0.113200E+21	0.649655E+21	0.572222E+00
169.0	0.259371E+21	0.371624E+22	0.290928E+21	0.113182E+21	0.649529E+21	0.572111E+00
170.0	0.259336E+21	0.371570E+22	0.290885E+21	0.113165E+21	0.649416E+21	0.572012E+00
171.0	0.259306E+21	0.371521E+22	0.290847E+21	0.113150E+21	0.649315E+21	0.571923E+00
172.0	0.259275E+21	0.371477E+22	0.290813E+21	0.113137E+21	0.649225E+21	0.571843E+00
173.0	0.259250E+21	0.371437E+22	0.290782E+21	0.113125E+21	0.649143E+21	0.571771E+00
174.0	0.259227E+21	0.371401E+22	0.290754E+21	0.113114E+21	0.649069E+21	0.571706E+00
175.0	0.259208E+21	0.371369E+22	0.290728E+21	0.113104E+21	0.649001E+21	0.571646E+00
176.0	0.259189E+21	0.371340E+22	0.290705E+21	0.113095E+21	0.648941E+21	0.571593E+00
177.0	0.259173E+21	0.371315E+22	0.290685E+21	0.113087E+21	0.648886E+21	0.571545E+00
178.0	0.259158E+21	0.371290E+22	0.290666E+21	0.113080E+21	0.648836E+21	0.571500E+00
179.0	0.259144E+21	0.371268E+22	0.290650E+21	0.113073E+21	0.648793E+21	0.571462E+00
180.0	0.259133E+21	0.371249E+22	0.290635E+21	0.113067E+21	0.648752E+21	0.571427E+00
181.0	0.259120E+21	0.371232E+22	0.290621E+21	0.113062E+21	0.648717E+21	0.571396E+00
182.0	0.259109E+21	0.371216E+22	0.290609E+21	0.113057E+21	0.648686E+21	0.571368E+00
183.0	0.259100E+21	0.371203E+22	0.290598E+21	0.113053E+21	0.648658E+21	0.571343E+00
184.0	0.259094E+21	0.371189E+22	0.290588E+21	0.113049E+21	0.648629E+21	0.571318E+00
185.0	0.259085E+21	0.371178E+22	0.290579E+21	0.113046E+21	0.648609E+21	0.571301E+00
186.0	0.259080E+21	0.371168E+22	0.290571E+21	0.113043E+21	0.648587E+21	0.571281E+00
187.0	0.259073E+21	0.371158E+22	0.290563E+21	0.113040E+21	0.648567E+21	0.571264E+00
188.0	0.259068E+21	0.371150E+22	0.290557E+21	0.113037E+21	0.648547E+21	0.571246E+00
189.0	0.259063E+21	0.371143E+22	0.290551E+21	0.113035E+21	0.648534E+21	0.571235E+00
190.0	0.259059E+21	0.371135E+22	0.290545E+21	0.113033E+21	0.648518E+21	0.571220E+00
191.0	0.259055E+21	0.371130E+22	0.290541E+21	0.113031E+21	0.648511E+21	0.571214E+00
192.0	0.259053E+21	0.371125E+22	0.290537E+21	0.113029E+21	0.648498E+21	0.571202E+00
193.0	0.485212E+21	0.498767E+22	0.390244E+21	0.149813E+21	0.431157E+21	0.379767E+00
194.0	0.573866E+21	0.589531E+22	0.461284E+21	0.177305E+21	0.453922E+21	0.399819E+00
195.0	0.648925E+21	0.671906E+22	0.525758E+21	0.202267E+21	0.512698E+21	0.451589E+00
196.0	0.715909E+21	0.746234E+22	0.583935E+21	0.224792E+21	0.572549E+21	0.504306E+00
197.0	0.776182E+21	0.813234E+22	0.636376E+21	0.245096E+21	0.627753E+21	0.552931E+00
198.0	0.830493E+21	0.873628E+22	0.683646E+21	0.263398E+21	0.677745E+21	0.596964E+00
199.0	0.879440E+21	0.928070E+22	0.726258E+21	0.279897E+21	0.722854E+21	0.636696E+00
200.0	0.923570E+21	0.977144E+22	0.764668E+21	0.294769E+21	0.763525E+21	0.672519E+00
201.0	0.963356E+21	0.102138E+23	0.799292E+21	0.308175E+21	0.800186E+21	0.704811E+00
202.0	0.999226E+21	0.106126E+23	0.830503E+21	0.320259E+21	0.833234E+21	0.733920E+00
203.0	0.103155E+22	0.109720E+23	0.858639E+21	0.331153E+21	0.863026E+21	0.760161E+00
204.0	0.106069E+22	0.112961E+23	0.884000E+21	0.340972E+21	0.889882E+21	0.783816E+00
205.0	0.108695E+22	0.115882E+23	0.906863E+21	0.349824E+21	0.914090E+21	0.805138E+00
206.0	0.111063E+22	0.118515E+23	0.927472E+21	0.357804E+21	0.935910E+21	0.824358E+00
207.0	0.113196E+22	0.120888E+23	0.946051E+21	0.364997E+21	0.955581E+21	0.841685E+00
208.0	0.115120E+22	0.123028E+23	0.962797E+21	0.371481E+21	0.973313E+21	0.857303E+00
209.0	0.116856E+22	0.124957E+23	0.977892E+21	0.377326E+21	0.989297E+21	0.871382E+00
210.0	0.118419E+22	0.126695E+23	0.991500E+21	0.382595E+21	0.100371E+22	0.884074E+00
211.0	0.119828E+22	0.128262E+23	0.100377E+22	0.387344E+21	0.101670E+22	0.895514E+00
212.0	0.121098E+22	0.129675E+23	0.101483E+22	0.391626E+21	0.102840E+22	0.905828E+00
213.0	0.122243E+22	0.130949E+23	0.102479E+22	0.395485E+21	0.103896E+22	0.915125E+00
214.0	0.123276E+22	0.132097E+23	0.103378E+22	0.398963E+21	0.104847E+22	0.923504E+00
215.0	0.124206E+22	0.133131E+23	0.104188E+22	0.402099E+21	0.105705E+22	0.931058E+00
216.0	0.125046E+22	0.134064E+23	0.104918E+22	0.404926E+21	0.106478E+22	0.937866E+00
217.0	0.125801E+22	0.134905E+23	0.105576E+22	0.407474E+21	0.107175E+22	0.944003E+00
218.0	0.126483E+22	0.135663E+23	0.106169E+22	0.409770E+21	0.107803E+22	0.949536E+00
219.0	0.127097E+22	0.136346E+23	0.106704E+22	0.411841E+21	0.108369E+22	0.954523E+00
220.0	0.127650E+22	0.136962E+23	0.107186E+22	0.413708E+21	0.108879E+22	0.959020E+00
221.0	0.128152E+22	0.137517E+23	0.107620E+22	0.415390E+21	0.109340E+22	0.963073E+00
222.0	0.128601E+22	0.138018E+23	0.108012E+22	0.416907E+21	0.109754E+22	0.966726E+00
223.0	0.129006E+22	0.138469E+23	0.108365E+22	0.418274E+21	0.110128E+22	0.970020E+00
224.0	0.129373E+22	0.138875E+23	0.108683E+22	0.419507E+21	0.110465E+22	0.972989E+00
225.0	0.129701E+22	0.139242E+23	0.108970E+22	0.420617E+21	0.110769E+22	0.975664E+00
226.0	0.130000E+22	0.139572E+23	0.109229E+22	0.421619E+21	0.111043E+22	0.978076E+00
227.0	0.130266E+22	0.139870E+23	0.109462E+22	0.422522E+21	0.111290E+22	0.980251E+00
228.0	0.130508E+22	0.140139E+23	0.109672E+22	0.423336E+21	0.111513E+22	0.982212E+00
229.0	0.130725E+22	0.140381E+23	0.109862E+22	0.424069E+21	0.111713E+22	0.983978E+00
230.0	0.130921E+22	0.140599E+23	0.110033E+22	0.424731E+21	0.111894E+22	0.985572E+00
231.0	0.131099E+22	0.140796E+23	0.110187E+22	0.425326E+21	0.112057E+22	0.987007E+00
232.0	0.131258E+22	0.140973E+23	0.110325E+22	0.425864E+21	0.112204E+22	0.988301E+00
233.0	0.131401E+22	0.141133E+23	0.110450E+22	0.426348E+21	0.112336E+22	0.989468E+00
234.0	0.131531E+22	0.141277E+23	0.110563E+22	0.426785E+21	0.112456E+22	0.990521E+00
235.0	0.131649E+22	0.141407E+23	0.110665E+22	0.427179E+21	0.112563E+22	0.991469E+00
236.0	0.131753E+22	0.141524E+23	0.110757E+22	0.427533E+21	0.112661E+22	0.992324E+00
237.0	0.131848E+22	0.141630E+23	0.110839E+22	0.427854E+21	0.112748E+22	0.993094E+00
238.0	0.131935E+22	0.141725E+23	0.110914E+22	0.428142E+21	0.112827E+22	0.993789E+00
239.0	0.132012E+22	0.141811E+23	0.110981E+22	0.428402E+21	0.112898E+22	0.994415E+00
240.0	0.132079E+22	0.141888E+23	0.111041E+22	0.428636E+21	0.112962E+22	0.994979E+00
241.0	0.132144E+22	0.141958E+23	0.111096E+22	0.428847E+21	0.113020E+22	0.995488E+00
242.0	0.132200E+22	0.142020E+23	0.111145E+22	0.429037E+21	0.113072E+22	0.995946E+00
243.0	0.132252E+22	0.142077E+23	0.111189E+22	0.429209E+21	0.113119E+22	0.996360E+00
244.0	0.132297E+22	0.142128E+23	0.111229E+22	0.429363E+21	0.113161E+22	0.996732E+00
245.0	0.132338E+22	0.142174E+23	0.111265E+22	0.429502E+21	0.113199E+22	0.997067E+00
246.0	0.132376E+22	0.142215E+23	0.111298E+22	0.429628E+21	0.113233E+22	0.997369E+00
247.0	0.132409E+22	0.142253E+23	0.111327E+22	0.429741E+21	0.113264E+22	0.997643E+00
248.0	0.132439E+22	0.142286E+23	0.111353E+22	0.429843E+21	0.113292E+22	0.997888E+00
249.0	0.132465E+22	0.142317E+23	0.111377E+22	0.429936E+21	0.113318E+22	0.998111E+00
250.0	0.132493E+22	0.142345E+23	0.111399E+22	0.430020E+21	0.113340E+22	0.998311E+00
251.0	0.132514E+22	0.142369E+23	0.111418E+22	0.430093E+21	0.113361E+22	0.998490E+00
252.0	0.132533E+22	0.142391E+23	0.111435E+22	0.430161E+21	0.113379E+22	0.998654E+00
253.0	0.132552E+22	0.142411E+23	0.111451E+22	0.430221E+21	0.113396E+22	0.998798E+00
254.0	0.132568E+22	0.142429E+23	0.111465E+22	0.430276E+21	0.113411E+22	0.998931E+00
255.0	0.132582E+22	0.142445E+23	0.111477E+22	0.430325E+21	0.113424E+22	0.999047E+00

256.0	0.132596E+22	0.142461E+23	0.111490E+22	0.430372E+21	0.113437E+22	0.999159E+00
257.0	0.132607E+22	0.142473E+23	0.111499E+22	0.430409E+21	0.113447E+22	0.999252E+00
258.0	0.132618E+22	0.142485E+23	0.111508E+22	0.430445E+21	0.113457E+22	0.999337E+00
259.0	0.132629E+22	0.142497E+23	0.111518E+22	0.430481E+21	0.113466E+22	0.999421E+00
260.0	0.132637E+22	0.142505E+23	0.111525E+22	0.430508E+21	0.113474E+22	0.999490E+00
261.0	0.132644E+22	0.142513E+23	0.111531E+22	0.430531E+21	0.113481E+22	0.999547E+00
262.0	0.132652E+22	0.142521E+23	0.111537E+22	0.430554E+21	0.113487E+22	0.999603E+00
263.0	0.132659E+22	0.142529E+23	0.111543E+22	0.430580E+21	0.113493E+22	0.999659E+00
264.0	0.132667E+22	0.142537E+23	0.111550E+22	0.430604E+21	0.113500E+22	0.999715E+00
265.0	0.132669E+22	0.142541E+23	0.111553E+22	0.430616E+21	0.113504E+22	0.999752E+00
266.0	0.132672E+22	0.142545E+23	0.111556E+22	0.430628E+21	0.113507E+22	0.999781E+00
267.0	0.132675E+22	0.142549E+23	0.111559E+22	0.430640E+21	0.113510E+22	0.999810E+00
268.0	0.132679E+22	0.142553E+23	0.111562E+22	0.430652E+21	0.113514E+22	0.999837E+00
269.0	0.132682E+22	0.142557E+23	0.111565E+22	0.430665E+21	0.113517E+22	0.999866E+00
270.0	0.132688E+22	0.142561E+23	0.111568E+22	0.430677E+21	0.113520E+22	0.999893E+00
271.0	0.132690E+22	0.142565E+23	0.111571E+22	0.430689E+21	0.113523E+22	0.999921E+00
272.0	0.132693E+22	0.142569E+23	0.111575E+22	0.430701E+21	0.113526E+22	0.999949E+00
273.0	0.132698E+22	0.142573E+23	0.111578E+22	0.430713E+21	0.113529E+22	0.999976E+00
274.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
275.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
276.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
277.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
278.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
279.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
280.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
281.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
282.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
283.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
284.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
285.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
286.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
287.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
288.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
289.0	0.127403E+22	0.141408E+23	0.110676E+22	0.428147E+21	0.118952E+22	0.104774E+01
290.0	0.118984E+22	0.138198E+23	0.108173E+22	0.419372E+21	0.128770E+22	0.113422E+01
291.0	0.108279E+22	0.133060E+23	0.104161E+22	0.404693E+21	0.141286E+22	0.124446E+01
292.0	0.101426E+22	0.127347E+23	0.996888E+21	0.387309E+21	0.147492E+22	0.129912E+01
293.0	0.967155E+21	0.122044E+23	0.955370E+21	0.371157E+21	0.145826E+22	0.128445E+01
294.0	0.928278E+21	0.117224E+23	0.917640E+21	0.356474E+21	0.141651E+22	0.124767E+01
295.0	0.894298E+21	0.112868E+23	0.883536E+21	0.343202E+21	0.136858E+22	0.120546E+01
296.0	0.864034E+21	0.108937E+23	0.852765E+21	0.331225E+21	0.132131E+22	0.116382E+01
297.0	0.836847E+21	0.105393E+23	0.825016E+21	0.320426E+21	0.127707E+22	0.112485E+01
298.0	0.864863E+21	0.103547E+23	0.810480E+21	0.314012E+21	0.115793E+22	0.101991E+01
299.0	0.922663E+21	0.104098E+23	0.814711E+21	0.314899E+21	0.100688E+22	0.886872E+00
300.0	0.995442E+21	0.106896E+23	0.836536E+21	0.322595E+21	0.900749E+21	0.793388E+00
301.0	0.103577E+22	0.110342E+23	0.863502E+21	0.333035E+21	0.829924E+21	0.774164E+00
302.0	0.106543E+22	0.113510E+23	0.888301E+21	0.342638E+21	0.896388E+21	0.789547E+00
303.0	0.109136E+22	0.116375E+23	0.910727E+21	0.351321E+21	0.918543E+21	0.809061E+00
304.0	0.111461E+22	0.118959E+23	0.930953E+21	0.359152E+21	0.939665E+21	0.827665E+00
305.0	0.113557E+22	0.121289E+23	0.949184E+21	0.366211E+21	0.958914E+21	0.844620E+00
306.0	0.115446E+22	0.123389E+23	0.965623E+21	0.372575E+21	0.976308E+21	0.859941E+00
307.0	0.117148E+22	0.125282E+23	0.980439E+21	0.378312E+21	0.991996E+21	0.873758E+00
308.0	0.118682E+22	0.126989E+23	0.993796E+21	0.383484E+21	0.100614E+22	0.886216E+00
309.0	0.120066E+22	0.128527E+23	0.100584E+22	0.388145E+21	0.101889E+22	0.897443E+00
310.0	0.121313E+22	0.129913E+23	0.101669E+22	0.392348E+21	0.103038E+22	0.907567E+00
311.0	0.122437E+22	0.131163E+23	0.102647E+22	0.396136E+21	0.104074E+22	0.916692E+00
312.0	0.123449E+22	0.132290E+23	0.103529E+22	0.399550E+21	0.105008E+22	0.924916E+00
313.0	0.119240E+22	0.132081E+23	0.103375E+22	0.399838E+21	0.110812E+22	0.976044E+00
314.0	0.111883E+22	0.129727E+23	0.101542E+22	0.393615E+21	0.120591E+22	0.106217E+01
315.0	0.102162E+22	0.125361E+23	0.981340E+21	0.381243E+21	0.132821E+22	0.116990E+01
316.0	0.960467E+21	0.120391E+23	0.942430E+21	0.366114E+21	0.139105E+22	0.122525E+01
317.0	0.918985E+21	0.115770E+23	0.906255E+21	0.352041E+21	0.137980E+22	0.121534E+01
318.0	0.884970E+21	0.111567E+23	0.873354E+21	0.339238E+21	0.134467E+22	0.118440E+01
319.0	0.855301E+21	0.107768E+23	0.843613E+21	0.327663E+21	0.130338E+22	0.114803E+01
320.0	0.828880E+21	0.104340E+23	0.816778E+21	0.317219E+21	0.126235E+22	0.111189E+01
321.0	0.805170E+21	0.101249E+23	0.792578E+21	0.307800E+21	0.122385E+22	0.107798E+01
322.0	0.835302E+21	0.998362E+22	0.781434E+21	0.302724E+21	0.111352E+22	0.980799E+00
323.0	0.894699E+21	0.100781E+23	0.788751E+21	0.304827E+21	0.972418E+21	0.856514E+00
324.0	0.969203E+21	0.103931E+23	0.813324E+21	0.313606E+21	0.874015E+21	0.769840E+00
325.0	0.101182E+22	0.107673E+23	0.842612E+21	0.324950E+21	0.856422E+21	0.754344E+00
326.0	0.104380E+22	0.111105E+23	0.869472E+21	0.335348E+21	0.876382E+21	0.771925E+00
327.0	0.107187E+22	0.114207E+23	0.893755E+21	0.344749E+21	0.900559E+21	0.793220E+00
328.0	0.109705E+22	0.117005E+23	0.915665E+21	0.353229E+21	0.923463E+21	0.813394E+00
329.0	0.111973E+22	0.119527E+23	0.935397E+21	0.360872E+21	0.944313E+21	0.831760E+00
330.0	0.114018E+22	0.121801E+23	0.953190E+21	0.367762E+21	0.963144E+21	0.848346E+00
331.0	0.115860E+22	0.123850E+23	0.969233E+21	0.373973E+21	0.980129E+21	0.863306E+00
332.0	0.117523E+22	0.125698E+23	0.983694E+21	0.379572E+21	0.995441E+21	0.876794E+00
333.0	0.119019E+22	0.127363E+23	0.996730E+21	0.384620E+21	0.100924E+22	0.888951E+00
334.0	0.120370E+22	0.128865E+23	0.100848E+22	0.389179E+21	0.102169E+22	0.899912E+00
335.0	0.121586E+22	0.130218E+23	0.101907E+22	0.393271E+21	0.103290E+22	0.909790E+00
336.0	0.122684E+22	0.131438E+23	0.102862E+22	0.396968E+21	0.104301E+22	0.918696E+00
337.0	0.118565E+22	0.131308E+23	0.102770E+22	0.397493E+21	0.110138E+22	0.970104E+00
338.0	0.111294E+22	0.129025E+23	0.100993E+22	0.391481E+21	0.119913E+22	0.105620E+01
339.0	0.101655E+22	0.124723E+23	0.976347E+21	0.379300E+21	0.132119E+22	0.116372E+01
340.0	0.955999E+21	0.119814E+23	0.937917E+21	0.364358E+21	0.138410E+22	0.121912E+01
341.0	0.914996E+21	0.115250E+23	0.902184E+21	0.350457E+21	0.137330E+22	0.120961E+01
342.0	0.881384E+21	0.111098E+23	0.869684E+21	0.337809E+21	0.133872E+22	0.117915E+01
343.0	0.852073E+21	0.107346E+23	0.840304E+21	0.326375E+21	0.129797E+22	0.114326E+01
344.0	0.825967E+21	0.103959E+23	0.813794E+21	0.316058E+21	0.125747E+22	0.110759E+01
345.0	0.802530E+21	0.100906E+23	0.789888E+21	0.306754E+21	0.121944E+22	0.107409E+01
346.0	0.832859E+21	0.995286E+22	0.779026E+21	0.301788E+21	0.110984E+22	0.977557E+00
347.0	0.892371E+21	0.100505E+23	0.786594E+21	0.303990E+21	0.969555E+21	0.853993E+00
348.0	0.967022E+21	0.103685E+23	0.811396E+21	0.312859E+21	0.871794E+21	0.767884E+00
349.0	0.100983E+22	0.107451E+23	0.840877E+21	0.324278E+21	0.854553E+21	0.752698E+00
350.0	0.104201E+22	0.110905E+23	0.867909E+21	0.334742E+21	0.874720E+21	0.770461E+00
351.0	0.107025E+22	0.114027E+23	0.892345E+21	0.344203E+21	0.899065E+21	0.791904E+00
352.0	0.109559E+22	0.116843E+23	0.914384E+21	0.352737E+21	0.922118E+21	0.812210E+00
353.0	0.111841E+22	0.119381E+23	0.934251E+21	0.360429E+21	0.943101E+21	0.830692E+00
354.0	0.113900E+22	0.121669E+23	0.952164E+21	0.367364E+21	0.962056E+21	0.847388E+00
355.0	0.115754E+22	0.123732E+23	0.968308E+21	0.373615E+21	0.979149E+21	0.862443E+00
356.0	0.117425E+22	0.125591E+23	0.982860E+21	0.379250E+21	0.994557E+21	0.876015E+00
357.0	0.118933E+22	0.127267E+23	0.995979E+21	0.384329E+21	0.100845E+22	0.888250E+00
358.0	0.120292E+22	0.128778E+23	0.100780E+22	0.388907E+21	0.102097E+22	0.899280E+00
359.0	0.121515E+22	0.130140E+23	0.101846E+22	0.393034E+21	0.103226E+22	0.909221E+00
360.0	0.122621E+22	0.131368E+23	0.102807E+22	0.396754E+21	0.104243E+22	0.918183E+00
361.0	0.118509E+22	0.131245E+23	0.102720E+22	0.397299E+21	0.110082E+22	0.969614E+00
362.0	0.111246E+22	0.128967E+23	0.100947E+22	0.391304E+21	0.119857E+22	0.105571E+01
363.0	0.101614E+22	0.124670E+23	0.975932E+21	0.379139E+21	0.132061E+22	0.116321E+01
364.0	0.955637E+21	0.119766E+23	0.937542E+21	0.364212E+21	0.134352E+22	0.121862E+01
365.0	0.914665E+21	0.115206E+23	0.901844E+21	0.350325E+21	0.137276E+22	0.120914E+01
366.0	0.881080E+21	0.111059E+23	0.869377E+21	0.337690E+21	0.133822E+22	0.117872E+01
367.0	0.851799E+21	0.107310E+23	0.840027E+21	0.326268E+21	0.129752E+22	0.114287E+01
368.0	0.825721E+21	0.103927E+23	0.813545E+21	0.315961E+21	0.125706E+22	0.110723E+01
369.0	0.802317E+21	0.100877E+23	0.789663E+21	0.306666E+21	0.121907E+22	0.107377E+01
370.0	0.832646E+21	0.995028E+22	0.778824E+21	0.301710E+21	0.110953E+22	0.977285E+00
371.0	0.892184E+21	0.100483E+23	0.786416E+21	0.303922E+21	0.969318E+21	0.853784E+00
372.0	0.966849E+21	0.103664E+23	0.811235E+21	0.312797E+21	0.871609E+21	0.767721E+00
373.0	0.100966E+22	0.107432E+23	0.840731E+21	0.324222E+21	0.854396E+21	0.752559E+00
374.0	0.104186E+22	0.110888E+23	0.867777E+21	0.334691E+21	0.874580E+21	0.770338E+00
375.0	0.107010E+22	0.114012E+23	0.892228E+21	0.344158E+21	0.898940E+21	0.791794E+00
376.0	0.109546E+22	0.116829E+23	0.914277E+21	0.352695E+21	0.922004E+21	0.812110E+00
377.0	0.111831E+22	0.119369E+23	0.934155E+21	0.360392E+21	0.942999E+21	0.830602E+00
378.0	0.113889E+22	0.121658E+23	0.952072E+21	0.367329E+21	0.961959E+21	0.847302E+00
379.0	0.115745E+22	0.123721E+23	0.968225E+21	0.373583E+21	0.979061E+21	0.862366E+00
380.0	0.117417E+22	0.125582E+23	0.982785E+21	0.379221E+21	0.994479E+21	0.875946E+00
381.0	0.118925E+22	0.127259E+23	0.995911E+21	0.384303E+21	0.100838E+22	0.888187E+00
382.0	0.120284E+22	0.128770E+23	0.100774E+22	0.388883E+21	0.102090E+22	0.899222E+00
383.0	0.121510E+22	0.130133E+23	0.101841E+22	0.393013E+21	0.103220E+22	0.909169E+00
384.0	0.122615E+22	0.131361E+23	0.102802E+22	0.396735E+21	0.104238E+22	0.918135E+00
385.0	0.118504E+22	0.131239E+23	0.102716E+22	0.397281E+21	0.110077E+22	0.969568E+00
386.0	0.111241E+22	0.128962E+23	0.100943E+22	0.391284E+21	0.119852E+22	0.105567E+01
387.0	0.101610E+22	0.124665E+23	0.975894E+21	0.379123E+21	0.132056E+22	0.116316E+01

388.0	0.955617E+21	0.119762E+23	0.937509E+21	0.364199E+21	0.138347E+22	0.121857E+01
389.0	0.914626E+21	0.115202E+23	0.901811E+21	0.350312E+21	0.137271E+22	0.120909E+01
390.0	0.881052E+21	0.111056E+23,	0.869348E+21	0.337679E+21	0.133817E+22	0.117868E+01
391.0	0.851760E+21	0.107307E+23	0.840002E+21	0.326258E+21	0.129748E+22	0.114283E+01
392.0	0.825692E+21	0.103925E+23	0.813522E+21	0.315952E+21	0.125702E+22	0.110719E+01
393.0	0.802297E+21	0.100874E+23	0.789643E+21	0.306658E+21	0.121904E+22	0.107374E+01
394.0	0.832636E+21	0.995004E+22	0.778806E+21	0.301702E+21	0.110950E+22	0.977260E+00
395.0	0.892174E+21	0.100481E+23	0.786399E+21	0.303915E+21	0.969297E+21	0.853765E+00
396.0	0.966829E+21	0.103662E+23	0.811219E+21	0.312790E+21	0.871591E+21	0.767705E+00
397.0	0.100965E+22	0.107431E+23	0.840716E+21	0.324216E+21	0.854381E+21	0.752547E+00
398.0	0.104185E+22	0.110886E+23	0.867763E+21	0.334686E+21	0.874566E+21	0.770325E+00
399.0	0.107009E+22	0.114010E+23	0.892215E+21	0.344153E+21	0.898927E+21	0.791783E+00
400.0	0.109545E+22	0.116828E+23	0.914266E+21	0.352691E+21	0.921993E+21	0.812100E+00
401.0	0.111829E+22	0.119367E+23	0.934145E+21	0.360388E+21	0.942989E+21	0.830593E+00
402.0	0.113888E+22	0.121657E+23	0.952063E+21	0.367325E+21	0.961950E+21	0.847294E+00
403.0	0.115743E+22	0.123720E+23	0.968216E+21	0.373580E+21	0.979053E+21	0.862359E+00
404.0	0.117417E+22	0.125581E+23	0.982777E+21	0.379217E+21	0.994470E+21	0.875938E+00
405.0	0.118925E+22	0.127258E+23	0.995904E+21	0.384300E+21	0.100837E+22	0.888181E+00
406.0	0.120284E+22	0.128770E+23	0.100774E+22	0.388881E+21	0.102090E+22	0.899216E+00
407.0	0.121510E+22	0.130132E+23	0.101840E+22	0.393011E+21	0.103219E+22	0.909164E+00
408.0	0.122614E+22	0.131361E+23	0.102802E+22	0.396733E+21	0.104237E+22	0.918131E+00

0.35919E+15 0.24050E+15 0.12911E+15 0.52570E+14 0.14290E+14 0.39569E+13 0.11105E+13 0.31626E+12 0.95830E+11 0.45135E+11

0.68604E+11 0.19583E+12 0.61585E+12 0.19603E+13 0.62611E+13 0.20043E+14 0.64288E+14 0.13884E+15 0.24635E+15 0.36039E+15

0.15319E+11 0.14149E+11 0.13369E+11 0.12949E+11 0.43734E+10 0.14471E+10 0.47207E+09 0.15220E+09 0.47930E+08 0.12336E+08

0.63142E+07=0.37511E+08=0.13468E+09=0.46578E+09=0.16010E+10=0.54859E+10=0.18753E+11=0.63948E+11=0.66249E+11=0.70357E+11

0.76478E+11

0.11440E+10 0.77119E+09 0.41679E+09 0.85291E+10 0.29086E+10 0.96883E+09 0.31776E+09 0.10356E+09 0.35341E+08 0.18508E+08

0.30965E+08 0.96476E+08 0.32884E+09 0.11277E+10 0.38604E+10 0.13186E+11 0.44949E+11 0.22844E+10 0.40645E+10 0.59572E+10

0.91099E+11

TIME 11.20.39

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.172600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.157498E+21	0.142549E+22	0.111478E+21	0.422849E+20	0.898642E+20	0.791532E-01
2.0	0.235834E+21	0.235054E+22	0.183888E+21	0.703937E+20	0.176552E+21	0.155508E+00
3.0	0.306187E+21	0.318467E+22	0.249183E+21	0.957403E+20	0.257711E+21	0.226994E+00
4.0	0.369539E+21	0.393666E+22	0.308047E+21	0.118591E+21	0.331683E+21	0.292149E+00
5.0	0.426626E+21	0.461454E+22	0.361111E+21	0.139190E+21	0.398588E+21	0.351080E+00
6.0	0.478086E+21	0.522560E+22	0.408944E+21	0.157758E+21	0.458959E+21	0.404255E+00
7.0	0.524476E+21	0.577644E+22	0.452063E+21	0.174496E+21	0.513397E+21	0.452205E+00
8.0	0.566285E+21	0.627298E+22	0.490931E+21	0.189585E+21	0.562475E+21	0.495433E+00
9.0	0.603982E+21	0.672060E+22	0.525970E+21	0.203186E+21	0.606717E+21	0.534402E+00
10.0	0.637960E+21	0.712408E+22	0.557554E+21	0.215447E+21	0.646598E+21	0.569529E+00
11.0	0.668579E+21	0.748778E+22	0.586024E+21	0.226499E+21	0.682548E+21	0.601194E+00
12.0	0.696160E+21	0.781542E+22	0.611670E+21	0.236455E+21	0.714942E+21	0.629727E+00
13.0	0.721031E+21	0.811072E+22	0.634786E+21	0.245428E+21	0.744133E+21	0.655439E+00
14.0	0.743440E+21	0.837690E+22	0.655623E+21	0.253517E+21	0.770444E+21	0.678614E+00
15.0	0.763656E+21	0.861693E+22	0.674412E+21	0.260810E+21	0.794165E+21	0.699507E+00
16.0	0.781866E+21	0.883323E+22	0.691344E+21	0.267383E+21	0.815546E+21	0.718340E+00
17.0	0.798278E+21	0.902820E+22	0.706606E+21	0.273308E+21	0.834817E+21	0.735314E+00
18.0	0.813083E+21	0.920395E+22	0.720363E+21	0.278648E+21	0.852189E+21	0.750616E+00
19.0	0.826430E+21	0.936238E+22	0.732764E+21	0.283462E+21	0.867847E+21	0.764408E+00
20.0	0.838446E+21	0.950519E+22	0.743944E+21	0.287802E+21	0.881964E+21	0.776843E+00
21.0	0.849289E+21	0.963393E+22	0.754021E+21	0.291714E+21	0.894689E+21	0.788050E+00
22.0	0.859068E+21	0.974999E+22	0.763106E+21	0.295240E+21	0.906160E+21	0.798154E+00
23.0	0.867868E+21	0.985459E+22	0.771295E+21	0.298419E+21	0.916499E+21	0.807260E+00
24.0	0.875816E+21	0.994890E+22	0.778677E+21	0.301285E+21	0.925821E+21	0.815471E+00
25.0	0.882971E+21	0.106839E+23	0.785330E+21	0.303868E+21	0.934224E+21	0.822872E+00
26.0	0.889424E+21	0.101105E+23	0.791330E+21	0.306197E+21	0.941797E+21	0.829543E+00
27.0	0.895250E+21	0.101796E+23	0.796737E+21	0.308296E+21	0.948625E+21	0.835557E+00
28.0	0.900502E+21	0.102419E+23	0.801611E+21	0.310187E+21	0.954779E+21	0.840978E+00
29.0	0.905219E+21	0.102980E+23	0.806005E+21	0.311893E+21	0.960328E+21	0.845866E+00
30.0	0.909468E+21	0.103486E+23	0.809965E+21	0.313431E+21	0.965329E+21	0.850270E+00
31.0	0.913317E+21	0.103942E+23	0.813534E+21	0.314816E+21	0.969836E+21	0.854240E+00
32.0	0.916787E+21	0.104353E+23	0.816753E+21	0.316065E+21	0.973899E+21	0.857819E+00
33.0	0.919896E+21	0.104724E+23	0.819653E+21	0.317192E+21	0.977562E+21	0.861045E+00
34.0	0.922717E+21	0.105058E+23	0.822269E+21	0.318207E+21	0.980865E+21	0.863954E+00
35.0	0.925253E+21	0.105359E+23	0.824627E+21	0.319122E+21	0.983842E+21	0.866577E+00
36.0	0.927534E+21	0.105630E+23	0.826751E+21	0.319947E+21	0.986525E+21	0.868940E+00
37.0	0.929609E+21	0.105875E+23	0.828667E+21	0.320690E+21	0.988944E+21	0.871070E+00
38.0	0.931462E+21	0.106096E+23	0.830393E+21	0.321361E+21	0.991122E+21	0.872989E+00
39.0	0.933130E+21	0.106296E+23	0.831949E+21	0.321965E+21	0.993085E+21	0.874721E+00
40.0	0.934637E+21	0.106476E+23	0.833353E+21	0.322510E+21	0.994861E+21	0.876282E+00
41.0	0.935993E+21	0.106635E+23	0.834617E+21	0.323000E+21	0.996457E+21	0.877688E+00
42.0	0.937239E+21	0.106781E+23	0.835767E+21	0.323443E+21	0.997897E+21	0.878956E+00
43.0	0.938341E+21	0.106912E+23	0.836783E+21	0.323842E+21	0.999195E+21	0.880100E+00
44.0	0.939327E+21	0.107031E+23	0.837711E+21	0.324201E+21	0.100036E+22	0.881130E+00
45.0	0.940223E+21	0.107137E+23	0.838546E+21	0.324525E+21	0.100142E+22	0.882059E+00
46.0	0.941062E+21	0.107234E+23	0.839300E+21	0.324818E+21	0.100237E+22	0.882896E+00
47.0	0.941772E+21	0.107320E+23	0.839979E+21	0.325082E+21	0.100323E+22	0.883651E+00
48.0	0.942425E+21	0.107398E+23	0.840590E+21	0.325319E+21	0.100400E+22	0.884332E+00
49.0	0.943028E+21	0.107469E+23	0.841142E+21	0.325533E+21	0.100470E+22	0.884945E+00
50.0	0.943555E+21	0.107532E+23	0.841638E+21	0.325726E+21	0.100532E+22	0.885497E+00
51.0	0.944033E+21	0.107590E+23	0.842087E+21	0.325900E+21	0.100589E+22	0.885996E+00
52.0	0.944461E+21	0.107641E+23	0.842490E+21	0.326056E+21	0.100640E+22	0.886444E+00
53.0	0.944852E+21	0.107688E+23	0.842853E+21	0.326198E+21	0.100686E+22	0.886849E+00
54.0	0.945212E+21	0.107729E+23	0.843181E+21	0.326325E+21	0.100727E+22	0.887213E+00
55.0	0.945524E+21	0.107767E+23	0.843477E+21	0.326439E+21	0.100764E+22	0.887542E+00
56.0	0.945817E+21	0.107801E+23	0.843743E+21	0.326543E+21	0.100798E+22	0.887839E+00
57.0	0.946071E+21	0.107832E+23	0.843984E+21	0.326637E+21	0.100829E+22	0.888107E+00
58.0	0.946314E+21	0.107860E+23	0.844205E+21	0.326722E+21	0.100856E+22	0.888348E+00
59.0	0.946527E+21	0.107884E+23	0.844395E+21	0.326796E+21	0.100880E+22	0.888563E+00
60.0	0.946711E+21	0.107907E+23	0.844572E+21	0.326865E+21	0.100903E+22	0.888762E+00
61.0	0.946887E+21	0.107927E+23	0.844730E+21	0.326926E+21	0.100923E+22	0.888936E+00
62.0	0.947026E+21	0.107946E+23	0.844874E+21	0.326982E+21	0.100941E+22	0.889097E+00
63.0	0.947171E+21	0.107962E+23	0.845000E+21	0.327031E+21	0.100957E+22	0.889236E+00
64.0	0.947307E+21	0.107978E+23	0.845124E+21	0.327079E+21	0.100972E+22	0.889370E+00
65.0	0.947404E+21	0.107990E+23	0.845220E+21	0.327116E+21	0.100985E+22	0.889482E+00
66.0	0.947503E+21	0.108002E+23	0.845314E+21	0.327153E+21	0.100996E+22	0.889585E+00
67.0	0.947609E+21	0.108014E+23	0.845408E+21	0.327189E+21	0.101008E+22	0.889685E+00
68.0	0.947686E+21	0.108023E+23	0.845477E+21	0.327216E+21	0.101017E+22	0.889760E+00
69.0	0.947746E+21	0.108031E+23	0.845540E+21	0.327241E+21	0.101025E+22	0.889840E+00
70.0	0.947814E+21	0.108039E+23	0.845603E+21	0.327265E+21	0.101033E+22	0.889907E+00
71.0	0.947890E+21	0.108047E+23	0.845666E+21	0.327290E+21	0.101040E+22	0.889974E+00
72.0	0.947959E+21	0.108055E+23	0.845728E+21	0.327313E+21	0.101048E+22	0.890040E+00
73.0	0.947980E+21	0.108059E+23	0.845761E+21	0.327326E+21	0.101053E+22	0.890085E+00
74.0	0.948019E+21	0.108063E+23	0.845792E+21	0.327339E+21	0.101057E+22	0.890121E+00
75.0	0.948056E+21	0.108067E+23	0.845824E+21	0.327351E+21	0.101061E+22	0.890155E+00
76.0	0.948088E+21	0.108071E+23	0.845855E+21	0.327363E+21	0.101065E+22	0.890189E+00
77.0	0.948117E+21	0.108075E+23	0.845887E+21	0.327375E+21	0.101069E+22	0.890223E+00
78.0	0.948165E+21	0.108079E+23	0.845918E+21	0.327387E+21	0.101072E+22	0.890255E+00
79.0	0.948194E+21	0.108083E+23	0.845949E+21	0.327399E+21	0.101076E+22	0.890288E+00
80.0	0.948233E+21	0.108087E+23	0.845981E+21	0.327412E+21	0.101080E+22	0.890321E+00
81.0	0.948273E+21	0.108091E+23	0.846013E+21	0.327424E+21	0.101084E+22	0.890354E+00
82.0	0.948281E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890382E+00
83.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
84.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
85.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
86.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
87.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
88.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
89.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
90.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
91.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
92.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
93.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
94.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
95.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
96.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
97.0	0.104489E+22	0.111670E+23	0.873900E+21	0.337070E+21	0.905921E+21	0.797943E+00
98.0	0.107563E+22	0.114685E+23	0.897495E+21	0.346198E+21	0.908942E+21	0.800604E+00
99.0	0.110079E+22	0.117431E+23	0.918993E+21	0.354521E+21	0.927805E+21	0.817218E+00
100.0	0.112316E+22	0.119911E+23	0.938402E+21	0.362036E+21	0.947644E+21	0.834694E+00
101.0	0.114329E+22	0.122146E+23	0.955898E+21	0.368810E+21	0.966039E+21	0.850896E+00
102.0	0.116140E+22	0.124162E+23	0.971673E+21	0.374918E+21	0.982718E+21	0.865586E+00
103.0	0.117774E+22	0.125979E+23	0.985893E+21	0.380424E+21	0.997770E+21	0.878845E+00
104.0	0.119247E+22	0.127617E+23	0.998712E+21	0.385387E+21	0.101134E+22	0.890801E+00
105.0	0.120575E+22	0.129093E+23	0.101027E+22	0.389862E+21	0.102358E+22	0.901579E+00
106.0	0.121772E+22	0.130424E+23	0.102069E+22	0.393895E+21	0.103461E+22	0.911293E+00
107.0	0.122851E+22	0.131624E+23	0.103008E+22	0.397531E+21	0.104455E+22	0.920052E+00
108.0	0.123824E+22	0.132705E+23	0.103854E+22	0.400809E+21	0.105352E+22	0.927947E+00
109.0	0.124699E+22	0.133680E+23	0.104617E+22	0.403763E+21	0.106160E+22	0.935064E+00
110.0	0.125491E+22	0.134559E+23	0.105305E+22	0.406425E+21	0.106888E+22	0.941478E+00
111.0	0.126203E+22	0.135351E+23	0.105925E+22	0.408827E+21	0.107544E+22	0.947261E+00
112.0	0.126845E+22	0.136065E+23	0.106484E+22	0.410991E+21	0.108136E+22	0.952474E+00
113.0	0.127424E+22	0.136709E+23	0.106988E+22	0.412941E+21	0.108670E+22	0.957172E+00
114.0	0.127946E+22	0.137289E+23	0.107442E+22	0.414699E+21	0.109151E+22	0.961407E+00
115.0	0.128415E+22	0.137812E+23	0.107851E+22	0.416284E+21	0.109584E+22	0.965225E+00
116.0	0.128839E+22	0.138283E+23	0.108220E+22	0.417713E+21	0.109975E+22	0.968667E+00
117.0	0.129223E+22	0.138708E+23	0.108553E+22	0.419000E+21	0.110327E+22	0.971768E+00
118.0	0.129566E+22	0.139091E+23	0.108853E+22	0.420161E+21	0.110644E+22	0.974565E+00
119.0	0.129877E+22	0.139437E+23	0.109123E+22	0.421208E+21	0.110931E+22	0.977086E+00
120.0	0.130157E+22	0.139748E+23	0.109366E+22	0.422151E+21	0.111189E+22	0.979359E+00
121.0	0.130409E+22	0.140029E+23	0.109586E+22	0.423001E+21	0.111421E+22	0.981406E+00
122.0	0.130636E+22	0.140281E+23	0.109784E+22	0.423768E+21	0.111631E+22	0.983252E+00
123.0	0.130841E+22	0.140509E+23	0.109962E+22	0.424465E+21	0.111820E+22	0.984918E+00

124.0	0.131026E+22	0.140715E+23	0.110123E+22	0.425082E+21	0.111990E+22	0.986418E+00
125.0	0.131193E+22	0.140900E+23	0.110268E+22	0.425643E+21	0.112144E+22	0.987771E+00
126.0	0.131344E+22	0.141067E+23	0.110399E+22	0.426150E+21	0.112282E+22	0.988990E+00
127.0	0.131478E+22	0.141218E+23	0.110517E+22	0.426606E+21	0.112407E+22	0.990089E+00
128.0	0.131601E+22	0.141354E+23	0.110623E+22	0.427017E+21	0.112519E+22	0.991080E+00
129.0	0.131711E+22	0.141476E+23	0.110719E+22	0.427388E+21	0.112621E+22	0.991973E+00
130.0	0.131809E+22	0.141586E+23	0.110805E+22	0.427722E+21	0.112712E+22	0.992774E+00
131.0	0.131899E+22	0.141686E+23	0.110883E+22	0.428023E+21	0.112794E+22	0.993503E+00
132.0	0.131979E+22	0.141775E+23	0.110953E+22	0.428295E+21	0.112869E+22	0.994158E+00
133.0	0.132051E+22	0.141856E+23	0.111016E+22	0.428539E+21	0.112936E+22	0.994747E+00
134.0	0.132118E+22	0.141929E+23	0.111073E+22	0.428760E+21	0.112996E+22	0.995278E+00
135.0	0.132177E+22	0.141995E+23	0.111125E+22	0.428959E+21	0.113050E+22	0.995757E+00
136.0	0.132229E+22	0.142054E+23	0.111171E+22	0.429138E+21	0.113099E+22	0.996189E+00
137.0	0.132278E+22	0.142107E+23	0.111213E+22	0.429300E+21	0.113144E+22	0.996579E+00
138.0	0.132321E+22	0.142155E+23	0.111250E+22	0.429446E+21	0.113183E+22	0.996929E+00
139.0	0.132359E+22	0.142198E+23	0.111284E+22	0.429577E+21	0.113219E+22	0.997245E+00
140.0	0.132395E+22	0.142237E+23	0.111315E+22	0.429695E+21	0.113252E+22	0.997531E+00
141.0	0.132427E+22	0.142273E+23	0.111343E+22	0.429802E+21	0.113281E+22	0.997788E+00
142.0	0.132457E+22	0.142305E+23	0.111367E+22	0.429899E+21	0.113307E+22	0.998020E+00
143.0	0.132482E+22	0.142333E+23	0.111390E+22	0.429984E+21	0.113331E+22	0.998227E+00
144.0	0.132504E+22	0.142359E+23	0.111410E+22	0.430062E+21	0.113352E+22	0.998416E+00
145.0	0.132527E+22	0.142382E+23	0.111428E+22	0.430134E+21	0.113372E+22	0.998588E+00
146.0	0.132545E+22	0.142403E+23	0.111444E+22	0.430196E+21	0.113389E+22	0.998738E+00
147.0	0.132562E+22	0.142422E+23	0.111460E+22	0.430256E+21	0.113405E+22	0.998878E+00
148.0	0.132576E+22	0.142438E+23	0.111472E+22	0.430304E+21	0.113418E+22	0.998999E+00
149.0	0.132592E+22	0.142454E+23	0.111485E+22	0.430352E+21	0.113431E+22	0.999112E+00
150.0	0.132601E+22	0.142468E+23	0.111495E+22	0.430394E+21	0.113443E+22	0.999215E+00
151.0	0.132613E+22	0.142480E+23	0.111505E+22	0.430430E+21	0.113453E+22	0.999301E+00
152.0	0.132624E+22	0.142492E+23	0.111514E+22	0.430466E+21	0.113462E+22	0.999385E+00
153.0	0.132633E+22	0.142502E+23	0.111522E+22	0.430497E+21	0.113471E+22	0.999463E+00
154.0	0.132641E+22	0.142510E+23	0.111528E+22	0.430521E+21	0.113478E+22	0.999523E+00
155.0	0.132648E+22	0.142518E+23	0.111535E+22	0.430546E+21	0.113484E+22	0.999580E+00
156.0	0.132656E+22	0.142526E+23	0.111541E+22	0.430570E+21	0.113491E+22	0.999635E+00
157.0	0.132664E+22	0.142534E+23	0.111547E+22	0.430594E+21	0.113497E+22	0.999691E+00
158.0	0.132667E+22	0.142540E+23	0.111551E+22	0.430611E+21	0.113502E+22	0.999739E+00
159.0	0.132670E+22	0.142543E+23	0.111554E+22	0.430623E+21	0.113506E+22	0.999768E+00
160.0	0.132674E+22	0.142546E+23	0.111558E+22	0.430635E+21	0.113509E+22	0.999797E+00
161.0	0.132677E+22	0.142551E+23	0.111561E+22	0.430647E+21	0.113512E+22	0.999825E+00
162.0	0.132680E+22	0.142555E+23	0.111564E+22	0.430659E+21	0.113515E+22	0.999853E+00
163.0	0.132686E+22	0.142559E+23	0.111567E+22	0.430671E+21	0.113519E+22	0.999881E+00
164.0	0.132689E+22	0.142563E+23	0.111570E+22	0.430683E+21	0.113522E+22	0.999908E+00
165.0	0.132693E+22	0.142567E+23	0.111573E+22	0.430695E+21	0.113525E+22	0.999936E+00
166.0	0.132696E+22	0.142571E+23	0.111576E+22	0.430707E+21	0.113528E+22	0.999963E+00
167.0	0.132700E+22	0.142575E+23	0.111579E+22	0.430719E+21	0.113531E+22	0.999992E+00
168.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
169.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
170.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
171.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
172.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
173.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
174.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
175.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
176.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
177.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
178.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
179.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
180.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
181.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
182.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
183.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
184.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
185.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
186.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
187.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
188.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
189.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
190.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
191.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
192.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
193.0	0.110350E+22	0.136094E+23	0.106536E+22	0.413932E+21	0.144271E+22	0.127075E+01
194.0	0.103490E+22	0.130068E+23	0.101819E+22	0.395599E+21	0.150555E+22	0.132610E+01
195.0	0.985908E+21	0.124494E+23	0.974554E+21	0.378624E+21	0.148789E+22	0.131054E+01
196.0	0.945192E+21	0.119433E+23	0.934930E+21	0.363203E+21	0.144412E+22	0.127199E+01
197.0	0.909541E+21	0.114859E+23	0.899120E+21	0.349267E+21	0.139344E+22	0.122771E+01
198.0	0.877745E+21	0.110732E+23	0.866813E+21	0.336693E+21	0.134242E+22	0.118402E+01
199.0	0.105853E+22	0.114017E+23	0.892271E+21	0.344197E+21	0.978654E+21	0.862007E+00
200.0	0.109309E+22	0.116741E+23	0.913590E+21	0.352433E+21	0.935588E+21	0.824074E+00
201.0	0.111724E+22	0.119277E+23	0.933440E+21	0.360113E+21	0.944867E+21	0.832247E+00
202.0	0.113808E+22	0.121574E+23	0.951413E+21	0.367074E+21	0.961751E+21	0.847119E+00
203.0	0.115676E+22	0.123645E+23	0.967628E+21	0.373352E+21	0.978521E+21	0.861890E+00
204.0	0.117356E+22	0.125513E+23	0.982247E+21	0.379012E+21	0.993926E+21	0.875458E+00
205.0	0.118870E+22	0.127197E+23	0.995425E+21	0.384115E+21	0.100787E+22	0.887736E+00
206.0	0.120234E+22	0.128714E+23	0.100731E+22	0.388714E+21	0.102044E+22	0.898815E+00
207.0	0.121465E+22	0.130083E+23	0.101801E+22	0.392861E+21	0.103178E+22	0.908802E+00
208.0	0.122574E+22	0.131316E+23	0.102767E+22	0.396598E+21	0.104200E+22	0.917805E+00
209.0	0.123574E+22	0.132428E+23	0.103637E+22	0.399968E+21	0.105122E+22	0.926023E+00
210.0	0.124474E+22	0.133430E+23	0.104422E+22	0.403005E+21	0.105953E+22	0.933239E+00
211.0	0.125288E+22	0.134334E+23	0.105129E+22	0.405743E+21	0.106701E+22	0.939833E+00
212.0	0.126021E+22	0.135148E+23	0.105766E+22	0.408210E+21	0.107376E+22	0.945778E+00
213.0	0.126680E+22	0.135882E+23	0.106341E+22	0.410435E+21	0.107984E+22	0.951137E+00
214.0	0.127275E+22	0.136544E+23	0.106858E+22	0.412441E+21	0.108533E+22	0.955968E+00
215.0	0.127812E+22	0.137140E+23	0.107325E+22	0.414248E+21	0.109027E+22	0.960321E+00
216.0	0.128296E+22	0.137678E+23	0.107746E+22	0.415877E+21	0.109473E+22	0.964245E+00
217.0	0.106778E+22	0.131579E+23	0.103002E+22	0.400179E+21	0.139337E+22	0.122729E+01
218.0	0.100338E+22	0.125991E+23	0.986271E+21	0.383178E+21	0.145653E+22	0.128292E+01
219.0	0.957684E+21	0.120817E+23	0.945769E+21	0.367420E+21	0.144197E+22	0.127010E+01
220.0	0.919803E+21	0.116118E+23	0.908980E+21	0.353104E+21	0.140204E+22	0.123493E+01
221.0	0.886687E+21	0.111871E+23	0.875729E+21	0.340163E+21	0.135565E+22	0.119407E+01
222.0	0.857161E+21	0.108039E+23	0.845729E+21	0.328487E+21	0.130970E+22	0.115360E+01
223.0	0.103752E+22	0.111646E+23	0.873713E+21	0.337011E+21	0.956852E+21	0.842804E+00
224.0	0.107393E+22	0.114606E+23	0.896880E+21	0.345962E+21	0.917508E+21	0.808149E+00
225.0	0.109995E+22	0.117353E+23	0.918379E+21	0.354284E+21	0.928849E+21	0.818139E+00
226.0	0.112250E+22	0.119839E+23	0.937838E+21	0.361818E+21	0.947364E+21	0.834447E+00
227.0	0.114269E+22	0.122081E+23	0.955389E+21	0.368613E+21	0.965360E+21	0.850474E+00
228.0	0.116088E+22	0.124103E+23	0.971214E+21	0.374740E+21	0.982244E+21	0.865169E+00
229.0	0.117727E+22	0.125926E+23	0.985480E+21	0.380264E+21	0.997355E+21	0.878462E+00
230.0	0.119204E+22	0.127569E+23	0.998340E+21	0.385243E+21	0.101095E+22	0.890453E+00
231.0	0.120536E+22	0.129050E+23	0.100993E+22	0.389731E+21	0.102322E+22	0.901264E+00
232.0	0.121737E+22	0.130385E+23	0.102038E+22	0.393777E+21	0.103429E+22	0.911010E+00
233.0	0.122819E+22	0.131588E+23	0.102980E+22	0.397424E+21	0.104426E+22	0.919796E+00
234.0	0.123795E+22	0.132673E+23	0.103829E+22	0.400712E+21	0.105325E+22	0.927714E+00
235.0	0.124674E+22	0.133651E+23	0.104595E+22	0.403675E+21	0.106136E+22	0.934953E+00
236.0	0.125467E+22	0.134533E+23	0.105284E+22	0.406346E+21	0.106866E+22	0.941787E+00
237.0	0.126181E+22	0.135327E+23	0.105906E+22	0.408754E+21	0.107525E+22	0.947097E+00
238.0	0.126827E+22	0.136044E+23	0.106467E+22	0.410925E+21	0.108118E+22	0.952316E+00
239.0	0.127407E+22	0.136689E+23	0.106972E+22	0.412882E+21	0.108654E+22	0.957030E+00
240.0	0.127929E+22	0.137271E+23	0.107428E+22	0.414646E+21	0.109136E+22	0.961279E+00
241.0	0.106481E+22	0.131205E+23	0.102709E+22	0.399037E+21	0.138928E+22	0.122369E+01
242.0	0.100076E+22	0.125653E+23	0.983623E+21	0.382147E+21	0.145246E+22	0.127934E+01
243.0	0.955337E+21	0.120512E+23	0.943382E+21	0.366491E+21	0.143816E+22	0.126674E+01
244.0	0.917701E+21	0.115843E+23	0.906823E+21	0.352264E+21	0.139855E+22	0.123185E+01
245.0	0.884773E+21	0.111622E+23	0.873785E+21	0.339406E+21	0.135248E+22	0.119127E+01
246.0	0.855438E+21	0.107815E+23	0.843975E+21	0.327804E+21	0.130683E+22	0.115107E+01
247.0	0.103577E+22	0.111449E+23	0.872169E+21	0.338413E+21	0.955038E+21	0.841206E+00
248.0	0.107235E+22	0.114429E+23	0.895491E+21	0.345424E+21	0.916004E+21	0.806825E+00
249.0	0.109851E+22	0.117193E+23	0.917127E+21	0.353799E+21	0.927519E+21	0.816967E+00
250.0	0.112120E+22	0.119695E+23	0.936711E+21	0.361381E+21	0.946169E+21	0.833394E+00
251.0	0.114153E+22	0.121952E+23	0.954376E+21	0.368221E+21	0.964486E+21	0.849528E+00
252.0	0.115983E+22	0.123987E+23	0.970301E+21	0.374387E+21	0.981277E+21	0.864317E+00
253.0	0.117633E+22	0.125821E+23	0.984657E+21	0.379945E+21	0.994465E+21	0.877695E+00
254.0	0.119121E+22	0.127474E+23	0.997599E+21	0.384956E+21	0.101016E+22	0.889762E+00
255.0	0.120459E+22	0.128965E+23	0.100926E+22	0.389472E+21	0.102262E+22	0.900642E+00

256.0	0.121667E+22	0.130308E+23	0.101970E+22	0.393544E+21	0.103365E+22	0.910449E+00
257.0	0.122757E+22	0.131519E+23	0.102926E+22	0.397214E+21	0.104369E+22	0.919290E+00
258.0	0.123737E+22	0.132611E+23	0.103780E+22	0.400522E+21	0.105273E+22	0.927258E+00
259.0	0.124623E+22	0.133595E+23	0.104550E+22	0.403504E+21	0.106089E+22	0.934441E+00
260.0	0.125421E+22	0.134482E+23	0.105245E+22	0.406192E+21	0.106824E+22	0.940916E+00
261.0	0.126139E+22	0.135281E+23	0.105870E+22	0.408615E+21	0.107487E+22	0.946752E+00
262.0	0.126789E+22	0.136002E+23	0.106435E+22	0.410799E+21	0.108084E+22	0.952015E+00
263.0	0.127372E+22	0.136652E+23	0.106943E+22	0.412768E+21	0.108623E+22	0.956758E+00
264.0	0.127899E+22	0.137238E+23	0.107402E+22	0.414544E+21	0.109108E+22	0.961033E+00
265.0	0.106457E+22	0.131174E+23	0.102684E+22	0.398943E+21	0.138894E+22	0.122339E+01
266.0	0.100055E+22	0.125625E+23	0.983404E+21	0.382062E+21	0.145213E+22	0.127905E+01
267.0	0.955141E+21	0.120487E+23	0.943184E+21	0.366414E+21	0.143784E+22	0.126647E+01
268.0	0.917524E+21	0.115820E+23	0.906648E+21	0.352196E+21	0.139826E+22	0.123160E+01
269.0	0.884617E+21	0.111602E+23	0.873628E+21	0.339345E+21	0.135222E+22	0.119104E+01
270.0	0.855313E+21	0.107797E+23	0.843834E+21	0.327749E+21	0.130660E+22	0.115087E+01
271.0	0.103563E+22	0.111433E+23	0.872043E+21	0.336364E+21	0.954891E+21	0.841077E+00
272.0	0.107220E+22	0.114414E+23	0.895377E+21	0.345380E+21	0.915582E+21	0.806717E+00
273.0	0.109839E+22	0.117180E+23	0.917024E+21	0.353759E+21	0.927409E+21	0.816870E+00
274.0	0.112109E+22	0.119683E+23	0.936617E+21	0.361345E+21	0.946070E+21	0.833307E+00
275.0	0.114143E+22	0.121941E+23	0.954288E+21	0.368187E+21	0.964394E+21	0.849447E+00
276.0	0.115973E+22	0.123977E+23	0.970223E+21	0.374356E+21	0.981193E+21	0.864244E+00
277.0	0.117624E+22	0.125812E+23	0.984586E+21	0.379917E+21	0.996389E+21	0.877629E+00
278.0	0.119111E+22	0.127466E+23	0.997534E+21	0.384931E+21	0.101010E+22	0.889701E+00
279.0	0.120452E+22	0.128957E+23	0.100920E+22	0.389450E+21	0.102245E+22	0.900583E+00
280.0	0.121662E+22	0.130302E+23	0.101973E+22	0.393523E+21	0.103360E+22	0.910400E+00
281.0	0.122751E+22	0.131513E+23	0.102921E+22	0.397196E+21	0.104364E+22	0.919244E+00
282.0	0.123734E+22	0.132605E+23	0.103776E+22	0.400505E+21	0.105269E+22	0.927218E+00
283.0	0.124618E+22	0.133590E+23	0.104547E+22	0.403489E+21	0.106085E+22	0.934406E+00
284.0	0.125418E+22	0.134477E+23	0.105241E+22	0.406179E+21	0.106820E+22	0.940894E+00
285.0	0.126136E+22	0.135278E+23	0.105867E+22	0.408603E+21	0.107484E+22	0.946724E+00
286.0	0.126787E+22	0.135999E+23	0.106432E+22	0.410789E+21	0.108081E+22	0.951989E+00
287.0	0.127369E+22	0.136649E+23	0.106941E+22	0.412759E+21	0.108620E+22	0.956738E+00
288.0	0.127896E+22	0.137235E+23	0.107399E+22	0.414535E+21	0.109106E+22	0.961013E+00
289.0	0.106455E+22	0.131171E+23	0.102682E+22	0.398933E+21	0.138891E+22	0.122337E+01
290.0	0.100054E+22	0.125623E+23	0.983387E+21	0.382055E+21	0.145210E+22	0.127902E+01
291.0	0.955132E+21	0.120485E+23	0.943167E+21	0.366404E+21	0.143782E+22	0.126646E+01
292.0	0.917513E+21	0.115818E+23	0.906633E+21	0.352190E+21	0.139824E+22	0.123158E+01
293.0	0.884615E+21	0.111601E+23	0.873615E+21	0.339340E+21	0.135220E+22	0.119103E+01
294.0	0.855292E+21	0.107795E+23	0.843822E+21	0.327745E+21	0.130658E+22	0.115085E+01
295.0	0.103563E+22	0.111432E+23	0.872033E+21	0.336361E+21	0.954880E+21	0.841067E+00
296.0	0.107220E+22	0.114413E+23	0.895369E+21	0.345377E+21	0.915574E+21	0.806710E+00
297.0	0.109839E+22	0.117179E+23	0.917017E+21	0.353756E+21	0.927402E+21	0.816865E+00
298.0	0.112109E+22	0.119682E+23	0.936612E+21	0.361343E+21	0.946064E+21	0.833302E+00
299.0	0.114142E+22	0.121940E+23	0.954283E+21	0.368185E+21	0.964389E+21	0.849442E+00
300.0	0.115974E+22	0.123976E+23	0.970218E+21	0.374355E+21	0.981189E+21	0.864240E+00
301.0	0.117624E+22	0.125811E+23	0.984582E+21	0.379916E+21	0.996385E+21	0.877624E+00
302.0	0.119111E+22	0.127466E+23	0.997530E+21	0.384929E+21	0.101009E+22	0.889698E+00
303.0	0.120452E+22	0.128957E+23	0.100920E+22	0.389448E+21	0.102245E+22	0.900583E+00
304.0	0.121660E+22	0.130301E+23	0.101972E+22	0.393522E+21	0.103359E+22	0.910396E+00
305.0	0.122751E+22	0.131513E+23	0.102921E+22	0.397194E+21	0.104363E+22	0.919241E+00
306.0	0.123733E+22	0.132605E+23	0.103776E+22	0.400505E+21	0.105269E+22	0.927216E+00
307.0	0.124619E+22	0.133590E+23	0.104546E+22	0.403488E+21	0.106085E+22	0.934403E+00
308.0	0.125417E+22	0.134477E+23	0.105241E+22	0.406178E+21	0.106820E+22	0.940881E+00
309.0	0.126135E+22	0.135277E+23	0.105867E+22	0.408602E+21	0.107483E+22	0.946723E+00
310.0	0.126785E+22	0.135999E+23	0.106432E+22	0.410789E+21	0.108081E+22	0.951987E+00
311.0	0.127370E+22	0.136649E+23	0.106941E+22	0.412759E+21	0.108620E+22	0.956738E+00
312.0	0.127898E+22	0.137235E+23	0.107399E+22	0.414535E+21	0.109106E+22	0.961011E+00

.37530E+15 0.25136E+15 0.13500E+15 0.55040E+14 0.14988E+14 0.41379E+13 0.11691E+13 0.33367E+12 0.10136E+12 0.47867E+11

.72705E+11 0.20705E+12 0.64974E+12 0.20640E+13 0.65796E+13 0.21024E+14 0.67312E+14 0.14498E+15 0.25748E+15 0.37677E+15

.15981E+11 0.14775E+11 0.13965E+11 0.13528E+11 0.45758E+10 0.15167E+10 0.49567E+09 0.16011E+09 0.50513E+08 0.13013E+08

.56826E+07=0.39610E+08=0.14195E+09=0.48996E+09=0.16809E+10=0.57494E+10=0.19619E+11=0.66800E+11=0.69197E+11=0.73485E+11

.79772E+11

.11953E+10 0.80601E+09 0.43580E+09 0.39298E+10 0.30507E+10 0.10181E+10 0.33455E+09 0.10926E+09 0.37378E+08 0.19628E+08

.32816E+08 0.10201E+09 0.34694E+09 0.11874E+10 0.40568E+10 0.13831E+11 0.47063E+11 0.23888E+10 0.42482E+10 0.62265E+10

.95418E+11

XENON CALCULATION

0.255306E+21 0.125560E+20 0.593990E-02 0.221905E+00 0.231586E-01

0.100997E-07 0.264167E-01 0.544489E+00 0.172800E-02 0.128800E-02

0.252000E-01 0.119210E-03 0.168329E-09 0.440279E-03 0.615860E-03

1.0	0.102623E+21	0.958577E+21	0.749712E+20	0.285083E+20	0.646036E+20	0.569034E-01
2.0	0.151514E+21	0.158275E+22	0.123836E+21	0.475255E+20	0.133817E+21	0.117867E+00
3.0	0.194972E+21	0.214605E+22	0.167935E+21	0.646886E+20	0.201859E+21	0.177799E+00
4.0	0.233942E+21	0.265405E+22	0.207704E+21	0.801669E+20	0.265410E+21	0.233776E+00
5.0	0.269004E+21	0.311205E+22	0.243560E+21	0.941218E+20	0.323576E+21	0.285009E+00
6.0	0.300584E+21	0.352493E+22	0.275883E+21	0.106702E+21	0.376365E+21	0.331505E+00
7.0	0.329043E+21	0.389712E+22	0.305020E+21	0.118042E+21	0.424095E+21	0.373546E+00
8.0	0.354691E+21	0.423262E+22	0.331286E+21	0.128265E+21	0.467180E+21	0.411496E+00
9.0	0.377815E+21	0.453506E+22	0.354964E+21	0.137480E+21	0.506042E+21	0.445727E+00
10.0	0.398653E+21	0.480770E+22	0.376307E+21	0.145787E+21	0.541084E+21	0.476592E+00
11.0	0.417440E+21	0.505343E+22	0.395545E+21	0.153275E+21	0.572675E+21	0.504418E+00
12.0	0.434381E+21	0.527497E+22	0.412888E+21	0.160025E+21	0.601155E+21	0.529503E+00
13.0	0.449644E+21	0.547467E+22	0.428522E+21	0.166110E+21	0.626828E+21	0.552116E+00
14.0	0.463402E+21	0.565468E+22	0.442615E+21	0.171594E+21	0.649972E+21	0.572501E+00
15.0	0.475810E+21	0.581696E+22	0.455319E+21	0.176539E+21	0.670835E+21	0.590877E+00
16.0	0.486994E+21	0.596323E+22	0.466771E+21	0.180996E+21	0.689637E+21	0.607439E+00
17.0	0.497074E+21	0.609509E+22	0.477094E+21	0.185013E+21	0.706588E+21	0.622369E+00
18.0	0.506159E+21	0.621395E+22	0.486399E+21	0.188635E+21	0.721869E+21	0.635828E+00
19.0	0.514352E+21	0.632110E+22	0.494787E+21	0.191900E+21	0.735644E+21	0.647961E+00
20.0	0.521730E+21	0.641768E+22	0.502348E+21	0.194843E+21	0.748062E+21	0.658900E+00
21.0	0.528384E+21	0.650475E+22	0.509164E+21	0.197496E+21	0.759255E+21	0.668759E+00
22.0	0.534389E+21	0.658324E+22	0.515309E+21	0.199887E+21	0.769345E+21	0.677646E+00
23.0	0.539800E+21	0.665398E+22	0.520847E+21	0.202043E+21	0.778441E+21	0.685658E+00
24.0	0.544666E+21	0.671775E+22	0.525840E+21	0.203986E+21	0.786640E+21	0.692880E+00
25.0	0.549063E+21	0.677525E+22	0.530341E+21	0.205737E+21	0.794031E+21	0.699389E+00
26.0	0.553025E+21	0.682707E+22	0.534397E+21	0.207316E+21	0.800693E+21	0.705258E+00
27.0	0.556594E+21	0.687379E+22	0.538055E+21	0.208740E+21	0.806699E+21	0.710548E+00
28.0	0.559815E+21	0.691589E+22	0.541351E+21	0.210023E+21	0.812113E+21	0.715316E+00
29.0	0.562715E+21	0.695385E+22	0.544323E+21	0.211179E+21	0.816994E+21	0.719615E+00
30.0	0.565334E+21	0.698806E+22	0.547001E+21	0.212222E+21	0.821392E+21	0.723490E+00
31.0	0.567688E+21	0.701890E+22	0.549416E+21	0.213161E+21	0.825357E+21	0.726982E+00
32.0	0.569819E+21	0.704671E+22	0.551593E+21	0.214009E+21	0.828932E+21	0.730130E+00
33.0	0.571734E+21	0.707177E+22	0.553555E+21	0.214772E+21	0.832153E+21	0.732968E+00
34.0	0.573463E+21	0.709436E+22	0.555323E+21	0.215461E+21	0.835058E+21	0.735526E+00
35.0	0.575017E+21	0.711473E+22	0.556918E+21	0.216081E+21	0.837677E+21	0.737833E+00
36.0	0.576421E+21	0.713308E+22	0.558355E+21	0.216640E+21	0.840036E+21	0.739912E+00
37.0	0.577689E+21	0.714964E+22	0.559651E+21	0.217145E+21	0.842164E+21	0.741786E+00
38.0	0.578823E+21	0.716455E+22	0.560818E+21	0.217599E+21	0.844082E+21	0.743475E+00
39.0	0.579858E+21	0.717800E+22	0.561871E+21	0.218009E+21	0.845811E+21	0.744998E+00
40.0	0.580779E+21	0.719013E+22	0.562820E+21	0.218379E+21	0.847369E+21	0.746371E+00
41.0	0.581614E+21	0.720105E+22	0.563676E+21	0.218712E+21	0.848775E+21	0.747609E+00
42.0	0.582367E+21	0.721090E+22	0.564447E+21	0.219011E+21	0.850041E+21	0.748724E+00
43.0	0.583044E+21	0.721977E+22	0.565142E+21	0.219282E+21	0.851182E+21	0.749727E+00
44.0	0.583658E+21	0.722778E+22	0.565768E+21	0.219526E+21	0.852211E+21	0.750635E+00
45.0	0.584217E+21	0.723500E+22	0.566333E+21	0.219746E+21	0.853138E+21	0.751452E+00
46.0	0.584709E+21	0.724150E+22	0.566842E+21	0.219944E+21	0.853975E+21	0.752188E+00
47.0	0.585159E+21	0.724737E+22	0.567302E+21	0.220123E+21	0.854729E+21	0.752853E+00
48.0	0.585563E+21	0.725265E+22	0.567715E+21	0.220284E+21	0.855408E+21	0.753451E+00
49.0	0.585923E+21	0.725742E+22	0.568088E+21	0.220429E+21	0.856019E+21	0.753999E+00
50.0	0.586256E+21	0.726170E+22	0.568424E+21	0.220559E+21	0.856571E+21	0.754476E+00
51.0	0.586551E+21	0.726558E+22	0.568728E+21	0.220678E+21	0.857070E+21	0.754915E+00
52.0	0.586821E+21	0.726907E+22	0.569001E+21	0.220784E+21	0.857518E+21	0.755309E+00
53.0	0.587055E+21	0.727221E+22	0.569247E+21	0.220880E+21	0.857923E+21	0.755666E+00
54.0	0.587272E+21	0.727505E+22	0.569469E+21	0.220966E+21	0.858287E+21	0.755987E+00
55.0	0.587474E+21	0.727761E+22	0.569669E+21	0.221044E+21	0.858616E+21	0.756277E+00
56.0	0.587651E+21	0.727991E+22	0.569849E+21	0.221114E+21	0.858913E+21	0.756538E+00
57.0	0.587801E+21	0.728199E+22	0.570012E+21	0.221178E+21	0.859180E+21	0.756773E+00
58.0	0.587950E+21	0.728387E+22	0.570159E+21	0.221235E+21	0.859420E+21	0.756985E+00
59.0	0.588078E+21	0.728555E+22	0.570291E+21	0.221286E+21	0.859637E+21	0.757176E+00
60.0	0.588195E+21	0.728707E+22	0.570410E+21	0.221332E+21	0.859834E+21	0.757349E+00
61.0	0.588293E+21	0.728844E+22	0.570517E+21	0.221374E+21	0.860009E+21	0.757503E+00
62.0	0.588394E+21	0.728968E+22	0.570614E+21	0.221412E+21	0.860168E+21	0.757644E+00
63.0	0.588479E+21	0.729079E+22	0.570701E+21	0.221446E+21	0.860311E+21	0.757769E+00
64.0	0.588556E+21	0.729180E+22	0.570780E+21	0.221476E+21	0.860439E+21	0.757883E+00
65.0	0.588616E+21	0.729270E+22	0.570851E+21	0.221504E+21	0.860557E+21	0.757986E+00
66.0	0.588685E+21	0.729351E+22	0.570914E+21	0.221529E+21	0.860661E+21	0.758078E+00
67.0	0.588739E+21	0.729425E+22	0.570972E+21	0.221551E+21	0.860755E+21	0.758161E+00
68.0	0.588788E+21	0.729491E+22	0.571024E+21	0.221571E+21	0.860841E+21	0.758236E+00
69.0	0.588840E+21	0.729551E+22	0.571071E+21	0.221590E+21	0.860919E+21	0.758305E+00
70.0	0.588881E+21	0.729605E+22	0.571113E+21	0.221606E+21	0.860986E+21	0.758364E+00
71.0	0.588916E+21	0.729655E+22	0.571151E+21	0.221621E+21	0.861048E+21	0.758419E+00
72.0	0.588952E+21	0.729698E+22	0.571186E+21	0.221634E+21	0.861106E+21	0.758470E+00
73.0	0.588984E+21	0.729738E+22	0.571217E+21	0.221646E+21	0.861156E+21	0.758514E+00
74.0	0.589006E+21	0.729772E+22	0.571244E+21	0.221657E+21	0.861202E+21	0.758554E+00
75.0	0.589032E+21	0.729805E+22	0.571269E+21	0.221667E+21	0.861243E+21	0.758591E+00
76.0	0.589052E+21	0.729834E+22	0.571292E+21	0.221676E+21	0.861281E+21	0.758624E+00
77.0	0.589080E+21	0.729861E+22	0.571313E+21	0.221684E+21	0.861315E+21	0.758654E+00
78.0	0.589095E+21	0.729883E+22	0.571330E+21	0.221691E+21	0.861342E+21	0.758678E+00
79.0	0.589112E+21	0.729905E+22	0.571347E+21	0.221697E+21	0.861372E+21	0.758704E+00
80.0	0.589127E+21	0.729923E+22	0.571362E+21	0.221703E+21	0.861394E+21	0.758724E+00
81.0	0.589136E+21	0.729940E+22	0.571375E+21	0.221708E+21	0.861417E+21	0.758744E+00
82.0	0.589149E+21	0.729956E+22	0.571387E+21	0.221713E+21	0.861435E+21	0.758760E+00
83.0	0.589159E+21	0.729969E+22	0.571398E+21	0.221717E+21	0.861455E+21	0.758777E+00
84.0	0.589167E+21	0.729982E+22	0.571408E+21	0.221721E+21	0.861469E+21	0.758790E+00
85.0	0.589178E+21	0.729993E+22	0.571417E+21	0.221724E+21	0.861484E+21	0.758803E+00
86.0	0.589183E+21	0.730003E+22	0.571424E+21	0.221727E+21	0.861498E+21	0.758815E+00
87.0	0.589192E+21	0.730013E+22	0.571432E+21	0.221730E+21	0.861510E+21	0.758826E+00
88.0	0.589198E+21	0.730021E+22	0.571438E+21	0.221733E+21	0.861517E+21	0.758832E+00
89.0	0.589199E+21	0.730029E+22	0.571444E+21	0.221735E+21	0.861530E+21	0.758843E+00
90.0	0.589211E+21	0.730036E+22	0.571450E+21	0.221737E+21	0.861537E+21	0.758850E+00
91.0	0.589219E+21	0.730041E+22	0.571454E+21	0.221739E+21	0.861546E+21	0.758858E+00
92.0	0.589217E+21	0.730047E+22	0.571458E+21	0.221740E+21	0.861552E+21	0.758862E+00
93.0	0.589221E+21	0.730050E+22	0.571461E+21	0.221742E+21	0.861553E+21	0.758863E+00
94.0	0.589226E+21	0.730056E+22	0.571466E+21	0.221744E+21	0.861559E+21	0.758869E+00
95.0	0.589232E+21	0.730061E+22	0.571470E+21	0.221745E+21	0.861569E+21	0.75887[illegible]+00
96.0	0.589232E+21	0.730064E+22	0.571472E+21	0.221746E+21	0.861570E+21	0.758879E+00
97.0	0.764155E+21	0.608009E+22	0.632288E+21	0.243527E+21	0.673473E+21	0.593201E+00
98.0	0.824731E+21	0.868335E+22	0.679504E+21	0.261796E+21	0.682348E+21	0.601018E+00
99.0	0.874931E+21	0.923220E+22	0.722462E+21	0.278428E+21	0.720484E+21	0.634609E+00
100.0	0.919614E+21	0.972763E+22	0.761239E+21	0.293441E+21	0.760199E+21	0.669590E+00
101.0	0.959796E+21	0.101743E+23	0.796198E+21	0.306977E+21	0.796967E+21	0.701976E+00
102.0	0.996017E+21	0.105769E+23	0.827715E+21	0.319179E+21	0.830292E+21	0.731329E+00
103.0	0.102866E+22	0.109400E+23	0.856127E+21	0.330180E+21	0.860367E+21	0.757819E+00
104.0	0.105808E+22	0.112671E+23	0.881737E+21	0.340096E+21	0.887484E+21	0.781704E+00
105.0	0.108461E+22	0.115621E+23	0.904822E+21	0.349035E+21	0.911929E+21	0.803235E+00
106.0	0.110852E+22	0.118280E+23	0.925632E+21	0.357092E+21	0.933962E+21	0.822642E+00
107.0	0.113006E+22	0.120676E+23	0.944390E+21	0.364354E+21	0.953824E+21	0.840137E+00
108.0	0.114949E+22	0.122837E+23	0.961301E+21	0.370902E+21	0.971730E+21	0.855908E+00
109.0	0.116701E+22	0.124784E+23	0.976544E+21	0.376804E+21	0.987870E+21	0.870125E+00
110.0	0.118278E+22	0.126540E+23	0.990284E+21	0.382124E+21	0.100242E+22	0.882940E+00
111.0	0.119702E+22	0.128122E+23	0.100267E+22	0.386920E+21	0.101554E+22	0.894492E+00
112.0	0.120985E+22	0.129549E+23	0.101384E+22	0.391243E+21	0.102736E+22	0.904906E+00
113.0	0.122141E+22	0.130835E+23	0.102390E+22	0.395140E+21	0.103801E+22	0.914293E+00
114.0	0.123183E+22	0.131994E+23	0.103298E+22	0.398653E+21	0.104762E+22	0.922756E+00
115.0	0.124124E+22	0.133039E+23	0.104115E+22	0.401820E+21	0.105628E+22	0.930384E+00
116.0	0.124971E+22	0.133981E+23	0.104853E+22	0.404674E+21	0.106409E+22	0.937260E+00
117.0	0.125735E+22	0.134830E+23	0.105517E+22	0.407247E+21	0.107113E+22	0.943457E+00
118.0	0.126422E+22	0.135596E+23	0.106116E+22	0.409567E+21	0.107747E+22	0.949046E+00
119.0	0.127042E+22	0.136285E+23	0.106656E+22	0.411658E+21	0.108319E+22	0.954081E+00
120.0	0.127602E+22	0.136907E+23	0.107143E+22	0.413543E+21	0.108834E+22	0.958622E+00
121.0	0.128107E+22	0.137468E+23	0.107582E+22	0.415241E+21	0.109299E+22	0.962714E+00
122.0	0.128561E+22	0.137973E+23	0.107977E+22	0.416773E+21	0.109718E+22	0.966403E+00
123.0	0.128971E+22	0.138429E+23	0.108334E+22	0.418153E+21	0.110095E+22	0.969728E+00

124.0	0.129339E+22	0.138839E+23	0.108655E+22	0.419398E+21	0.110436E+22	0.972726E+00
125.0	0.129672E+22	0.139210E+23	0.108945E+22	0.420519E+21	0.110742E+22	0.975427E+00
126.0	0.129973E+22	0.139543E+23	0.109206E+22	0.421531E+21	0.111019E+22	0.977864E+00
127.0	0.130242E+22	0.139844E+23	0.109442E+22	0.422442E+21	0.111268E+22	0.980060E+00
128.0	0.130487E+22	0.140115E+23	0.109654E+22	0.423264E+21	0.111493E+22	0.982039E+00
129.0	0.130707E+22	0.140360E+23	0.109845E+22	0.424005E+21	0.111695E+22	0.983824E+00
130.0	0.130904E+22	0.140580E+23	0.110018E+22	0.424672E+21	0.111878E+22	0.985431E+00
131.0	0.131083E+22	0.140778E+23	0.110173E+22	0.425274E+21	0.112043E+22	0.986881E+00
132.0	0.131244E+22	0.140958E+23	0.110313E+22	0.425817E+21	0.112191E+22	0.988189E+00
133.0	0.131389E+22	0.141119E+23	0.110439E+22	0.426306E+21	0.112325E+22	0.989366E+00
134.0	0.131520E+22	0.141264E+23	0.110553E+22	0.426746E+21	0.112445E+22	0.990428E+00
135.0	0.131640E+22	0.141396E+23	0.110656E+22	0.427144E+21	0.112554E+22	0.991385E+00
136.0	0.131745E+22	0.141514E+23	0.110748E+22	0.427502E+21	0.112652E+22	0.992248E+00
137.0	0.131840E+22	0.141620E+23	0.110832E+22	0.427825E+21	0.112740E+22	0.993026E+00
138.0	0.131927E+22	0.141716E+23	0.110907E+22	0.428116E+21	0.112820E+22	0.993727E+00
139.0	0.132004E+22	0.141803E+23	0.110975E+22	0.428379E+21	0.112892E+22	0.994359E+00
140.0	0.132074E+22	0.141881E+23	0.111036E+22	0.428615E+21	0.112956E+22	0.994929E+00
141.0	0.132138E+22	0.141951E+23	0.111091E+22	0.428828E+21	0.113015E+22	0.995442E+00
142.0	0.132196E+22	0.142015E+23	0.111141E+22	0.429020E+21	0.113067E+22	0.995905E+00
143.0	0.132248E+22	0.142072E+23	0.111185E+22	0.429194E+21	0.113115E+22	0.996323E+00
144.0	0.132292E+22	0.142123E+23	0.111226E+22	0.429350E+21	0.113157E+22	0.996699E+00
145.0	0.132334E+22	0.142170E+23	0.111262E+22	0.429491E+21	0.113196E+22	0.997038E+00
146.0	0.132372E+22	0.142212E+23	0.111295E+22	0.429617E+21	0.113230E+22	0.997342E+00
147.0	0.132406E+22	0.142249E+23	0.111324E+22	0.429732E+21	0.113262E+22	0.997618E+00
148.0	0.132436E+22	0.142283E+23	0.111351E+22	0.429835E+21	0.113290E+22	0.997867E+00
149.0	0.132463E+22	0.142314E+23	0.111375E+22	0.429928E+21	0.113315E+22	0.998091E+00
150.0	0.132491E+22	0.142342E+23	0.111397E+22	0.430012E+21	0.113338E+22	0.998293E+00
151.0	0.132511E+22	0.142367E+23	0.111416E+22	0.430086E+21	0.113359E+22	0.998474E+00
152.0	0.132532E+22	0.142389E+23	0.111434E+22	0.430156E+21	0.113378E+22	0.998640E+00
153.0	0.132551E+22	0.142409E+23	0.111449E+22	0.430216E+21	0.113394E+22	0.998785E+00
154.0	0.132566E+22	0.142428E+23	0.111464E+22	0.430272E+21	0.113409E+22	0.998921E+00
155.0	0.132580E+22	0.142444E+23	0.111476E+22	0.430320E+21	0.113423E+22	0.999037E+00
156.0	0.132596E+22	0.142460E+23	0.111489E+22	0.430368E+21	0.113435E+22	0.999149E+00
157.0	0.132607E+22	0.142472E+23	0.111498E+22	0.430406E+21	0.113446E+22	0.999244E+00
158.0	0.132616E+22	0.142484E+23	0.111508E+22	0.430445E+21	0.113456E+22	0.999329E+00
159.0	0.132628E+22	0.142496E+23	0.111517E+22	0.430478E+21	0.113465E+22	0.999413E+00
160.0	0.132635E+22	0.142505E+23	0.111524E+22	0.430506E+21	0.113473E+22	0.999484E+00
161.0	0.132643E+22	0.142513E+23	0.111530E+22	0.430529E+21	0.113480E+22	0.999541E+00
162.0	0.132650E+22	0.142521E+23	0.111537E+22	0.430553E+21	0.113486E+22	0.999599E+00
163.0	0.132657E+22	0.142529E+23	0.111543E+22	0.430577E+21	0.113493E+22	0.999654E+00
164.0	0.132666E+22	0.142537E+23	0.111549E+22	0.430602E+21	0.113499E+22	0.999710E+00
165.0	0.132668E+22	0.142541E+23	0.111552E+22	0.430615E+21	0.113503E+22	0.999749E+00
166.0	0.132671E+22	0.142545E+23	0.111556E+22	0.430627E+21	0.113507E+22	0.999779E+00
167.0	0.132675E+22	0.142549E+23	0.111559E+22	0.430639E+21	0.113510E+22	0.999807E+00
168.0	0.132678E+22	0.142553E+23	0.111562E+22	0.430651E+21	0.113513E+22	0.999835E+00
169.0	0.132683E+22	0.142557E+23	0.111565E+22	0.430663E+21	0.113517E+22	0.999864E+00
170.0	0.132686E+22	0.142561E+23	0.111568E+22	0.430675E+21	0.113520E+22	0.999890E+00
171.0	0.132690E+22	0.142565E+23	0.111571E+22	0.430687E+21	0.113523E+22	0.999918E+00
172.0	0.132694E+22	0.142569E+23	0.111574E+22	0.430699E+21	0.113526E+22	0.999946E+00
173.0	0.132698E+22	0.142573E+23	0.111577E+22	0.430711E+21	0.113529E+22	0.999973E+00
174.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.999999E+00
175.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
176.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
177.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
178.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
179.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
180.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
181.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
182.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
183.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
184.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
185.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
186.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
187.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
188.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
189.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
190.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
191.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
192.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01

0.38996E+15 0.26173E+15 0.14036E+15 0.57286E+14 0.15623E+14 0.43407E+13 0.12225E+13 0.34950E+12 0.10639E+12 0.50253E+11

0.76437E+11 0.21726E+12 0.68056E+12 0.21583E+13 0.68692E+13 0.21915E+14 0.70062E+14 0.15076E+15 0.26700E+15 0.39148E+15

0.16583E+11 0.15345E+11 0.14507E+11 0.14054E+11 0.47599E+10 0.15800E+10 0.51714E+09 0.16731E+09 0.52863E+08 0.13630E+08

=0.70175E+07=0.41520E+08=0.14856E+09=0.51195E+09=0.17536E+10=0.59990E+10=0.20407E+11=0.69393E+11=0.71877E+11=0.76293E+11

=0.82764E+11

0.12420E+10 0.83767E+09 0.45309E+09 0.92942E+10 0.31799E+10 0.10628E+10 0.34982E+09 0.11445E+09 0.37232E+08 0.2[illegible]E+08

0.34500E+08 0.10703E+09 0.36340E+09 0.12416E+10 0.42353E+10 0.14417E+11 0.49986E+11 0.2[illegible]E+10 0.44152E+10 0.6[illegible]E+10

0.99346E+11

Shutdown

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01		
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126600E-02		
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-03		
1.0	0.214317E+21	0.188474E+22	0.147377E+21	0.557630E+20	0.111905E+21	0.985668E-01
2.0	0.324062E+21	0.310467E+22	0.242860E+21	0.927328E+20	0.211376E+21	0.186182E+00
3.0	0.422969E+21	0.420434E+22	0.328932E+21	0.126058E+21	0.302205E+21	0.266185E+00
4.0	0.512109E+21	0.519563E+22	0.406520E+21	0.156099E+21	0.384300E+21	0.338495E+00
5.0	0.592471E+21	0.608923E+22	0.476461E+21	0.183180E+21	0.458347E+21	0.403716E+00
6.0	0.664903E+21	0.689475E+22	0.539510E+21	0.207591E+21	0.525105E+21	0.462517E+00
7.0	0.730191E+21	0.762085E+22	0.596341E+21	0.229595E+21	0.585282E+21	0.515522E+00
8.0	0.789025E+21	0.827520E+22	0.647557E+21	0.249426E+21	0.639519E+21	0.563294E+00
9.0	0.842078E+21	0.886507E+22	0.693726E+21	0.267301E+21	0.688404E+21	0.606353E+00
10.0	0.889888E+21	0.939678E+22	0.735344E+21	0.283415E+21	0.732473E+21	0.645148E+00
11.0	0.932990E+21	0.987610E+22	0.772859E+21	0.297940E+21	0.772196E+21	0.680157E+00
12.0	0.971846E+21	0.103081E+23	0.806676E+21	0.311034E+21	0.808004E+21	0.711697E+00
13.0	0.100686E+22	0.106976E+23	0.837159E+21	0.322836E+21	0.840282E+21	0.740128E+00
14.0	0.103844E+22	0.110487E+23	0.864639E+21	0.333476E+21	0.869379E+21	0.765757E+00
15.0	0.106690E+22	0.113652E+23	0.889410E+21	0.343067E+21	0.895609E+21	0.788820E+00
16.0	0.109255E+22	0.116505E+23	0.911739E+21	0.351712E+21	0.919253E+21	0.809696E+00
17.0	0.111567E+22	0.119076E+23	0.931867E+21	0.359506E+21	0.940564E+21	0.828457E+00
18.0	0.113653E+22	0.121394E+23	0.950008E+21	0.366530E+21	0.959773E+21	0.845377E+00
19.0	0.115531E+22	0.123484E+23	0.966364E+21	0.372863E+21	0.977091E+21	0.860630E+00
20.0	0.117225E+22	0.125367E+23	0.981108E+21	0.378571E+21	0.992702E+21	0.874381E+00
21.0	0.118751E+22	0.127065E+23	0.994398E+21	0.383717E+21	0.100067E+22	0.886777E+00
22.0	0.120127E+22	0.128596E+23	0.100638E+22	0.388356E+21	0.101946E+22	0.897951E+00
23.0	0.121370E+22	0.129976E+23	0.101718E+22	0.392537E+21	0.103090E+22	0.908023E+00
24.0	0.122488E+22	0.131220E+23	0.102691E+22	0.396306E+21	0.104121E+22	0.917104E+00
25.0	0.123496E+22	0.132341E+23	0.103569E+22	0.399705E+21	0.105050E+22	0.925289E+00
26.0	0.124404E+22	0.133352E+23	0.104360E+22	0.402768E+21	0.105888E+22	0.932667E+00
27.0	0.125226E+22	0.134263E+23	0.105073E+22	0.405529E+21	0.106643E+22	0.939317E+00
28.0	0.125963E+22	0.135084E+23	0.105716E+22	0.408017E+21	0.107325E+22	0.945312E+00
29.0	0.126630E+22	0.135824E+23	0.106295E+22	0.410261E+21	0.107937E+22	0.950716E+00
30.0	0.127229E+22	0.136492E+23	0.106818E+22	0.412283E+21	0.108490E+22	0.955588E+00
31.0	0.127769E+22	0.137093E+23	0.107289E+22	0.414106E+21	0.108988E+22	0.959979E+00
32.0	0.128257E+22	0.137635E+23	0.107713E+22	0.415749E+21	0.109438E+22	0.963937E+00
33.0	0.128696E+22	0.138124E+23	0.108096E+22	0.417231E+21	0.109843E+22	0.967506E+00
34.0	0.129093E+22	0.138565E+23	0.108441E+22	0.418566E+21	0.110208E+22	0.970723E+00
35.0	0.129450E+22	0.138962E+23	0.108751E+22	0.419770E+21	0.110537E+22	0.973622E+00
36.0	0.129771E+22	0.139320E+23	0.109032E+22	0.420855E+21	0.110834E+22	0.976236E+00
37.0	0.130062E+22	0.139643E+23	0.109284E+22	0.421833E+21	0.111102E+22	0.978592E+00
38.0	0.130324E+22	0.139934E+23	0.109512E+22	0.422714E+21	0.111343E+22	0.980715E+00
39.0	0.130562E+22	0.140196E+23	0.109717E+22	0.423510E+21	0.111560E+22	0.982630E+00
40.0	0.130773E+22	0.140433E+23	0.109902E+22	0.424226E+21	0.111756E+22	0.984355E+00
41.0	0.130965E+22	0.140646E+23	0.110069E+22	0.424872E+21	0.111933E+22	0.985912E+00
42.0	0.131137E+22	0.140838E+23	0.110220E+22	0.425454E+21	0.112092E+22	0.987314E+00
43.0	0.131292E+22	0.141011E+23	0.110355E+22	0.425979E+21	0.112235E+22	0.988578E+00
44.0	0.131433E+22	0.141167E+23	0.110477E+22	0.426452E+21	0.112365E+22	0.989717E+00
45.0	0.131560E+22	0.141308E+23	0.110587E+22	0.426878E+21	0.112481E+22	0.990745E+00
46.0	0.131673E+22	0.141435E+23	0.110687E+22	0.427262E+21	0.112586E+22	0.991670E+00
47.0	0.131778E+22	0.141549E+23	0.110776E+22	0.427609E+21	0.112681E+22	0.992506E+00
48.0	0.131870E+22	0.141652E+23	0.110857E+22	0.427922E+21	0.112767E+22	0.993258E+00
49.0	0.131952E+22	0.141745E+23	0.110929E+22	0.428203E+21	0.112844E+22	0.993936E+00
50.0	0.132028E+22	0.141829E+23	0.110995E+22	0.428457E+21	0.112913E+22	0.994547E+00
51.0	0.132096E+22	0.141904E+23	0.111054E+22	0.428686E+21	0.112976E+22	0.995098E+00
52.0	0.132156E+22	0.141972E+23	0.111107E+22	0.428892E+21	0.113032E+22	0.995596E+00
53.0	0.132212E+22	0.142034E+23	0.111155E+22	0.429078E+21	0.113083E+22	0.996043E+00
54.0	0.132262E+22	0.142089E+23	0.111199E+22	0.429245E+21	0.113129E+22	0.996447E+00
55.0	0.132307E+22	0.142139E+23	0.111238E+22	0.429396E+21	0.113170E+22	0.996811E+00
56.0	0.132348E+22	0.142184E+23	0.111273E+22	0.429533E+21	0.113207E+22	0.997139E+00
57.0	0.132384E+22	0.142224E+23	0.111305E+22	0.429655E+21	0.113241E+22	0.997434E+00
58.0	0.132417E+22	0.142261E+23	0.111333E+22	0.429766E+21	0.113271E+22	0.997700E+00
59.0	0.132445E+22	0.142293E+23	0.111359E+22	0.429865E+21	0.113298E+22	0.997940E+00
60.0	0.132471E+22	0.142323E+23	0.111382E+22	0.429955E+21	0.113323E+22	0.998157E+00
61.0	0.132496E+22	0.142350E+23	0.111403E+22	0.430037E+21	0.113345E+22	0.998353E+00
62.0	0.132517E+22	0.142374E+23	0.111422E+22	0.430109E+21	0.113365E+22	0.998528E+00
63.0	0.132538E+22	0.142396E+23	0.111439E+22	0.430175E+21	0.113383E+22	0.998687E+00
64.0	0.132555E+22	0.142416E+23	0.111454E+22	0.430235E+21	0.113399E+22	0.998830E+00
65.0	0.132571E+22	0.142433E+23	0.111468E+22	0.430287E+21	0.113414E+22	0.998958E+00
66.0	0.132586E+22	0.142449E+23	0.111480E+22	0.430335E+21	0.113427E+22	0.999072E+00
67.0	0.132599E+22	0.142464E+23	0.111492E+22	0.430381E+21	0.113439E+22	0.999182E+00
68.0	0.132610E+22	0.142476E+23	0.111501E+22	0.430417E+21	0.113449E+22	0.999272E+00
69.0	0.132620E+22	0.142487E+23	0.111511E+22	0.430453E+21	0.113459E+22	0.999356E+00
70.0	0.132630E+22	0.142499E+23	0.111520E+22	0.430489E+21	0.113468E+22	0.999439E+00
71.0	0.132639E+22	0.142507E+23	0.111526E+22	0.430513E+21	0.113476E+22	0.999503E+00
72.0	0.132644E+22	0.142515E+23	0.111532E+22	0.430537E+21	0.113482E+22	0.999560E+00
73.0	0.132652E+22	0.142523E+23	0.111538E+22	0.430561E+21	0.113488E+22	0.999616E+00
74.0	0.132659E+22	0.142531E+23	0.111545E+22	0.430585E+21	0.113495E+22	0.999671E+00
75.0	0.132665E+22	0.142538E+23	0.111550E+22	0.430607E+21	0.113501E+22	0.999725E+00
76.0	0.132668E+22	0.142542E+23	0.111553E+22	0.430619E+21	0.113504E+22	0.999757E+00
77.0	0.132673E+22	0.142546E+23	0.111557E+22	0.430631E+21	0.113504E+22	0.999787E+00
78.0	0.132676E+22	0.142550E+23	0.111560E+22	0.430643E+21	0.113511E+22	0.999814E+00
79.0	0.132680E+22	0.142554E+23	0.111563E+22	0.430655E+21	0.113514E+22	0.999843E+00
80.0	0.132683E+22	0.142558E+23	0.111566E+22	0.430667E+21	0.113517E+22	0.999872E+00
81.0	0.132688E+22	0.142562E+23	0.111569E+22	0.430679E+21	0.113520E+22	0.999898E+00
82.0	0.132691E+22	0.142566E+23	0.111572E+22	0.430691E+21	0.113524E+22	0.999927E+00
83.0	0.132696E+22	0.142570E+23	0.111575E+22	0.430703E+21	0.113527E+22	0.999955E+00
84.0	0.132698E+22	0.142574E+23	0.111578E+22	0.430715E+21	0.113530E+22	0.999983E+00
85.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
86.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
87.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
88.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
89.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
90.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
91.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
92.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
93.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
94.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
95.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
96.0	0.132699E+22	0.142576E+23	0.111580E+22	0.430720E+21	0.113532E+22	0.100000E+01
97.0	0.833482E+21	0.129878E+23	0.101699E+22	0.397733E+21	0.201223E+22	0.177239E+01
98.0	0.643408E+21	0.118212E+23	0.925643E+21	0.362062E+21	0.258161E+22	0.227390E+01
99.0	0.513879E+21	0.107251E+23	0.839819E+21	0.328514E+21	0.295693E+22	0.260449E+01
100.0	0.418137E+21	0.971521E+22	0.760739E+21	0.297590E+21	0.319595E+22	0.281502E+01
101.0	0.344218E+21	0.879204E+22	0.688452E+21	0.269318E+21	0.333499E+22	0.293749E+01
102.0	0.285610E+21	0.795161E+22	0.622643E+21	0.243578E+21	0.339919E+22	0.299404E+01
103.0	0.238307E+21	0.718857E+22	0.562894E+21	0.220206E+21	0.340687E+22	0.300080E+01
104.0	0.199593E+21	0.649696E+22	0.508738E+21	0.199022E+21	0.337183E+22	0.296993E+01
105.0	0.167584E+21	0.587056E+22	0.459689E+21	0.179835E+21	0.330464E+22	0.291075E+01
106.0	0.140912E+21	0.530371E+22	0.415302E+21	0.162471E+21	0.321354E+22	0.283052E+01
107.0	0.118551E+21	0.479103E+22	0.375157E+21	0.146766E+21	0.310501E+22	0.273492E+01
108.0	0.997108E+20	0.432754E+22	0.338864E+21	0.132568E+21	0.298417E+22	0.262848E+01
109.0	0.837861E+20	0.390867E+22	0.306065E+21	0.119737E+21	0.285507E+22	0.251477E+01
110.0	0.702896E+20	0.353022E+22	0.276431E+21	0.108143E+21	0.272096E+22	0.239665E+01
111.0	0.588296E+20	0.318836E+22	0.249661E+21	0.976709E+20	0.258439E+22	0.227636E+01
112.0	0.490856E+20	0.287960E+22	0.225484E+21	0.882124E+20	0.244740E+22	0.215569E+01
113.0	0.407995E+20	0.260077E+22	0.203651E+21	0.796709E+20	0.231158E+22	0.203606E+01
114.0	0.337526E+20	0.234900E+22	0.183936E+21	0.719583E+20	0.217818E+22	0.191856E+01
115.0	0.277631E+20	0.212168E+22	0.166136E+21	0.649946E+20	0.204816E+22	0.180403E+01
116.0	0.226775E+20	0.191646E+22	0.150066E+21	0.587077E+20	0.192222E+22	0.169311E+01
117.0	0.183683E+20	0.173118E+22	0.135559E+21	0.530320E+20	0.180091E+22	0.158626E+01
118.0	0.147194E+20	0.156393E+22	0.122462E+21	0.479084E+20	0.168459E+22	0.148380E+01
119.0	0.116404E+20	0.141295E+22	0.110640E+21	0.432834E+20	0.157351E+22	0.138596E+01
120.0	0.904862E+19	0.127667E+22	0.999688E+20	0.391086E+20	0.146780E+22	0.129285E+01
121.0	0.687484E+19	0.115367E+22	0.903368E+20	0.353403E+20	0.136751E+22	0.120452E+01
122.0	0.505971E+19	0.104264E+22	0.816429E+20	0.319391E+20	0.127264E+22	0.112095E+01
123.0	0.355032E+19	0.942425E+21	0.737957E+20	0.288691E+20	0.118310E+22	0.104208E+01

124.0	0.230392E+19	0.851974E+21	0.667131E+20	0.260983E+20	0.109879E+22	0.967826E+00
125.0	0.128043E+19	0.770340E+21	0.603208E+20	0.235975E+20	0.101958E+22	0.898051E+00
126.0	0.448372E+18	0.696662E+21	0.545514E+20	0.213404E+20	0.945285E+21	0.832615E+00
127.0	-0.221881E+18	0.630168E+21	0.493446E+20	0.193033E+20	0.875729E+21	0.771350E+00
128.0	-0.759117E+18	0.570157E+21	0.446455E+20	0.174650E+20	0.810715E+21	0.714085E+00
129.0	-0.117855E+19	0.515998E+21	0.404047E+20	0.158058E+20	0.750027E+21	0.660630E+00
130.0	-0.149665E+19	0.467132E+21	0.365782E+20	0.143088E+20	0.693444E+21	0.610792E+00
131.0	-0.173169E+19	0.423046E+21	0.331261E+20	0.129583E+20	0.640756E+21	0.564383E+00
132.0	-0.189801E+19	0.383260E+21	0.300107E+20	0.117395E+20	0.591749E+21	0.521218E+00
133.0	-0.200722E+19	0.347354E+21	0.271991E+20	0.106395E+20	0.546215E+21	0.481111E+00
134.0	-0.206890E+19	0.314951E+21	0.246618E+20	0.964686E+19	0.503951E+21	0.443885E+00
135.0	-0.209144E+19	0.285710E+21	0.223721E+20	0.875108E+19	0.464759E+21	0.409364E+00
136.0	-0.208233E+19	0.259320E+21	0.203057E+20	0.794265E+19	0.428446E+21	0.377379E+00
137.0	-0.204789E+19	0.235505E+21	0.184409E+20	0.721309E+19	0.394830E+21	0.347770E+00
138.0	-0.199336E+19	0.214015E+21	0.167581E+20	0.655474E+19	0.363735E+21	0.320381E+00
139.0	-0.192281E+19	0.194620E+21	0.152394E+20	0.596061E+19	0.334992E+21	0.295064E+00
140.0	-0.184020E+19	0.177119E+21	0.138690E+20	0.542446E+19	0.308443E+21	0.271679E+00
141.0	-0.174876E+19	0.161325E+21	0.126323E+20	0.494064E+19	0.283935E+21	0.250093E+00
142.0	-0.165089E+19	0.147073E+21	0.115163E+20	0.450403E+19	0.261327E+21	0.230179E+00
143.0	-0.154887E+19	0.134212E+21	0.105092E+20	0.411003E+19	0.240483E+21	0.211820E+00
144.0	-0.144477E+19	0.122606E+21	0.960039E+19	0.375449E+19	0.221277E+21	0.194903E+00
145.0	-0.133962E+19	0.112133E+21	0.878031E+19	0.343365E+19	0.203589E+21	0.179323E+00
146.0	-0.123502E+19	0.102682E+21	0.804029E+19	0.314414E+19	0.187309E+21	0.164983E+00
147.0	-0.113177E+19	0.941540E+20	0.737250E+19	0.288288E+19	0.172331E+21	0.151790E+00
148.0	-0.103068E+19	0.864583E+20	0.676990E+19	0.264713E+19	0.158557E+21	0.139659E+00
149.0	-0.932366E+18	0.795138E+20	0.622612E+19	0.243439E+19	0.145897E+21	0.128508E+00
150.0	-0.837344E+18	0.732476E+20	0.573544E+19	0.224243E+19	0.134266E+21	0.118263E+00
151.0	-0.745761E+18	0.675931E+20	0.529267E+19	0.206921E+19	0.123584E+21	0.108856E+00
152.0	-0.658053E+18	0.624908E+20	0.489314E+19	0.191290E+19	0.113778E+21	0.100217E+00
153.0	-0.574315E+18	0.578866E+20	0.453262E+19	0.177185E+19	0.104780E+21	0.922909E-01
154.0	-0.494545E+18	0.537322E+20	0.420730E+19	0.164458E+19	0.965253E+20	0.850203E-01
155.0	-0.418851E+18	0.499833E+20	0.391375E+19	0.152974E+19	0.889558E+20	0.783530E-01
156.0	-0.347364E+18	0.466006E+20	0.364887E+19	0.142611E+19	0.820172E+20	0.722414E-01
157.0	-0.279748E+18	0.435482E+20	0.340986E+19	0.133260E+19	0.756587E+20	0.666409E-01
158.0	-0.216056E+18	0.407940E+20	0.319419E+19	0.124823E+19	0.698338E+20	0.615102E-01
159.0	-0.156194E+18	0.383088E+20	0.299959E+19	0.117210E+19	0.644993E+20	0.568115E-01
160.0	-0.100270E+18	0.360664E+20	0.282400E+19	0.110340E+19	0.596152E+20	0.525096E-01
161.0	-0.478718E+17	0.340434E+20	0.266559E+19	0.104143E+19	0.551465E+20	0.485735E-01
162.0	0.122170E+16	0.322177E+20	0.252263E+19	0.985498E+18	0.510588E+20	0.449730E-01
163.0	0.471399E+17	0.305706E+20	0.239365E+19	0.935040E+18	0.473194E+20	0.416793E-01
164.0	0.900016E+17	0.290849E+20	0.227732E+19	0.889525E+18	0.438995E+20	0.386670E-01
165.0	0.129917E+18	0.277442E+20	0.217234E+19	0.848455E+18	0.407726E+20	0.359129E-01
166.0	0.167077E+18	0.265347E+20	0.207762E+19	0.811401E+18	0.379143E+20	0.333952E-01
167.0	0.201612E+18	0.254432E+20	0.199216E+19	0.777965E+18	0.353022E+20	0.310945E-01
168.0	0.233673E+18	0.244585E+20	0.191505E+19	0.747797E+18	0.329155E+20	0.289923E-01
169.0	0.263446E+18	0.235699E+20	0.184547E+19	0.720575E+18	0.307353E+20	0.270719E-01
170.0	0.291002E+18	0.227681E+20	0.178268E+19	0.696013E+18	0.287442E+20	0.253182E-01
171.0	0.316564E+18	0.220446E+20	0.172604E+19	0.673851E+18	0.269262E+20	0.237168E-01
172.0	0.340186E+18	0.213919E+20	0.167493E+19	0.653856E+18	0.252664E+20	0.222549E-01
173.0	0.362042E+18	0.208030E+20	0.162881E+19	0.635814E+18	0.237515E+20	0.209206E-01
174.0	0.382264E+18	0.202716E+20	0.158720E+19	0.619535E+18	0.223692E+20	0.197029E-01
175.0	0.400919E+18	0.197922E+20	0.154966E+19	0.604847E+18	0.211079E+20	0.185920E-01
176.0	0.418115E+18	0.193595E+20	0.151578E+19	0.591594E+18	0.199573E+20	0.175786E-01
177.0	0.433994E+18	0.189692E+20	0.148522E+19	0.579637E+18	0.189079E+20	0.166543E-01
178.0	0.448636E+18	0.186171E+20	0.145765E+19	0.568850E+18	0.179510E+20	0.158114E-01
179.0	0.462125E+18	0.182994E+20	0.143277E+19	0.559117E+18	0.170786E+20	0.150429E-01
180.0	0.474533E+18	0.180127E+20	0.141032E+19	0.550335E+18	0.162832E+20	0.143424E-01
181.0	0.485947E+18	0.177540E+20	0.139006E+19	0.542410E+18	0.155583E+20	0.137038E-01
182.0	0.496461E+18	0.175206E+20	0.137179E+19	0.535260E+18	0.148976E+20	0.131219E-01
183.0	0.506114E+18	0.173101E+20	0.135530E+19	0.528810E+18	0.142956E+20	0.125917E-01
184.0	0.515009E+18	0.171201E+20	0.134042E+19	0.522990E+18	0.137472E+20	0.121087E-01
185.0	0.523168E+18	0.169487E+20	0.132700E+19	0.517739E+18	0.132477E+20	0.116687E-01
186.0	0.530654E+18	0.167940E+20	0.131489E+19	0.513001E+18	0.127927E+20	0.112679E-01
187.0	0.537533E+18	0.166545E+20	0.130397E+19	0.508727E+18	0.123783E+20	0.109029E-01
188.0	0.543835E+18	0.165286E+20	0.129411E+19	0.504870E+18	0.120011E+20	0.105706E-01
189.0	0.549617E+18	0.164150E+20	0.128521E+19	0.501391E+18	0.116576E+20	0.102681E-01
190.0	0.554934E+18	0.163126E+20	0.127719E+19	0.498251E+18	0.113449E+20	0.999269E-02
191.0	0.559790E+18	0.162201E+20	0.126995E+19	0.495419E+18	0.110603E+20	0.974203E-02
192.0	0.564244E+18	0.161367E+20	0.126342E+19	0.492864E+18	0.108013E+20	0.951390E-02
193.0	0.158446E+21	0.143877E+22	0.112517E+21	0.426886E+20	0.937353E+20	0.825629E-01
194.0	0.236790E+21	0.236239E+22	0.184816E+21	0.707539E+20	0.178437E+21	0.157169E+00
195.0	0.307073E+21	0.319533E+22	0.250018E+21	0.960643E+20	0.258965E+21	0.228098E+00
196.0	0.370343E+21	0.394626E+22	0.308799E+21	0.118883E+21	0.332689E+21	0.293035E+00
197.0	0.427355E+21	0.462319E+22	0.361789E+21	0.139453E+21	0.399460E+21	0.351848E+00
198.0	0.478743E+21	0.523339E+22	0.409554E+21	0.157995E+21	0.459735E+21	0.404938E+00
199.0	0.525067E+21	0.578347E+22	0.452613E+21	0.174710E+21	0.514094E+21	0.452818E+00
200.0	0.566819E+21	0.627932E+22	0.491428E+21	0.189777E+21	0.563102E+21	0.495985E+00
201.0	0.604462E+21	0.672631E+22	0.526417E+21	0.203360E+21	0.607282E+21	0.534899E+00
202.0	0.638385E+21	0.712922E+22	0.557956E+21	0.215603E+21	0.647107E+21	0.569978E+00
203.0	0.668973E+21	0.749243E+22	0.586388E+21	0.226640E+21	0.683007E+21	0.601599E+00
204.0	0.696510E+21	0.781959E+22	0.611998E+21	0.236582E+21	0.715355E+21	0.630091E+00
205.0	0.721342E+21	0.811449E+22	0.635081E+21	0.245543E+21	0.744505E+21	0.655767E+00
206.0	0.743731E+21	0.838031E+22	0.655889E+21	0.253620E+21	0.770780E+21	0.678910E+00
207.0	0.763907E+21	0.861994E+22	0.674648E+21	0.260902E+21	0.794463E+21	0.699771E+00
208.0	0.782099E+21	0.883595E+22	0.691556E+21	0.267465E+21	0.815814E+21	0.718576E+00
209.0	0.798488E+21	0.903064E+22	0.706797E+21	0.273382E+21	0.835058E+21	0.735527E+00
210.0	0.813269E+21	0.920616E+22	0.720536E+21	0.278715E+21	0.852406E+21	0.750807E+00
211.0	0.826592E+21	0.936436E+22	0.732919E+21	0.283522E+21	0.868043E+21	0.764580E+00
212.0	0.838587E+21	0.950696E+22	0.744083E+21	0.287856E+21	0.882139E+21	0.776996E+00
213.0	0.849428E+21	0.963553E+22	0.754146E+21	0.291763E+21	0.894847E+21	0.788189E+00
214.0	0.859177E+21	0.975141E+22	0.763217E+21	0.295284E+21	0.906302E+21	0.798279E+00
215.0	0.867975E+21	0.985587E+22	0.771395E+21	0.298458E+21	0.916627E+21	0.807374E+00
216.0	0.875916E+21	0.995005E+22	0.778766E+21	0.301320E+21	0.925935E+21	0.815572E+00
217.0	0.883059E+21	0.100349E+23	0.785412E+21	0.303900E+21	0.934325E+21	0.822962E+00
218.0	0.889501E+21	0.101115E+23	0.791402E+21	0.306225E+21	0.941890E+21	0.829625E+00
219.0	0.895319E+21	0.101804E+23	0.796801E+21	0.308321E+21	0.948707E+21	0.835630E+00
220.0	0.900551E+21	0.102426E+23	0.801668E+21	0.310210E+21	0.954853E+21	0.841043E+00
221.0	0.905277E+21	0.102987E+23	0.806057E+21	0.311913E+21	0.960393E+21	0.845922E+00
222.0	0.909529E+21	0.103492E+23	0.810013E+21	0.313449E+21	0.965388E+21	0.850322E+00
223.0	0.913356E+21	0.103947E+23	0.813577E+21	0.314833E+21	0.969889E+21	0.854287E+00
224.0	0.916836E+21	0.104358E+23	0.816791E+21	0.316080E+21	0.973948E+21	0.857862E+00
225.0	0.919936E+21	0.104728E+23	0.819688E+21	0.317205E+21	0.977606E+21	0.861084E+00
226.0	0.922751E+21	0.105062E+23	0.822300E+21	0.318219E+21	0.980903E+21	0.863988E+00
227.0	0.925274E+21	0.105363E+23	0.824655E+21	0.319133E+21	0.983877E+21	0.866608E+00
228.0	0.927564E+21	0.105634E+23	0.826777E+21	0.319957E+21	0.986557E+21	0.868968E+00
229.0	0.929620E+21	0.105878E+23	0.828690E+21	0.320699E+21	0.988972E+21	0.871095E+00
230.0	0.931491E+21	0.106098E+23	0.830415E+21	0.321369E+21	0.991150E+21	0.873014E+00
231.0	0.933157E+21	0.106297E+23	0.831969E+21	0.321972E+21	0.993113E+21	0.874742E+00
232.0	0.934658E+21	0.106476E+23	0.833370E+21	0.322516E+21	0.994882E+21	0.876301E+00
233.0	0.936014E+21	0.106637E+23	0.834633E+21	0.323007E+21	0.996477E+21	0.877705E+00
234.0	0.937249E+21	0.106783E+23	0.835771E+21	0.323448E+21	0.997914E+21	0.878972E+00
235.0	0.938341E+21	0.106914E+23	0.836798E+21	0.323847E+21	0.999210E+21	0.880113E+00
236.0	0.939335E+21	0.107032E+23	0.837722E+21	0.324206E+21	0.100038E+22	0.881142E+00
237.0	0.940231E+21	0.107139E+23	0.838557E+21	0.324530E+21	0.100143E+22	0.882070E+00
238.0	0.941042E+21	0.107235E+23	0.839309E+21	0.324822E+21	0.100238E+22	0.882906E+00
239.0	0.941773E+21	0.107321E+23	0.839987E+21	0.325085E+21	0.100324E+22	0.883660E+00
240.0	0.942435E+21	0.107399E+23	0.840597E+21	0.325322E+21	0.100401E+22	0.884339E+00
241.0	0.943030E+21	0.107470E+23	0.841149E+21	0.325536E+21	0.100470E+22	0.884952E+00
242.0	0.943565E+21	0.107533E+23	0.841644E+21	0.325728E+21	0.100533E+22	0.885503E+00
243.0	0.944033E+21	0.107590E+23	0.842092E+21	0.325902E+21	0.100590E+22	0.886001E+00
244.0	0.944472E+21	0.107642E+23	0.842494E+21	0.326058E+21	0.100640E+22	0.886449E+00
245.0	0.944861E+21	0.107688E+23	0.842857E+21	0.326199E+21	0.100686E+22	0.886853E+00
246.0	0.945212E+21	0.107730E+23	0.843185E+21	0.326326E+21	0.100728E+22	0.887218E+00
247.0	0.945536E+21	0.107768E+23	0.843481E+21	0.326441E+21	0.100765E+22	0.887546E+00
248.0	0.945817E+21	0.107802E+23	0.843746E+21	0.326544E+21	0.100798E+22	0.887842E+00
249.0	0.946080E+21	0.107832E+23	0.843987E+21	0.326638E+21	0.100829E+22	0.888110E+00
250.0	0.946322E+21	0.107860E+23	0.844207E+21	0.326723E+21	0.100856E+22	0.888351E+00
251.0	0.946527E+21	0.107885E+23	0.844397E+21	0.326797E+21	0.100881E+22	0.888566E+00
252.0	0.946705E+21	0.107907E+23	0.844575E+21	0.326866E+21	0.100903E+22	0.888764E+00
253.0	0.946879E+21	0.107927E+23	0.844732E+21	0.326927E+21	0.100923E+22	0.888938E+00
254.0	0.947025E+21	0.107946E+23	0.844875E+21	0.326983E+21	0.100941E+22	0.889099E+00
255.0	0.947170E+21	0.107962E+23	0.845001E+21	0.327031E+21	0.100957E+22	0.889239E+00

256.0	0.947297E+21	0.107978E+23	0.845125E+21	0.327080E+21	0.100972E+22	0.889372E+00
257.0	0.947396E+21	0.107990E+23	0.845220E+21	0.327116E+21	0.100985E+22	0.889484E+00
258.0	0.947503E+21	0.108002E+23	0.845315E+21	0.327153E+21	0.100996E+22	0.889586E+00
259.0	0.947618E+21	0.108014E+23	0.845409E+21	0.327190E+21	0.101008E+22	0.889687E+00
260.0	0.947686E+21	0.108023E+23	0.845478E+21	0.327216E+21	0.101017E+22	0.889770E+00
261.0	0.947747E+21	0.108031E+23	0.845541E+21	0.327241E+21	0.101025E+22	0.889841E+00
262.0	0.947814E+21	0.108039E+23	0.845604E+21	0.327265E+21	0.101033E+22	0.889908E+00
263.0	0.947892E+21	0.108047E+23	0.845667E+21	0.327290E+21	0.101041E+22	0.889974E+00
264.0	0.947959E+21	0.108055E+23	0.845729E+21	0.327314E+21	0.101048E+22	0.890040E+00
265.0	0.947980E+21	0.108059E+23	0.845761E+21	0.327327E+21	0.101053E+22	0.890085E+00
266.0	0.948019E+21	0.108063E+23	0.845793E+21	0.327339E+21	0.101057E+22	0.890122E+00
267.0	0.948056E+21	0.108067E+23	0.845824E+21	0.327351E+21	0.101061E+22	0.890156E+00
268.0	0.948098E+21	0.108071E+23	0.845856E+21	0.327363E+21	0.101065E+22	0.890190E+00
269.0	0.948136E+21	0.108075E+23	0.845887E+21	0.327375E+21	0.101069E+22	0.890224E+00
270.0	0.948164E+21	0.108079E+23	0.845919E+21	0.327387E+21	0.101072E+22	0.890255E+00
271.0	0.948194E+21	0.108083E+23	0.845950E+21	0.327400E+21	0.101076E+22	0.890288E+00
272.0	0.948233E+21	0.108087E+23	0.845982E+21	0.327412E+21	0.101080E+22	0.890321E+00
273.0	0.948271E+21	0.108091E+23	0.846013E+21	0.327424E+21	0.101084E+22	0.890355E+00
274.0	0.948281E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890382E+00
275.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
276.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
277.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
278.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
279.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
280.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
281.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
282.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
283.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
284.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
285.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
286.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
287.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
288.0	0.948279E+21	0.108094E+23	0.846032E+21	0.327432E+21	0.101087E+22	0.890385E+00
289.0	0.608320E+21	0.975680E+22	0.763988E+21	0.298796E+21	0.163238E+22	0.143781E+01
290.0	0.472202E+21	0.887541E+22	0.694977E+21	0.271841E+21	0.203764E+22	0.179477E+01
291.0	0.378315E+21	0.805035E+22	0.630373E+21	0.246586E+21	0.230334E+22	0.202880E+01
292.0	0.308453E+21	0.729135E+22	0.570941E+21	0.223344E+21	0.247040E+22	0.217595E+01
293.0	0.254310E+21	0.659437E+22	0.516679E+21	0.202122E+21	0.256492E+22	0.225920E+01
294.0	0.211255E+21	0.596778E+22	0.467302E+21	0.182804E+21	0.260507E+22	0.229457E+01
295.0	0.176399E+21	0.539531E+22	0.422475E+21	0.165274E+21	0.260416E+22	0.229376E+01
296.0	0.147824E+21	0.487637E+22	0.381839E+21	0.149378E+21	0.257221E+22	0.226562E+01
297.0	0.124167E+21	0.440645E+22	0.345043E+21	0.134984E+21	0.251696E+22	0.221696E+01
298.0	0.104435E+21	0.398122E+22	0.311746E+21	0.121958E+21	0.244444E+22	0.215309E+01
299.0	0.878800E+20	0.359666E+22	0.281633E+21	0.110178E+21	0.235939E+22	0.207817E+01
300.0	0.739224E+20	0.324902E+22	0.254412E+21	0.995288E+20	0.226555E+22	0.199552E+01
301.0	0.621211E+20	0.293487E+22	0.229812E+21	0.899051E+20	0.216592E+22	0.190776E+01
302.0	0.521135E+20	0.265103E+22	0.207587E+21	0.812104E+20	0.206296E+22	0.181698E+01
303.0	0.436149E+20	0.239465E+22	0.187511E+21	0.733565E+20	0.195824E+22	0.172483E+01
304.0	0.365898E+20	0.216310E+22	0.169380E+21	0.662632E+20	0.185355E+22	0.163262E+01
305.0	0.302459E+20	0.195400E+22	0.153006E+21	0.598577E+20	0.174996E+22	0.154138E+01
306.0	0.250217E+20	0.176519E+22	0.138222E+21	0.540739E+20	0.164838E+22	0.145191E+01
307.0	0.205826E+20	0.159473E+22	0.124874E+21	0.488518E+20	0.154949E+22	0.136481E+01
308.0	0.168130E+20	0.144083E+22	0.112823E+21	0.441373E+20	0.145383E+22	0.128054E+01
309.0	0.136206E+20	0.130190E+22	0.101944E+21	0.398812E+20	0.136176E+22	0.119945E+01
310.0	0.109179E+20	0.117648E+22	0.921232E+20	0.360391E+20	0.127355E+22	0.112176E+01
311.0	0.866019E+19	0.106327E+22	0.832582E+20	0.325710E+20	0.118938E+22	0.104762E+01
312.0	0.672270E+19	0.961077E+21	0.752363E+20	0.294405E+20	0.110933E+22	0.977107E+00
313.0	0.511782E+19	0.868840E+21	0.680336E+20	0.266149E+20	0.103344E+22	0.910260E+00
314.0	0.377646E+19	0.785583E+21	0.615143E+20	0.240644E+20	0.961679E+21	0.847055E+00
315.0	0.266142E+19	0.710437E+21	0.556301E+20	0.217623E+20	0.893997E+21	0.787440E+00
316.0	0.174335E+19	0.642614E+21	0.503192E+20	0.196846E+20	0.830298E+21	0.731334E+00
317.0	0.985503E+18	0.581402E+21	0.455261E+20	0.178095E+20	0.770474E+21	0.678640E+00
318.0	0.371270E+18	0.526159E+21	0.412003E+20	0.161171E+20	0.714386E+21	0.629238E+00
319.0	-0.119905E+18	0.476304E+21	0.372965E+20	0.145898E+20	0.661881E+21	0.582990E+00
320.0	-0.508435E+18	0.431331E+21	0.337749E+20	0.132121E+20	0.612807E+21	0.539766E+00
321.0	-0.810643E+18	0.390744E+21	0.305968E+20	0.119687E+20	0.567006E+21	0.499424E+00
322.0	-0.104011E+19	0.354115E+21	0.277285E+20	0.108466E+20	0.524315E+21	0.461921E+00
323.0	-0.120914E+19	0.321057E+21	0.251400E+20	0.983391E+19	0.484571E+21	0.426814E+00
324.0	-0.132721E+19	0.291224E+21	0.228039E+20	0.892001E+19	0.447612E+21	0.394260E+00
325.0	-0.140305E+19	0.264301E+21	0.206957E+20	0.809523E+19	0.413279E+21	0.364020E+00
326.0	-0.144398E+19	0.240003E+21	0.187931E+20	0.735089E+19	0.381417E+21	0.335955E+00
327.0	-0.145616E+19	0.218077E+21	0.170762E+20	0.667918E+19	0.351876E+21	0.309935E+00
328.0	-0.144526E+19	0.198289E+21	0.155267E+20	0.607299E+19	0.324510E+21	0.285842E+00
329.0	-0.141567E+19	0.180431E+21	0.141284E+20	0.552594E+19	0.299180E+21	0.263521E+00
330.0	-0.137120E+19	0.164317E+21	0.128665E+20	0.503227E+19	0.275754E+21	0.242886E+00
331.0	-0.131533E+19	0.149774E+21	0.117278E+20	0.458677E+19	0.254102E+21	0.223815E+00
332.0	-0.125059E+19	0.136651E+21	0.107002E+20	0.418475E+19	0.234105E+21	0.206202E+00
333.0	-0.117945E+19	0.124808E+21	0.977285E+19	0.382195E+19	0.215648E+21	0.189945E+00
334.0	-0.110397E+19	0.114121E+21	0.893603E+19	0.349457E+19	0.198624E+21	0.174950E+00
335.0	-0.102552E+19	0.104478E+21	0.818088E+19	0.319914E+19	0.182931E+21	0.161127E+00
336.0	-0.945561E+18	0.957752E+20	0.749944E+19	0.293255E+19	0.168471E+21	0.148391E+00
337.0	-0.865143E+18	0.879221E+20	0.688452E+19	0.269197E+19	0.155157E+21	0.136666E+00
338.0	-0.785334E+18	0.808356E+20	0.632961E+19	0.247488E+19	0.142903E+21	0.125870E+00
339.0	-0.706680E+18	0.744408E+20	0.582887E+19	0.227898E+19	0.131630E+21	0.115941E+00
340.0	-0.629650E+18	0.686704E+20	0.537703E+19	0.210221E+19	0.121265E+21	0.106811E+00
341.0	-0.554913E+18	0.634634E+20	0.496930E+19	0.194269E+19	0.111739E+21	0.984205E-01
342.0	-0.482683E+18	0.587648E+20	0.460138E+19	0.179875E+19	0.102987E+21	0.907120E-01
343.0	-0.413263E+18	0.545250E+20	0.426938E+19	0.166887E+19	0.949505E+20	0.836332E-01
344.0	-0.346781E+18	0.506990E+20	0.396980E+19	0.155166E+19	0.875734E+20	0.771354E-01
345.0	-0.283253E+18	0.472467E+20	0.369947E+19	0.144591E+19	0.808042E+20	0.711731E-01
346.0	-0.222859E+18	0.441315E+20	0.345553E+19	0.135047E+19	0.745952E+20	0.657041E-01
347.0	-0.165583E+18	0.413206E+20	0.323542E+19	0.126436E+19	0.689019E+20	0.606894E-01
348.0	-0.111362E+18	0.387941E+20	0.303681E+19	0.118666E+19	0.636832E+20	0.560928E-01
349.0	-0.604893E+17	0.364954E+20	0.285759E+19	0.111654E+19	0.589014E+20	0.518808E-01
350.0	-0.126243E+17	0.344307E+20	0.269592E+19	0.105329E+19	0.545228E+20	0.480242E-01
351.0	0.324427E+17	0.325674E+20	0.255001E+19	0.996212E+18	0.505141E+20	0.444933E-01
352.0	0.748282E+17	0.308862E+20	0.241836E+19	0.944707E+18	0.468441E+20	0.412607E-01
353.0	0.114531E+18	0.293697E+20	0.229962E+19	0.898252E+18	0.434851E+20	0.383021E-01
354.0	0.151665E+18	0.280014E+20	0.219248E+19	0.856334E+18	0.404117E+20	0.355950E-01
355.0	0.186355E+18	0.267668E+20	0.209580E+19	0.818513E+18	0.376004E+20	0.331187E-01
356.0	0.218687E+18	0.256528E+20	0.200857E+19	0.784385E+18	0.350294E+20	0.308542E-01
357.0	0.248795E+18	0.246476E+20	0.192966E+19	0.753591E+18	0.326788E+20	0.287838E-01
358.0	0.276819E+18	0.237406E+20	0.185884E+19	0.725806E+18	0.305302E+20	0.268913E-01
359.0	0.302860E+18	0.229222E+20	0.179475E+19	0.700736E+18	0.285667E+20	0.251618E-01
360.0	0.327027E+18	0.221838E+20	0.173693E+19	0.678115E+18	0.267728E+20	0.235818E-01
361.0	0.349481E+18	0.215176E+20	0.168476E+19	0.657704E+18	0.251342E+20	0.221384E-01
362.0	0.370261E+18	0.209164E+20	0.163769E+19	0.639288E+18	0.236378E+20	0.208203E-01
363.0	0.389511E+18	0.203740E+20	0.159521E+19	0.622671E+18	0.222714E+20	0.196169E-01
364.0	0.407292E+18	0.198845E+20	0.155689E+19	0.607678E+18	0.210241E+20	0.185182E-01
365.0	0.423775E+18	0.194430E+20	0.152231E+19	0.594150E+18	0.198857E+20	0.175155E-01
366.0	0.438979E+18	0.190445E+20	0.149111E+19	0.581944E+18	0.188469E+20	0.166005E-01
367.0	0.453048E+18	0.186851E+20	0.146297E+19	0.570932E+18	0.178992E+20	0.157657E-01
368.0	0.466009E+18	0.183607E+20	0.143757E+19	0.560996E+18	0.170346E+20	0.150043E-01
369.0	0.477966E+18	0.180681E+20	0.141465E+19	0.552031E+18	0.162461E+20	0.143097E-01
370.0	0.488979E+18	0.178040E+20	0.139398E+19	0.543942E+18	0.155272E+20	0.136764E-01
371.0	0.499129E+18	0.175658E+20	0.137532E+19	0.536643E+18	0.148716E+20	0.130991E-01
372.0	0.508489E+18	0.173508E+20	0.135849E+19	0.530058E+18	0.142741E+20	0.125727E-01
373.0	0.517070E+18	0.171569E+20	0.134330E+19	0.524116E+18	0.137294E+20	0.120930E-01
374.0	0.524985E+18	0.169819E+20	0.132960E+19	0.518756E+18	0.132331E+20	0.116559E-01
375.0	0.532257E+18	0.168240E+20	0.131724E+19	0.513919E+18	0.127809E+20	0.112575E-01
376.0	0.538928E+18	0.166816E+20	0.130608E+19	0.509555E+18	0.123689E+20	0.108947E-01
377.0	0.545075E+18	0.165530E+20	0.129602E+19	0.505618E+18	0.119937E+20	0.105641E-01
378.0	0.550710E+18	0.164371E+20	0.128694E+19	0.502065E+18	0.116519E+20	0.102631E-01
379.0	0.555882E+18	0.163324E+20	0.127875E+19	0.498860E+18	0.113406E+20	0.998894E-02
380.0	0.560619E+18	0.162381E+20	0.127135E+19	0.495969E+18	0.110573E+20	0.973933E-02
381.0	0.564979E+18	0.161529E+20	0.126469E+19	0.493360E+18	0.107993E+20	0.951209E-02
382.0	0.568975E+18	0.160761E+20	0.125867E+19	0.491006E+18	0.105644E+20	0.930523E-02
383.0	0.572624E+18	0.160067E+20	0.125324E+19	0.488882E+18	0.103507E+20	0.911696E-02
384.0	0.575970E+18	0.159442E+20	0.124834E+19	0.486966E+18	0.101561E+20	0.894562E-02

0.4580E+12 0.3856E+12 0.3142E+12 0.2637E+12 0.2045E+12 0.1674E+12 0.1445E+12 0.1314E+12 0.1255E+12 0.1255E+12

XENON CALCULATION

0.255306E+21	0.125560E+20	0.593990E-02	0.221905E+00	0.231586E-01	
0.100997E-07	0.264167E-01	0.544489E+00	0.172800E-02	0.126800E-02	
0.252000E-01	0.119210E-03	0.168329E-09	0.440279E-03	0.615860E-04	
1.0	0.102623E+21	0.958577E+21	0.749712E+20	0.285083E+20	0.646036E+20	0.569034E-01
2.0	0.151514E+21	0.158275E+22	0.123836E+21	0.475255E+20	0.133817E+21	0.117867E+00
3.0	0.194972E+21	0.214605E+22	0.167935E+21	0.646886E+20	0.201859E+21	0.177799E+00
4.0	0.233942E+21	0.265405E+22	0.207704E+21	0.801669E+20	0.265410E+21	0.233776E+00
5.0	0.269004E+21	0.311205E+22	0.243560E+21	0.941218E+20	0.323576E+21	0.285009E+00
6.0	0.300584E+21	0.352493E+22	0.275883E+21	0.106702E+21	0.376365E+21	0.331505E+00
7.0	0.329043E+21	0.389712E+22	0.305020E+21	0.118042E+21	0.424095E+21	0.373546E+00
8.0	0.354691E+21	0.423262E+22	0.331286E+21	0.128265E+21	0.467180E+21	0.411496E+00
9.0	0.377815E+21	0.453506E+22	0.354964E+21	0.137480E+21	0.506042E+21	0.445727E+00
10.0	0.398653E+21	0.480770E+22	0.376307E+21	0.145787E+21	0.541084E+21	0.476592E+00
11.0	0.417440E+21	0.505343E+22	0.395545E+21	0.153275E+21	0.572675E+21	0.504418E+00
12.0	0.434381E+21	0.527497E+22	0.412888E+21	0.160025E+21	0.601155E+21	0.529503E+00
13.0	0.449644E+21	0.547467E+22	0.428522E+21	0.166110E+21	0.626828E+21	0.552116E+00
14.0	0.463402E+21	0.565468E+22	0.442615E+21	0.171594E+21	0.649972E+21	0.572501E+00
15.0	0.475810E+21	0.581696E+22	0.455319E+21	0.176539E+21	0.670835E+21	0.590877E+00
16.0	0.486994E+21	0.596323E+22	0.466771E+21	0.180996E+21	0.689657E+21	0.607439E+00
17.0	0.497074E+21	0.609509E+22	0.477094E+21	0.185013E+21	0.706588E+21	0.622369E+00
18.0	0.506159E+21	0.621395E+22	0.486399E+21	0.188635E+21	0.721869E+21	0.635828E+00
19.0	0.514352E+21	0.632110E+22	0.494787E+21	0.191900E+21	0.735644E+21	0.647961E+00
20.0	0.521730E+21	0.641768E+22	0.502348E+21	0.194843E+21	0.748062E+21	0.658900E+00
21.0	0.528384E+21	0.650475E+22	0.509164E+21	0.197496E+21	0.759255E+21	0.668759E+00
22.0	0.534389E+21	0.658324E+22	0.515309E+21	0.199887E+21	0.769345E+21	0.677646E+00
23.0	0.539800E+21	0.665398E+22	0.520847E+21	0.202043E+21	0.778441E+21	0.685658E+00
24.0	0.544666E+21	0.671775E+22	0.525940E+21	0.203986E+21	0.786640E+21	0.692880E+00
25.0	0.549063E+21	0.677525E+22	0.530341E+21	0.205737E+21	0.794031E+21	0.699389E+00
26.0	0.553025E+21	0.682707E+22	0.534397E+21	0.207316E+21	0.800693E+21	0.705258E+00
27.0	0.556594E+21	0.687379E+22	0.538055E+21	0.208740E+21	0.806699E+21	0.710548E+00
28.0	0.559815E+21	0.691589E+22	0.541351E+21	0.210023E+21	0.812113E+21	0.715316E+00
29.0	0.562715E+21	0.695385E+22	0.544323E+21	0.211179E+21	0.816994E+21	0.719615E+00
30.0	0.565334E+21	0.698806E+22	0.547001E+21	0.212222E+21	0.821392E+21	0.723490E+00
31.0	0.567688E+21	0.701890E+22	0.549416E+21	0.213161E+21	0.825357E+21	0.726982E+00
32.0	0.569819E+21	0.704671E+22	0.551593E+21	0.214009E+21	0.828932E+21	0.730130E+00
33.0	0.571734E+21	0.707177E+22	0.553555E+21	0.214772E+21	0.832153E+21	0.732968E+00
34.0	0.573463E+21	0.709436E+22	0.555323E+21	0.215461E+21	0.835058E+21	0.735526E+00
35.0	0.575017E+21	0.711473E+22	0.556918E+21	0.216081E+21	0.837677E+21	0.737833E+00
36.0	0.576421E+21	0.713308E+22	0.558355E+21	0.216640E+21	0.840036E+21	0.739912E+00
37.0	0.577689E+21	0.714964E+22	0.559651E+21	0.217145E+21	0.842164E+21	0.741786E+00
38.0	0.578823E+21	0.716455E+22	0.560818E+21	0.217599E+21	0.844082E+21	0.743475E+00
39.0	0.579858E+21	0.717800E+22	0.561871E+21	0.218009E+21	0.845811E+21	0.744998E+00
40.0	0.580779E+21	0.719013E+22	0.562820E+21	0.218379E+21	0.847369E+21	0.746371E+00
41.0	0.581614E+21	0.720105E+22	0.563676E+21	0.218712E+21	0.848775E+21	0.747609E+00
42.0	0.582367E+21	0.721090E+22	0.564447E+21	0.219011E+21	0.850041E+21	0.748724E+00
43.0	0.583044E+21	0.721977E+22	0.565142E+21	0.219282E+21	0.851182E+21	0.749729E+00
44.0	0.583658E+21	0.722778E+22	0.565768E+21	0.219526E+21	0.852211E+21	0.750635E+00
45.0	0.584217E+21	0.723500E+22	0.566333E+21	0.219746E+21	0.853138E+21	0.751452E+00
46.0	0.584709E+21	0.724150E+22	0.566842E+21	0.219944E+21	0.853975E+21	0.752188E+00
47.0	0.585159E+21	0.724737E+22	0.567302E+21	0.220123E+21	0.854729E+21	0.752853E+00
48.0	0.585563E+21	0.725265E+22	0.567715E+21	0.220284E+21	0.855408E+21	0.753451E+00
49.0	0.585923E+21	0.725742E+22	0.568088E+21	0.220429E+21	0.856019E+21	0.753990E+00
50.0	0.586256E+21	0.726170E+22	0.568424E+21	0.220559E+21	0.856571E+21	0.754476E+00
51.0	0.586551E+21	0.726558E+22	0.568728E+21	0.220678E+21	0.857070E+21	0.754915E+00
52.0	0.586821E+21	0.726907E+22	0.569001E+21	0.220784E+21	0.857518E+21	0.755309E+00
53.0	0.587055E+21	0.727221E+22	0.569247E+21	0.220880E+21	0.857923E+21	0.755666E+00
54.0	0.587272E+21	0.727505E+22	0.569469E+21	0.220966E+21	0.858287E+21	0.755987E+00
55.0	0.587474E+21	0.727761E+22	0.569669E+21	0.221044E+21	0.858616E+21	0.756277E+00
56.0	0.587651E+21	0.727991E+22	0.569849E+21	0.221114E+21	0.858913E+21	0.756538E+00
57.0	0.587801E+21	0.728199E+22	0.570012E+21	0.221178E+21	0.859180E+21	0.756773E+00
58.0	0.587950E+21	0.728387E+22	0.570159E+21	0.221235E+21	0.859420E+21	0.756985E+00
59.0	0.588078E+21	0.728555E+22	0.570291E+21	0.221286E+21	0.859637E+21	0.757176E+00
60.0	0.588195E+21	0.728707E+22	0.570410E+21	0.221332E+21	0.859834E+21	0.757349E+00
61.0	0.588293E+21	0.728844E+22	0.570517E+21	0.221374E+21	0.860009E+21	0.757503E+00
62.0	0.588394E+21	0.728968E+22	0.570614E+21	0.221412E+21	0.860168E+21	0.757644E+00
63.0	0.588479E+21	0.729079E+22	0.570701E+21	0.221446E+21	0.860311E+21	0.757769E+00
64.0	0.588556E+21	0.729180E+22	0.570780E+21	0.221476E+21	0.860439E+21	0.757883E+00
65.0	0.588616E+21	0.729270E+22	0.570851E+21	0.221504E+21	0.860557E+21	0.757986E+00
66.0	0.588685E+21	0.729351E+22	0.570914E+21	0.221529E+21	0.860661E+21	0.758078E+00
67.0	0.588739E+21	0.729425E+22	0.570972E+21	0.221551E+21	0.860755E+21	0.758161E+00
68.0	0.588788E+21	0.729491E+22	0.571024E+21	0.221571E+21	0.860841E+21	0.758236E+00
69.0	0.588840E+21	0.729551E+22	0.571071E+21	0.221590E+21	0.860919E+21	0.758305E+00
70.0	0.588881E+21	0.729605E+22	0.571113E+21	0.221606E+21	0.860986E+21	0.758364E+00
71.0	0.588916E+21	0.729653E+22	0.571151E+21	0.221621E+21	0.861048E+21	0.758419E+00
72.0	0.588952E+21	0.729698E+22	0.571186E+21	0.221634E+21	0.861106E+21	0.758470E+00
73.0	0.588984E+21	0.729738E+22	0.571217E+21	0.221646E+21	0.861156E+21	0.758514E+00
74.0	0.589006E+21	0.729772E+22	0.571244E+21	0.221657E+21	0.861202E+21	0.758554E+00
75.0	0.589032E+21	0.729805E+22	0.571269E+21	0.221667E+21	0.861243E+21	0.758591E+00
76.0	0.589052E+21	0.729834E+22	0.571292E+21	0.221676E+21	0.861281E+21	0.758624E+00
77.0	0.589080E+21	0.729861E+22	0.571313E+21	0.221684E+21	0.861315E+21	0.758654E+00
78.0	0.589095E+21	0.729883E+22	0.571330E+21	0.221691E+21	0.861342E+21	0.758678E+00
79.0	0.589112E+21	0.729905E+22	0.571347E+21	0.221697E+21	0.861372E+21	0.758704E+00
80.0	0.589127E+21	0.729923E+22	0.571362E+21	0.221703E+21	0.861394E+21	0.758724E+00
81.0	0.589136E+21	0.729940E+22	0.571375E+21	0.221708E+21	0.861417E+21	0.758744E+00
82.0	0.589149E+21	0.729956E+22	0.571387E+21	0.221713E+21	0.861435E+21	0.758760E+00
83.0	0.589159E+21	0.729969E+22	0.571398E+21	0.221717E+21	0.861455E+21	0.758777E+00
84.0	0.589167E+21	0.729982E+22	0.571408E+21	0.221721E+21	0.861469E+21	0.758790E+00
85.0	0.589178E+21	0.729993E+22	0.571417E+21	0.221724E+21	0.861484E+21	0.758803E+00
86.0	0.589183E+21	0.730003E+22	0.571424E+21	0.221727E+21	0.861498E+21	0.758815E+00
87.0	0.589192E+21	0.730013E+22	0.571432E+21	0.221730E+21	0.861510E+21	0.758826E+00
88.0	0.589198E+21	0.730021E+22	0.571438E+21	0.221733E+21	0.861517E+21	0.758832E+00
89.0	0.589199E+21	0.730029E+22	0.571444E+21	0.221735E+21	0.861530E+21	0.758843E+00
90.0	0.589211E+21	0.730036E+22	0.571450E+21	0.221737E+21	0.861537E+21	0.758850E+00
91.0	0.589219E+21	0.730041E+22	0.571454E+21	0.221739E+21	0.861546E+21	0.758858E+00
92.0	0.589217E+21	0.730047E+22	0.571458E+21	0.221740E+21	0.861552E+21	0.758862E+00
93.0	0.589221E+21	0.730050E+22	0.571461E+21	0.221742E+21	0.861553E+21	0.758863E+00
94.0	0.589226E+21	0.730056E+22	0.571466E+21	0.221744E+21	0.861559E+21	0.758869E+00
95.0	0.589232E+21	0.730061E+22	0.571470E+21	0.221745E+21	0.861569E+21	0.758878E+00
96.0	0.589232E+21	0.730064E+22	0.571472E+21	0.221746E+21	0.861570E+21	0.758879E+00
97.0	0.387735E+21	0.652678E+22	0.511068E+21	0.199886E+21	0.123734E+22	0.108986E+01
98.0	0.303513E+21	0.593273E+22	0.464554E+21	0.181714E+21	0.148283E+22	0.130609E+01
99.0	0.244370E+21	0.537949E+22	0.421235E+21	0.164777E+21	0.164166E+22	0.144599E+01
100.0	0.199891E+21	0.487160E+22	0.381465E+21	0.149225E+21	0.173868E+22	0.153145E+01
101.0	0.165182E+21	0.440824E+22	0.345183E+21	0.135034E+21	0.179005E+22	0.157669E+01
102.0	0.137441E+21	0.398690E+22	0.312190E+21	0.122129E+21	0.180715E+22	0.159175E+01
103.0	0.114909E+21	0.360457E+22	0.282252E+21	0.110418E+21	0.179838E+22	0.158403E+01
104.0	0.963837E+20	0.325809E+22	0.255122E+21	0.998050E+20	0.177012E+22	0.155913E+01
105.0	0.810128E+20	0.294442E+22	0.230560E+21	0.901968E+20	0.172728E+22	0.152140E+01
106.0	0.681713E+20	0.266064E+22	0.208339E+21	0.815039E+20	0.167371E+22	0.147422E+01
107.0	0.573803E+20	0.240403E+22	0.188246E+21	0.736433E+20	0.161245E+22	0.142026E+01
108.0	0.482777E+20	0.217209E+22	0.170084E+21	0.665382E+20	0.154589E+22	0.136163E+01
109.0	0.405728E+20	0.196250E+22	0.153672E+21	0.601178E+20	0.147593E+22	0.130001E+01
110.0	0.340376E+20	0.177316E+22	0.138845E+21	0.543175E+20	0.140409E+22	0.123674E+01
111.0	0.284860E+20	0.160213E+22	0.125454E+21	0.490784E+20	0.133158E+22	0.117286E+01
112.0	0.237673E+20	0.144768E+22	0.113359E+21	0.443470E+20	0.125932E+22	0.110922E+01
113.0	0.197530E+20	0.130821E+22	0.102438E+21	0.400744E+20	0.118807E+22	0.104646E+01
114.0	0.163421E+20	0.118227E+22	0.925768E+20	0.362166E+20	0.111839E+22	0.985091E+00
115.0	0.134441E+20	0.106858E+22	0.836739E+20	0.327336E+20	0.105073E+22	0.925493E+00
116.0	0.109867E+20	0.965931E+21	0.756363E+20	0.295891E+20	0.985399E+21	0.867948E+00
117.0	0.890496E+19	0.873270E+21	0.683806E+20	0.267505E+20	0.922633E+21	0.812664E+00
118.0	0.714408E+19	0.789622E+21	0.618306E+20	0.241881E+20	0.862592E+21	0.759778E+00
119.0	0.566116E+19	0.714116E+21	0.559182E+20	0.218750E+20	0.805371E+21	0.709378E+00
120.0	0.441547E+19	0.645963E+21	0.505815E+20	0.197872E+20	0.751019E+21	0.661505E+00
121.0	0.336691E+19	0.584451E+21	0.457649E+20	0.179028E+20	0.699546E+21	0.616166E+00
122.0	0.249614E+19	0.528928E+21	0.414171E+20	0.162019E+20	0.650917E+21	0.573334E+00
123.0	0.177632E+19	0.478817E+21	0.374933E+20	0.146668E+20	0.605082E+21	0.532962E+00

124.0	0.118560E+19	0.433613E+21	0.339536E+20	0.132820E+20	0.561974E+21	0.494991E+00
125.0	0.702687E+18	0.392815E+21	0.307589E+20	0.120322E+20	0.521508E+21	0.459349E+00
126.0	0.312343E+18	0.355992E+21	0.278756E+20	0.109041E+20	0.483590E+21	0.425951E+00
127.0	-0.279945E+15	0.322760E+21	0.252733E+20	0.988608E+19	0.448117E+21	0.394705E+00
128.0	-0.246144E+18	0.292769E+21	0.229249E+20	0.896731E+19	0.414979E+21	0.365517E+00
129.0	-0.436140E+18	0.265700E+21	0.208053E+20	0.813810E+19	0.384066E+21	0.338289E+00
130.0	-0.579121E+18	0.241272E+21	0.188925E+20	0.738975E+19	0.355266E+21	0.312921E+00
131.0	-0.682498E+18	0.219226E+21	0.171662E+20	0.671438E+19	0.328464E+21	0.289314E+00
132.0	-0.752917E+18	0.199330E+21	0.156082E+20	0.610488E+19	0.303551E+21	0.267370E+00
133.0	-0.796049E+18	0.181375E+21	0.142022E+20	0.555483E+19	0.280417E+21	0.246994E+00
134.0	-0.816598E+18	0.165171E+21	0.129334E+20	0.505844E+19	0.258955E+21	0.228090E+00
135.0	-0.818839E+18	0.150548E+21	0.117884E+20	0.461047E+19	0.239062E+21	0.210568E+00
136.0	-0.806216E+18	0.137351E+21	0.107550E+20	0.420620E+19	0.220640E+21	0.194342E+00
137.0	-0.781623E+18	0.125442E+21	0.982251E+19	0.384138E+19	0.203594E+21	0.179327E+00
138.0	-0.747683E+18	0.114695E+21	0.898098E+19	0.351216E+19	0.187832E+21	0.165444E+00
139.0	-0.706564E+18	0.104997E+21	0.822157E+19	0.321506E+19	0.173268E+21	0.152616E+00
140.0	-0.660022E+18	0.962453E+20	0.753626E+19	0.294695E+19	0.159821E+21	0.140772E+00
141.0	-0.609475E+18	0.883476E+20	0.691783E+19	0.270501E+19	0.147412E+21	0.129842E+00
142.0	-0.556293E+18	0.812207E+20	0.635977E+19	0.248668E+19	0.135969E+21	0.119763E+00
143.0	-0.501506E+18	0.747894E+20	0.585617E+19	0.228966E+19	0.125423E+21	0.110474E+00
144.0	-0.446003E+18	0.689858E+20	0.540173E+19	0.211187E+19	0.115708E+21	0.101917E+00
145.0	-0.390408E+18	0.637487E+20	0.499164E+19	0.195143E+19	0.106764E+21	0.940385E-01
146.0	-0.335277E+18	0.590229E+20	0.462159E+19	0.180666E+19	0.985336E+20	0.867893E-01
147.0	-0.281293E+18	0.547584E+20	0.428767E+19	0.167602E+19	0.909638E+20	0.801217E-01
148.0	-0.228520E+18	0.509104E+20	0.398634E+19	0.155814E+19	0.840045E+20	0.739919E-01
149.0	-0.177350E+18	0.474379E+20	0.371444E+19	0.145176E+19	0.776096E+20	0.683592E-01
150.0	-0.128056E+18	0.443045E+20	0.346908E+19	0.135577E+19	0.717356E+20	0.631853E-01
151.0	-0.806339E+17	0.414771E+20	0.324768E+19	0.126916E+19	0.663422E+20	0.584348E-01
152.0	-0.353540E+17	0.389257E+20	0.304790E+19	0.119099E+19	0.613920E+20	0.540747E-01
153.0	0.755600E+16	0.366236E+20	0.286763E+19	0.112047E+19	0.568508E+20	0.500747E-01
154.0	0.483852E+17	0.345466E+20	0.270499E+19	0.105684E+19	0.526885E+20	0.464085E-01
155.0	0.871186E+17	0.326722E+20	0.255822E+19	0.999420E+18	0.488723E+20	0.430471E-01
156.0	0.123739E+18	0.309808E+20	0.242577E+19	0.947606E+18	0.453746E+20	0.399663E-01
157.0	0.158365E+18	0.294553E+20	0.230632E+19	0.900872E+18	0.421699E+20	0.371436E-01
158.0	0.190917E+18	0.280788E+20	0.219854E+19	0.858704E+18	0.392347E+20	0.345582E-01
159.0	0.221489E+18	0.268368E+20	0.210128E+19	0.820656E+18	0.365470E+20	0.321909E-01
160.0	0.250156E+18	0.257161E+20	0.201352E+19	0.786324E+18	0.340867E+20	0.300238E-01
161.0	0.276987E+18	0.247048E+20	0.193434E+19	0.755345E+18	0.318352E+20	0.280407E-01
162.0	0.302074E+18	0.237924E+20	0.186289E+19	0.727392E+18	0.297753E+20	0.262263E-01
163.0	0.325473E+18	0.229690E+20	0.179842E+19	0.702169E+18	0.278912E+20	0.245568E-01
164.0	0.347302E+18	0.222262E+20	0.174025E+19	0.679411E+18	0.261683E+20	0.230493E-01
165.0	0.367616E+18	0.215558E+20	0.168776E+19	0.658876E+18	0.245933E+20	0.216620E-01
166.0	0.386499E+18	0.209510E+20	0.164040E+19	0.640348E+18	0.231538E+20	0.203940E-01
167.0	0.404051E+18	0.204052E+20	0.159766E+19	0.623629E+18	0.218384E+20	0.192354E-01
168.0	0.420345E+18	0.199128E+20	0.155911E+19	0.608544E+18	0.206366E+20	0.181769E-01
169.0	0.435449E+18	0.194686E+20	0.152432E+19	0.594934E+18	0.195391E+20	0.172102E-01
170.0	0.449440E+18	0.190677E+20	0.149292E+19	0.582652E+18	0.185368E+20	0.163274E-01
171.0	0.462401E+18	0.187060E+20	0.146460E+19	0.571573E+18	0.176217E+20	0.155214E-01
172.0	0.474387E+18	0.183796E+20	0.143905E+19	0.561575E+18	0.167864E+20	0.147856E-01
173.0	0.485469E+18	0.180852E+20	0.141599E+19	0.552554E+18	0.160241E+20	0.141142E-01
174.0	0.495694E+18	0.178195E+20	0.139519E+19	0.544415E+18	0.153285E+20	0.135015E-01
175.0	0.505150E+18	0.175798E+20	0.137641E+19	0.537071E+18	0.146940E+20	0.129426E-01
176.0	0.513862E+18	0.173635E+20	0.135948E+19	0.530445E+18	0.141152E+20	0.124328E-01
177.0	0.521898E+18	0.171683E+20	0.134420E+19	0.524466E+18	0.135873E+20	0.119678E-01
178.0	0.529292E+18	0.169922E+20	0.133041E+19	0.519072E+18	0.131060E+20	0.115439E-01
179.0	0.536120E+18	0.168333E+20	0.131797E+19	0.514205E+18	0.126672E+20	0.111574E-01
180.0	0.542393E+18	0.166900E+20	0.130674E+19	0.509813E+18	0.122672E+20	0.108051E-01
181.0	0.548170E+18	0.165606E+20	0.129661E+19	0.505851E+18	0.119027E+20	0.104840E-01
182.0	0.553475E+18	0.164439E+20	0.128748E+19	0.502276E+18	0.115706E+20	0.101915E-01
183.0	0.558362E+18	0.163387E+20	0.127923E+19	0.499051E+18	0.112679E+20	0.992489E-02
184.0	0.562850E+18	0.162437E+20	0.127179E+19	0.496141E+18	0.109922E+20	0.968206E-02
185.0	0.566961E+18	0.161580E+20	0.126508E+19	0.493515E+18	0.107411E+20	0.946088E-02
186.0	0.570752E+18	0.160807E+20	0.125903E+19	0.491147E+18	0.105124E+20	0.925944E-02
187.0	0.574223E+18	0.160109E+20	0.125357E+19	0.489010E+18	0.103042E+20	0.907602E-02
188.0	0.577408E+18	0.159480E+20	0.124864E+19	0.487081E+18	0.101146E+20	0.890902E-02
189.0	0.580326E+18	0.158912E+20	0.124419E+19	0.485342E+18	0.994198E+19	0.875699E-02
190.0	0.582994E+18	0.158399E+20	0.124018E+19	0.483772E+18	0.978487E+19	0.861860E-02
191.0	0.585458E+18	0.157937E+20	0.123656E+19	0.482357E+18	0.964188E+19	0.849265E-02
192.0	0.587694E+18	0.157520E+20	0.123329E+19	0.481079E+18	0.951176E+19	0.837804E-02
193.0	0.506284E+20	0.497016E+21	0.388771E+20	0.148296E+20	0.417108E+20	0.367393E-01
194.0	0.729088E+20	0.811968E+21	0.635364E+20	0.244508E+20	0.828487E+20	0.729738E-01
195.0	0.920979E+20	0.109681E+22	0.858380E+20	0.331527E+20	0.127718E+21	0.112495E+00
196.0	0.108978E+21	0.133401E+22	0.105976E+21	0.410105E+20	0.172620E+21	0.152045E+00
197.0	0.123993E+21	0.158607E+22	0.124145E+21	0.481004E+20	0.215689E+21	0.189981E+00
198.0	0.137423E+21	0.179537E+22	0.140532E+21	0.544948E+20	0.256044E+21	0.225526E+00
199.0	0.149476E+21	0.198409E+22	0.155308E+21	0.602606E+20	0.293333E+21	0.258370E+00
200.0	0.160313E+21	0.215424E+22	0.168630E+21	0.654591E+20	0.327489E+21	0.288455E+00
201.0	0.170063E+21	0.230764E+22	0.180640E+21	0.701457E+20	0.358609E+21	0.315866E+00
202.0	0.178845E+21	0.244592E+22	0.191468E+21	0.743707E+20	0.386862E+21	0.340751E+00
203.0	0.186754E+21	0.257058E+22	0.201228E+21	0.781794E+20	0.412450E+21	0.363290E+00
204.0	0.193881E+21	0.268296E+22	0.210027E+21	0.816128E+20	0.435592E+21	0.383673E+00
205.0	0.200305E+21	0.278426E+22	0.217958E+21	0.847077E+20	0.456496E+21	0.402086E+00
206.0	0.206094E+21	0.287558E+22	0.225108E+21	0.874977E+20	0.475367E+21	0.418708E+00
207.0	0.211311E+21	0.295789E+22	0.231553E+21	0.900127E+20	0.492396E+21	0.433707E+00
208.0	0.216015E+21	0.303210E+22	0.237363E+21	0.922798E+20	0.507756E+21	0.447235E+00
209.0	0.220254E+21	0.309899E+22	0.242600E+21	0.943234E+20	0.521608E+21	0.459437E+00
210.0	0.224076E+21	0.315928E+22	0.247321E+21	0.961656E+20	0.534098E+21	0.470439E+00
211.0	0.227520E+21	0.321364E+22	0.251577E+21	0.978263E+20	0.545361E+21	0.480358E+00
212.0	0.230625E+21	0.326264E+22	0.255413E+21	0.993232E+20	0.555514E+21	0.489302E+00
213.0	0.233424E+21	0.330680E+22	0.258871E+21	0.100673E+21	0.564667E+21	0.497364E+00
214.0	0.235947E+21	0.334662E+22	0.261988E+21	0.101889E+21	0.572920E+21	0.504633E+00
215.0	0.238221E+21	0.338251E+22	0.264798E+21	0.102986E+21	0.580358E+21	0.511185E+00
216.0	0.240272E+21	0.341486E+22	0.267331E+21	0.103974E+21	0.587061E+21	0.517088E+00
217.0	0.242121E+21	0.344402E+22	0.269615E+21	0.104865E+21	0.593103E+21	0.522410E+00
218.0	0.243787E+21	0.347031E+22	0.271673E+21	0.105668E+21	0.598550E+21	0.527208E+00
219.0	0.245289E+21	0.349401E+22	0.273528E+21	0.106392E+21	0.603463E+21	0.531536E+00
220.0	0.246640E+21	0.351537E+22	0.275201E+21	0.107045E+21	0.607892E+21	0.535436E+00
221.0	0.247863E+21	0.353463E+22	0.276708E+21	0.107633E+21	0.611882E+21	0.538951E+00
222.0	0.248963E+21	0.355198E+22	0.278067E+21	0.108163E+21	0.615480E+21	0.542120E+00
223.0	0.249955E+21	0.356764E+22	0.279293E+21	0.108642E+21	0.618723E+21	0.544977E+00
224.0	0.250847E+21	0.358174E+22	0.280397E+21	0.109073E+21	0.621648E+21	0.547553E+00
225.0	0.251654E+21	0.359445E+22	0.281393E+21	0.109461E+21	0.624283E+21	0.549874E+00
226.0	0.252379E+21	0.360591E+22	0.282290E+21	0.109811E+21	0.626658E+21	0.551966E+00
227.0	0.253034E+21	0.361624E+22	0.283099E+21	0.110127E+21	0.628801E+21	0.553853E+00
228.0	0.253625E+21	0.362556E+22	0.283828E+21	0.110411E+21	0.630731E+21	0.555554E+00
229.0	0.254158E+21	0.363395E+22	0.284485E+21	0.110668E+21	0.632471E+21	0.557086E+00
230.0	0.254637E+21	0.364152E+22	0.285078E+21	0.110899E+21	0.634039E+21	0.558467E+00
231.0	0.255069E+21	0.364834E+22	0.285612E+21	0.111107E+21	0.635453E+21	0.559712E+00
232.0	0.255458E+21	0.365449E+22	0.286093E+21	0.111295E+21	0.636728E+21	0.560836E+00
233.0	0.255809E+21	0.366003E+22	0.286527E+21	0.111465E+21	0.637877E+21	0.561848E+00
234.0	0.256127E+21	0.366503E+22	0.286919E+21	0.111617E+21	0.638913E+21	0.562760E+00
235.0	0.256411E+21	0.366954E+22	0.287271E+21	0.111755E+21	0.639847E+21	0.563583E+00
236.0	0.256670E+21	0.367360E+22	0.287589E+21	0.111879E+21	0.640688E+21	0.564323E+00
237.0	0.256902E+21	0.367726E+22	0.287876E+21	0.111991E+21	0.641447E+21	0.564992E+00
238.0	0.257110E+21	0.368056E+22	0.288134E+21	0.112092E+21	0.642131E+21	0.565594E+00
239.0	0.257300E+21	0.368353E+22	0.288367E+21	0.112182E+21	0.642747E+21	0.566137E+00
240.0	0.257470E+21	0.368621E+22	0.288577E+21	0.112264E+21	0.643302E+21	0.566626E+00
241.0	0.257622E+21	0.368863E+22	0.288766E+21	0.112338E+21	0.643804E+21	0.567068E+00
242.0	0.257759E+21	0.369081E+22	0.288937E+21	0.112405E+21	0.644256E+21	0.567466E+00
243.0	0.257884E+21	0.369277E+22	0.289090E+21	0.112465E+21	0.644663E+21	0.567825E+00
244.0	0.257997E+21	0.369454E+22	0.289229E+21	0.112519E+21	0.645030E+21	0.568148E+00
245.0	0.258097E+21	0.369614E+22	0.289354E+21	0.112568E+21	0.645361E+21	0.568439E+00
246.0	0.258188E+21	0.369757E+22	0.289467E+21	0.112612E+21	0.645660E+21	0.568703E+00
247.0	0.258271E+21	0.369887E+22	0.289568E+21	0.112651E+21	0.645927E+21	0.568938E+00
248.0	0.258344E+21	0.370004E+22	0.289660E+21	0.112687E+21	0.646170E+21	0.569152E+00
249.0	0.258413E+21	0.370109E+22	0.289742E+21	0.112719E+21	0.646388E+21	0.569344E+00
250.0	0.258471E+21	0.370204E+22	0.289816E+21	0.112748E+21	0.646586E+21	0.569518E+00
251.0	0.258526E+21	0.370290E+22	0.289883E+21	0.112774E+21	0.646762E+21	0.569674E+00
252.0	0.258576E+21	0.370367E+22	0.289944E+21	0.112798E+21	0.646922E+21	0.569814E+00
253.0	0.258621E+21	0.370436E+22	0.289998E+21	0.112819E+21	0.647065E+21	0.569941E+00
254.0	0.258660E+21	0.370499E+22	0.290047E+21	0.112838E+21	0.647195E+21	0.570055E+00
255.0	0.258696E+21	0.370556E+22	0.290092E+21	0.112856E+21	0.647314E+21	0.570160E+00

256.0	0.258727E+21	0.370607E+22	0.290132E+21	0.112871E+21	0.647421E+21	0.570254E+00
257.0	0.258759E+21	0.370653E+22	0.290167E+21	0.112885E+21	0.647515E+21	0.570337E+00
258.0	0.258784E+21	0.370694E+22	0.290200E+21	0.112898E+21	0.647599E+21	0.570411E+00
259.0	0.258808E+21	0.370731E+22	0.290229E+21	0.112909E+21	0.647675E+21	0.570478E+00
260.0	0.258830E+21	0.370765E+22	0.290255E+21	0.112919E+21	0.647745E+21	0.570539E+00
261.0	0.258849E+21	0.370795E+22	0.290279E+21	0.112929E+21	0.647807E+21	0.570594E+00
262.0	0.258865E+21	0.370823E+22	0.290300E+21	0.112937E+21	0.647864E+21	0.570645E+00
263.0	0.258880E+21	0.370847E+22	0.290320E+21	0.112945E+21	0.647916E+21	0.570690E+00
264.0	0.258895E+21	0.370869E+22	0.290337E+21	0.112951E+21	0.647962E+21	0.570731E+00
265.0	0.258907E+21	0.370890E+22	0.290353E+21	0.112958E+21	0.648004E+21	0.570767E+00
266.0	0.258918E+21	0.370908E+22	0.290367E+21	0.112963E+21	0.648041E+21	0.570800E+00
267.0	0.258929E+21	0.370924E+22	0.290380E+21	0.112968E+21	0.648075E+21	0.570830E+00
268.0	0.258940E+21	0.370939E+22	0.290391E+21	0.112972E+21	0.648106E+21	0.570858E+00
269.0	0.258947E+21	0.370951E+22	0.290401E+21	0.112976E+21	0.648130E+21	0.570879E+00
270.0	0.258955E+21	0.370963E+22	0.290411E+21	0.112980E+21	0.648157E+21	0.570902E+00
271.0	0.258962E+21	0.370974E+22	0.290419E+21	0.112983E+21	0.648181E+21	0.570923E+00
272.0	0.258969E+21	0.370984E+22	0.290427E+21	0.112986E+21	0.648198E+21	0.570939E+00
273.0	0.258972E+21	0.370992E+22	0.290433E+21	0.112989E+21	0.648216E+21	0.570955E+00
274.0	0.258979E+21	0.371000E+22	0.290439E+21	0.112991E+21	0.648232E+21	0.570969E+00
275.0	0.258983E+21	0.371008E+22	0.290446E+21	0.112994E+21	0.648251E+21	0.570985E+00
276.0	0.258986E+21	0.371014E+22	0.290450E+21	0.112996E+21	0.648264E+21	0.570997E+00
277.0	0.258990E+21	0.371019E+22	0.290454E+21	0.112997E+21	0.648269E+21	0.571001E+00
278.0	0.258995E+21	0.371024E+22	0.290458E+21	0.112999E+21	0.648275E+21	0.571007E+00
279.0	0.258998E+21	0.371029E+22	0.290462E+21	0.113000E+21	0.648288E+21	0.571018E+00
280.0	0.259000E+21	0.371035E+22	0.290467E+21	0.113002E+21	0.648304E+21	0.571032E+00
281.0	0.259002E+21	0.371037E+22	0.290469E+21	0.113003E+21	0.648308E+21	0.571036E+00
282.0	0.259004E+21	0.371040E+22	0.290471E+21	0.113004E+21	0.648312E+21	0.571039E+00
283.0	0.259005E+21	0.371043E+22	0.290473E+21	0.113004E+21	0.648317E+21	0.571044E+00
284.0	0.259008E+21	0.371045E+22	0.290475E+21	0.113005E+21	0.648324E+21	0.571049E+00
285.0	0.259010E+21	0.371048E+22	0.290477E+21	0.113006E+21	0.648329E+21	0.571054E+00
286.0	0.259011E+21	0.371050E+22	0.290479E+21	0.113007E+21	0.648333E+21	0.571057E+00
287.0	0.259012E+21	0.371053E+22	0.290481E+21	0.113007E+21	0.648335E+21	0.571060E+00
288.0	0.259015E+21	0.371056E+22	0.290483E+21	0.113008E+21	0.648338E+21	0.571062E+00
289.0	0.175978E+21	0.328286E+22	0.257059E+21	0.100545E+21	0.796926E+21	0.701939E+00
290.0	0.139779E+21	0.298030E+22	0.233368E+21	0.912858E+20	0.892364E+21	0.786002E+00
291.0	0.113548E+21	0.270083E+22	0.211485E+21	0.827290E+20	0.950756E+21	0.837434E+00
292.0	0.934473E+20	0.244523E+22	0.191471E+21	0.749015E+20	0.982378E+21	0.865287E+00
293.0	0.775597E+20	0.221254E+22	0.173251E+21	0.677747E+20	0.994133E+21	0.875641E+00
294.0	0.647425E+20	0.200124E+22	0.156705E+21	0.613027E+20	0.990986E+21	0.872870E+00
295.0	0.542585E+20	0.180968E+22	0.141705E+21	0.554350E+20	0.976653E+21	0.860244E+00
296.0	0.455920E+20	0.163620E+22	0.128121E+21	0.501211E+20	0.953968E+21	0.840263E+00
297.0	0.383697E+20	0.147922E+22	0.115829E+21	0.453124E+20	0.925141E+21	0.814872E+00
298.0	0.323157E+20	0.133725E+22	0.104712E+21	0.409635E+20	0.891902E+21	0.785595E+00
299.0	0.272182E+20	0.120891E+22	0.946624E+20	0.370321E+20	0.855617E+21	0.753635E+00
300.0	0.229090E+20	0.109293E+22	0.855808E+20	0.334793E+20	0.817361E+21	0.719939E+00
301.0	0.192602E+20	0.988147E+21	0.773759E+20	0.302695E+20	0.777991E+21	0.685262E+00
302.0	0.161586E+20	0.893497E+21	0.699644E+20	0.273700E+20	0.738191E+21	0.650205E+00
303.0	0.135281E+20	0.808016E+21	0.632709E+20	0.247514E+20	0.698491E+21	0.615237E+00
304.0	0.112881E+20	0.730825E+21	0.572266E+20	0.223868E+20	0.659311E+21	0.580727E+00
305.0	0.938738E+19	0.661127E+21	0.517689E+20	0.202516E+20	0.620970E+21	0.546956E+00
306.0	0.776708E+19	0.598203E+21	0.468417E+20	0.183241E+20	0.583720E+21	0.514146E+00
307.0	0.639575E+19	0.541392E+21	0.423931E+20	0.165837E+20	0.547735E+21	0.482450E+00
308.0	0.523506E+19	0.490104E+21	0.383770E+20	0.150125E+20	0.513148E+21	0.451986E+00
309.0	0.425826E+19	0.443829E+21	0.347535E+20	0.135949E+20	0.480049E+21	0.422832E+00
310.0	0.343337E+19	0.402063E+21	0.314830E+20	0.123154E+20	0.448496E+21	0.395039E+00
311.0	0.274104E+19	0.364362E+21	0.285309E+20	0.111605E+20	0.418514E+21	0.368631E+00
312.0	0.216112E+19	0.330332E+21	0.258663E+20	0.101180E+20	0.390111E+21	0.343613E+00
313.0	0.167811E+19	0.299618E+21	0.234612E+20	0.917712E+19	0.363273E+21	0.319974E+00
314.0	0.127769E+19	0.271896E+21	0.212905E+20	0.832789E+19	0.337974E+21	0.297691E+00
315.0	0.948097E+18	0.246875E+21	0.193312E+20	0.756138E+19	0.314177E+21	0.276730E+00
316.0	0.678664E+18	0.224292E+21	0.175629E+20	0.686958E+19	0.291836E+21	0.257051E+00
317.0	0.460591E+18	0.203911E+21	0.159669E+20	0.624520E+19	0.270898E+21	0.238609E+00
318.0	0.286092E+18	0.185515E+21	0.145265E+20	0.568168E+19	0.251308E+21	0.221354E+00
319.0	0.148535E+18	0.168914E+21	0.132265E+20	0.517309E+19	0.233006E+21	0.205234E+00
320.0	0.421648E+17	0.153931E+21	0.120533E+20	0.471410E+19	0.215931E+21	0.190194E+00
321.0	-0.380811E+17	0.140409E+21	0.109945E+20	0.429987E+19	0.200022E+21	0.176181E+00
322.0	-0.962121E+17	0.128206E+21	0.100389E+20	0.392603E+19	0.185216E+21	0.163140E+00
323.0	-0.136104E+18	0.117193E+21	0.917653E+19	0.358865E+19	0.171451E+21	0.151016E+00
324.0	-0.160684E+18	0.107254E+21	0.839828E+19	0.328419E+19	0.158669E+21	0.139757E+00
325.0	-0.172794E+18	0.982846E+20	0.769595E+19	0.300942E+19	0.146810E+21	0.129312E+00
326.0	-0.174585E+18	0.901903E+20	0.706213E+19	0.276145E+19	0.135818E+21	0.119629E+00
327.0	-0.168187E+18	0.828855E+20	0.649013E+19	0.253768E+19	0.125637E+21	0.110662E+00
328.0	-0.155010E+18	0.762935E+20	0.597395E+19	0.233573E+19	0.116216E+21	0.102364E+00
329.0	-0.136654E+18	0.703448E+20	0.550814E+19	0.215350E+19	0.107505E+21	0.946916E-01
330.0	-0.114261E+18	0.649766E+20	0.508779E+19	0.198905E+19	0.994560E+20	0.876017E-01
331.0	-0.888220E+17	0.601322E+20	0.470846E+19	0.184064E+19	0.920233E+20	0.810549E-01
332.0	-0.612994E+17	0.557606E+20	0.436613E+19	0.170672E+19	0.851646E+20	0.750137E-01
333.0	-0.321019E+17	0.518156E+20	0.405723E+19	0.158587E+19	0.788392E+20	0.694422E-01
334.0	-0.194574E+16	0.482556E+20	0.377847E+19	0.147681E+19	0.730090E+20	0.643070E-01
335.0	0.285233E+17	0.450432E+20	0.352692E+19	0.137840E+19	0.676386E+20	0.595767E-01
336.0	0.590840E+17	0.421443E+20	0.329993E+19	0.128960E+19	0.626940E+20	0.552215E-01
337.0	0.894834E+17	0.395284E+20	0.309509E+19	0.120946E+19	0.581438E+20	0.512136E-01
338.0	0.118930E+18	0.371681E+20	0.291027E+19	0.113715E+19	0.539609E+20	0.475292E-01
339.0	0.147735E+18	0.350384E+20	0.274350E+19	0.107191E+19	0.501161E+20	0.441427E-01
340.0	0.175784E+18	0.331164E+20	0.259300E+19	0.101303E+19	0.465827E+20	0.410305E-01
341.0	0.202871E+18	0.313821E+20	0.245720E+19	0.959899E+18	0.433370E+20	0.381716E-01
342.0	0.228969E+18	0.298176E+20	0.233469E+19	0.911971E+18	0.403569E+20	0.355447E-01
343.0	0.253966E+18	0.284060E+20	0.222416E+19	0.868725E+18	0.376215E+20	0.331374E-01
344.0	0.277733E+18	0.271323E+20	0.212442E+19	0.829709E+18	0.351119E+20	0.309268E-01
345.0	0.300362E+18	0.259830E+20	0.203442E+19	0.794500E+18	0.328102E+20	0.288995E-01
346.0	0.321782E+18	0.249459E+20	0.195322E+19	0.762730E+18	0.306998E+20	0.270407E-01
347.0	0.342027E+18	0.240101E+20	0.187994E+19	0.734062E+18	0.287657E+20	0.253371E-01
348.0	0.361132E+18	0.231657E+20	0.181381E+19	0.708192E+18	0.269935E+20	0.237761E-01
349.0	0.379098E+18	0.224037E+20	0.175415E+19	0.684851E+18	0.253703E+20	0.223464E-01
350.0	0.395994E+18	0.217162E+20	0.170032E+19	0.663789E+18	0.238839E+20	0.210372E-01
351.0	0.411820E+18	0.210958E+20	0.165174E+19	0.644784E+18	0.225233E+20	0.198387E-01
352.0	0.426634E+18	0.205360E+20	0.160791E+19	0.627636E+18	0.212782E+20	0.187420E-01
353.0	0.440482E+18	0.200310E+20	0.156836E+19	0.612163E+18	0.201389E+20	0.177386E-01
354.0	0.453415E+18	0.195752E+20	0.153267E+19	0.598201E+18	0.190969E+20	0.168207E-01
355.0	0.465478E+18	0.191640E+20	0.150047E+19	0.585603E+18	0.181441E+20	0.159815E-01
356.0	0.476680E+18	0.187930E+20	0.147142E+19	0.574238E+18	0.172730E+20	0.152142E-01
357.0	0.487121E+18	0.184582E+20	0.144520E+19	0.563982E+18	0.164768E+20	0.145129E-01
358.0	0.496821E+18	0.181561E+20	0.142155E+19	0.554728E+18	0.157493E+20	0.138721E-01
359.0	0.505829E+18	0.178835E+20	0.140020E+19	0.546377E+18	0.150846E+20	0.132867E-01
360.0	0.514183E+18	0.176376E+20	0.138094E+19	0.538843E+18	0.144775E+20	0.127519E-01
361.0	0.521915E+18	0.174157E+20	0.136357E+19	0.532045E+18	0.139232E+20	0.122636E-01
362.0	0.529065E+18	0.172155E+20	0.134789E+19	0.525911E+18	0.134170E+20	0.118178E-01
363.0	0.535689E+18	0.170348E+20	0.133374E+19	0.520376E+18	0.129550E+20	0.114109E-01
364.0	0.541813E+18	0.168718E+20	0.132098E+19	0.515383E+18	0.125333E+20	0.110394E-01
365.0	0.547467E+18	0.167247E+20	0.130946E+19	0.510877E+18	0.121486E+20	0.107005E-01
366.0	0.552688E+18	0.165920E+20	0.129907E+19	0.506812E+18	0.117975E+20	0.103914E-01
367.0	0.557513E+18	0.164723E+20	0.128970E+19	0.503144E+18	0.114774E+20	0.101094E-01
368.0	0.561949E+18	0.163643E+20	0.128124E+19	0.499835E+18	0.111854E+20	0.985218E-02
369.0	0.566042E+18	0.162668E+20	0.127360E+19	0.496849E+18	0.109191E+20	0.961767E-02
370.0	0.569816E+18	0.161788E+20	0.126672E+19	0.494154E+18	0.106764E+20	0.940387E-02
371.0	0.573287E+18	0.160995E+20	0.126050E+19	0.491724E+18	0.104551E+20	0.920899E-02
372.0	0.576470E+18	0.160279E+20	0.125490E+19	0.489530E+18	0.102535E+20	0.903137E-02
373.0	0.579416E+18	0.159633E+20	0.124984E+19	0.487552E+18	0.100698E+20	0.886953E-02
374.0	0.582109E+18	0.159050E+20	0.124528E+19	0.485767E+18	0.990233E+19	0.872206E-02
375.0	0.584596E+18	0.158525E+20	0.124116E+19	0.484156E+18	0.974983E+19	0.858773E-02
376.0	0.586860E+18	0.158050E+20	0.123744E+19	0.482702E+18	0.961091E+19	0.846537E-02
377.0	0.588963E+18	0.157622E+20	0.123409E+19	0.481391E+18	0.948439E+19	0.835394E-02
378.0	0.590879E+18	0.157236E+20	0.123107E+19	0.480208E+18	0.936919E+19	0.825247E-02
379.0	0.592633E+18	0.156887E+20	0.122834E+19	0.479141E+18	0.926431E+19	0.816008E-02
380.0	0.594244E+18	0.156573E+20	0.122588E+19	0.478177E+18	0.916882E+19	0.807598E-02
381.0	0.595733E+18	0.156290E+20	0.122366E+19	0.477309E+18	0.908191E+19	0.799942E-02
382.0	0.597087E+18	0.156034E+20	0.122165E+19	0.476525E+18	0.900280E+19	0.792975E-02
383.0	0.598334E+18	0.155803E+20	0.121985E+19	0.475818E+18	0.893081E+19	0.786634E-02
384.0	0.599479E+18	0.155594E+20	0.121822E+19	0.475179E+18	0.886531E+19	0.780864E-02

0.44562E+12 0.36973E+12 0.29481E+12 0.24191E+12 0.17942E+12 0.14006E+12 0.11570E+12 0.10175E+12 0.95585E+11 0.95784E+11

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IE	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.
	0.00009971		0.00017196			0.00032406		0.00027154	0.00147599								0.00016000
	0.00094517		0.00042206			0.04965990		0.01077482	0.00221931								0.0
0.	0.003640	0.001000	0.000000	0.000115	566.	566.	0.150718E-04	0.238234E-04	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003641	0.001000	0.000001	0.000133	566.	566.	0.322009E-04	0.506658E-04	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003641	0.001000	0.000001	0.000153	566.	566.	0.517463E-04	0.810679E-04	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003641	0.001000	0.000001	0.000177	566.	566.	0.741257E-04	0.115659E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003642	0.001000	0.000002	0.000205	566.	566.	0.998262E-04	0.155172E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003642	0.001000	0.000002	0.000238	566.	566.	0.129415E-03	0.200462E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003642	0.001000	0.000002	0.000277	566.	566.	0.163554E-03	0.252519E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003642	0.001000	0.000002	0.000322	566.	566.	0.203012E-03	0.312495E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003642	0.001000	0.000003	0.000374	566.	566.	0.248689E-03	0.381750E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.003643	0.001000	0.000003	0.000435	566.	566.	0.301624E-03	0.461859E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.000506	566.	566.	0.363052E-03	0.554661E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.000590	566.	566.	0.434399E-03	0.662296E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.000687	566.	566.	0.517332E-03	0.787266E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.000801	566.	566.	0.613792E-03	0.932487E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.000933	566.	566.	0.726049E-03	0.110136E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.001088	566.	566.	0.856742E-03	0.129785E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.001268	566.	566.	0.100896E-02	0.152658E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.001479	566.	566.	0.118629E-02	0.179295E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.001725	566.	566.	0.139293E-02	0.210326E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.002012	566.	566.	0.163378E-02	0.246483E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.002346	566.	566.	0.191455E-02	0.288625E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.002737	566.	566.	0.224190E-02	0.337750E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.003192	566.	566.	0.262360E-02	0.395023E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.003724	566.	566.	0.306872E-02	0.461790E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.004344	566.	566.	0.358784E-02	0.539654E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.005067	566.	566.	0.419319E-02	0.630458E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.005911	566.	566.	0.489913E-02	0.736363E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.006895	566.	566.	0.572257E-02	0.859883E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.008044	566.	566.	0.668308E-02	0.100396E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.003643	0.001000	0.000003	0.009384	566.	566.	0.780350E-02	0.117202E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003643	0.001000	0.000003	0.010947	566.	566.	0.911051E-02	0.136806E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003643	0.001000	0.000003	0.012771	566.	566.	0.106352E-01	0.159674E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003643	0.001000	0.000003	0.014898	566.	566.	0.124137E-01	0.186350E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003642	0.001000	0.000002	0.017379	566.	566.	0.144884E-01	0.217468E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003642	0.001000	0.000002	0.020272	566.	566.	0.169085E-01	0.253764E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003641	0.001000	0.000001	0.023645	566.	566.	0.197313E-01	0.296100E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003640	0.001000	0.000000	0.027577	566.	566.	0.230236E-01	0.345476E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003639	0.001000	-0.000001	0.032159	566.	566.	0.268629E-01	0.403055E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003638	0.001000	-0.000002	0.037497	566.	566.	0.313396E-01	0.470191E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003637	0.001000	-0.000003	0.043713	566.	566.	0.365586E-01	0.548457E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003635	0.001000	-0.000005	0.050949	566.	566.	0.426418E-01	0.639876E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003633	0.001000	-0.000007	0.059368	566.	566.	0.497306E-01	0.745949E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003631	0.001000	-0.000010	0.069155	566.	566.	0.579887E-01	0.869755E-01	566.	567.	567.	567.	566.	566.	566.	566.	566.
2.	0.003628	0.001000	-0.000012	0.080526	566.	567.	0.676042E-01	0.101392E+00	566.	567.	567.	567.	566.	566.	566.	566.	566.
2.	0.003625	0.001000	-0.000015	0.093733	566.	567.	0.787963E-01	0.118173E+00	567.	567.	567.	567.	566.	566.	566.	566.	566.
2.	0.003621	0.001000	-0.000019	0.109057	566.	567.	0.918196E-01	0.137697E+00	567.	567.	567.	567.	566.	566.	566.	566.	566.
2.	0.003617	0.001000	-0.000024	0.126819	566.	567.	0.106966E+00	0.160402E+00	567.	567.	567.	567.	566.	566.	566.	566.	566.
2.	0.003611	0.001000	-0.000029	0.147382	566.	567.	0.124571E+00	0.186790E+00	567.	568.	568.	568.	566.	566.	566.	566.	566.
2.	0.003605	0.001000	-0.000035	0.171152	567.	568.	0.145019E+00	0.217434E+00	567.	568.	568.	568.	566.	566.	566.	566.	566.
2.	0.003598	0.001000	-0.000042	0.198585	567.	568.	0.168749E+00	0.252991E+00	568.	568.	568.	569.	566.	566.	566.	566.	566.
3.	0.003590	0.001000	-0.000050	0.230182	567.	569.	0.196261E+00	0.294206E+00	568.	569.	569.	569.	566.	567.	566.	566.	566.
3.	0.003581	0.001000	-0.000060	0.266495	567.	569.	0.228121E+00	0.341924E+00	568.	569.	569.	570.	567.	567.	566.	566.	566.
3.	0.003570	0.001000	-0.000071	0.308121	567.	570.	0.264967E+00	0.397096E+00	569.	570.	570.	570.	567.	567.	566.	566.	566.
3.	0.003557	0.001000	-0.000083	0.355695	568.	570.	0.307515E+00	0.460786E+00	569.	571.	570.	571.	567.	567.	566.	566.	566.
3.	0.003542	0.001000	-0.000098	0.409874	568.	571.	0.356561E+00	0.534175E+00	570.	572.	571.	572.	567.	567.	566.	566.	566.
3.	0.003525	0.001000	-0.000115	0.471322	568.	572.	0.412980E+00	0.618563E+00	571.	573.	572.	573.	567.	567.	566.	566.	566.
3.	0.003506	0.001000	-0.000134	0.540688	569.	573.	0.477731E+00	0.715364E+00	572.	574.	573.	574.	567.	568.	566.	566.	566.
3.	0.003484	0.001000	-0.000157	0.618572	569.	574.	0.551843E+00	0.826096E+00	572.	575.	574.	575.	568.	568.	566.	566.	566.
3.	0.003459	0.001000	-0.000182	0.705469	570.	575.	0.636409E+00	0.952362E+00	573.	576.	575.	577.	568.	568.	566.	566.	566.
3.	0.003430	0.001000	-0.000211	0.801714	570.	577.	0.732563E+00	0.109579E+01	575.	578.	577.	579.	568.	569.	566.	566.	566.
3.	0.003398	0.001000	-0.000243	0.907443	571.	578.	0.841458E+00	0.125807E+01	576.	580.	578.	581.	569.	569.	566.	566.	566.

3.	0.003361	0.001000	-0.000280.	1.022479	572.	580.	0.964229E+00	0.144083E+01	577.	582.	580.	583.	569.	570.	566.	566.	566.
3.	0.003320	0.001000	-0.000321	1.146233	573.	582.	0.110191E+01	0.164559E+01	579.	584.	582.	585.	570.	570.	566.	566.	566.
3.	0.003275	0.001000	-0.000366	1.277736	574.	585.	0.125545E+01	0.187362E+01	581.	587.	585.	588.	570.	571.	566.	567.	566.
3.	0.003224	0.001000	-0.000417	1.415455	575.	587.	0.142563E+01	0.212593E+01	583.	590.	587.	591.	571.	571.	566.	567.	566.
3.	0.003169	0.001000	-0.000472	1.557284	577.	590.	0.161292E+01	0.240306E+01	585.	593.	590.	594.	572.	572.	567.	567.	566.
3.	0.003109	0.001000	-0.000532	1.700571	578.	593.	0.181747E+01	0.270504E+01	588.	596.	593.	598.	572.	573.	567.	567.	566.
3.	0.003044	0.001000	-0.000597	1.842127	580.	597.	0.203901E+01	0.303123E+01	590.	600.	596.	602.	573.	574.	567.	567.	566.
3.	0.002975	0.001000	-0.000667	1.978348	582.	601.	0.227680E+01	0.338026E+01	593.	604.	600.	606.	574.	575.	567.	567.	566.
3.	0.002901	0.001000	-0.000741	2.105361	584.	604.	0.252957E+01	0.374995E+01	596.	608.	604.	611.	575.	576.	567.	567.	567.
4.	0.002824	0.001000	-0.000818	2.219298	587.	609.	0.279554E+01	0.413731E+01	599.	613.	608.	616.	576.	577.	567.	568.	567.
4.	0.002744	0.001000	-0.000897	2.316554	589.	613.	0.307241E+01	0.453860E+01	602.	617.	612.	621.	577.	578.	567.	568.	567.
4.	0.002663	0.001000	-0.000979	2.394102	592.	617.	0.335745E+01	0.494943E+01	605.	622.	616.	626.	578.	580.	568.	568.	567.
4.	0.002581	0.001000	-0.001061	2.449688	595.	622.	0.364762E+01	0.536490E+01	608.	627.	620.	631.	580.	581.	568.	568.	567.
4.	0.002499	0.001000	-0.001143	2.482009	598.	626.	0.393963E+01	0.577987E+01	612.	631.	624.	636.	581.	582.	568.	569.	567.
4.	0.002418	0.001000	-0.001224	2.490877	601.	631.	0.423016E+01	0.618914E+01	615.	636.	628.	642.	582.	584.	568.	569.	567.
4.	0.002339	0.001000	-0.001302	2.477205	604.	635.	0.451599E+01	0.658771E+01	618.	640.	632.	647.	583.	585.	569.	569.	567.
4.	0.002264	0.001000	-0.001378	2.442800	608.	639.	0.479414E+01	0.697101E+01	620.	645.	636.	652.	584.	586.	569.	570.	568.
4.	0.002192	0.001000	-0.001449	2.390266	611.	644.	0.506197E+01	0.733811E+01	623.	649.	639.	656.	585.	588.	569.	570.	568.
4.	0.002125	0.001000	-0.001517	2.322717	615.	647.	0.531731E+01	0.767677E+01	625.	653.	642.	661.	586.	589.	570.	570.	568.
4.	0.002062	0.001000	-0.001579	2.243537	619.	651.	0.555847E+01	0.799359E+01	628.	656.	645.	665.	587.	590.	570.	571.	569.
4.	0.002005	0.001000	-0.001636	2.156067	622.	655.	0.578425E+01	0.828397E+01	630.	660.	648.	669.	588.	591.	570.	571.	568.
4.	0.001952	0.001000	-0.001688	2.063513	626.	658.	0.599393E+01	0.854707E+01	632.	663.	650.	673.	589.	592.	570.	572.	568.
4.	0.001905	0.001000	-0.001735	1.968752	629.	661.	0.618727E+01	0.878278E+01	633.	665.	653.	676.	590.	593.	571.	572.	568.
4.	0.001864	0.001000	-0.001777	1.874218	633.	663.	0.636435E+01	0.899155E+01	635.	668.	654.	679.	591.	594.	571.	572.	569.
4.	0.001826	0.001000	-0.001814	1.781908	636.	666.	0.652561E+01	0.917433E+01	636.	670.	656.	682.	592.	595.	571.	573.	569.
4.	0.001794	0.001000	-0.001847	1.693325	639.	668.	0.667170E+01	0.933243E+01	637.	672.	657.	684.	593.	596.	572.	573.	569.
4.	0.001766	0.001000	-0.001875	1.609553	642.	670.	0.680346E+01	0.946742E+01	639.	673.	659.	686.	594.	597.	572.	574.	569.
4.	0.001741	0.001000	-0.001899	1.531268	645.	671.	0.692183E+01	0.958103E+01	640.	674.	660.	688.	594.	598.	573.	574.	570.
4.	0.001720	0.001000	-0.001920	1.458901	648.	673.	0.702781E+01	0.967506E+01	641.	676.	660.	690.	595.	599.	573.	575.	570.
5.	0.001702	0.001000	-0.001938	1.392498	651.	674.	0.712244E+01	0.975132E+01	642.	677.	661.	691.	596.	599.	573.	575.	570.
5.	0.001687	0.001000	-0.001953	1.332029	653.	675.	0.720671E+01	0.981158E+01	642.	677.	661.	692.	596.	600.	574.	576.	570.
5.	0.001674	0.001000	-0.001966	1.277303	656.	676.	0.728161E+01	0.985753E+01	643.	678.	662.	693.	597.	601.	574.	576.	571.
5.	0.001663	0.001000	-0.001977	1.228005	658.	677.	0.734807E+01	0.989078E+01	644.	679.	662.	694.	597.	601.	574.	576.	571.
5.	0.001655	0.001000	-0.001986	1.183771	660.	677.	0.740695E+01	0.991280E+01	645.	679.	662.	694.	598.	602.	575.	577.	571.
5.	0.001647	0.001000	-0.001993	1.144207	662.	678.	0.745905E+01	0.992496E+01	645.	679.	662.	695.	599.	602.	575.	577.	571.
5.	0.001641	0.001000	-0.001999	1.108903	663.	678.	0.750509E+01	0.992850E+01	646.	680.	662.	695.	599.	603.	575.	578.	572.
5.	0.001637	0.001000	-0.002004	1.077457	665.	678.	0.754575E+01	0.992454E+01	647.	680.	662.	695.	600.	604.	576.	578.	572.
5.	0.001633	0.001000	-0.002007	1.049490	666.	679.	0.758163E+01	0.991408E+01	647.	680.	662.	696.	600.	604.	576.	579.	572.
5.	0.001630	0.001000	-0.002010	1.024638	668.	679.	0.761324E+01	0.989800E+01	648.	680.	662.	696.	601.	605.	576.	579.	572.
5.	0.001628	0.001000	-0.002012	1.002546	669.	679.	0.764109E+01	0.987711E+01	649.	680.	662.	696.	601.	605.	577.	579.	573.
5.	0.001626	0.001000	-0.002014	0.982970	670.	679.	0.766558E+01	0.985211E+01	649.	681.	662.	696.	601.	606.	577.	580.	573.
5.	0.001625	0.001000	-0.002015	0.965556	671.	679.	0.768711E+01	0.982363E+01	650.	681.	662.	696.	602.	606.	578.	580.	573.
5.	0.001625	0.001000	-0.002015	0.950040	672.	679.	0.770599E+01	0.979219E+01	650.	681.	662.	696.	602.	607.	578.	581.	573.
5.	0.001625	0.001000	-0.002015	0.936195	672.	679.	0.772253E+01	0.975828E+01	651.	681.	662.	695.	603.	607.	578.	581.	574.
5.	0.001624	0.001000	-0.002016	0.923808	673.	679.	0.773698E+01	0.972229E+01	651.	681.	662.	695.	603.	607.	579.	581.	574.
5.	0.001625	0.001000	-0.002015	0.912698	674.	679.	0.774955E+01	0.968458E+01	652.	681.	662.	695.	604.	608.	579.	582.	574.
5.	0.001625	0.001000	-0.002015	0.902706	674.	679.	0.776046E+01	0.964547E+01	652.	681.	661.	695.	604.	608.	579.	582.	574.
5.	0.001626	0.001000	-0.002014	0.893694	675.	679.	0.776986E+01	0.960522E+01	652.	681.	661.	695.	604.	609.	580.	583.	575.
5.	0.001627	0.001000	-0.002013	0.885524	675.	678.	0.777792E+01	0.956406E+01	653.	681.	661.	694.	605.	609.	580.	583.	575.
6.	0.001627	0.001000	-0.002013	0.878082	675.	678.	0.778476E+01	0.952220E+01	653.	681.	661.	694.	605.	610.	580.	583.	575.
6.	0.001628	0.001000	-0.002012	0.871286	676.	678.	0.779049E+01	0.947979E+01	654.	681.	661.	694.	606.	610.	581.	584.	575.
6.	0.001629	0.001000	-0.002011	0.865062	676.	678.	0.779522E+01	0.943699E+01	654.	682.	661.	694.	606.	611.	581.	584.	576.
6.	0.001631	0.001000	-0.002009	0.859333	676.	678.	0.779905E+01	0.939393E+01	654.	682.	661.	693.	606.	611.	582.	585.	576.
6.	0.001632	0.001000	-0.002008	0.854046	676.	678.	0.780204E+01	0.935071E+01	655.	682.	661.	693.	607.	611.	582.	585.	576.
6.	0.001633	0.001000	-0.002007	0.849155	677.	678.	0.780426E+01	0.930744E+01	655.	682.	661.	693.	607.	612.	582.	585.	576.
6.	0.001635	0.001000	-0.002005	0.844600	677.	678.	0.780579E+01	0.926419E+01	655.	682.	661.	693.	607.	612.	583.	586.	577.
6.	0.001636	0.001000	-0.002004	0.840339	677.	678.	0.780667E+01	0.922104E+01	655.	682.	661.	692.	608.	613.	583.	586.	577.
6.	0.001637	0.001000	-0.002003	0.836332	677.	677.	0.780697E+01	0.917804E+01	656.	682.	661.	692.	608.	613.	583.	587.	577.
6.	0.001639	0.001000	-0.002001	0.832566	677.	677.	0.780672E+01	0.913525E+01	656.	682.	661.	692.	608.	613.	584.	587.	577.
6.	0.001641	0.001000	-0.001999	0.829018	677.	677.	0.780594E+01	0.909272E+01	656.	682.	662.	692.	609.	614.	584.	587.	578.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

E	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.
	0.00009971		0.00017196			0.00032406		0.00027154			0.00147599						0.00016000
	0.00094517		0.00042206			0.04965990		0.01077482			0.00221931						0.0
0.	0.005640	0.003000	0.000000	0.000150	566.	566.	0.172322E-04	0.272446E-04	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005641	0.003000	0.000001	0.000228	566.	566.	0.431180E-04	0.679045E-04	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005641	0.003000	0.000001	0.000347	566.	566.	0.822021E-04	0.129037E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005641	0.003000	0.000001	0.000528	566.	566.	0.141403E-03	0.221384E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005642	0.003000	0.000002	0.000804	566.	566.	0.231264E-03	0.361312E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005642	0.003000	0.000002	0.001225	566.	566.	0.367646E-03	0.573779E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005642	0.003000	0.000002	0.001866	566.	566.	0.575645E-03	0.898816E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005642	0.003000	0.000002	0.002842	566.	566.	0.891981E-03	0.138837E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005642	0.003000	0.000003	0.004331	566.	566.	0.137373E-02	0.213675E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.005643	0.003000	0.000003	0.006599	566.	566.	0.210753E-02	0.327651E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005643	0.003000	0.000003	0.010055	566.	566.	0.322544E-02	0.501260E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005642	0.003000	0.000002	0.015322	566.	566.	0.492861E-02	0.763755E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005642	0.003000	0.000002	0.023347	566.	566.	0.752367E-02	0.116875E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005641	0.003000	0.000001	0.035572	566.	566.	0.114777E-01	0.178276E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005639	0.003000	-0.000001	0.054190	566.	566.	0.175015E-01	0.271817E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005637	0.003000	-0.000004	0.082524	566.	566.	0.266764E-01	0.414285E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005632	0.003000	-0.000008	0.125614	566.	566.	0.406449E-01	0.631184E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.005626	0.003000	-0.000014	0.191066	566.	567.	0.618988E-01	0.961177E-01	567.	567.	567.	567.	566.	566.	566.	566.	566.
1.	0.005616	0.003000	-0.000024	0.290303	566.	567.	0.942059E-01	0.146282E+00	567.	567.	567.	567.	566.	566.	566.	566.	566.
1.	0.005600	0.003000	-0.000040	0.440328	566.	568.	0.143249E+00	0.222429E+00	568.	568.	568.	568.	566.	566.	566.	566.	566.
1.	0.005577	0.003000	-0.000063	0.666140	566.	569.	0.217535E+00	0.337759E+00	569.	570.	569.	570.	567.	567.	566.	566.	566.
1.	0.005542	0.003000	-0.000099	1.003770	567.	571.	0.329682E+00	0.511849E+00	571.	572.	571.	572.	567.	567.	566.	566.	566.
1.	0.005489	0.003000	-0.000152	1.503434	567.	573.	0.498126E+00	0.773288E+00	573.	574.	574.	575.	568.	568.	566.	566.	566.
1.	0.005410	0.003000	-0.000232	2.231821	568.	577.	0.749222E+00	0.116289E+01	577.	579.	578.	579.	569.	569.	566.	566.	566.
1.	0.005294	0.003000	-0.000349	3.269485	569.	583.	0.111932E+01	0.173692E+01	582.	585.	584.	586.	570.	570.	566.	566.	566.
1.	0.005125	0.003000	-0.000519	4.697683	571.	591.	0.165586E+01	0.256864E+01	590.	595.	593.	595.	572.	572.	566.	566.	566.
1.	0.004886	0.003000	-0.000759	6.565135	574.	602.	0.241529E+01	0.374484E+01	601.	608.	605.	609.	575.	575.	567.	567.	566.
1.	0.004561	0.003000	-0.001087	8.828157	578.	618.	0.345456E+01	0.535221E+01	615.	626.	622.	628.	579.	579.	567.	567.	566.
1.	0.004136	0.003000	-0.001513	11.276886	583.	639.	0.481288E+01	0.744865E+01	634.	650.	645.	652.	584.	585.	567.	567.	567.
1.	0.003616	0.003000	-0.002035	13.500928	590.	665.	0.648540E+01	0.100218E+02	657.	680.	672.	682.	590.	591.	568.	568.	567.
2.	0.003025	0.003000	-0.002627	14.977006	600.	694.	0.839984E+01	0.129531E+02	682.	713.	702.	717.	597.	599.	569.	569.	567.
2.	0.002411	0.003000	-0.003241	15.299434	611.	726.	0.104164E+02	0.160181E+02	707.	748.	734.	753.	605.	607.	569.	570.	569.
2.	0.001829	0.003000	-0.003822	14.412047	625.	756.	0.123625E+02	0.189428E+02	730.	782.	764.	789.	612.	615.	570.	571.	568.
2.	0.001328	0.003000	-0.004321	12.635633	640.	783.	0.140878E+02	0.214919E+02	748.	812.	789.	821.	618.	623.	571.	572.	569.
2.	0.000934	0.003000	-0.004712	10.466984	657.	806.	0.155044E+02	0.235307E+02	760.	835.	809.	847.	624.	629.	573.	574.	570.
2.	0.000652	0.003000	-0.004992	8.338189	673.	823.	0.165929E+02	0.250345E+02	767.	853.	823.	867.	628.	634.	574.	575.	570.
2.	0.000468	0.003000	-0.005175	6.500441	690.	836.	0.173837E+02	0.260568E+02	770.	864.	832.	882.	631.	638.	575.	576.	571.
2.	0.000363	0.003000	-0.005278	5.037573	706.	845.	0.179294E+02	0.266859E+02	770.	871.	837.	892.	633.	641.	576.	578.	571.
2.	0.000316	0.003000	-0.005324	3.931494	721.	851.	0.182872E+02	0.270143E+02	768.	875.	838.	899.	635.	643.	577.	579.	572.
2.	0.000311	0.003000	-0.005329	3.121545	735.	855.	0.185049E+02	0.271222E+02	765.	875.	837.	903.	636.	645.	578.	580.	573.
2.	0.000333	0.003000	-0.005306	2.539804	748.	857.	0.186221E+02	0.270736E+02	761.	874.	835.	905.	637.	646.	579.	582.	573.
2.	0.000374	0.003000	-0.005266	2.126692	759.	858.	0.186679E+02	0.269164E+02	758.	872.	832.	906.	638.	648.	580.	583.	574.
2.	0.000425	0.003000	-0.005214	1.835337	769.	857.	0.186636E+02	0.266854E+02	755.	868.	828.	905.	639.	648.	581.	584.	574.
2.	0.000482	0.003000	-0.005157	1.630890	779.	856.	0.186251E+02	0.264054E+02	753.	864.	824.	903.	639.	649.	581.	585.	575.
2.	0.000542	0.003000	-0.005097	1.488170	787.	855.	0.185627E+02	0.260941E+02	751.	860.	820.	901.	640.	650.	582.	587.	575.
2.	0.000602	0.003000	-0.005037	1.389273	794.	853.	0.184846E+02	0.257638E+02	749.	855.	815.	899.	641.	651.	583.	588.	576.
2.	0.000662	0.003000	-0.004977	1.321568	800.	850.	0.183959E+02	0.254234E+02	748.	851.	811.	896.	641.	651.	584.	589.	577.
2.	0.000719	0.003000	-0.004919	1.276154	805.	848.	0.183006E+02	0.250789E+02	748.	847.	807.	893.	642.	652.	585.	590.	577.
2.	0.000775	0.003000	-0.004864	1.246740	809.	846.	0.182016E+02	0.247348E+02	748.	843.	803.	890.	642.	653.	586.	591.	578.
2.	0.000828	0.003000	-0.004811	1.228849	813.	843.	0.181008E+02	0.243941E+02	748.	839.	799.	886.	643.	653.	586.	592.	578.
3.	0.000878	0.003000	-0.004761	1.219276	816.	840.	0.179995E+02	0.240587E+02	748.	835.	795.	883.	644.	654.	587.	593.	579.
3.	0.000926	0.003000	-0.004713	1.215732	818.	837.	0.178989E+02	0.237303E+02	749.	832.	792.	879.	644.	654.	588.	594.	579.
3.	0.000971	0.003000	-0.004668	1.216529	820.	835.	0.177995E+02	0.234097E+02	749.	829.	788.	876.	645.	655.	589.	595.	580.
3.	0.001013	0.003000	-0.004626	1.220453	822.	832.	0.177021E+02	0.230977E+02	750.	826.	785.	872.	646.	655.	590.	596.	580.
3.	0.001053	0.003000	-0.004587	1.226608	823.	829.	0.176068E+02	0.227946E+02	751.	824.	783.	869.	646.	656.	590.	597.	581.
3.	0.001090	0.003000	-0.004549	1.234325	823.	827.	0.175140E+02	0.225005E+02	751.	822.	780.	866.	647.	657.	591.	598.	582.
3.	0.001125	0.003000	-0.004514	1.243125	823.	824.	0.174238E+02	0.222157E+02	752.	820.	778.	862.	648.	657.	592.	599.	582.
3.	0.001159	0.003000	-0.004481	1.252641	823.	822.	0.173362E+02	0.219399E+02	753.	818.	775.	859.	648.	658.	593.	600.	583.
3.	0.001190	0.003000	-0.004450	1.262590	823.	820.	0.172512E+02	0.216731E+02	754.	816.	773.	856.	649.	658.	594.	601.	583.
3.	0.001219	0.003000	-0.004420	1.272770	823.	817.	0.171690E+02	0.214153E+02	754.	815.	772.	853.	650.	659.	594.	601.	584.
3.	0.001247	0.003000	-0.004393	1.283003	822.	815.	0.170895E+02	0.211661E+02	755.	814.	770.	851.	650.	660.	595.	602.	584.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

NF	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00009971		0.00017196			0.00032406		0.00027154	0.00147599				0.00016000			
	0.00094517		0.00042206			0.04965990		0.01077482	0.00221931				0.0			
0.	0.007640	0.005000	0.000000	0.000194	566.	566.	0.196029E-04	0.309997E-04	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007641	0.005000	0.000001	0.000388	566.	566.	0.584199E-04	0.920813E-04	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007641	0.005000	0.000001	0.000775	566.	566.	0.135715E-03	0.213417E-03	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007641	0.005000	0.000001	0.001551	566.	566.	0.290000E-03	0.455324E-03	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007642	0.005000	0.000002	0.003102	566.	566.	0.598334E-03	0.938512E-03	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007642	0.005000	0.000002	0.006206	566.	566.	0.121492E-02	0.190450E-02	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007642	0.005000	0.000002	0.012417	566.	566.	0.244827E-02	0.383651E-02	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007642	0.005000	0.000002	0.024844	566.	566.	0.491566E-02	0.770127E-02	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007640	0.005000	0.000000	0.049704	566.	566.	0.985195E-02	0.154332E-01	566.	566.	566.	566.	566.	566.	566.	566.
0.	0.007638	0.005000	-0.000002	0.099412	566.	566.	0.197264E-01	0.308996E-01	566.	566.	566.	566.	566.	566.	566.	566.
1.	0.007632	0.005000	-0.000008	0.198723	566.	566.	0.394706E-01	0.618247E-01	566.	567.	567.	567.	566.	566.	566.	566.
1.	0.007619	0.005000	-0.000021	0.396772	566.	567.	0.789146E-01	0.123603E+00	567.	567.	567.	567.	566.	566.	566.	566.
1.	0.007594	0.005000	-0.000046	0.790254	566.	568.	0.157570E+00	0.246796E+00	568.	569.	568.	569.	566.	567.	566.	566.
1.	0.007545	0.005000	-0.000097	1.566146	566.	571.	0.313839E+00	0.491535E+00	571.	571.	571.	571.	567.	567.	566.	566.
1.	0.007447	0.005000	-0.000196	3.073547	567.	575.	0.622004E+00	0.974114E+00	575.	577.	576.	577.	568.	568.	566.	566.
1.	0.007256	0.005000	-0.000390	5.917041	568.	584.	0.122091E+01	0.191177E+01	585.	587.	586.	588.	570.	571.	566.	566.
1.	0.006895	0.005000	-0.000755	10.979091	571.	601.	0.235254E+01	0.368278E+01	602.	607.	605.	608.	575.	575.	566.	566.
1.	0.006248	0.005000	-0.001409	19.035156	576.	632.	0.438108E+01	0.685481E+01	633.	643.	639.	644.	582.	583.	567.	567.
1.	0.005193	0.005000	-0.002473	29.385605	584.	682.	0.769516E+01	0.120285E+02	683.	702.	695.	703.	595.	596.	568.	568.
1.	0.003711	0.005000	-0.003962	38.055161	598.	753.	0.123653E+02	0.192951E+02	751.	784.	772.	787.	612.	614.	569.	569.
1.	0.002024	0.005000	-0.005649	39.469223	619.	836.	0.177342E+02	0.275951E+02	826.	879.	860.	883.	632.	635.	571.	571.
1.	0.000521	0.005000	-0.007145	32.759964	646.	912.	0.226259E+02	0.350615E+02	886.	966.	937.	972.	650.	655.	573.	573.
1.	-0.000527	0.005000	-0.008183	22.[illegible]74603	677.	969.	0.262115E+02	0.403937E+02	922.	1028.	991.	1039.	663.	670.	575.	576.
1.	-0.001106	0.005000	-0.008754	14.440497	710.	1006.	0.284190E+02	0.435007E+02	934.	1065.	1019.	1081.	672.	680.	577.	578.
1.	-0.001344	0.005000	-0.008986	8.601376	742.	1026.	0.295998E+02	0.449612E+02	930.	1083.	1030.	1104.	676.	686.	579.	580.
1.	-0.001375	0.005000	-0.009015	5.444428	773.	1036.	0.301375E+02	0.453973E+02	919.	1089.	1031.	1116.	678.	690.	581.	583.
1.	-0.001295	0.005000	-0.008933	3.544011	801.	1040.	0.303044E+02	0.452497E+02	905.	1087.	1025.	1120.	679.	692.	582.	585.
1.	-0.001160	0.005000	-0.008797	2.486511	826.	1041.	0.302654E+02	0.447845E+02	891.	1080.	1016.	1120.	680.	693.	584.	587.
1.	-0.001002	0.005000	-0.008639	1.900027	842.	1039.	0.301141E+02	0.441524E+02	879.	1072.	1007.	1117.	680.	695.	585.	589.
1.	-0.000836	0.005000	-0.008473	1.575428	866.	1036.	0.299025E+02	0.434371E+02	868.	1062.	996.	1113.	680.	695.	587.	591.
2.	-0.000673	0.005000	-0.008309	1.397854	886.	1032.	0.296595E+02	0.426851E+02	860.	1051.	986.	1108.	680.	696.	588.	593.
2.	-0.000515	0.005000	-0.008152	1.304209	901.	1027.	0.294016E+02	0.419223E+02	853.	1040.	976.	1102.	681.	697.	590.	595.
2.	-0.000365	0.005000	-0.008002	1.259423	914.	1022.	0.291380E+02	0.411634E+02	848.	1030.	966.	1096.	681.	697.	591.	597.
2.	-0.000224	0.005000	-0.007862	1.243670	925.	1017.	0.288743E+02	0.404169E+02	845.	1020.	957.	1089.	681.	698.	592.	599.
2.	-0.000092	0.005000	-0.007729	1.245535	934.	1011.	0.286135E+02	0.396876E+02	842.	1010.	948.	1083.	682.	698.	593.	601.
2.	0.000032	0.005000	-0.007606	1.258268	942.	1006.	0.283578E+02	0.389781E+02	841.	1001.	939.	1076.	683.	699.	595.	603.
2.	0.000147	0.005000	-0.007491	1.277824	948.	1000.	0.281084E+02	0.382900E+02	840.	993.	931.	1069.	683.	699.	596.	604.
2.	0.000255	0.005000	-0.007383	1.301712	953.	994.	0.278657E+02	0.376237E+02	840.	985.	924.	1062.	684.	700.	597.	606.
2.	0.000356	0.005000	-0.007282	1.328390	957.	989.	0.276303E+02	0.369797E+02	840.	978.	917.	1055.	685.	700.	598.	607.
2.	0.000450	0.005000	-0.007189	1.356848	960.	983.	0.274023E+02	0.363579E+02	841.	971.	910.	1048.	685.	701.	600.	609.
2.	0.000538	0.005000	-0.007101	1.386449	963.	978.	0.271818E+02	0.357579E+02	842.	965.	904.	1041.	686.	702.	601.	610.
2.	0.000620	0.005000	-0.007019	1.416760	964.	973.	0.269688E+02	0.351796E+02	843.	960.	898.	1034.	687.	702.	602.	612.
2.	0.000696	0.005000	-0.006942	1.447490	965.	968.	0.267634E+02	0.346224E+02	844.	955.	893.	1028.	688.	703.	603.	613.
2.	0.000768	0.005000	-0.006870	1.478434	965.	963.	0.265653E+02	0.340859E+02	845.	951.	888.	1022.	689.	703.	604.	615.
2.	0.000836	0.005000	-0.006803	1.509470	964.	958.	0.263746E+02	0.335697E+02	846.	947.	884.	1016.	690.	704.	606.	616.
2.	0.000899	0.005000	-0.006740	1.540505	963.	953.	0.261912E+02	0.330732E+02	847.	943.	880.	1010.	691.	705.	607.	617.
2.	0.000959	0.005000	-0.006680	1.571481	962.	949.	0.260149E+02	0.325959E+02	848.	940.	876.	1004.	692.	706.	608.	619.
2.	0.001014	0.005000	-0.006625	1.602321	960.	944.	0.258455E+02	0.321374E+02	849.	937.	872.	999.	693.	706.	609.	620.
2.	0.001066	0.005000	-0.006573	1.632944	958.	940.	0.256831E+02	0.316970E+02	850.	935.	869.	993.	693.	707.	611.	621.
2.	0.001115	0.005000	-0.006524	1.663306	956.	936.	0.255274E+02	0.312744E+02	851.	933.	867.	988.	694.	708.	612.	623.
3.	0.001161	0.005000	-0.006478	1.693382	954.	933.	0.253782E+02	0.308691E+02	851.	931.	864.	984.	695.	709.	613.	624.
3.	0.001205	0.005000	-0.006435	1.723142	951.	929.	0.252355E+02	0.304805E+02	852.	929.	862.	979.	696.	709.	614.	625.
3.	0.001245	0.005000	-0.006394	1.752543	949.	926.	0.250992E+02	0.301081E+02	852.	928.	860.	975.	697.	710.	615.	626.
3.	0.001283	0.005000	-0.006356	1.781556	946.	923.	0.249690E+02	0.297514E+02	852.	927.	859.	971.	698.	711.	617.	627.
3.	0.001319	0.005000	-0.006321	1.810163	944.	920.	0.248448E+02	0.294101E+02	852.	926.	857.	967.	699.	712.	618.	628.
3.	0.001352	0.005000	-0.006287	1.838334	941.	917.	0.247265E+02	0.290835E+02	852.	925.	856.	964.	699.	713.	619.	630.
3.	0.001383	0.005000	-0.006256	1.866042	938.	915.	0.246139E+02	0.287713E+02	852.	924.	855.	960.	700.	714.	620.	631.
3.	0.001413	0.005000	-0.006227	1.893256	936.	912.	0.245068E+02	0.284729E+02	852.	924.	854.	957.	701.	715.	621.	632.
3.	0.001440	0.005000	-0.006199	1.919946	933.	910.	0.244052E+02	0.281879E+02	852.	923.	854.	955.	702.	715.	622.	633.
3.	0.001466	0.005000	-0.006173	1.946073	931.	908.	0.243088E+02	0.279159E+02	852.	923.	853.	952.	703.	716.	624.	634.
3.	0.001490	0.005000	-0.006149	1.971631	928.	906.	0.242175E+02	0.276565E+02	852.	922.	853.	950.	703.	717.	625.	635.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00009971	0.00017196			0.00032406		0.00027154	0.00147599	0.00016000
	0.00094517	0.00042206			0.04965990		0.01077482	0.00221931	0.30758685
0.	0.002397	0.001000 -0.000003	1.136353	566.	704.	0.450664E+02	0.104362E+02	601. 635. 671. 704. 637. 704. 605. 674. 639.	
0.	0.002388	0.001000 -0.000012	1.267567	566.	705.	0.450934E+02	0.104806E+02	602. 636. 671. 705. 637. 705. 605. 674. 639.	
0.	0.002374	0.001000 -0.000027	1.392865	566.	706.	0.451384E+02	0.105524E+02	603. 636. 672. 706. 637. 705. 605. 674. 639.	
0.	0.002354	0.001000 -0.000047	1.511308	566.	706.	0.451998E+02	0.106496E+02	603. 637. 673. 707. 638. 705. 605. 674. 639.	
0.	0.002330	0.001000 -0.000071	1.621861	566.	708.	0.452764E+02	0.107698E+02	605. 639. 674. 708. 638. 705. 605. 674. 639.	
0.	0.002301	0.001000 -0.000099	1.723459	567.	709.	0.453669E+02	0.109107E+02	606. 640. 676. 710. 638. 706. 605. 674. 639.	
0.	0.002269	0.001000 -0.000131	1.815073	567.	711.	0.454696E+02	0.110695E+02	607. 642. 677. 712. 639. 706. 605. 674. 639.	
0.	0.002235	0.001000 -0.000166	1.895842	568.	712.	0.455827E+02	0.112436E+02	609. 644. 679. 714. 639. 706. 605. 674. 639.	
0.	0.002198	0.001000 -0.000203	1.965082	568.	714.	0.457049E+02	0.114301E+02	610. 646. 681. 716. 639. 707. 605. 674. 639.	
0.	0.002159	0.001000 -0.000242	2.022368	569.	716.	0.458340E+02	0.116260E+02	612. 649. 683. 718. 640. 707. 605. 674. 639.	
1.	0.002119	0.001000 -0.000282	2.067547	570.	718.	0.459685E+02	0.118284E+02	613. 651. 685. 721. 640. 708. 605. 674. 639.	
1.	0.002078	0.001000 -0.000323	2.100779	571.	721.	0.461064E+02	0.120345E+02	615. 653. 687. 723. 641. 709. 605. 674. 639.	
1.	0.002038	0.001000 -0.000363	2.122483	573.	723.	0.462462E+02	0.122417E+02	616. 656. 689. 726. 641. 709. 605. 674. 639.	
1.	0.001997	0.001000 -0.000404	2.133391	574.	725.	0.463861E+02	0.124473E+02	618. 658. 691. 728. 642. 710. 605. 674. 639.	
1.	0.001958	0.001000 -0.000443	2.134412	575.	727.	0.465249E+02	0.126491E+02	619. 660. 693. 731. 642. 710. 605. 675. 639.	
1.	0.001920	0.001000 -0.000481	2.126627	577.	729.	0.466610E+02	0.128451E+02	620. 662. 695. 733. 643. 711. 605. 675. 639.	
1.	0.001883	0.001000 -0.000518	2.111285	578.	731.	0.467935E+02	0.130337E+02	622. 665. 697. 736. 643. 711. 605. 675. 639.	
1.	0.001848	0.001000 -0.000553	2.089638	580.	733.	0.469213E+02	0.132135E+02	623. 667. 699. 738. 644. 712. 605. 675. 639.	
1.	0.001815	0.001000 -0.000586	2.062944	582.	735.	0.470438E+02	0.133834E+02	624. 669. 700. 740. 644. 713. 605. 675. 639.	
1.	0.001784	0.001000 -0.000616	2.032395	583.	737.	0.471604E+02	0.135427E+02	625. 670. 702. 743. 645. 713. 606. 675. 639.	
1.	0.001756	0.001000 -0.000645	1.999120	585.	739.	0.472707E+02	0.136910E+02	626. 672. 703. 744. 645. 714. 606. 675. 639.	
1.	0.001729	0.001000 -0.000672	1.964117	587.	740.	0.473746E+02	0.138280E+02	627. 673. 705. 746. 646. 714. 606. 676. 639.	
1.	0.001705	0.001000 -0.000696	1.928258	588.	742.	0.474719E+02	0.139536E+02	628. 675. 706. 748. 646. 715. 606. 676. 639.	
1.	0.001682	0.001000 -0.000718	1.892277	590.	743.	0.475627E+02	0.140682E+02	629. 676. 707. 750. 647. 715. 606. 676. 639.	
1.	0.001662	0.001000 -0.000738	1.856795	592.	744.	0.476471E+02	0.141719E+02	629. 677. 708. 751. 647. 716. 606. 676. 640.	
1.	0.001643	0.001000 -0.000757	1.822289	593.	746.	0.477254E+02	0.142653E+02	630. 678. 708. 752. 647. 716. 606. 676. 640.	
1.	0.001627	0.001000 -0.000774	1.789125	595.	747.	0.477976E+02	0.143488E+02	631. 679. 709. 754. 648. 716. 606. 676. 640.	
1.	0.001612	0.001000 -0.000789	1.757544	596.	748.	0.478642E+02	0.144231E+02	631. 680. 710. 755. 648. 717. 607. 677. 640.	
1.	0.001598	0.001000 -0.000802	1.727736	597.	749.	0.479256E+02	0.144887E+02	632. 681. 710. 756. 648. 717. 607. 677. 640.	
1.	0.001586	0.001000 -0.000814	1.699821	599.	749.	0.479819E+02	0.145462E+02	632. 681. 711. 757. 649. 718. 607. 677. 640.	
2.	0.001576	0.001000 -0.000825	1.673841	600.	750.	0.480336E+02	0.145963E+02	633. 682. 711. 757. 649. 718. 607. 677. 640.	
2.	0.001566	0.001000 -0.000834	1.649781	601.	751.	0.480810E+02	0.146396E+02	633. 682. 711. 758. 649. 718. 607. 677. 640.	
2.	0.001557	0.001000 -0.000843	1.627586	602.	751.	0.481243E+02	0.146767E+02	634. 683. 712. 759. 650. 719. 607. 677. 640.	
2.	0.001550	0.001000 -0.000851	1.607201	604.	752.	0.481640E+02	0.147081E+02	634. 683. 712. 759. 650. 719. 607. 678. 640.	
2.	0.001543	0.001000 -0.000857	1.588544	605.	752.	0.482005E+02	0.147344E+02	635. 684. 712. 760. 650. 719. 608. 678. 640.	
2.	0.001537	0.001000 -0.000863	1.571518	606.	753.	0.482340E+02	0.147561E+02	635. 684. 712. 760. 650. 719. 608. 678. 640.	
2.	0.001532	0.001000 -0.000868	1.556036	606.	753.	0.482644E+02	0.147736E+02	636. 684. 713. 760. 651. 720. 608. 678. 641.	
2.	0.001527	0.001000 -0.000873	1.541967	607.	753.	0.482925E+02	0.147874E+02	636. 684. 713. 761. 651. 720. 608. 678. 641.	
2.	0.001523	0.001000 -0.000877	1.529172	608.	753.	0.483182E+02	0.147979E+02	636. 685. 713. 761. 651. 720. 608. 679. 641.	
2.	0.001519	0.001000 -0.000881	1.517549	609.	754.	0.483418E+02	0.148054E+02	637. 685. 713. 761. 651. 721. 608. 679. 641.	
2.	0.001516	0.001000 -0.000885	1.507003	609.	754.	0.483634E+02	0.148103E+02	637. 685. 713. 761. 652. 721. 609. 679. 641.	
2.	0.001512	0.001000 -0.000888	1.497373	610.	754.	0.483836E+02	0.148128E+02	637. 685. 713. 761. 652. 721. 609. 679. 641.	
2.	0.001509	0.001000 -0.000891	1.488614	611.	754.	0.484017E+02	0.148132E+02	638. 685. 713. 762. 652. 721. 609. 679. 641.	
2.	0.001507	0.001000 -0.000893	1.480581	611.	754.	0.484187E+02	0.148117E+02	638. 686. 713. 762. 652. 721. 609. 680. 641.	
2.	0.001504	0.001000 -0.000896	1.473238	612.	754.	0.484345E+02	0.148086E+02	638. 686. 713. 762. 653. 722. 609. 680. 641.	
2.	0.001502	0.001000 -0.000898	1.466496	612.	754.	0.484486E+02	0.148039E+02	639. 686. 713. 762. 653. 722. 609. 680. 641.	
2.	0.001500	0.001000 -0.000900	1.460302	612.	754.	0.484617E+02	0.147979E+02	639. 686. 713. 762. 653. 722. 609. 680. 642.	
2.	0.001498	0.001000 -0.000902	1.454647	613.	755.	0.484741E+02	0.147908E+02	639. 686. 713. 762. 653. 722. 610. 680. 642.	
2.	0.001497	0.001000 -0.000903	1.449437	613.	755.	0.484856E+02	0.147827E+02	639. 686. 713. 762. 653. 723. 610. 680. 642.	
2.	0.001496	0.001000 -0.000905	1.444652	613.	755.	0.484956E+02	0.147736E+02	640. 686. 713. 762. 654. 723. 610. 681. 642.	
3.	0.001494	0.001000 -0.000906	1.440267	614.	755.	0.485050E+02	0.147637E+02	640. 687. 713. 762. 654. 723. 610. 681. 642.	
3.	0.001493	0.001000 -0.000907	1.436265	614.	755.	0.485139E+02	0.147532E+02	640. 687. 713. 762. 654. 723. 610. 681. 642.	
3.	0.001492	0.001000 -0.000908	1.432550	614.	755.	0.485222E+02	0.147420E+02	640. 687. 713. 762. 654. 723. 610. 681. 642.	
3.	0.001492	0.001000 -0.000909	1.429092	614.	755.	0.485299E+02	0.147304E+02	640. 687. 713. 762. 654. 724. 611. 681. 642.	
3.	0.001491	0.001000 -0.000909	1.425862	614.	755.	0.485370E+02	0.147182E+02	641. 687. 714. 762. 655. 724. 611. 681. 642.	
3.	0.001490	0.001000 -0.000910	1.422872	615.	755.	0.485432E+02	0.147057E+02	641. 687. 714. 762. 655. 724. 611. 682. 643.	
3.	0.001490	0.001000 -0.000910	1.420113	615.	755.	0.485488E+02	0.146929E+02	641. 687. 714. 762. 655. 724. 611. 682. 643.	
3.	0.001489	0.001000 -0.000911	1.417530	615.	755.	0.485541E+02	0.146798E+02	641. 687. 714. 762. 655. 724. 611. 682. 643.	
3.	0.001488	0.001000 -0.000912	1.415089	615.	755.	0.485591E+02	0.146664E+02	641. 687. 714. 762. 655. 725. 611. 682. 643.	
3.	0.001488	0.001000 -0.000912	1.412777	615.	755.	0.485637E+02	0.146529E+02	641. 687. 714. 762. 655. 725. 612. 682. 643.	
3.	0.001487	0.001000 -0.000913	1.410573	615.	755.	0.485681E+02	0.146392E+02	642. 688. 714. 762. 655. 725. 612. 682. 643.	

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00009971		0.00017196			0.00032406	0.00027154	0.00147599				0.00016000			
	0.00094517		0.00042206			0.04965990	0.01077482	0.00221931				0.30758685			
. 0.004391	0.003000	-0.000010	1.459500	566.	705.	0.450866E+02	0.104685E+02	602.	635.	671.	705.	637.	705.	605.	674. 639.
. 0.004357	0.003000	-0.000044	2.051792	566.	706.	0.451892E+02	0.106317E+02	603.	637.	673.	707.	638.	705.	605.	674. 639.
. 0.004295	0.003000	-0.000107	2.790332	566.	709.	0.453835E+02	0.109381E+02	607.	641.	676.	710.	638.	706.	605.	674. 639.
. 0.004197	0.003000	-0.000206	3.688658	567.	714.	0.456896E+02	0.114185E+02	611.	646.	681.	716.	639.	707.	605.	674. 639.
. 0.004057	0.003000	-0.000346	4.742028	568.	720.	0.461284E+02	0.121038E+02	618.	654.	689.	723.	641.	709.	605.	674. 639.
. 0.003871	0.003000	-0.000533	5.914875	570.	729.	0.467176E+02	0.130202E+02	626.	664.	698.	734.	643.	711.	605.	674. 639.
. 0.003636	0.003000	-0.000769	7.129821	573.	741.	0.474669E+02	0.141810E+02	637.	678.	711.	747.	646.	714.	605.	675. 639.
. 0.003354	0.003000	-0.001052	8.266219	577.	755.	0.483719E+02	0.155769E+02	649.	694.	725.	764.	649.	717.	605.	675. 639.
. 0.003033	0.003000	-0.001373	9.177073	582.	771.	0.494093E+02	0.171683E+02	663.	712.	742.	783.	653.	722.	606.	675. 639.
. 0.002689	0.003000	-0.001718	9.726236	588.	788.	0.505355E+02	0.188850E+02	677.	731.	760.	803.	657.	726.	606.	676. 640.
. 0.002340	0.003000	-0.002067	9.833475	595.	806.	0.516919E+02	0.206335E+02	691.	752.	778.	824.	662.	731.	607.	676. 640.
. 0.002008	0.003000	-0.002399	9.504047	604.	824.	0.528153E+02	0.223136E+02	703.	771.	795.	845.	666.	735.	607.	677. 640.
. 0.001709	0.003000	-0.002697	8.824162	613.	840.	0.538498E+02	0.238382E+02	714.	789.	810.	864.	670.	740.	608.	678. 641.
. 0.001455	0.003000	-0.002949	7.926761	623.	855.	0.547565E+02	0.251474E+02	722.	804.	823.	880.	673.	744.	609.	679. 641.
. 0.001253	0.003000	-0.003151	6.947891	634.	867.	0.555162E+02	0.262134E+02	728.	816.	833.	894.	676.	747.	609.	680. 641.
. 0.001099	0.003000	-0.003303	5.995099	644.	877.	0.561276E+02	0.270365E+02	732.	825.	840.	906.	679.	750.	610.	680. 642.
. 0.000991	0.003000	-0.003411	5.135886	655.	884.	0.566017E+02	0.276367E+02	734.	832.	845.	915.	681.	753.	611.	681. 642.
. 0.000920	0.003000	-0.003481	4.401434	665.	890.	0.569563E+02	0.280444E+02	734.	836.	849.	921.	682.	755.	611.	682. 642.
. 0.000881	0.003000	-0.003520	3.797028	674.	894.	0.572113E+02	0.282931E+02	734.	839.	850.	926.	683.	756.	612.	683. 643.
. 0.000865	0.003000	-0.003536	3.313026	683.	897.	0.573860E+02	0.284146E+02	733.	840.	850.	929.	684.	757.	613.	684. 643.
. 0.000866	0.003000	-0.003534	2.933064	691.	899.	0.574974E+02	0.284373E+02	732.	840.	849.	931.	685.	759.	613.	685. 644.
. 0.000881	0.003000	-0.003519	2.639274	698.	900.	0.575596E+02	0.283847E+02	730.	839.	848.	932.	686.	759.	614.	686. 644.
. 0.000904	0.003000	-0.003495	2.414881	705.	900.	0.575851E+02	0.282760E+02	729.	837.	846.	932.	686.	760.	615.	686. 644.
. 0.000934	0.003000	-0.003465	2.245411	711.	899.	0.575827E+02	0.281264E+02	728.	835.	843.	931.	687.	761.	615.	687. 645.
. 0.000967	0.003000	-0.003432	2.118926	716.	899.	0.575593E+02	0.279478E+02	727.	832.	841.	930.	687.	761.	616.	688. 645.
. 0.001003	0.003000	-0.003397	2.025864	720.	897.	0.575207E+02	0.277493E+02	726.	830.	838.	928.	688.	762.	616.	689. 645.
. 0.001039	0.003000	-0.003361	1.958704	724.	896.	0.574715E+02	0.275381E+02	726.	827.	836.	927.	688.	762.	617.	690. 646.
. 0.001075	0.003000	-0.003324	1.911603	728.	895.	0.574151E+02	0.273194E+02	725.	824.	833.	925.	689.	763.	617.	690. 646.
. 0.001110	0.003000	-0.003289	1.879992	731.	893.	0.573539E+02	0.270974E+02	725.	822.	830.	923.	689.	763.	618.	691. 647.
. 0.001144	0.003000	-0.003255	1.860311	733.	891.	0.572901E+02	0.268754E+02	725.	819.	828.	920.	690.	764.	619.	692. 647.
. 0.001177	0.003000	-0.003222	1.849833	735.	889.	0.572252E+02	0.266555E+02	725.	817.	825.	918.	690.	764.	619.	692. 647.
. 0.001208	0.003000	-0.003191	1.846432	737.	888.	0.571603E+02	0.264396E+02	726.	815.	823.	916.	690.	764.	620.	693. 648.
. 0.001238	0.003000	-0.003162	1.848421	738.	886.	0.570962E+02	0.262288E+02	726.	813.	821.	914.	691.	765.	620.	694. 648.
. 0.001265	0.003000	-0.003134	1.854499	739.	884.	0.570337E+02	0.260243E+02	727.	811.	819.	911.	691.	765.	621.	694. 649.
. 0.001291	0.003000	-0.003109	1.863623	739.	882.	0.569733E+02	0.258266E+02	727.	810.	817.	909.	692.	766.	621.	695. 649.
. 0.001314	0.003000	-0.003085	1.874950	740.	881.	0.569152E+02	0.256361E+02	728.	808.	816.	907.	692.	766.	622.	696. 649.
. 0.001337	0.003000	-0.003063	1.887859	740.	879.	0.568597E+02	0.254530E+02	728.	807.	814.	905.	693.	766.	622.	696. 650.
. 0.001357	0.003000	-0.003043	1.901840	740.	878.	0.568069E+02	0.252774E+02	729.	806.	813.	903.	693.	767.	623.	697. 650.
. 0.001376	0.003000	-0.003024	1.916452	740.	876.	0.567569E+02	0.251094E+02	729.	805.	812.	901.	694.	767.	624.	697. 651.
. 0.001393	0.003000	-0.003006	1.931370	739.	875.	0.567098E+02	0.249488E+02	730.	804.	811.	899.	694.	768.	624.	698. 651.
. 0.001409	0.003000	-0.002991	1.946321	739.	874.	0.566655E+02	0.247956E+02	730.	804.	810.	898.	695.	768.	625.	699. 651.
. 0.001424	0.003000	-0.002976	1.961089	738.	872.	0.566239E+02	0.246495E+02	731.	803.	809.	896.	695.	769.	625.	699. 652.
. 0.001437	0.003000	-0.002963	1.975514	738.	871.	0.565849E+02	0.245103E+02	731.	803.	808.	894.	696.	769.	626.	700. 652.
. 0.001449	0.003000	-0.002951	1.989489	737.	870.	0.565487E+02	0.243776E+02	731.	802.	808.	893.	696.	769.	626.	700. 652.
. 0.001460	0.003000	-0.002940	2.002892	737.	869.	0.565149E+02	0.242514E+02	732.	802.	807.	892.	696.	770.	627.	701. 653.
. 0.001470	0.003000	-0.002930	2.015648	736.	868.	0.564833E+02	0.241311E+02	732.	802.	807.	890.	697.	770.	627.	701. 653.
. 0.001479	0.003000	-0.002921	2.027715	735.	867.	0.564542E+02	0.240167E+02	732.	802.	806.	889.	697.	771.	628.	702. 654.
. 0.001487	0.003000	-0.002912	2.039039	734.	867.	0.564269E+02	0.239077E+02	733.	802.	806.	888.	698.	771.	628.	703. 654.
. 0.001495	0.003000	-0.002905	2.049627	734.	866.	0.564018E+02	0.238038E+02	733.	802.	806.	887.	698.	772.	629.	703. 654.
. 0.001502	0.003000	-0.002898	2.059485	733.	865.	0.563782E+02	0.237047E+02	733.	802.	806.	886.	699.	772.	629.	704. 655.
. 0.001508	0.003000	-0.002892	2.068583	732.	865.	0.563566E+02	0.236102E+02	733.	802.	806.	886.	699.	773.	630.	704. 655.
. 0.001514	0.003000	-0.002886	2.076967	732.	864.	0.563364E+02	0.235201E+02	733.	802.	806.	885.	700.	773.	631.	705. 656.
. 0.001519	0.003000	-0.002881	2.084665	731.	864.	0.563177E+02	0.234340E+02	734.	802.	806.	884.	700.	774.	631.	705. 656.
. 0.001524	0.003000	-0.002876	2.091736	730.	863.	0.563004E+02	0.233516E+02	734.	802.	806.	884.	700.	774.	632.	706. 656.
. 0.001528	0.003000	-0.002871	2.098145	730.	863.	0.562840E+02	0.232728E+02	734.	802.	806.	883.	701.	775.	632.	706. 657.
. 0.001533	0.003000	-0.002867	2.103974	729.	863.	0.562690E+02	0.231974E+02	734.	802.	806.	883.	701.	776.	633.	707. 657.
. 0.001536	0.003000	-0.002864	2.109245	729.	863.	0.562551E+02	0.231249E+02	734.	803.	807.	882.	702.	776.	633.	707. 658.
. 0.001540	0.003000	-0.002860	2.113958	728.	862.	0.562418E+02	0.230555E+02	734.	803.	807.	882.	702.	777.	634.	708. 658.
. 0.001543	0.003000	-0.002857	2.118170	728.	862.	0.562292E+02	0.229888E+02	734.	803.	807.	882.	702.	777.	634.	708. 658.
. 0.001546	0.003000	-0.002854	2.121898	727.	862.	0.562178E+02	0.229246E+02	734.	803.	807.	881.	703.	778.	635.	709. 659.
. 0.001548	0.003000	-0.002852	2.125193	727.	862.	0.562071E+02	0.228627E+02	734.	803.	808.	881.	703.	778.	635.	709. 659.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
0.00009971		0.00017196			0.00032406		0.00027154	0.00147599				0.00016000			
0.00094517		0.00042206			0.04965990		0.01077482	0.00221931				0.30758685			
0.	0.006384	0.005000	-0.000017	1.858727	566.	705.	0.451089E+02	0.105039E+02	602.	636.	672.	705.	637.	705.	605.	674.	639.
0.	0.006315	0.005000	-0.000087	3.331920	566.	708.	0.453211E+02	0.108402E+02	606.	640.	675.	709.	638.	705.	605.	674.	639.
0.	0.006162	0.005000	-0.000242	5.716594	567.	715.	0.457960E+02	0.115885E+02	613.	648.	683.	717.	640.	707.	605.	674.	639.
0.	0.005877	0.005000	-0.000530	9.378228	568.	729.	0.466834E+02	0.129817E+02	627.	664.	698.	733.	643.	711.	605.	674.	639.
0.	0.005401	0.005000	-0.001011	14.490338	572.	751.	0.481731E+02	0.153137E+02	650.	690.	723.	760.	649.	716.	605.	675.	639.
0.	0.004681	0.005000	-0.001736	20.535599	578.	785.	0.504362E+02	0.188449E+02	683.	730.	761.	800.	657.	725.	606.	675.	639.
0.	0.003715	0.005000	-0.002707	25.842590	587.	832.	0.534905E+02	0.235924E+02	728.	784.	812.	855.	669.	737.	607.	676.	640.
0.	0.002596	0.005000	-0.003827	28.105957	602.	887.	0.570593E+02	0.291071E+02	777.	847.	870.	919.	682.	751.	608.	677.	641.
0.	0.001503	0.005000	-0.004917	26.219208	620.	942.	0.606051E+02	0.345327E+02	822.	910.	926.	984.	695.	766.	609.	679.	641.
0.	0.000608	0.005000	-0.005807	21.375015	642.	989.	0.636032E+02	0.390415E+02	855.	962.	972.	1039.	706.	778.	611.	681.	642.
1.	-0.000010	0.005000	-0.006420	15.816507	666.	1025.	0.658009E+02	0.422444E+02	874.	1000.	1003.	1080.	714.	787.	612.	682.	643.
1.	-0.000369	0.005000	-0.006774	11.094778	691.	1048.	0.672305E+02	0.442062E+02	880.	1023.	1021.	1107.	720.	794.	614.	684.	644.
1.	-0.000531	0.005000	-0.006933	7.671096	714.	1063.	0.680637E+02	0.452108E+02	877.	1035.	1028.	1123.	723.	798.	615.	686.	645.
1.	-0.000563	0.005000	-0.006963	5.392454	737.	1070.	0.684855E+02	0.455603E+02	870.	1039.	1029.	1132.	725.	801.	617.	688.	645.
1.	-0.000515	0.005000	-0.006913	3.941659	758.	1074.	0.686413E+02	0.454910E+02	861.	1038.	1025.	1136.	726.	803.	618.	690.	646.
1.	-0.000422	0.005000	-0.006819	3.037851	776.	1074.	0.686317E+02	0.451653E+02	852.	1033.	1019.	1136.	726.	804.	619.	691.	647.
1.	-0.000305	0.005000	-0.006702	2.481395	793.	1073.	0.685208E+02	0.446877E+02	843.	1027.	1012.	1134.	726.	805.	620.	693.	647.
1.	-0.000177	0.005000	-0.006575	2.142554	808.	1070.	0.683495E+02	0.441241E+02	836.	1019.	1004.	1130.	727.	806.	621.	695.	648.
1.	-0.000048	0.005000	-0.006445	1.940224	821.	1067.	0.681433E+02	0.435152E+02	830.	1010.	995.	1126.	727.	806.	622.	696.	649.
1.	0.000080	0.005000	-0.006317	1.824359	832.	1062.	0.679183E+02	0.428867E+02	824.	1002.	987.	1121.	727.	807.	623.	698.	650.
1.	0.000204	0.005000	-0.006194	1.764029	841.	1058.	0.676844E+02	0.422547E+02	821.	993.	979.	1115.	727.	807.	624.	699.	650.
1.	0.000321	0.005000	-0.006077	1.739954	849.	1053.	0.674483E+02	0.416292E+02	818.	985.	972.	1110.	727.	807.	625.	700.	651.
1.	0.000431	0.005000	-0.005966	1.739955	856.	1049.	0.672139E+02	0.410166E+02	816.	977.	964.	1104.	728.	808.	626.	702.	652.
1.	0.000535	0.005000	-0.005863	1.756229	861.	1044.	0.669844E+02	0.404212E+02	814.	970.	957.	1098.	728.	808.	627.	703.	652.
1.	0.000632	0.005000	-0.005766	1.783665	865.	1039.	0.667615E+02	0.398455E+02	813.	963.	951.	1092.	728.	808.	628.	704.	653.
1.	0.000722	0.005000	-0.005676	1.818864	869.	1034.	0.665464E+02	0.392912E+02	813.	957.	945.	1086.	729.	808.	629.	706.	653.
1.	0.000806	0.005000	-0.005593	1.859536	871.	1029.	0.663398E+02	0.387590E+02	813.	951.	939.	1080.	729.	809.	630.	707.	654.
1.	0.000883	0.005000	-0.005515	1.904008	873.	1025.	0.661424E+02	0.382497E+02	814.	946.	934.	1074.	730.	809.	631.	708.	655.
1.	0.000955	0.005000	-0.005444	1.951124	874.	1020.	0.659544E+02	0.377631E+02	814.	941.	929.	1069.	730.	810.	632.	709.	655.
1.	0.001021	0.005000	-0.005378	2.000053	875.	1016.	0.657763E+02	0.372993E+02	815.	936.	924.	1063.	731.	810.	633.	710.	656.
2.	0.001081	0.005000	-0.005317	2.050074	875.	1012.	0.656072E+02	0.368581E+02	816.	933.	920.	1058.	732.	810.	634.	711.	657.
2.	0.001137	0.005000	-0.005262	2.100743	875.	1008.	0.654480E+02	0.364390E+02	817.	929.	916.	1053.	732.	811.	635.	712.	657.
2.	0.001188	0.005000	-0.005211	2.151620	874.	1004.	0.652984E+02	0.360417E+02	818.	926.	913.	1048.	733.	811.	636.	713.	658.
2.	0.001235	0.005000	-0.005164	2.202342	873.	1001.	0.651582E+02	0.356655E+02	818.	924.	910.	1044.	734.	812.	637.	714.	659.
2.	0.001278	0.005000	-0.005121	2.252602	871.	997.	0.650272E+02	0.353099E+02	819.	922.	908.	1039.	734.	812.	638.	715.	659.
2.	0.001317	0.005000	-0.005082	2.302129	870.	994.	0.649052E+02	0.349743E+02	820.	920.	905.	1035.	735.	813.	639.	716.	660.
2.	0.001352	0.005000	-0.005047	2.350695	868.	991.	0.647919E+02	0.346578E+02	821.	918.	903.	1032.	736.	814.	640.	717.	661.
2.	0.001384	0.005000	-0.005015	2.398062	866.	988.	0.646871E+02	0.343599E+02	822.	917.	902.	1028.	737.	814.	640.	718.	661.
2.	0.001413	0.005000	-0.004986	2.444024	864.	986.	0.645904E+02	0.340798E+02	822.	916.	900.	1025.	737.	815.	641.	719.	662.
2.	0.001439	0.005000	-0.004960	2.488416	863.	983.	0.645015E+02	0.338167E+02	823.	915.	899.	1022.	738.	816.	642.	720.	663.
2.	0.001462	0.005000	-0.004937	2.531066	861.	981.	0.644201E+02	0.335698E+02	823.	915.	898.	1019.	739.	816.	643.	721.	663.
2.	0.001483	0.005000	-0.004916	2.571836	859.	979.	0.643459E+02	0.333384E+02	824.	914.	897.	1016.	740.	817.	644.	722.	664.
2.	0.001502	0.005000	-0.004898	2.610590	857.	978.	0.642782E+02	0.331216E+02	824.	914.	897.	1014.	740.	818.	645.	723.	665.
2.	0.001518	0.005000	-0.004882	2.647249	855.	976.	0.642170E+02	0.329185E+02	825.	914.	896.	1012.	741.	819.	646.	724.	665.
2.	0.001532	0.005000	-0.004867	2.681685	853.	975.	0.641617E+02	0.327284E+02	825.	914.	896.	1010.	742.	820.	647.	725.	666.
2.	0.001545	0.005000	-0.004855	2.713861	851.	974.	0.641119E+02	0.325504E+02	825.	914.	896.	1008.	742.	820.	648.	725.	667.
2.	0.001556	0.005000	-0.004844	2.743788	849.	972.	0.640672E+02	0.323838E+02	825.	914.	896.	1007.	743.	821.	649.	726.	667.
2.	0.001566	0.005000	-0.004834	2.771478	848.	972.	0.640271E+02	0.322277E+02	826.	915.	896.	1006.	744.	822.	650.	727.	668.
2.	0.001574	0.005000	-0.004826	2.796901	846.	971.	0.639916E+02	0.320814E+02	826.	915.	897.	1005.	745.	823.	651.	728.	669.
2.	0.001581	0.005000	-0.004819	2.820076	844.	970.	0.639599E+02	0.319441E+02	826.	915.	897.	1004.	745.	824.	651.	729.	670.
3.	0.001587	0.005000	-0.004813	2.841070	843.	970.	0.639318E+02	0.318151E+02	826.	916.	897.	1003.	746.	825.	652.	730.	670.
3.	0.001592	0.005000	-0.004807	2.859932	842.	969.	0.639070E+02	0.316938E+02	826.	916.	898.	1002.	747.	826.	653.	731.	671.
3.	0.001597	0.005000	-0.004803	2.876734	841.	969.	0.638849E+02	0.315795E+02	826.	917.	898.	1002.	747.	826.	654.	732.	672.
3.	0.001601	0.005000	-0.004799	2.891614	840.	969.	0.638655E+02	0.314715E+02	826.	917.	899.	1001.	748.	827.	655.	732.	672.
3.	0.001604	0.005000	-0.004796	2.904617	839.	969.	0.638485E+02	0.313693E+02	826.	918.	900.	1001.	749.	828.	656.	733.	673.
3.	0.001606	0.005000	-0.004794	2.915887	838.	969.	0.638331E+02	0.312724E+02	826.	918.	900.	1001.	749.	829.	657.	734.	674.
3.	0.001609	0.005000	-0.004791	2.925551	837.	969.	0.638196E+02	0.311802E+02	826.	918.	901.	1000.	750.	830.	658.	735.	674.
3.	0.001610	0.005000	-0.004790	2.933683	836.	969.	0.638077E+02	0.310923E+02	826.	919.	902.	1000.	751.	831.	659.	736.	675.
3.	0.001612	0.005000	-0.004788	2.940450	836.	969.	0.637969E+02	0.310081E+02	826.	919.	902.	1000.	751.	832.	659.	737.	676.
3.	0.001613	0.005000	-0.004787	2.945999	835.	969.	0.637870E+02	0.309276E+02	827.	920.	903.	1001.	752.	833.	660.	738.	676.
3.	0.001614	0.005000	-0.004786	2.950377	835.	970.	0.637778E+02	0.308500E+02	827.	920.	904.	1001.	753.	834.	661.	738.	677.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PK	TI	TKO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544				0.01475992					0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821				0.02218312					0.0
1.	0.003641	0.001000	0.000001	0.001865	566.	566.	0.151330E-02	0.228394E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.003632	0.001000	-0.000008	0.037349	566.	566.	0.313344E-01	0.470031E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
3.	0.003470	0.001000	-0.000175	0.652537	570.	575.	0.587998E+00	0.879849E+00	573.	576.	575.	577.	568.	568.	566.	566.	566.
4.	0.002266	0.001000	-0.001389	2.428337	609.	639.	0.480302E+01	0.698268E+01	621.	646.	636.	652.	585.	587.	559.	570.	568.
5.	0.001634	0.001000	-0.002006	1.069649	665.	679.	0.751951E+01	0.989631E+01	647.	680.	663.	696.	600.	604.	576.	579.	572.
6.	0.001633	0.001000	-0.002007	0.835160	677.	678.	0.777412E+01	0.919161E+01	656.	682.	662.	693.	608.	613.	584.	587.	578.
7.	0.001664	0.001000	-0.001975	0.760274	677.	678.	0.770355E+01	0.839783E+01	659.	684.	664.	690.	614.	621.	591.	594.	583.
8.	0.001695	0.001000	-0.001945	0.746628	678.	679.	0.755223E+01	0.777220E+01	661.	685.	667.	691.	619.	628.	597.	601.	589.
9.	0.001718	0.001000	-0.001922	0.719884	680.	681.	0.739878E+01	0.730176E+01	664.	687.	669.	692.	624.	634.	604.	607.	594.
10.	0.001730	0.001000	-0.001910	0.704521	683.	684.	0.761543E+01	0.709797E+01	667.	689.	673.	694.	628.	640.	610.	614.	599.
11.	0.001722	0.001000	-0.001918	0.718071	686.	688.	0.867075E+01	0.730307E+01	672.	693.	677.	698.	632.	645.	616.	620.	604.
12.	0.001690	0.001000	-0.001950	0.729778	691.	693.	0.976140E+01	0.752238E+01	677.	698.	682.	703.	637.	651.	621.	625.	609.
13.	0.001654	0.001000	-0.001987	0.723155	696.	699.	0.105879E+02	0.761584E+01	682.	703.	687.	708.	642.	656.	627.	631.	614.
14.	0.001623	0.001000	-0.002017	0.706179	701.	703.	0.111457E+02	0.758681E+01	687.	707.	692.	713.	646.	662.	633.	637.	619.
15.	0.001601	0.001000	-0.002039	0.685658	706.	708.	0.114789E+02	0.747032E+01	692.	712.	697.	717.	651.	667.	638.	643.	624.
16.	0.001586	0.001000	-0.002054	0.664767	710.	712.	0.116631E+02	0.730519E+01	696.	716.	701.	721.	655.	671.	643.	648.	628.
17.	0.001577	0.001000	-0.002064	0.646147	714.	715.	0.118760E+02	0.713475E+01	700.	719.	705.	725.	660.	676.	649.	653.	633.
18.	0.001568	0.001000	-0.002072	0.631575	717.	719.	0.122255E+02	0.694690E+01	704.	723.	709.	728.	664.	680.	654.	659.	638.
19.	0.001559	0.001000	-0.002081	0.619629	721.	723.	0.126548E+02	0.686078E+01	708.	726.	713.	731.	668.	684.	659.	664.	642.
20.	0.001548	0.001000	-0.002092	0.608551	725.	726.	0.130909E+02	0.674640E+01	712.	730.	717.	735.	672.	688.	664.	669.	647.
21.	0.001537	0.001000	-0.002104	0.597249	728.	730.	0.134810E+02	0.663387E+01	716.	733.	721.	738.	676.	692.	669.	674.	651.
22.	0.001525	0.001000	-0.002115	0.585263	732.	733.	0.137949E+02	0.651664E+01	719.	737.	724.	742.	680.	696.	674.	678.	656.
23.	0.001514	0.001000	-0.002126	0.572780	735.	737.	0.140345E+02	0.639278E+01	723.	740.	728.	745.	684.	700.	678.	683.	660.
24.	0.001505	0.001000	-0.002136	0.560230	738.	740.	0.142376E+02	0.626441E+01	727.	743.	732.	748.	688.	703.	683.	688.	664.
25.	0.001496	0.001000	-0.002145	0.548072	742.	743.	0.144381E+02	0.613536E+01	730.	746.	735.	751.	692.	707.	687.	692.	668.
26.	0.001487	0.001000	-0.002155	0.536480	745.	746.	0.146479E+02	0.600865E+01	734.	749.	738.	754.	696.	710.	692.	696.	672.
27.	0.001478	0.001000	-0.002162	0.525391	748.	749.	0.148622E+02	0.588568E+01	737.	752.	742.	757.	699.	714.	696.	701.	677.
28.	0.001469	0.001000	-0.002171	0.514592	751.	752.	0.150682E+02	0.576628E+01	740.	755.	745.	760.	703.	717.	700.	705.	681.
29.	0.001460	0.001000	-0.002180	0.504052	754.	755.	0.152526E+02	0.564968E+01	743.	758.	748.	763.	707.	720.	704.	709.	684.
30.	0.001451	0.001000	-0.002189	0.493675	757.	758.	0.154091E+02	0.553510E+01	746.	761.	751.	766.	710.	723.	708.	713.	688.
31.	0.001443	0.001000	-0.002197	0.483431	759.	761.	0.155411E+02	0.542213E+01	749.	764.	754.	769.	714.	726.	712.	717.	692.
32.	0.001434	0.001000	-0.002206	0.473356	762.	763.	0.156563E+02	0.531070E+01	752.	767.	757.	771.	717.	729.	716.	720.	696.
33.	0.001426	0.001000	-0.002214	0.463505	765.	766.	0.157612E+02	0.520108E+01	755.	769.	760.	774.	720.	733.	719.	724.	699.
34.	0.001418	0.001000	-0.002222	0.453902	767.	769.	0.158589E+02	0.509359E+01	758.	772.	763.	776.	724.	735.	723.	728.	703.
35.	0.001409	0.001000	-0.002231	0.444462	770.	771.	0.159489E+02	0.498838E+01	761.	774.	765.	779.	727.	738.	727.	731.	707.
36.	0.001401	0.001000	-0.002239	0.435204	773.	774.	0.160273E+02	0.488516E+01	764.	777.	768.	781.	730.	741.	730.	735.	710.
37.	0.001393	0.001000	-0.002247	0.426176	775.	776.	0.160925E+02	0.478405E+01	766.	779.	771.	783.	733.	744.	733.	738.	714.
38.	0.001385	0.001000	-0.002256	0.417349	777.	778.	0.161449E+02	0.468506E+01	769.	781.	773.	786.	736.	747.	737.	741.	717.
39.	0.001377	0.001000	-0.002264	0.408718	780.	781.	0.161850E+02	0.458813E+01	772.	784.	776.	788.	739.	749.	740.	745.	720.
40.	0.001369	0.001000	-0.002272	0.400274	782.	783.	0.162149E+02	0.449326E+01	774.	786.	778.	790.	742.	752.	743.	748.	723.
41.	0.001361	0.001000	-0.002279	0.392020	784.	785.	0.162362E+02	0.440039E+01	777.	788.	781.	792.	745.	755.	746.	751.	727.
42.	0.001353	0.001000	-0.002287	0.383952	787.	788.	0.162500E+02	0.430954E+01	779.	790.	783.	794.	748.	757.	749.	754.	730.
43.	0.001345	0.001000	-0.002295	0.376066	789.	790.	0.162556E+02	0.422067E+01	781.	792.	785.	797.	750.	760.	752.	757.	733.
44.	0.001337	0.001000	-0.002303	0.368264	791.	792.	0.162531E+02	0.413358E+01	784.	795.	788.	799.	753.	762.	755.	760.	736.
45.	0.001329	0.001000	-0.002311	0.360636	793.	794.	0.162422E+02	0.404813E+01	786.	797.	790.	801.	756.	765.	758.	762.	739.
46.	0.001321	0.001000	-0.002319	0.353176	795.	796.	0.162232E+02	0.396442E+01	788.	799.	792.	802.	758.	767.	761.	765.	742.
47.	0.001313	0.001000	-0.002327	0.345889	797.	798.	0.161966E+02	0.388245E+01	790.	800.	794.	804.	761.	769.	764.	768.	745.
48.	0.001305	0.001000	-0.002335	0.338786	799.	800.	0.161631E+02	0.380230E+01	792.	802.	796.	806.	763.	772.	766.	771.	747.
49.	0.001298	0.001000	-0.002342	0.331853	801.	802.	0.161234E+02	0.372398E+01	794.	804.	798.	808.	766.	774.	769.	773.	750.
50.	0.001290	0.001000	-0.002350	0.325077	803.	803.	0.160777E+02	0.364745E+01	796.	806.	800.	810.	768.	776.	772.	776.	753.
51.	0.001283	0.001000	-0.002357	0.318460	804.	805.	0.160268E+02	0.357265E+01	798.	808.	802.	811.	771.	778.	774.	778.	756.
52.	0.001275	0.001000	-0.002365	0.311998	806.	807.	0.159713E+02	0.349956E+01	800.	810.	804.	813.	773.	781.	776.	781.	758.
53.	0.001268	0.001000	-0.002372	0.305684	808.	809.	0.159107E+02	0.342813E+01	802.	811.	806.	815.	775.	783.	779.	783.	761.
54.	0.001261	0.001000	-0.002380	0.299498	810.	811.	0.158446E+02	0.335831E+01	804.	813.	807.	816.	778.	785.	781.	785.	763.
55.	0.001253	0.001000	-0.002387	0.293385	811.	812.	0.157733E+02	0.328988E+01	806.	815.	809.	818.	780.	787.	784.	787.	766.
56.	0.001245	0.001000	-0.002395	0.287419	813.	814.	0.156972E+02	0.322281E+01	808.	816.	811.	820.	782.	789.	786.	790.	768.
57.	0.001238	0.001000	-0.002402	0.281599	815.	815.	0.156166E+02	0.315716E+01	809.	818.	813.	821.	784.	791.	788.	792.	771.
58.	0.001231	0.001000	-0.002409	0.275916	816.	817.	0.155322E+02	0.309299E+01	811.	819.	814.	823.	786.	793.	790.	794.	773.
59.	0.001224	0.001000	-0.002416	0.270370	818.	819.	0.154442E+02	0.303028E+01	813.	821.	816.	824.	788.	795.	792.	796.	775.
60.	0.001217	0.001000	-0.002423	0.264942	819.	820.	0.153527E+02	0.296900E+01	814.	822.	817.	825.	790.	796.	794.	798.	778.
61.	0.001210	0.001000	-0.002430	0.259641	821.	821.	0.152580E+02	0.290910E+01	816.	824.	819.	827.	792.	798.	796.	800.	780.

62.	0.001203	0.001000	-0.002437	0.254472	822.	823.	0.151600E+02	0.285057E+01	817.	825.	821.	824.	794.	800.	798.	802.	782.
63.	0.001196	0.001000	-0.002444	0.249425	824.	824.	0.150591E+02	0.279339E+01	819.	826.	822.	830.	796.	802.	800.	804.	784.
64.	0.001189	0.001000	-0.002451	0.244488	825.	826.	0.149553E+02	0.273752E+01	820.	828.	824.	831.	798.	804.	802.	806.	786.
65.	0.001183	0.001000	-0.002458	0.239668	826.	827.	0.148489E+02	0.268293E+01	822.	829.	825.	832.	800.	805.	804.	807.	788.
66.	0.001176	0.001000	-0.002464	0.234955	828.	828.	0.147402E+02	0.262959E+01	823.	830.	826.	833.	802.	807.	806.	809.	790.
67.	0.001169	0.001000	-0.002471	0.230352	829.	830.	0.146293E+02	0.257747E+01	825.	832.	828.	835.	804.	809.	808.	811.	792.
68.	0.001163	0.001000	-0.002477	0.225849	830.	831.	0.145163E+02	0.252654E+01	826.	833.	829.	836.	805.	810.	809.	813.	794.
69.	0.001156	0.001000	-0.002484	0.221407	832.	832.	0.144014E+02	0.247668E+01	828.	834.	830.	837.	807.	812.	811.	814.	796.
70.	0.001149	0.001000	-0.002491	0.217060	833.	834.	0.142847E+02	0.242781E+01	829.	835.	832.	838.	809.	813.	813.	816.	798.
71.	0.001143	0.001000	-0.002497	0.212818	834.	835.	0.141662E+02	0.237999E+01	830.	837.	833.	839.	810.	815.	814.	817.	800.
72.	0.001137	0.001000	-0.002503	0.208681	835.	836.	0.140463E+02	0.233324E+01	832.	838.	834.	840.	812.	816.	816.	819.	802.
73.	0.001130	0.001000	-0.002510	0.204642	837.	837.	0.139250E+02	0.228755E+01	833.	839.	835.	842.	813.	818.	817.	821.	803.
74.	0.001124	0.001000	-0.002516	0.200694	838.	838.	0.138025E+02	0.224290E+01	834.	840.	837.	843.	815.	819.	819.	822.	805.
75.	0.001118	0.001000	-0.002522	0.196832	839.	839.	0.136789E+02	0.219927E+01	835.	841.	838.	844.	817.	821.	820.	823.	807.
76.	0.001112	0.001000	-0.002528	0.193064	840.	840.	0.135545E+02	0.215664E+01	836.	842.	839.	845.	818.	822.	822.	825.	809.
77.	0.001106	0.001000	-0.002534	0.189378	841.	842.	0.134289E+02	0.211496E+01	838.	843.	840.	846.	820.	824.	823.	826.	810.
78.	0.001100	0.001000	-0.002540	0.185770	842.	843.	0.133026E+02	0.207421E+01	839.	844.	841.	847.	821.	825.	825.	828.	812.
79.	0.001094	0.001000	-0.002546	0.182246	843.	844.	0.131757E+02	0.203437E+01	840.	845.	842.	848.	822.	826.	826.	829.	813.
80.	0.001088	0.001000	-0.002552	0.178791	844.	845.	0.130482E+02	0.199541E+01	841.	846.	843.	849.	824.	828.	828.	830.	815.
81.	0.001083	0.001000	-0.002557	0.175411	845.	846.	0.129202E+02	0.195729E+01	842.	847.	844.	850.	825.	829.	829.	832.	816.
82.	0.001077	0.001000	-0.002563	0.172106	846.	847.	0.127918E+02	0.191999E+01	843.	848.	845.	850.	827.	830.	830.	833.	818.
83.	0.001072	0.001000	-0.002569	0.168880	847.	848.	0.126631E+02	0.188354E+01	844.	849.	846.	851.	828.	831.	832.	834.	819.
84.	0.001066	0.001000	-0.002574	0.165725	848.	849.	0.125342E+02	0.184790E+01	845.	850.	847.	852.	829.	833.	833.	835.	821.
85.	0.001061	0.001000	-0.002579	0.162643	849.	850.	0.124051E+02	0.181307E+01	846.	851.	848.	853.	830.	834.	834.	837.	822.
86.	0.001055	0.001000	-0.002585	0.159626	850.	850.	0.122760E+02	0.177901E+01	847.	852.	849.	854.	832.	835.	835.	838.	824.
87.	0.001050	0.001000	-0.002590	0.156680	851.	851.	0.121469E+02	0.174571E+01	848.	853.	850.	855.	833.	836.	836.	839.	825.
88.	0.001045	0.001000	-0.002595	0.153790	852.	852.	0.120178E+02	0.171314E+01	849.	854.	851.	856.	834.	837.	838.	840.	826.
89.	0.001040	0.001000	-0.002600	0.150969	853.	853.	0.118889E+02	0.168128E+01	850.	854.	852.	856.	835.	838.	839.	841.	828.
90.	0.001034	0.001000	-0.002606	0.148180	854.	854.	0.117601E+02	0.165008E+01	851.	855.	853.	857.	836.	839.	840.	842.	829.
91.	0.001029	0.001000	-0.002611	0.145446	854.	855.	0.116315E+02	0.161946E+01	852.	856.	854.	858.	838.	840.	841.	843.	830.
92.	0.001024	0.001000	-0.002616	0.142775	855.	856.	0.115032E+02	0.158947E+01	853.	857.	855.	859.	839.	842.	842.	844.	831.
93.	0.001019	0.001000	-0.002621	0.140162	856.	856.	0.113752E+02	0.156009E+01	853.	858.	855.	860.	840.	843.	843.	845.	833.
94.	0.001014	0.001000	-0.002626	0.137615	857.	857.	0.112476E+02	0.153136E+01	854.	858.	856.	860.	841.	844.	844.	846.	834.
95.	0.001010	0.001000	-0.002631	0.135117	858.	858.	0.111205E+02	0.150326E+01	855.	859.	857.	861.	842.	845.	845.	847.	835.
96.	0.001005	0.001000	-0.002635	0.132674	858.	859.	0.109938E+02	0.147577E+01	856.	860.	858.	862.	843.	846.	846.	848.	836.
97.	0.001000	0.001000	-0.002640	0.130288	859.	859.	0.108677E+02	0.144888E+01	857.	861.	859.	862.	844.	847.	847.	849.	837.
98.	0.000996	0.001000	-0.002644	0.127944	860.	860.	0.107422E+02	0.142255E+01	858.	861.	859.	863.	845.	847.	848.	850.	838.
99.	0.000991	0.001000	-0.002649	0.125655	861.	861.	0.106172E+02	0.139677E+01	858.	862.	860.	864.	846.	848.	849.	851.	840.
100.	0.000987	0.001000	-0.002653	0.123414	861.	862.	0.104923E+02	0.137155E+01	859.	863.	861.	864.	847.	849.	850.	852.	841.
101.	0.000982	0.001000	-0.002658	0.121212	862.	862.	0.103692E+02	0.134684E+01	860.	863.	861.	865.	848.	850.	851.	853.	842.
102.	0.000978	0.001000	-0.002662	0.119060	863.	863.	0.102462E+02	0.132266E+01	861.	864.	862.	866.	849.	851.	852.	854.	843.
103.	0.000974	0.001000	-0.002666	0.116955	863.	864.	0.101240E+02	0.129897E+01	861.	865.	863.	866.	850.	852.	853.	854.	844.
104.	0.000969	0.001000	-0.002671	0.114883	864.	864.	0.100026E+02	0.127577E+01	862.	865.	863.	867.	851.	853.	853.	855.	845.
105.	0.000965	0.001000	-0.002675	0.112861	865.	865.	0.988187E+01	0.125305E+01	863.	866.	864.	868.	851.	854.	854.	856.	846.
106.	0.000961	0.001000	-0.002679	0.110877	865.	866.	0.976200E+01	0.123080E+01	863.	867.	865.	868.	852.	855.	855.	857.	847.
107.	0.000957	0.001000	-0.002683	0.108936	866.	866.	0.964296E+01	0.120901E+01	864.	867.	865.	869.	853.	855.	856.	858.	848.
108.	0.000953	0.001000	-0.002687	0.107029	867.	867.	0.952475E+01	0.118763E+01	865.	868.	866.	869.	854.	856.	857.	858.	849.
109.	0.000949	0.001000	-0.002691	0.105161	867.	867.	0.940742E+01	0.116671E+01	865.	868.	867.	870.	855.	857.	857.	859.	850.
110.	0.000946	0.001000	-0.002695	0.103336	868.	868.	0.929098E+01	0.114621E+01	866.	869.	867.	870.	856.	858.	858.	860.	850.
111.	0.000942	0.001000	-0.002698	0.101535	868.	869.	0.917544E+01	0.112612E+01	867.	870.	868.	871.	856.	858.	859.	861.	851.
112.	0.000938	0.001000	-0.002702	0.099778	869.	869.	0.906082E+01	0.110642E+01	867.	870.	868.	871.	857.	859.	860.	861.	852.
113.	0.000934	0.001000	-0.002706	0.098052	869.	870.	0.894712E+01	0.108711E+01	868.	871.	869.	872.	858.	860.	861.	862.	853.
114.	0.000931	0.001000	-0.002709	0.096369	870.	870.	0.883440E+01	0.106820E+01	868.	871.	870.	873.	859.	861.	861.	863.	854.
115.	0.000927	0.001000	-0.002713	0.094701	871.	871.	0.872262E+01	0.104965E+01	869.	872.	870.	873.	860.	861.	862.	863.	855.
116.	0.000923	0.001000	-0.002717	0.093078	871.	871.	0.861179E+01	0.103145E+01	869.	872.	871.	874.	860.	862.	863.	864.	856.
117.	0.000920	0.001000	-0.002720	0.091479	872.	872.	0.850193E+01	0.101361E+01	870.	873.	871.	874.	861.	863.	863.	865.	856.
118.	0.000917	0.001000	-0.002723	0.089922	872.	872.	0.839306E+01	0.996148E+00	871.	873.	872.	875.	862.	863.	864.	865.	857.
119.	0.000913	0.001000	-0.002727	0.088383	873.	873.	0.828520E+01	0.979109E+00	871.	874.	872.	875.	862.	864.	865.	866.	858.
120.	0.000910	0.001000	-0.002730	0.086882	873.	873.	0.817833E+01	0.962352E+00	872.	874.	873.	875.	863.	865.	865.	867.	859.
121.	0.000906	0.001000	-0.002734	0.085401	874.	874.	0.807248E+01	0.945898E+00	872.	875.	873.	876.	864.	865.	866.	867.	859.
122.	0.000903	0.001000	-0.002737	0.083956	874.	874.	0.796763E+01	0.929747E+00	873.	875.	874.	876.	864.	866.	867.	868.	860.
123.	0.000900	0.001000	-0.002740	0.082541	875.	875.	0.786381E+01	0.913917E+00	873.	876.	874.	877.	865.	867.	867.	869.	861.
124.	0.000897	0.001000	-0.002743	0.081151	875.	875.	0.776101E+01	0.898338E+00	874.	876.	875.	877.	866.	867.	868.	869.	862.
125.	0.000894	0.001000	-0.002746	0.079796	876.	876.	0.765926E+01	0.883183E+00	874.	877.	875.	878.	866.	868.	868.	870.	862.
126.	0.000891	0.001000	-0.002749	0.078452	876.	876.	0.755853E+01	0.868261E+00	875.	877.	876.	878.	867.	868.	869.	870.	863.
127.	0.000888	0.001000	-0.002752	0.077138	877.	877.	0.745883E+01	0.853615E+00	875.	877.	876.	879.	867.	869.	870.	871.	864.

128.	0.000885	0.001000	-0.002755	0.075550	877.	877.	0.736016E+01	0.839244E+00	876.	878.	877.	879.	869.	870.	870.	871.	864.
129.	0.000882	0.001000	-0.002758	0.074576	877.	878.	0.726251E+01	0.828134E+00	876.	878.	877.	879.	869.	870.	871.	872.	865.
130.	0.000879	0.001000	-0.002761	0.073329	878.	878.	0.716586E+01	0.811256E+00	877.	879.	878.	880.	869.	871.	871.	872.	865.
131.	0.000876	0.001000	-0.002764	0.072100	878.	878.	0.707024E+01	0.797629E+00	877.	879.	878.	880.	870.	871.	872.	873.	866.
132.	0.000873	0.001000	-0.002767	0.070894	879.	879.	0.697564E+01	0.784241E+00	877.	879.	878.	880.	870.	872.	872.	873.	867.
133.	0.000871	0.001000	-0.002769	0.069714	879.	879.	0.688205E+01	0.771091E+00	878.	880.	879.	881.	871.	872.	873.	874.	867.
134.	0.000868	0.001000	-0.002772	0.068553	879.	880.	0.678951E+01	0.758194E+00	878.	880.	879.	881.	871.	873.	873.	874.	868.
135.	0.000865	0.001000	-0.002775	0.067415	880.	880.	0.669797E+01	0.745524E+00	879.	881.	880.	882.	872.	873.	874.	875.	868.
136.	0.000863	0.001000	-0.002777	0.066304	880.	880.	0.660746E+01	0.733109E+00	879.	881.	880.	882.	872.	874.	874.	875.	869.
137.	0.000860	0.001000	-0.002780	0.065211	881.	881.	0.651797E+01	0.720929E+00	879.	881.	880.	882.	873.	874.	875.	876.	870.
138.	0.000858	0.001000	-0.002782	0.064141	881.	881.	0.642951E+01	0.708984E+00	880.	882.	881.	883.	873.	875.	875.	876.	870.
139.	0.000856	0.001000	-0.002784	0.063087	881.	881.	0.634205E+01	0.697262E+00	880.	882.	881.	883.	874.	875.	875.	877.	871.
140.	0.000853	0.001000	-0.002787	0.062052	882.	882.	0.625560E+01	0.685751E+00	881.	882.	881.	883.	874.	876.	876.	877.	871.
141.	0.000851	0.001000	-0.002789	0.061029	882.	882.	0.617013E+01	0.674435E+00	881.	883.	882.	884.	875.	876.	876.	877.	872.
142.	0.000848	0.001000	-0.002792	0.060035	882.	882.	0.608565E+01	0.663320E+00	881.	883.	882.	884.	875.	876.	877.	878.	872.
143.	0.000846	0.001000	-0.002794	0.059054	883.	883.	0.600217E+01	0.652419E+00	882.	883.	882.	884.	876.	877.	877.	878.	873.
144.	0.000844	0.001000	-0.002796	0.058091	883.	883.	0.591968E+01	0.641712E+00	882.	884.	883.	884.	876.	877.	878.	879.	873.
145.	0.000842	0.001000	-0.002798	0.057147	883.	883.	0.583817E+01	0.631203E+00	882.	884.	883.	885.	877.	878.	878.	879.	874.
146.	0.000840	0.001000	-0.002800	0.056223	884.	884.	0.575764E+01	0.620893E+00	883.	884.	883.	885.	877.	878.	878.	879.	874.
147.	0.000838	0.001000	-0.002802	0.055311	884.	884.	0.567809E+01	0.610776E+00	883.	885.	884.	885.	877.	878.	879.	880.	875.
148.	0.000835	0.001000	-0.002805	0.054407	884.	884.	0.559948E+01	0.600817E+00	883.	885.	884.	886.	878.	879.	879.	880.	875.
149.	0.000833	0.001000	-0.002807	0.053528	884.	885.	0.552182E+01	0.591025E+00	884.	885.	884.	886.	878.	879.	880.	880.	876.
150.	0.000831	0.001000	-0.002809	0.052663	885.	885.	0.544510E+01	0.581416E+00	884.	885.	885.	886.	879.	880.	880.	881.	876.
151.	0.000829	0.001000	-0.002811	0.051810	885.	885.	0.536933E+01	0.571966E+00	884.	886.	885.	886.	879.	880.	880.	881.	876.
152.	0.000827	0.001000	-0.002813	0.050976	885.	885.	0.529449E+01	0.562692E+00	884.	886.	885.	887.	879.	880.	881.	882.	877.
153.	0.000825	0.001000	-0.002815	0.050155	886.	886.	0.522059E+01	0.553585E+00	885.	886.	885.	887.	880.	881.	881.	882.	877.
154.	0.000824	0.001000	-0.002816	0.049349	886.	886.	0.514759E+01	0.544636E+00	885.	887.	886.	887.	880.	881.	881.	882.	878.
155.	0.000822	0.001000	-0.002818	0.048561	886.	886.	0.507552E+01	0.535854E+00	886.	887.	886.	887.	881.	881.	882.	883.	878.
156.	0.000820	0.001000	-0.002820	0.047783	886.	887.	0.500437E+01	0.527236E+00	886.	887.	886.	888.	881.	882.	882.	883.	878.
157.	0.000818	0.001000	-0.002822	0.047016	887.	887.	0.493411E+01	0.518750E+00	886.	887.	887.	888.	881.	882.	882.	883.	879.
158.	0.000817	0.001000	-0.002823	0.046264	887.	887.	0.486473E+01	0.510412E+00	886.	888.	887.	888.	882.	882.	883.	883.	879.
159.	0.000815	0.001000	-0.002825	0.045520	887.	887.	0.479623E+01	0.502209E+00	886.	888.	887.	888.	882.	883.	883.	884.	880.
160.	0.000813	0.001000	-0.002827	0.044793	887.	888.	0.472860E+01	0.494142E+00	887.	888.	887.	889.	882.	883.	883.	884.	880.
161.	0.000811	0.001000	-0.002829	0.044077	888.	888.	0.466183E+01	0.486215E+00	887.	888.	888.	889.	883.	883.	884.	884.	880.
162.	0.000810	0.001000	-0.002830	0.043375	888.	888.	0.459592E+01	0.478430E+00	887.	888.	888.	889.	883.	884.	884.	885.	881.
163.	0.000808	0.001000	-0.002832	0.042684	888.	888.	0.453087E+01	0.470774E+00	887.	889.	888.	889.	883.	884.	884.	885.	881.
164.	0.000807	0.001000	-0.002833	0.042007	888.	889.	0.446667E+01	0.463259E+00	888.	889.	888.	889.	884.	884.	885.	885.	881.
165.	0.000805	0.001000	-0.002835	0.041342	889.	889.	0.440330E+01	0.455879E+00	888.	889.	888.	890.	884.	885.	885.	886.	882.
166.	0.000804	0.001000	-0.002836	0.040685	889.	889.	0.434076E+01	0.448620E+00	888.	889.	889.	890.	884.	885.	885.	886.	882.
167.	0.000802	0.001000	-0.002838	0.040047	889.	889.	0.427904E+01	0.441493E+00	888.	890.	889.	890.	884.	885.	885.	886.	882.
168.	0.000801	0.001000	-0.002839	0.039411	889.	889.	0.421813E+01	0.434493E+00	889.	890.	889.	890.	885.	885.	886.	886.	883.
169.	0.000799	0.001000	-0.002841	0.038783	890.	890.	0.415801E+01	0.427590E+00	889.	890.	889.	891.	885.	886.	886.	887.	883.
170.	0.000798	0.001000	-0.002842	0.038169	890.	890.	0.409867E+01	0.420793E+00	889.	890.	890.	891.	885.	886.	886.	887.	883.
171.	0.000796	0.001000	-0.002844	0.037567	890.	890.	0.404012E+01	0.414117E+00	889.	890.	890.	891.	886.	886.	887.	887.	884.
172.	0.000795	0.001000	-0.002845	0.036973	890.	890.	0.398236E+01	0.407536E+00	889.	891.	890.	891.	886.	887.	887.	887.	884.
173.	0.000793	0.001000	-0.002847	0.036385	890.	890.	0.392535E+01	0.401094E+00	890.	891.	890.	891.	886.	887.	887.	888.	884.
174.	0.000792	0.001000	-0.002848	0.035812	891.	891.	0.386911E+01	0.394737E+00	890.	891.	890.	891.	886.	887.	887.	888.	885.
175.	0.000791	0.001000	-0.002849	0.035250	891.	891.	0.381362E+01	0.388496E+00	890.	891.	891.	892.	887.	887.	888.	888.	885.
176.	0.000790	0.001000	-0.002850	0.034699	891.	891.	0.375888E+01	0.382375E+00	890.	891.	891.	892.	887.	888.	888.	888.	885.
177.	0.000788	0.001000	-0.002852	0.034152	891.	891.	0.370488E+01	0.376331E+00	891.	892.	891.	892.	887.	888.	888.	889.	885.
178.	0.000787	0.001000	-0.002853	0.033617	891.	891.	0.365160E+01	0.370422E+00	891.	892.	891.	892.	887.	888.	888.	889.	886.
179.	0.000786	0.001000	-0.002854	0.033092	891.	892.	0.359905E+01	0.364602E+00	891.	892.	891.	892.	888.	888.	888.	889.	886.
180.	0.000785	0.001000	-0.002855	0.032575	892.	892.	0.354721E+01	0.358840E+00	891.	892.	892.	892.	888.	888.	889.	889.	886.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992	0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312	0.0
1.	0.005612	0.003000	-0.000030	0.302227	566.	567.	0.981954E-01	0.152474E+00	567. 568. 568. 568. 566. 566. 566. 566. 566.
2.	0.000253	0.003000	-0.005395	4.158808	716.	853.	0.184163E+02	0.273136E+02	772. 879. 842. 902. 636. 644. 577. 579. 572.
3.	0.001148	0.003000	-0.004486	1.242392	826.	823.	0.173721E+02	0.218981E+02	755. 818. 775. 860. 650. 659. 594. 601. 584.
4.	0.001538	0.003000	-0.004099	1.413174	803.	793.	0.161084E+02	0.180051E+02	738. 807. 761. 821. 661. 672. 610. 617. 595.
5.	0.001690	0.003000	-0.003949	1.494638	792.	791.	0.154696E+02	0.160661E+02	756. 806. 766. 815. 670. 685. 624. 631. 607.
6.	0.001739	0.003000	-0.003901	1.504852	794.	797.	0.151027E+02	0.150399E+02	761. 808. 772. 819. 679. 698. 637. 644. 618.
7.	0.001749	0.003000	-0.003891	1.467729	800.	804.	0.147900E+02	0.143535E+02	768. 814. 779. 825. 688. 711. 649. 657. 628.
8.	0.001750	0.003000	-0.003890	1.437638	807.	811.	0.156322E+02	0.143057E+02	776. 820. 787. 831. 696. 722. 661. 669. 639.
9.	0.001701	0.003000	-0.003939	1.486539	816.	820.	0.168973E+02	0.152534E+02	786. 829. 797. 840. 705. 734. 673. 681. 649.
10.	0.001635	0.003000	-0.004006	1.453891	826.	830.	0.210164E+02	0.155543E+02	796. 839. 808. 850. 715. 745. 685. 693. 659.
11.	0.001595	0.003000	-0.004045	1.396790	835.	839.	0.222646E+02	0.153946E+02	806. 847. 817. 859. 724. 755. 696. 705. 669.
12.	0.001575	0.003000	-0.004065	1.346026	843.	847.	0.229537E+02	0.150245E+02	814. 855. 825. 866. 733. 765. 707. 716. 678.
13.	0.001566	0.003000	-0.004074	1.302054	851.	854.	0.232812E+02	0.145878E+02	822. 862. 833. 872. 742. 774. 718. 727. 688.
14.	0.001561	0.003000	-0.004079	1.262614	857.	860.	0.233899E+02	0.141465E+02	830. 868. 840. 878. 750. 783. 728. 738. 697.
15.	0.001556	0.003000	-0.004084	1.230873	864.	867.	0.238594E+02	0.137868E+02	837. 874. 847. 884. 759. 791. 739. 748. 707.
16.	0.001548	0.003000	-0.004093	1.206331	871.	874.	0.247115E+02	0.135097E+02	845. 881. 855. 891. 767. 799. 749. 758. 716.
17.	0.001534	0.003000	-0.004106	1.181682	877.	880.	0.256371E+02	0.132606E+02	852. 887. 862. 897. 775. 806. 758. 768. 725.
18.	0.001520	0.003000	-0.004120	1.155146	884.	887.	0.264635E+02	0.130040E+02	859. 894. 869. 904. 782. 814. 768. 777. 733.
19.	0.001507	0.003000	-0.004134	1.127316	890.	893.	0.271166E+02	0.127296E+02	866. 900. 876. 910. 790. 821. 777. 787. 742.
20.	0.001495	0.003000	-0.004145	1.098753	897.	899.	0.275758E+02	0.124388E+02	873. 906. 883. 916. 798. 828. 786. 796. 750.
21.	0.001485	0.003000	-0.004155	1.070514	903.	905.	0.278902E+02	0.121392E+02	880. 912. 889. 921. 805. 835. 795. 804. 759.
22.	0.001476	0.003000	-0.004164	1.043577	908.	911.	0.281927E+02	0.118426E+02	886. 918. 896. 927. 812. 841. 804. 813. 767.
23.	0.001467	0.003000	-0.004173	1.018234	914.	917.	0.285392E+02	0.115563E+02	892. 923. 902. 932. 820. 848. 812. 821. 775.
24.	0.001458	0.003000	-0.004182	0.994288	920.	922.	0.289198E+02	0.112822E+02	899. 928. 908. 938. 827. 854. 820. 829. 783.
25.	0.001449	0.003000	-0.004191	0.971082	925.	927.	0.293002E+02	0.110186E+02	905. 934. 914. 943. 833. 860. 828. 837. 790.
26.	0.001439	0.003000	-0.004201	0.948134	930.	933.	0.296432E+02	0.107617E+02	910. 939. 919. 948. 840. 866. 836. 845. 798.
27.	0.001429	0.003000	-0.004211	0.925530	935.	938.	0.299217E+02	0.105093E+02	916. 944. 925. 953. 847. 872. 843. 853. 805.
28.	0.001419	0.003000	-0.004221	0.903250	940.	943.	0.301353E+02	0.102605E+02	922. 949. 930. 957. 853. 878. 851. 860. 812.
29.	0.001410	0.003000	-0.004230	0.881135	945.	947.	0.303055E+02	0.100151E+02	927. 953. 936. 962. 859. 884. 858. 867. 819.
30.	0.001400	0.003000	-0.004240	0.859669	950.	952.	0.304535E+02	0.977392E+01	932. 958. 941. 967. 866. 889. 865. 874. 826.
31.	0.001391	0.003000	-0.004249	0.838935	955.	957.	0.305910E+02	0.953842E+01	937. 963. 946. 971. 872. 694. 872. 881. 833.
32.	0.001382	0.003000	-0.004258	0.818789	959.	961.	0.307188E+02	0.930928E+01	942. 967. 951. 975. 878. 900. 878. 887. 840.
33.	0.001373	0.003000	-0.004268	0.799057	964.	965.	0.308303E+02	0.908589E+01	947. 971. 955. 979. 883. 905. 885. 894. 846.
34.	0.001363	0.003000	-0.004277	0.779835	968.	970.	0.309170E+02	0.886788E+01	952. 975. 960. 983. 889. 910. 891. 900. 853.
35.	0.001354	0.003000	-0.004286	0.761082	972.	974.	0.309749E+02	0.865509E+01	957. 979. 964. 987. 895. 915. 897. 906. 859.
36.	0.001344	0.003000	-0.004296	0.742676	976.	978.	0.310055E+02	0.844715E+01	961. 983. 969. 991. 900. 920. 903. 912. 865.
37.	0.001335	0.003000	-0.004305	0.724612	980.	982.	0.310133E+02	0.824344E+01	965. 987. 973. 995. 905. 924. 909. 918. 871.
38.	0.001326	0.003000	-0.004315	0.707025	984.	986.	0.310034E+02	0.804422E+01	970. 991. 977. 999. 911. 929. 915. 923. 877.
39.	0.001316	0.003000	-0.004324	0.689917	988.	989.	0.309791E+02	0.784971E+01	974. 995. 981.1002. 916. 934. 920. 929. 883.
40.	0.001307	0.003000	-0.004333	0.673260	991.	993.	0.309411E+02	0.766007E+01	978. 998. 985.1006. 921. 938. 926. 934. 889.
41.	0.001297	0.003000	-0.004343	0.656913	995.	997.	0.308882E+02	0.747492E+01	982.1002. 989.1009. 926. 942. 931. 939. 894.
42.	0.001288	0.003000	-0.004352	0.641022	998.1000.		0.308195E+02	0.729419E+01	986.1005. 993.1012. 930. 947. 936. 944. 900.
43.	0.001279	0.003000	-0.004361	0.625540	1002.1003.		0.307346E+02	0.711790E+01	989.1008. 997.1015. 935. 951. 941. 949. 905.
44.	0.001270	0.003000	-0.004370	0.610420	1005.1007.		0.306347E+02	0.694588E+01	993.1011.1000.1018. 940. 955. 946. 954. 910.
45.	0.001260	0.003000	-0.004380	0.595653	1008.1010.		0.305213E+02	0.677803E+01	997.1015.1004.1022. 944. 959. 951. 959. 915.
46.	0.001251	0.003000	-0.004389	0.581192	1012.1013.		0.303957E+02	0.661403E+01	1000.1018.1007.1024. 949. 963. 955. 963. 920.
47.	0.001242	0.003000	-0.004398	0.567149	1015.1016.		0.302591E+02	0.645397E+01	1004.1021.1010.1027. 953. 967. 960. 968. 925.
48.	0.001233	0.003000	-0.004408	0.553494	1018.1019.		0.301121E+02	0.629796E+01	1007.1023.1013.1030. 957. 971. 964. 972. 930.
49.	0.001224	0.003000	-0.004417	0.540202	1021.1022.		0.299550E+02	0.614597E+01	1010.1026.1016.1033. 961. 974. 969. 976. 935.
50.	0.001214	0.003000	-0.004426	0.527230	1023.1025.		0.297880E+02	0.599787E+01	1013.1029.1020.1035. 965. 978. 973. 980. 939.
51.	0.001205	0.003000	-0.004435	0.514501	1026.1027.		0.296115E+02	0.585336E+01	1016.1032.1022.1038. 969. 981. 977. 984. 944.
52.	0.001196	0.003000	-0.004444	0.502115	1029.1030.		0.294259E+02	0.571224E+01	1019.1034.1025.1041. 973. 985. 981. 988. 948.
53.	0.001187	0.003000	-0.004453	0.490081	1032.1033.		0.292321E+02	0.557465E+01	1022.1037.1028.1043. 977. 988. 985. 992. 952.
54.	0.001178	0.003000	-0.004462	0.478383	1034.1035.		0.290308E+02	0.544064E+01	1025.1039.1031.1045. 980. 992. 989. 995. 957.
55.	0.001169	0.003000	-0.004471	0.466997	1037.1038.		0.288226E+02	0.531015E+01	1028.1042.1034.1048. 984. 995. 992. 999. 961.
56.	0.001160	0.003000	-0.004480	0.455910	1039.1040.		0.286080E+02	0.518310E+01	1031.1044.1036.1050. 988. 998. 996.1003. 965.
57.	0.001151	0.003000	-0.004489	0.445061	1042.1043.		0.283874E+02	0.505934E+01	1033.1047.1039.1052. 991.1001. 999.1006. 969.
58.	0.001142	0.003000	-0.004498	0.434444	1044.1045.		0.281608E+02	0.493848E+01	1036.1049.1041.1054. 994.1004.1003.1009. 973.
59.	0.001133	0.003000	-0.004507	0.424140	1046.1047.		0.279287E+02	0.482060E+01	1038.1051.1044.1056. 998.1007.1006.1012. 976.
60.	0.001124	0.003000	-0.004516	0.414128	1049.1050.		0.276917E+02	0.470579E+01	1041.1053.1046.1059.1001.1010.1009.1016. 980.
61.	0.001116	0.003000	-0.004524	0.404396	1051.1052.		0.274505E+02	0.459404E+01	1043.1055.1048.1061.1004.1013.1012.1019. 984.

62.	0.001107	0.003000	-0.004533	0.3949271053.1054.	0.272048E+02	0.448531E+011045.1057.1051.1063.1007.1016.1016.1022. 987.
63.	0.001099	0.003000	-0.004542	0.3857111055.1056.	0.269558E+02	0.437949E+011048.1059.1053.1064.1010.1019.1019.1025. 991.
64.	0.001090	0.003000	-0.004550	0.3767401057.1058.	0.267033E+02	0.427649E+011050.1061.1055.1066.1013.1021.1022.1027. 994.
65.	0.001081	0.003000	-0.004559	0.3679391059.1060.	0.264478E+02	0.417610E+011052.1063.1057.1068.1016.1024.1024.1030. 997.
66.	0.001073	0.003000	-0.004567	0.3593671061.1062.	0.261893E+02	0.407814E+011054.1065.1059.1070.1019.1027.1027.1033.1001.
67.	0.001064	0.003000	-0.004576	0.3510211063.1064.	0.259283E+02	0.398263E+011056.1067.1061.1072.1022.1029.1030.1036.1004.
68.	0.001056	0.003000	-0.004584	0.3429141065.1066.	0.256650E+02	0.388962E+011058.1069.1063.1073.1024.1032.1033.1038.1007.
69.	0.001048	0.003000	-0.004592	0.3350341067.1067.	0.253999E+02	0.379909E+011060.1070.1065.1075.1027.1034.1035.1041.1010.
70.	0.001040	0.003000	-0.004601	0.3273721068.1069.	0.251332E+02	0.371102E+011062.1072.1067.1077.1030.1037.1038.1043.1013.
71.	0.001031	0.003000	-0.004609	0.3199161070.1071.	0.248652E+02	0.362534E+011064.1074.1069.1078.1032.1039.1040.1045.1016.
72.	0.001023	0.003000	-0.004617	0.3126611072.1073.	0.245960E+02	0.354196E+011066.1075.1070.1080.1035.1041.1043.1048.1018.
73.	0.001016	0.003000	-0.004625	0.3055961074.1074.	0.243259E+02	0.346080E+011068.1077.1072.1081.1037.1043.1045.1050.1021.
74.	0.001008	0.003000	-0.004632	0.2987001075.1076.	0.240551E+02	0.338176E+011070.1079.1074.1083.1039.1046.1047.1052.1024.
75.	0.001000	0.003000	-0.004641	0.2919381077.1077.	0.237837E+02	0.330466E+011071.1080.1075.1084.1042.1048.1050.1054.1027.
76.	0.000992	0.003000	-0.004648	0.2853641078.1079.	0.235119E+02	0.322944E+011073.1082.1077.1086.1044.1050.1052.1057.1029.
77.	0.000984	0.003000	-0.004656	0.2789741080.1081.	0.232399E+02	0.315617E+011075.1083.1079.1087.1046.1052.1054.1059.1032.
78.	0.000976	0.003000	-0.004664	0.2727551081.1082.	0.229680E+02	0.308483E+011076.1085.1080.1088.1048.1054.1056.1061.1034.
79.	0.000969	0.003000	-0.004671	0.2666971083.1083.	0.226964E+02	0.301539E+011078.1086.1082.1090.1051.1056.1058.1063.1037.
80.	0.000961	0.003000	-0.004679	0.2607961084.1085.	0.224250E+02	0.294775E+011079.1087.1083.1091.1053.1058.1060.1065.1039.
81.	0.000954	0.003000	-0.004686	0.2550541086.1086.	0.221542E+02	0.288189E+011081.1089.1085.1092.1055.1060.1062.1066.1041.
82.	0.000947	0.003000	-0.004693	0.2494681087.1088.	0.218840E+02	0.281777E+011082.1090.1086.1094.1057.1062.1064.1068.1044.
83.	0.000940	0.003000	-0.004700	0.2440271088.1089.	0.216147E+02	0.275533E+011084.1091.1087.1095.1059.1064.1066.1070.1046.
84.	0.000933	0.003000	-0.004708	0.2387271090.1090.	0.213463E+02	0.269452E+011085.1093.1089.1096.1061.1065.1068.1072.1048.
85.	0.000926	0.003000	-0.004715	0.2335621091.1092.	0.210789E+02	0.263531E+011087.1094.1090.1097.1062.1067.1069.1074.1050.
86.	0.000919	0.003000	-0.004721	0.2285281092.1093.	0.208127E+02	0.257763E+011088.1095.1091.1098.1064.1069.1071.1075.1052.
87.	0.000912	0.003000	-0.004728	0.2236111093.1094.	0.205477E+02	0.252144E+011089.1096.1093.1099.1066.1071.1073.1077.1054.
88.	0.000905	0.003000	-0.004733	0.2187881095.1095.	0.202841E+02	0.246656E+011091.1097.1094.1100.1068.1072.1075.1078.1056.
89.	0.000898	0.003000	-0.004742	0.2140931096.1096.	0.200217E+02	0.241300E+011092.1098.1095.1102.1070.1074.1076.1080.1058.
90.	0.000891	0.003000	-0.004749	0.2095211097.1098.	0.197609E+02	0.236078E+011093.1100.1096.1103.1071.1075.1078.1081.1060.
91.	0.000885	0.003000	-0.004755	0.2050741098.1099.	0.195018E+02	0.230989E+011094.1101.1097.1104.1073.1077.1079.1083.1062.
92.	0.000878	0.003000	-0.004762	0.2007381099.1100.	0.192443E+02	0.226031E+011096.1102.1099.1105.1075.1078.1081.1084.1064.
93.	0.000872	0.003000	-0.004768	0.1965101100.1101.	0.189886E+02	0.221200E+011097.1103.1100.1106.1076.1080.1082.1086.1066.
94.	0.000865	0.003000	-0.004775	0.1923921101.1102.	0.187348E+02	0.216492E+011098.1104.1101.1107.1078.1081.1084.1087.1068.
95.	0.000859	0.003000	-0.004781	0.1883711102.1103.	0.184828E+02	0.211901E+011099.1105.1102.1108.1079.1083.1085.1089.1069.
96.	0.000853	0.003000	-0.004787	0.1844541103.1104.	0.182329E+02	0.207426E+011100.1106.1103.1108.1081.1084.1087.1090.1071.
97.	0.000847	0.003000	-0.004793	0.1806281104.1105.	0.179849E+02	0.203061E+011101.1107.1104.1109.1082.1086.1088.1091.1073.
98.	0.000841	0.003000	-0.004799	0.1768901105.1106.	0.177388E+02	0.198804E+011102.1108.1105.1110.1084.1087.1089.1092.1074.
99.	0.000835	0.003000	-0.004805	0.1732431106.1107.	0.174948E+02	0.194648E+011103.1109.1106.1111.1085.1088.1091.1094.1076.
100.	0.000829	0.003000	-0.004811	0.1696881107.1108.	0.172530E+02	0.190596E+011104.1109.1107.1112.1086.1090.1092.1095.1077.
101.	0.000824	0.003000	-0.004816	0.1662201108.1109.	0.170133E+02	0.186641E+011105.1110.1108.1113.1088.1091.1093.1096.1079.
102.	0.000818	0.003000	-0.004822	0.1628391109.1110.	0.167758E+02	0.182786E+011106.1111.1109.1114.1089.1092.1094.1097.1081.
103.	0.000813	0.003000	-0.004827	0.1595361110.1111.	0.165406E+02	0.179023E+011107.1112.1110.1114.1090.1093.1096.1098.1082.
104.	0.000807	0.003000	-0.004833	0.1563181111.1111.	0.163078E+02	0.175354E+011108.1113.1111.1115.1092.1095.1097.1100.1083.
105.	0.000802	0.003000	-0.004838	0.1531701112.1112.	0.160771E+02	0.171774E+011109.1114.1111.1116.1093.1096.1098.1101.1085.
106.	0.000797	0.003000	-0.004843	0.1501031113.1113.	0.158501E+02	0.168281E+011110.1115.1112.1117.1094.1097.1099.1102.1086.
107.	0.000791	0.003000	-0.004849	0.1470811114.1114.	0.156256E+02	0.164867E+011111.1115.1113.1118.1095.1098.1100.1103.1088.
108.	0.000786	0.003000	-0.004854	0.1441331114.1115.	0.154029E+02	0.161528E+011112.1116.1114.1118.1096.1099.1101.1104.1089.
109.	0.000781	0.003000	-0.004859	0.1412621115.1115.	0.151823E+02	0.158267E+011113.1117.1115.1119.1098.1100.1102.1105.1090.
110.	0.000776	0.003000	-0.004864	0.1384521116.1116.	0.149639E+02	0.155082E+011113.1118.1115.1120.1099.1101.1103.1106.1091.
111.	0.000771	0.003000	-0.004869	0.1357131117.1117.	0.147478E+02	0.151973E+011114.1118.1116.1120.1100.1102.1104.1107.1093.
112.	0.000766	0.003000	-0.004874	0.1330401117.1118.	0.145340E+02	0.148937E+011115.1119.1117.1121.1101.1103.1105.1108.1094.
113.	0.000761	0.003000	-0.004879	0.1304231118.1118.	0.143228E+02	0.145972E+011116.1120.1118.1122.1102.1104.1106.1109.1095.
114.	0.000757	0.003000	-0.004883	0.1278711119.1119.	0.141141E+02	0.143076E+011117.1120.1118.1122.1103.1105.1107.1110.1096.
115.	0.000752	0.003000	-0.004888	0.1253811120.1120.	0.139079E+02	0.140249E+011117.1121.1119.1123.1104.1106.1108.1110.1097.
116.	0.000748	0.003000	-0.004892	0.1229411120.1121.	0.137040E+02	0.137486E+011118.1122.1120.1124.1105.1107.1109.1111.1099.
117.	0.000743	0.003000	-0.004897	0.1205561121.1121.	0.135024E+02	0.134786E+011119.1122.1121.1124.1106.1108.1110.1112.1100.
118.	0.000739	0.003000	-0.004901	0.1182281122.1122.	0.133031E+02	0.132148E+011119.1123.1121.1125.1107.1109.1111.1113.1101.
119.	0.000734	0.003000	-0.004906	0.1159471122.1122.	0.131062E+02	0.129569E+011120.1124.1122.1125.1108.1110.1112.1114.1102.
120.	0.000730	0.003000	-0.004910	0.1137151123.1123.	0.129118E+02	0.127047E+011121.1124.1123.1126.1109.1111.1112.1115.1103.
121.	0.000726	0.003000	-0.004914	0.1115381123.1124.	0.127197E+02	0.124583E+011121.1125.1123.1126.1110.1112.1113.1115.1104.
122.	0.000722	0.003000	-0.004918	0.1094051124.1124.	0.125300E+02	0.122174E+011122.1125.1124.1127.1111.1113.1114.1116.1105.
123.	0.000718	0.003000	-0.004922	0.1073161125.1125.	0.123427E+02	0.119818E+011123.1126.1124.1128.1111.1113.1115.1117.1106.
124.	0.000714	0.003000	-0.004926	0.1052761125.1126.	0.121577E+02	0.117514E+011123.1127.1125.1128.1112.1114.1116.1118.1107.
125.	0.000710	0.003000	-0.004930	0.1032811126.1126.	0.119750E+02	0.115260E+011124.1127.1126.1129.1113.1115.1116.1118.1108.
126.	0.000706	0.003000	-0.004934	0.1013231126.1127.	0.117947E+02	0.113056E+011125.1128.1126.1129.1114.1116.1117.1119.1109.
127.	0.000703	0.003000	-0.004938	0.0994071127.1127.	0.116164E+02	0.110899E+011125.1128.1127.1130.1115.1116.1118.1120.1110.

128.	0.000699	0.003000	-0.004941	0.0975561128.1128.	0.114409E+02	0.108788E+011126.1129.1127.1130.1116.1117.1119.1120.1119.
129.	0.000695	0.003000	-0.004945	0.0957061128.1128.	0.112675E+02	0.106723E+011126.1129.1128.1131.1116.1118.1119.1121.1111.
130.	0.000692	0.003000	-0.004948	0.0939131129.1129.	0.110963E+02	0.104704E+011127.1130.1128.1131.1117.1119.1120.1122.1112.
131.	0.000688	0.003000	-0.004952	0.0921521129.1129.	0.109274E+02	0.102726E+011128.1130.1129.1132.1118.1119.1121.1122.1113.
132.	0.000685	0.003000	-0.004955	0.0904311130.1130.	0.107608E+02	0.100790E+011128.1131.1129.1132.1119.1120.1121.1123.1114.
133.	0.000681	0.003000	-0.004959	0.0887481130.1130.	0.105963E+02	0.989005E+001129.1131.1130.1133.1119.1121.1122.1124.1115.
134.	0.000678	0.003000	-0.004962	0.0871061131.1131.	0.104341E+02	0.970543E+001129.1132.1130.1133.1120.1121.1123.1124.1115.
135.	0.000675	0.003000	-0.004965	0.0854881131.1131.	0.102740E+02	0.952446E+001130.1132.1131.1133.1121.1122.1123.1125.1116.
136.	0.000671	0.003000	-0.004969	0.0839081132.1132.	0.101162E+02	0.934710E+001130.1133.1131.1134.1121.1123.1124.1126.1117.
137.	0.000668	0.003000	-0.004972	0.0823581132.1132.	0.996048E+01	0.917325E+001131.1133.1132.1134.1122.1123.1125.1126.1118.
138.	0.000665	0.003000	-0.004975	0.0808461133.1133.	0.980692E+01	0.900301E+001131.1134.1132.1135.1123.1124.1125.1127.1118.
139.	0.000662	0.003000	-0.004978	0.0793591133.1133.	0.965548E+01	0.883637E+001132.1134.1133.1135.1123.1125.1126.1127.1119.
140.	0.000659	0.003000	-0.004981	0.0779131133.1134.	0.950614E+01	0.867324E+001132.1134.1133.1136.1124.1125.1126.1128.1120.
141.	0.000656	0.003000	-0.004984	0.0764911134.1134.	0.935891E+01	0.851366E+001133.1135.1134.1136.1124.1126.1127.1128.1120.
142.	0.000653	0.003000	-0.004987	0.0750951134.1134.	0.921373E+01	0.835732E+001133.1135.1134.1136.1125.1126.1127.1129.1121.
143.	0.000650	0.003000	-0.004990	0.0737181135.1135.	0.907057E+01	0.820382E+001133.1136.1134.1137.1126.1127.1128.1129.1122.
144.	0.000647	0.003000	-0.004993	0.0723621135.1135.	0.892941E+01	0.805308E+001134.1136.1135.1137.1126.1127.1129.1130.1122.
145.	0.000645	0.003000	-0.004995	0.0710451135.1136.	0.879023E+01	0.790519E+001134.1136.1135.1137.1127.1128.1129.1130.1123.
146.	0.000642	0.003000	-0.004998	0.0697551136.1136.	0.865303E+01	0.776045E+001135.1137.1136.1138.1127.1129.1130.1131.1124.
147.	0.000639	0.003000	-0.005001	0.0684891136.1136.	0.851780E+01	0.761867E+001135.1137.1136.1138.1128.1129.1130.1131.1124.
148.	0.000637	0.003000	-0.005003	0.0672531137.1137.	0.838452E+01	0.747985E+001135.1137.1136.1138.1128.1130.1130.1132.1125.
149.	0.000634	0.003000	-0.005006	0.0660371137.1137.	0.825317E+01	0.734392E+001136.1138.1137.1139.1129.1130.1131.1132.1125.
150.	0.000632	0.003000	-0.005008	0.0648441137.1137.	0.812370E+01	0.721051E+001136.1138.1137.1139.1129.1131.1131.1133.1126.
151.	0.000629	0.003000	-0.005011	0.0636781138.1138.	0.799611E+01	0.707981E+001137.1138.1137.1139.1130.1131.1132.1133.1126.
152.	0.000627	0.003000	-0.005013	0.0625361138.1138.	0.787037E+01	0.695175E+001137.1139.1138.1140.1130.1131.1132.1133.1127.
153.	0.000624	0.003000	-0.005016	0.0614131138.1139.	0.774646E+01	0.682625E+001137.1139.1138.1140.1131.1132.1133.1134.1128.
154.	0.000622	0.003000	-0.005018	0.0603181139.1139.	0.762435E+01	0.670323E+001138.1139.1138.1140.1131.1132.1133.1134.1128.
155.	0.000620	0.003000	-0.005020	0.0592431139.1139.	0.750407E+01	0.658288E+001138.1140.1139.1141.1132.1133.1134.1135.1129.
156.	0.000618	0.003000	-0.005022	0.0581851139.1139.	0.738555E+01	0.646475E+001138.1140.1139.1141.1132.1133.1134.1135.1129.
157.	0.000616	0.003000	-0.005024	0.0571491140.1140.	0.726877E+01	0.634894E+001139.1140.1139.1141.1133.1134.1134.1135.1130.
158.	0.000613	0.003000	-0.005027	0.0561311140.1140.	0.715373E+01	0.623533E+001139.1141.1140.1141.1133.1134.1135.1136.1130.
159.	0.000611	0.003000	-0.005029	0.0551321140.1140.	0.704038E+01	0.612387E+001139.1141.1140.1142.1133.1135.1135.1136.1131.
160.	0.000609	0.003000	-0.005031	0.0541531141.1141.	0.692872E+01	0.601450E+001140.1141.1140.1142.1134.1135.1136.1137.1131.
161.	0.000607	0.003000	-0.005033	0.0531981141.1141.	0.681873E+01	0.590735E+001140.1141.1141.1142.1134.1135.1136.1137.1132.
162.	0.000605	0.003000	-0.005035	0.0522561141.1141.	0.671039E+01	0.580236E+001140.1142.1141.1143.1135.1136.1136.1137.1132.
163.	0.000604	0.003000	-0.005036	0.0513341141.1142.	0.660367E+01	0.569932E+001140.1142.1141.1143.1135.1136.1137.1138.1132.
164.	0.000602	0.003000	-0.005038	0.0504331142.1142.	0.649857E+01	0.559837E+001141.1142.1141.1143.1136.1136.1137.1138.1133.
165.	0.000600	0.003000	-0.005040	0.0495441142.1142.	0.639505E+01	0.549937E+001141.1143.1142.1143.1136.1137.1137.1138.1133.
166.	0.000598	0.003000	-0.005042	0.0486711142.1142.	0.629309E+01	0.540220E+001141.1143.1142.1143.1136.1137.1138.1139.1134.
167.	0.000596	0.003000	-0.005044	0.0478131142.1143.	0.619266E+01	0.530674E+001142.1143.1142.1144.1137.1138.1138.1139.1134.
168.	0.000594	0.003000	-0.005046	0.0469751143.1143.	0.609375E+01	0.521301E+001142.1143.1143.1144.1137.1138.1138.1139.1135.
169.	0.000593	0.003000	-0.005047	0.0461511143.1143.	0.599636E+01	0.512119E+001142.1144.1143.1144.1137.1138.1139.1140.1135.
170.	0.000591	0.003000	-0.005049	0.0453411143.1143.	0.590044E+01	0.503106E+001142.1144.1143.1144.1138.1139.1139.1140.1135.
171.	0.000589	0.003000	-0.005051	0.0445501143.1144.	0.580598E+01	0.494260E+001143.1144.1143.1145.1138.1139.1139.1140.1136.
172.	0.000588	0.003000	-0.005052	0.0437731144.1144.	0.571299E+01	0.485592E+001143.1144.1144.1145.1138.1139.1140.1140.1136.
173.	0.000586	0.003000	-0.005054	0.0430081144.1144.	0.562140E+01	0.477086E+001143.1144.1144.1145.1139.1139.1140.1141.1136.
174.	0.000585	0.003000	-0.005055	0.0422631144.1144.	0.553123E+01	0.468738E+001143.1145.1144.1145.1139.1140.1140.1141.1137.
175.	0.000583	0.003000	-0.005057	0.0415291144.1144.	0.544245E+01	0.460559E+001144.1145.1144.1145.1139.1140.1141.1141.1137.
176.	0.000582	0.003000	-0.005058	0.0408021145.1145.	0.535503E+01	0.452517E+001144.1145.1144.1146.1140.1140.1141.1142.1138.
177.	0.000580	0.003000	-0.005060	0.0400941145.1145.	0.526894E+01	0.444616E+001144.1145.1145.1146.1140.1141.1141.1142.1138.
178.	0.000579	0.003000	-0.005061	0.0393971145.1145.	0.518420E+01	0.436864E+001144.1145.1145.1146.1140.1141.1141.1142.1138.
179.	0.000577	0.003000	-0.005063	0.0387111145.1145.	0.510075E+01	0.429248E+001145.1146.1145.1146.1141.1141.1142.1142.1139.
180.	0.000576	0.003000	-0.005064	0.0380391145.1146.	0.501860E+01	0.421771E+001145.1146.1145.1146.1141.1142.1142.1143.1139.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PK	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992				0.00159996			
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312				0.0			
1.	0.005689	0.005000	-0.002173	2.105392	581.	658.	0.674213E+01	0.105438E+02	669.	685.	679.	686.	591.	592.	568.	568. 567.
2.	0.000211	0.005000	-0.007408	1.282255	963.	998.	0.280706E+02	0.376910E+02	843.	985.	924.	1064.	686.	702.	599.	608. 586.
3.	0.001382	0.005000	-0.006252	1.858639	938.	914.	0.246276E+02	0.284803E+02	855.	926.	856.	958.	703.	717.	623.	634. 603.
4.	0.001706	0.005000	-0.005933	2.262186	904.	898.	0.233046E+02	0.246673E+02	849.	923.	860.	935.	717.	736.	645.	655. 620.
5.	0.001751	0.005000	-0.005889	2.346594	905.	909.	0.229014E+02	0.231539E+02	855.	929.	873.	944.	730.	757.	665.	676. 637.
6.	0.001748	0.005000	-0.005892	2.268702	916.	921.	0.225556E+02	0.221638E+02	867.	937.	885.	954.	744.	777.	684.	695. 653.
7.	0.001750	0.005000	-0.005890	2.181591	927.	932.	0.221270E+02	0.212717E+02	879.	946.	896.	963.	758.	795.	703.	714. 669.
8.	0.001720	0.005000	-0.005921	2.225829	938.	944.	0.268836E+02	0.227030E+02	893.	958.	909.	974.	771.	812.	720.	733. 685.
9.	0.001634	0.005000	-0.006007	2.184564	952.	959.	0.307125E+02	0.234164E+02	907.	972.	924.	989.	785.	829.	738.	751. 700.
10.	0.001590	0.005000	-0.006050	2.088557	966.	971.	0.328377E+02	0.231824E+02	921.	984.	937.	1000.	799.	848.	755.	768. 715.
11.	0.001572	0.005000	-0.006068	2.014097	977.	982.	0.340337E+02	0.225994E+02	934.	994.	949.	1010.	812.	859.	772.	785. 730.
12.	0.001564	0.005000	-0.006076	1.951668	988.	992.	0.346856E+02	0.219426E+02	945.	1004.	961.	1020.	825.	873.	788.	802. 744.
13.	0.001559	0.005000	-0.006081	1.893468	998.	1002.	0.349409E+02	0.212815E+02	956.	1014.	972.	1029.	838.	886.	804.	818. 758.
14.	0.001555	0.005000	-0.006085	1.841634	1008.	1012.	0.352998E+02	0.206371E+02	967.	1023.	982.	1038.	850.	898.	820.	833. 772.
15.	0.001546	0.005000	-0.006094	1.801534	1017.	1022.	0.364559E+02	0.202424E+02	978.	1032.	993.	1047.	862.	910.	835.	848. 786.
16.	0.001532	0.005000	-0.006109	1.761229	1027.	1031.	0.378391E+02	0.198472E+02	989.	1042.	1004.	1057.	874.	921.	849.	863. 799.
17.	0.001516	0.005000	-0.006124	1.718253	1037.	1041.	0.391075E+02	0.194364E+02	1000.	1051.	1014.	1066.	885.	932.	863.	877. 812.
18.	0.001502	0.005000	-0.006138	1.673965	1046.	1050.	0.401347E+02	0.188980E+02	1010.	1060.	1024.	1075.	897.	943.	877.	891. 825.
19.	0.001490	0.005000	-0.006150	1.629953	1055.	1059.	0.408855E+02	0.183397E+02	1020.	1069.	1034.	1083.	908.	953.	891.	905. 837.
20.	0.001480	0.005000	-0.006160	1.586624	1064.	1068.	0.413757E+02	0.180717E+02	1030.	1078.	1044.	1092.	919.	963.	904.	918. 850.
21.	0.001471	0.005000	-0.006169	1.544965	1072.	1076.	0.417870E+02	0.176090E+02	1039.	1086.	1053.	1100.	930.	973.	916.	931. 862.
22.	0.001463	0.005000	-0.006177	1.505847	1081.	1084.	0.422599E+02	0.171633E+02	1048.	1094.	1062.	1107.	940.	983.	929.	943. 874.
23.	0.001453	0.005000	-0.006187	1.468368	1089.	1092.	0.427955E+02	0.167364E+02	1057.	1101.	1071.	1115.	951.	992.	941.	955. 885.
24.	0.001443	0.005000	-0.006197	1.432097	1096.	1100.	0.433437E+02	0.163243E+02	1066.	1109.	1079.	1122.	961.	1001.	953.	967. 897.
25.	0.001433	0.005000	-0.006207	1.396274	1104.	1107.	0.438497E+02	0.159231E+02	1075.	1116.	1088.	1130.	971.	1010.	964.	978. 908.
26.	0.001422	0.005000	-0.006218	1.361153	1111.	1115.	0.442685E+02	0.155392E+02	1083.	1124.	1096.	1137.	980.	1018.	975.	989. 919.
27.	0.001412	0.005000	-0.006228	1.326324	1119.	1122.	0.445837E+02	0.151429E+02	1091.	1131.	1104.	1144.	990.	1027.	986.	1000. 929.
28.	0.001402	0.005000	-0.006238	1.292236	1126.	1129.	0.448227E+02	0.147611E+02	1099.	1138.	1111.	1150.	999.	1035.	997.	1010. 940.
29.	0.001392	0.005000	-0.006248	1.259065	1132.	1135.	0.450217E+02	0.143870E+02	1106.	1144.	1119.	1157.	1008.	1043.	1007.	1021. 950.
30.	0.001383	0.005000	-0.006257	1.226810	1139.	1142.	0.452019E+02	0.140214E+02	1114.	1151.	1126.	1163.	1017.	1051.	1017.	1031. 960.
31.	0.001373	0.005000	-0.006267	1.195584	1146.	1148.	0.453685E+02	0.136655E+02	1121.	1157.	1133.	1169.	1026.	1058.	1027.	1040. 970.
32.	0.001363	0.005000	-0.006277	1.165048	1152.	1155.	0.455141E+02	0.133188E+02	1128.	1163.	1140.	1175.	1034.	1066.	1036.	1050. 980.
33.	0.001353	0.005000	-0.006287	1.135326	1158.	1161.	0.456259E+02	0.129807E+02	1135.	1169.	1146.	1181.	1042.	1073.	1046.	1059. 989.
34.	0.001343	0.005000	-0.006297	1.106173	1164.	1166.	0.456947E+02	0.126508E+02	1141.	1174.	1153.	1186.	1050.	1080.	1055.	1068. 998.
35.	0.001333	0.005000	-0.006308	1.077671	1170.	1172.	0.457210E+02	0.123280E+02	1148.	1180.	1159.	1192.	1058.	1087.	1063.	1076. 1007.
36.	0.001322	0.005000	-0.006318	1.049879	1175.	1178.	0.457113E+02	0.120126E+02	1154.	1185.	1165.	1197.	1066.	1094.	1072.	1085. 1016.
37.	0.001312	0.005000	-0.006328	1.022659	1181.	1183.	0.456733E+02	0.117043E+02	1160.	1191.	1171.	1202.	1074.	1101.	1080.	1093. 1025.
38.	0.001302	0.005000	-0.006338	0.996259	1186.	1188.	0.456128E+02	0.114034E+02	1166.	1196.	1177.	1207.	1081.	1107.	1088.	1101. 1033.
39.	0.001292	0.005000	-0.006348	0.970528	1191.	1193.	0.455322E+02	0.111102E+02	1172.	1201.	1182.	1212.	1088.	1114.	1096.	1108. 1042.
40.	0.001282	0.005000	-0.006358	0.945335	1196.	1198.	0.454299E+02	0.108240E+02	1177.	1206.	1188.	1216.	1095.	1120.	1104.	1116. 1050.
41.	0.001272	0.005000	-0.006368	0.920887	1201.	1203.	0.453045E+02	0.105449E+02	1183.	1210.	1193.	1221.	1102.	1126.	1111.	1123. 1058.
42.	0.001262	0.005000	-0.006378	0.897079	1206.	1208.	0.451550E+02	0.102730E+02	1188.	1215.	1198.	1225.	1109.	1132.	1118.	1130. 1065.
43.	0.001251	0.005000	-0.006389	0.873689	1210.	1212.	0.449827E+02	0.100076E+02	1193.	1219.	1203.	1230.	1115.	1138.	1125.	1137. 1073.
44.	0.001241	0.005000	-0.006399	0.850997	1215.	1217.	0.447894E+02	0.974850E+01	1198.	1224.	1208.	1234.	1122.	1143.	1132.	1144. 1080.
45.	0.001231	0.005000	-0.006409	0.828963	1219.	1221.	0.445779E+02	0.949615E+01	1203.	1228.	1213.	1238.	1128.	1149.	1139.	1150. 1087.
46.	0.001221	0.005000	-0.006419	0.807386	1224.	1225.	0.443500E+02	0.925022E+01	1208.	1232.	1217.	1242.	1134.	1154.	1145.	1157. 1095.
47.	0.001211	0.005000	-0.006429	0.786377	1228.	1230.	0.441066E+02	0.901033E+01	1212.	1236.	1222.	1246.	1140.	1160.	1152.	1163. 1101.
48.	0.001200	0.005000	-0.006440	0.765997	1232.	1234.	0.438483E+02	0.877666E+01	1217.	1240.	1226.	1249.	1146.	1165.	1158.	1169. 1108.
49.	0.001190	0.005000	-0.006450	0.746161	1236.	1237.	0.435754E+02	0.854926E+01	1221.	1244.	1230.	1253.	1152.	1170.	1164.	1174. 1115.
50.	0.001180	0.005000	-0.006460	0.726756	1240.	1241.	0.432885E+02	0.832759E+01	1225.	1247.	1234.	1256.	1158.	1175.	1170.	1180. 1121.
51.	0.001170	0.005000	-0.006470	0.707902	1243.	1245.	0.429882E+02	0.811160E+01	1230.	1251.	1238.	1260.	1163.	1180.	1175.	1186. 1127.
52.	0.001160	0.005000	-0.006480	0.689588	1247.	1248.	0.426759E+02	0.790130E+01	1234.	1254.	1242.	1263.	1168.	1185.	1181.	1191. 1134.
53.	0.001149	0.005000	-0.006491	0.671776	1250.	1252.	0.423527E+02	0.769669E+01	1237.	1258.	1246.	1266.	1174.	1189.	1186.	1196. 1140.
54.	0.001139	0.005000	-0.006501	0.654362	1254.	1255.	0.420193E+02	0.749734E+01	1241.	1261.	1250.	1269.	1179.	1194.	1191.	1201. 1145.
55.	0.001129	0.005000	-0.006511	0.637475	1257.	1259.	0.416763E+02	0.730323E+01	1245.	1264.	1253.	1272.	1184.	1198.	1196.	1206. 1151.
56.	0.001119	0.005000	-0.006521	0.621067	1260.	1262.	0.413246E+02	0.711443E+01	1249.	1267.	1257.	1275.	1188.	1203.	1201.	1211. 1157.
57.	0.001109	0.005000	-0.006531	0.605121	1264.	1265.	0.409647E+02	0.693078E+01	1252.	1270.	1260.	1278.	1193.	1207.	1206.	1215. 1162.
58.	0.001099	0.005000	-0.006541	0.589550	1267.	1268.	0.405972E+02	0.675209E+01	1256.	1273.	1263.	1281.	1198.	1211.	1211.	1220. 1168.
59.	0.001089	0.005000	-0.006552	0.574410	1270.	1271.	0.402226E+02	0.657805E+01	1259.	1276.	1266.	1284.	1202.	1215.	1215.	1224. 1173.
60.	0.001079	0.005000	-0.006562	0.559728	1273.	1274.	0.398416E+02	0.640877E+01	1262.	1279.	1270.	1287.	1207.	1219.	1220.	1229. 1178.
61.	0.001069	0.005000	-0.006571	0.545474	1276.	1277.	0.394551E+02	0.624423E+01	1265.	1282.	1273.	1289.	1211.	1223.	1224.	1233. 1183.

62.	0.001059	0.005000	-0.006581	0.5316151278.1280.	0.390634E+02	0.608430E+011268.1284.1275.1292.1215.1227.1228.1237.1189.
63.	0.001049	0.005000	-0.006591	0.5180801281.1282.	0.386672E+02	0.592875E+011271.1287.1278.1294.1219.1231.1232.1241.1192.
64.	0.001039	0.005000	-0.006601	0.5049141284.1285.	0.382666E+02	0.577727E+011274.1290.1281.1297.1223.1234.1236.1244.1197.
65.	0.001029	0.005000	-0.006611	0.4921511286.1287.	0.378623E+02	0.562994E+011277.1292.1284.1299.1227.1238.1240.1248.1202.
66.	0.001019	0.005000	-0.006621	0.4797681289.1290.	0.374548E+02	0.548677E+011280.1294.1287.1301.1231.1241.1244.1252.1206.
67.	0.001010	0.005000	-0.006631	0.4677441291.1292.	0.370446E+02	0.534770E+011283.1297.1289.1303.1235.1245.1247.1255.1210.
68.	0.001000	0.005000	-0.006640	0.4560641294.1295.	0.366321E+02	0.521259E+011285.1299.1292.1305.1238.1248.1251.1259.1215.
69.	0.000990	0.005000	-0.006650	0.4446611296.1297.	0.362178E+02	0.508129E+011288.1301.1294.1308.1242.1251.1254.1262.1219.
70.	0.000980	0.005000	-0.006660	0.4335371298.1299.	0.358017E+02	0.495338E+011290.1303.1296.1310.1245.1255.1258.1265.1223.
71.	0.000971	0.005000	-0.006669	0.4227611301.1302.	0.353844E+02	0.482896E+011293.1306.1299.1312.1249.1258.1261.1268.1227.
72.	0.000961	0.005000	-0.006679	0.4123111303.1304.	0.349661E+02	0.470805E+011295.1308.1301.1314.1252.1261.1264.1271.1230.
73.	0.000952	0.005000	-0.006688	0.4021691305.1306.	0.345474E+02	0.459062E+011298.1310.1303.1315.1255.1264.1267.1274.1234.
74.	0.000943	0.005000	-0.006697	0.3923191307.1308.	0.341285E+02	0.447658E+011300.1312.1305.1317.1259.1267.1270.1277.1238.
75.	0.000934	0.005000	-0.006706	0.3827481309.1310.	0.337097E+02	0.436580E+011302.1314.1308.1319.1262.1270.1273.1280.1241.
76.	0.000925	0.005000	-0.006716	0.3734371311.1312.	0.332914E+02	0.425819E+011304.1315.1310.1321.1265.1272.1276.1283.1245.
77.	0.000915	0.005000	-0.006725	0.3643281313.1314.	0.328735E+02	0.415346E+011306.1317.1312.1323.1268.1275.1279.1286.1248.
78.	0.000906	0.005000	-0.006734	0.3554881315.1316.	0.324565E+02	0.405152E+011308.1319.1314.1324.1271.1278.1282.1288.1252.
79.	0.000897	0.005000	-0.006743	0.3469011317.1317.	0.320405E+02	0.395237E+011310.1321.1315.1326.1273.1280.1285.1291.1255.
80.	0.000888	0.005000	-0.006752	0.3385701318.1319.	0.316256E+02	0.385602E+011312.1323.1317.1328.1276.1283.1287.1293.1258.
81.	0.000880	0.005000	-0.006761	0.3304821320.1321.	0.312122E+02	0.376242E+011314.1324.1319.1329.1279.1285.1290.1296.1261.
82.	0.000871	0.005000	-0.006769	0.3226251322.1323.	0.308007E+02	0.367152E+011316.1326.1321.1331.1282.1288.1292.1298.1264.
83.	0.000862	0.005000	-0.006778	0.3149941324.1324.	0.303914E+02	0.358321E+011318.1327.1323.1332.1284.1290.1295.1300.1267.
84.	0.000854	0.005000	-0.006786	0.3075761325.1326.	0.299840E+02	0.349742E+011320.1329.1324.1334.1287.1293.1297.1303.1270.
85.	0.000846	0.005000	-0.006794	0.3003611327.1328.	0.295790E+02	0.341403E+011322.1331.1326.1335.1289.1295.1299.1305.1273.
86.	0.000837	0.005000	-0.006803	0.2932901328.1329.	0.291762E+02	0.333286E+011323.1332.1328.1337.1291.1297.1301.1307.1276.
87.	0.000829	0.005000	-0.006811	0.2864211330.1331.	0.287758E+02	0.325379E+011325.1334.1329.1338.1294.1299.1304.1309.1278.
88.	0.000821	0.005000	-0.006820	0.2797521332.1332.	0.283780E+02	0.317688E+011327.1335.1331.1339.1296.1301.1306.1311.1281.
89.	0.000812	0.005000	-0.006828	0.2732711333.1334.	0.279831E+02	0.310210E+011328.1336.1332.1341.1298.1304.1308.1313.1284.
90.	0.000804	0.005000	-0.006836	0.2669661334.1335.	0.275911E+02	0.302939E+011330.1338.1334.1342.1301.1306.1310.1315.1286.
91.	0.000797	0.005000	-0.006844	0.2608311336.1336.	0.272022E+02	0.295868E+011331.1339.1335.1343.1303.1308.1312.1317.1289.
92.	0.000789	0.005000	-0.006851	0.2548701337.1338.	0.268164E+02	0.288993E+011333.1340.1337.1344.1305.1310.1314.1319.1291.
93.	0.000781	0.005000	-0.006859	0.2490731339.1339.	0.264338E+02	0.282308E+011334.1342.1338.1345.1307.1311.1316.1321.1293.
94.	0.000774	0.005000	-0.006866	0.2434371340.1340.	0.260545E+02	0.275808E+011336.1343.1339.1347.1309.1313.1318.1322.1296.
95.	0.000766	0.005000	-0.006874	0.2379551341.1342.	0.256785E+02	0.269485E+011337.1344.1341.1348.1311.1315.1319.1324.1298.
96.	0.000759	0.005000	-0.006881	0.2326171342.1343.	0.253061E+02	0.263335E+011338.1345.1342.1349.1313.1317.1321.1326.1300.
97.	0.000752	0.005000	-0.006888	0.2274191344.1344.	0.249371E+02	0.257351E+011340.1346.1343.1350.1315.1319.1323.1327.1302.
98.	0.000744	0.005000	-0.006896	0.2223351345.1345.	0.245716E+02	0.251526E+011341.1348.1344.1351.1316.1320.1325.1329.1304.
99.	0.000737	0.005000	-0.006903	0.2173731346.1347.	0.242097E+02	0.245846E+011342.1349.1346.1352.1318.1322.1326.1330.1306.
100.	0.000730	0.005000	-0.006910	0.2125471347.1348.	0.238514E+02	0.240309E+011343.1350.1347.1353.1320.1324.1328.1332.1308.
101.	0.000723	0.005000	-0.006917	0.2078521348.1349.	0.234968E+02	0.234920E+011345.1351.1348.1354.1322.1325.1329.1333.1310.
102.	0.000716	0.005000	-0.006924	0.2032871349.1350.	0.231460E+02	0.229673E+011346.1352.1349.1355.1323.1327.1331.1335.1312.
103.	0.000710	0.005000	-0.006930	0.1988381350.1351.	0.227990E+02	0.224567E+011347.1353.1350.1356.1325.1329.1332.1336.1314.
104.	0.000703	0.005000	-0.006937	0.1945071352.1352.	0.224558E+02	0.219597E+011348.1354.1351.1357.1327.1330.1334.1338.1316.
105.	0.000697	0.005000	-0.006943	0.1902901353.1353.	0.221164E+02	0.214755E+011349.1355.1352.1358.1328.1332.1335.1339.1318.
106.	0.000690	0.005000	-0.006950	0.1861771354.1354.	0.217809E+02	0.210042E+011350.1356.1353.1359.1330.1333.1337.1340.1320.
107.	0.000684	0.005000	-0.006956	0.1821701355.1355.	0.214490E+02	0.205449E+011351.1357.1354.1360.1331.1334.1338.1342.1321.
108.	0.000678	0.005000	-0.006962	0.1782571356.1356.	0.211212E+02	0.200974E+011352.1358.1355.1361.1333.1336.1339.1343.1323.
109.	0.000672	0.005000	-0.006969	0.1744451357.1357.	0.207973E+02	0.196612E+011353.1359.1356.1361.1334.1337.1341.1344.1325.
110.	0.000666	0.005000	-0.006975	0.1707271357.1358.	0.204772E+02	0.192360E+011355.1360.1357.1362.1336.1339.1342.1345.1326.
111.	0.000660	0.005000	-0.006980	0.1671081358.1359.	0.201610E+02	0.188216E+011355.1361.1358.1363.1337.1340.1343.1347.1328.
112.	0.000654	0.005000	-0.006986	0.1635791359.1360.	0.198488E+02	0.184179E+011356.1361.1359.1364.1338.1341.1344.1348.1329.
113.	0.000648	0.005000	-0.006992	0.1601361360.1361.	0.195404E+02	0.180244E+011357.1362.1360.1365.1340.1342.1346.1349.1331.
114.	0.000643	0.005000	-0.006997	0.1567831361.1361.	0.192359E+02	0.176409E+011358.1363.1361.1366.1341.1344.1347.1350.1332.
115.	0.000637	0.005000	-0.007003	0.1535051362.1362.	0.189352E+02	0.172669E+011359.1364.1362.1366.1342.1345.1348.1351.1334.
116.	0.000632	0.005000	-0.007008	0.1503121363.1363.	0.186385E+02	0.169023E+011360.1365.1362.1367.1343.1346.1349.1352.1335.
117.	0.000626	0.005000	-0.007014	0.1471691364.1364.	0.183454E+02	0.165462E+011361.1365.1363.1368.1345.1347.1350.1353.1337.
118.	0.000621	0.005000	-0.007019	0.1441051364.1365.	0.180562E+02	0.161982E+011362.1366.1364.1368.1346.1348.1351.1354.1338.
119.	0.000615	0.005000	-0.007025	0.1411241365.1365.	0.177710E+02	0.158585E+011363.1367.1365.1369.1347.1349.1352.1355.1339.
120.	0.000610	0.005000	-0.007030	0.1382081366.1366.	0.174894E+02	0.155270E+011363.1368.1366.1370.1348.1351.1353.1356.1341.
121.	0.000605	0.005000	-0.007035	0.1353671367.1367.	0.172116E+02	0.152036E+011364.1368.1366.1370.1349.1352.1354.1357.1342.
122.	0.000600	0.005000	-0.007040	0.1325991367.1368.	0.169376E+02	0.148882E+011365.1369.1367.1371.1350.1353.1355.1358.1343.
123.	0.000595	0.005000	-0.007045	0.1298921368.1368.	0.166674E+02	0.145805E+011366.1370.1368.1372.1351.1354.1356.1359.1344.
124.	0.000591	0.005000	-0.007049	0.1272511369.1369.	0.164008E+02	0.142800E+011367.1370.1369.1372.1352.1355.1357.1360.1346.
125.	0.000586	0.005000	-0.007054	0.1246731369.1370.	0.161380E+02	0.139868E+011367.1371.1369.1373.1353.1356.1358.1361.1347.
126.	0.000581	0.005000	-0.007059	0.1221521370.1370.	0.158798E+02	0.137006E+011368.1372.1370.1374.1354.1357.1359.1361.1348.
127.	0.000577	0.005000	-0.007063	0.1196971371.1371.	0.156257E+02	0.134212E+011369.1372.1371.1374.1355.1358.1360.1362.1349.

128.	0.000573	0.005000	-0.007067	0.1173021371.1372.	0.153749E+02	0.131485E+011369.1373.1371.1375.1356.1358.1361.1363.1350.
129.	0.000568	0.005000	-0.007072	0.1149541372.1372.	0.151274E+02	0.128824E+011370.1373.1372.1375.1357.1359.1362.1364.1351.
130.	0.000564	0.005000	-0.007076	0.1126591373.1373.	0.148832E+02	0.126223E+011371.1374.1372.1376.1358.1360.1362.1365.1352.
131.	0.000560	0.005000	-0.007080	0.1104191373.1374.	0.146423E+02	0.123681E+011371.1375.1373.1376.1359.1361.1363.1365.1353.
132.	0.000556	0.005000	-0.007084	0.1082271374.1374.	0.144049E+02	0.121199E+011372.1375.1374.1377.1360.1362.1364.1366.1354.
133.	0.000552	0.005000	-0.007088	0.1060841374.1375.	0.141712E+02	0.118773E+011373.1376.1374.1377.1361.1363.1366.1367.1355.
134.	0.000548	0.005000	-0.007092	0.1039871375.1375.	0.139409E+02	0.116401E+011373.1376.1375.1378.1362.1364.1366.1368.1356.
135.	0.000544	0.005000	-0.007096	0.1019391376.1376.	0.137141E+02	0.114083E+011374.1377.1375.1378.1363.1364.1366.1368.1357.
136.	0.000540	0.005000	-0.007100	0.0999421376.1376.	0.134906E+02	0.111819E+011374.1377.1376.1379.1363.1365.1367.1369.1358.
137.	0.000536	0.005000	-0.007104	0.0979821377.1377.	0.132704E+02	0.109606E+011375.1378.1377.1379.1364.1366.1368.1370.1359.
138.	0.000532	0.005000	-0.007108	0.0960651377.1377.	0.130533E+02	0.107441E+011376.1378.1377.1380.1365.1367.1369.1370.1360.
139.	0.000529	0.005000	-0.007111	0.0941891378.1378.	0.128395E+02	0.105323E+011376.1379.1378.1380.1366.1367.1369.1371.1361.
140.	0.000525	0.005000	-0.007115	0.0923561378.1379.	0.126289E+02	0.103253E+011377.1379.1378.1381.1367.1368.1370.1372.1362.
141.	0.000522	0.005000	-0.007118	0.0905651379.1379.	0.124214E+02	0.101229E+011377.1380.1379.1381.1367.1369.1371.1372.1362.
142.	0.000518	0.005000	-0.007122	0.0888071379.1380.	0.122172E+02	0.992523E+001378.1380.1379.1382.1368.1370.1371.1373.1363.
143.	0.000515	0.005000	-0.007125	0.0870891380.1380.	0.120160E+02	0.973231E+001378.1381.1380.1382.1369.1370.1372.1374.1364.
144.	0.000512	0.005000	-0.007128	0.0854101380.1380.	0.118179E+02	0.954332E+001379.1381.1380.1383.1369.1371.1373.1374.1365.
145.	0.000508	0.005000	-0.007132	0.0837661381.1381.	0.116228E+02	0.935836E+001379.1382.1381.1383.1370.1372.1373.1375.1366.
146.	0.000505	0.005000	-0.007135	0.0821641381.1381.	0.114307E+02	0.917734E+001380.1382.1381.1383.1371.1372.1374.1375.1366.
147.	0.000502	0.005000	-0.007138	0.0805941382.1382.	0.112415E+02	0.900030E+001380.1383.1381.1384.1371.1373.1374.1376.1367.
148.	0.000499	0.005000	-0.007141	0.0790501382.1382.	0.110553E+02	0.882700E+001381.1383.1382.1384.1372.1373.1375.1376.1368.
149.	0.000496	0.005000	-0.007144	0.0775451383.1383.	0.108719E+02	0.865738E+001381.1383.1382.1385.1373.1374.1376.1377.1369.
150.	0.000493	0.005000	-0.007147	0.0760661383.1383.	0.106914E+02	0.849129E+001382.1384.1383.1385.1373.1375.1376.1378.1369.
151.	0.000490	0.005000	-0.007150	0.0746181383.1384.	0.105137E+02	0.832870E+001382.1384.1383.1385.1374.1375.1377.1378.1370.
152.	0.000487	0.005000	-0.007153	0.0731931384.1384.	0.103387E+02	0.816929E+001382.1385.1384.1386.1374.1376.1377.1379.1371.
153.	0.000484	0.005000	-0.007156	0.0718011384.1384.	0.101665E+02	0.801297E+001383.1385.1384.1386.1375.1376.1378.1379.1371.
154.	0.000482	0.005000	-0.007158	0.0704431385.1385.	0.999694E+01	0.786009E+001383.1385.1384.1387.1376.1377.1378.1380.1372.
155.	0.000479	0.005000	-0.007161	0.0691051385.1385.	0.983006E+01	0.771028E+001384.1386.1385.1387.1376.1377.1379.1380.1372.
156.	0.000476	0.005000	-0.007164	0.0677971385.1385.	0.966582E+01	0.756353E+001384.1386.1385.1387.1377.1378.1379.1380.1373.
157.	0.000474	0.005000	-0.007166	0.0665211386.1386.	0.950417E+01	0.741996E+001384.1386.1385.1387.1377.1378.1380.1381.1374.
158.	0.000471	0.005000	-0.007169	0.0652661386.1386.	0.934508E+01	0.727931E+001385.1387.1386.1388.1378.1379.1380.1381.1374.
159.	0.000469	0.005000	-0.007171	0.0640461386.1386.	0.918851E+01	0.714167E+001385.1387.1386.1388.1378.1379.1381.1382.1375.
160.	0.000466	0.005000	-0.007174	0.0628461387.1387.	0.903445E+01	0.700700E+001386.1387.1387.1388.1379.1380.1381.1382.1375.
161.	0.000464	0.005000	-0.007176	0.0616731387.1387.	0.888284E+01	0.687511E+001386.1388.1387.1389.1379.1380.1381.1383.1376.
162.	0.000462	0.005000	-0.007178	0.0605241387.1387.	0.873367E+01	0.674599E+001386.1388.1387.1389.1380.1381.1382.1383.1376.
163.	0.000459	0.005000	-0.007181	0.0593941388.1388.	0.858689E+01	0.661952E+001387.1388.1388.1389.1380.1381.1382.1383.1377.
164.	0.000457	0.005000	-0.007183	0.0582851388.1388.	0.844244E+01	0.649541E+001387.1389.1388.1390.1381.1382.1383.1384.1378.
165.	0.000455	0.005000	-0.007185	0.0572031388.1388.	0.830031E+01	0.637385E+001387.1389.1388.1390.1381.1382.1383.1384.1378.
166.	0.000453	0.005000	-0.007187	0.0561411389.1389.	0.816043E+01	0.625479E+001388.1389.1388.1390.1382.1383.1383.1385.1379.
167.	0.000451	0.005000	-0.007189	0.0550991389.1389.	0.802291E+01	0.613810E+001388.1390.1389.1390.1382.1383.1384.1385.1379.
168.	0.000449	0.005000	-0.007191	0.0540801389.1389.	0.788756E+01	0.602378E+001388.1390.1389.1391.1382.1383.1384.1385.1380.
169.	0.000447	0.005000	-0.007193	0.0530851389.1390.	0.775441E+01	0.591195E+001389.1390.1389.1391.1383.1384.1385.1386.1380.
170.	0.000445	0.005000	-0.007195	0.0521031390.1390.	0.762343E+01	0.580233E+001389.1390.1390.1391.1383.1384.1385.1386.1380.
171.	0.000443	0.005000	-0.007197	0.0511441390.1390.	0.749457E+01	0.569483E+001389.1391.1390.1391.1384.1385.1385.1386.1381.
172.	0.000441	0.005000	-0.007199	0.0502031390.1390.	0.736781E+01	0.558948E+001389.1391.1390.1392.1384.1385.1386.1387.1381.
173.	0.000439	0.005000	-0.007201	0.0492781391.1391.	0.724311E+01	0.548612E+001390.1391.1390.1392.1384.1385.1386.1387.1382.
174.	0.000437	0.005000	-0.007203	0.0483711391.1391.	0.712044E+01	0.538477E+001390.1391.1391.1392.1385.1386.1386.1387.1382.
175.	0.000435	0.005000	-0.007205	0.0474791391.1391.	0.699977E+01	0.528536E+001390.1392.1391.1392.1385.1386.1387.1388.1383.
176.	0.000434	0.005000	-0.007206	0.0466131391.1391.	0.688108E+01	0.518800E+001390.1392.1391.1393.1385.1386.1387.1388.1383.
177.	0.000432	0.005000	-0.007208	0.0457611392.1392.	0.676435E+01	0.509265E+001391.1392.1391.1393.1386.1387.1387.1388.1383.
178.	0.000431	0.005000	-0.007209	0.0449231392.1392.	0.664954E+01	0.499907E+001391.1392.1392.1393.1386.1387.1388.1389.1384.
179.	0.000429	0.005000	-0.007211	0.0441051392.1392.	0.653661E+01	0.490742E+001391.1393.1392.1393.1387.1387.1388.1389.1384.
180.	0.000428	0.005000	-0.007212	0.0433041392.1392.	0.642555E+01	0.481764E+001391.1393.1392.1393.1387.1388.1388.1389.1385.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544		0.01475992							0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821		0.02219312							0.0
1.	0.002740	0.000099	0.000001	0.000169	566.	566.	0.299421E-03	0.437788E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.002839	0.000198	0.000001	0.000488	566.	566.	0.948503E-03	0.133693E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
3.	0.002937	0.000297	0.000000	0.001793	566.	566.	0.315553E-02	0.443943E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
4.	0.003034	0.000396	-0.000002	0.008053	566.	566.	0.125706E-01	0.178729E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
5.	0.003119	0.000495	-0.000016	0.043955	566.	567.	0.615192E-01	0.884904E-01	567.	567.	567.	567.	566.	566.	566.	566.	566.
6.	0.003133	0.000594	-0.000103	0.271186	569.	571.	0.358536E+00	0.519874E+00	570.	572.	571.	572.	567.	567.	566.	566.	566.
7.	0.002782	0.000693	-0.000558	1.197372	583.	595.	0.193714E+01	0.279291E+01	588.	598.	594.	601.	574.	574.	567.	568.	567.
8.	0.002065	0.000792	-0.001372	1.387581	622.	641.	0.496988E+01	0.682671E+01	621.	644.	634.	653.	587.	590.	571.	573.	569.
9.	0.001836	0.000891	-0.001696	0.969917	653.	661.	0.642717E+01	0.809975E+01	638.	663.	648.	674.	598.	601.	577.	579.	573.
10.	0.001822	0.000990	-0.001809	0.886557	664.	667.	0.697387E+01	0.812009E+01	648.	672.	654.	680.	606.	610.	584.	586.	578.
11.	0.001764	0.001000	-0.001877	0.834360	670.	673.	0.726372E+01	0.796282E+01	654.	679.	660.	685.	612.	619.	590.	593.	583.
12.	0.001739	0.001000	-0.001901	0.777948	675.	677.	0.735553E+01	0.766375E+01	659.	683.	665.	689.	618.	626.	597.	600.	588.
13.	0.001734	0.001000	-0.001906	0.741707	679.	681.	0.745897E+01	0.738197E+01	663.	686.	668.	692.	622.	633.	603.	607.	593.
14.	0.001729	0.001000	-0.001911	0.727325	683.	684.	0.797240E+01	0.731532E+01	667.	689.	672.	695.	627.	639.	609.	613.	598.
15.	0.001712	0.001000	-0.001928	0.729379	686.	688.	0.884684E+01	0.742340E+01	671.	693.	677.	698.	632.	645.	615.	619.	603.
16.	0.001684	0.001000	-0.001956	0.727620	691.	693.	0.969625E+01	0.752334E+01	676.	698.	682.	703.	636.	650.	621.	625.	608.
17.	0.001655	0.001000	-0.001986	0.717406	696.	698.	0.103970E+02	0.755701E+01	681.	702.	687.	708.	641.	656.	626.	630.	613.
18.	0.001629	0.001000	-0.002011	0.702031	701.	703.	0.109243E+02	0.751808E+01	686.	707.	692.	712.	646.	661.	632.	636.	618.
19.	0.001609	0.001000	-0.002031	0.684119	705.	707.	0.112882E+02	0.741779E+01	691.	711.	696.	717.	650.	666.	637.	642.	623.
20.	0.001593	0.001000	-0.002047	0.665742	709.	711.	0.115646E+02	0.728136E+01	695.	715.	700.	720.	655.	670.	643.	647.	628.
21.	0.001582	0.001000	-0.002058	0.649080	713.	715.	0.118714E+02	0.713824E+01	699.	719.	705.	724.	659.	675.	648.	653.	633.
22.	0.001571	0.001000	-0.002069	0.634851	717.	718.	0.122432E+02	0.700395E+01	703.	722.	709.	727.	663.	679.	653.	658.	637.
23.	0.001560	0.001000	-0.002080	0.622197	720.	722.	0.126486E+02	0.687976E+01	707.	726.	712.	731.	668.	683.	658.	663.	642.
24.	0.001549	0.001000	-0.002091	0.610239	724.	726.	0.130482E+02	0.676149E+01	711.	729.	716.	734.	672.	688.	663.	668.	646.
25.	0.001538	0.001000	-0.002102	0.598346	728.	729.	0.134087E+02	0.664423E+01	715.	733.	720.	738.	676.	691.	668.	673.	651.
26.	0.001527	0.001000	-0.002113	0.586082	731.	733.	0.137116E+02	0.652389E+01	719.	736.	724.	741.	680.	695.	673.	678.	655.
27.	0.001516	0.001000	-0.002124	0.573665	735.	736.	0.139639E+02	0.639948E+01	723.	740.	728.	745.	684.	699.	678.	682.	659.
28.	0.001507	0.001000	-0.002134	0.561363	738.	739.	0.141498E+02	0.627265E+01	726.	743.	731.	749.	688.	703.	682.	687.	663.
29.	0.001497	0.001000	-0.002143	0.549414	741.	743.	0.144073E+02	0.614581E+01	730.	746.	735.	751.	692.	706.	687.	691.	668.
30.	0.001488	0.001000	-0.002152	0.537904	744.	746.	0.146243E+02	0.602088E+01	733.	749.	738.	754.	695.	710.	691.	696.	672.
31.	0.001480	0.001000	-0.002161	0.526786	747.	749.	0.148365E+02	0.589880E+01	736.	752.	741.	757.	699.	713.	695.	700.	676.
32.	0.001470	0.001000	-0.002170	0.515884	750.	752.	0.150362E+02	0.577946E+01	740.	755.	744.	760.	703.	716.	699.	704.	680.
33.	0.001462	0.001000	-0.002179	0.505233	753.	755.	0.152155E+02	0.566236E+01	743.	758.	748.	763.	706.	720.	703.	708.	684.
34.	0.001453	0.001000	-0.002187	0.494789	756.	757.	0.153719E+02	0.554721E+01	746.	761.	751.	765.	710.	723.	707.	712.	688.
35.	0.001444	0.001000	-0.002196	0.484526	759.	760.	0.155081E+02	0.543386E+01	749.	763.	754.	768.	713.	726.	711.	716.	692.
36.	0.001436	0.001000	-0.002204	0.474464	762.	763.	0.156291E+02	0.532231E+01	752.	766.	757.	771.	717.	729.	715.	720.	695.
37.	0.001427	0.001000	-0.002213	0.464626	764.	766.	0.157389E+02	0.521275E+01	755.	769.	759.	773.	720.	732.	719.	724.	699.
38.	0.001419	0.001000	-0.002221	0.455020	767.	768.	0.158393E+02	0.510536E+01	758.	771.	762.	776.	723.	735.	723.	727.	703.
39.	0.001411	0.001000	-0.002229	0.445575	770.	771.	0.159300E+02	0.500016E+01	761.	774.	765.	778.	726.	738.	726.	731.	706.
40.	0.001402	0.001000	-0.002238	0.436280	772.	773.	0.160090E+02	0.489684E+01	763.	776.	768.	781.	729.	741.	730.	734.	710.
41.	0.001394	0.001000	-0.002246	0.427215	775.	776.	0.160743E+02	0.479552E+01	766.	779.	770.	783.	733.	744.	733.	738.	713.
42.	0.001386	0.001000	-0.002254	0.418361	777.	778.	0.161273E+02	0.469627E+01	769.	781.	773.	785.	736.	746.	736.	741.	716.
43.	0.001378	0.001000	-0.002262	0.409707	779.	780.	0.161692E+02	0.459910E+01	771.	783.	775.	788.	739.	749.	740.	744.	720.
44.	0.001370	0.001000	-0.002270	0.401248	782.	783.	0.162013E+02	0.450402E+01	774.	786.	778.	790.	742.	752.	743.	747.	723.
45.	0.001362	0.001000	-0.002278	0.392981	784.	785.	0.162246E+02	0.441098E+01	776.	788.	780.	792.	744.	754.	746.	750.	726.
46.	0.001354	0.001000	-0.002286	0.384898	786.	787.	0.162398E+02	0.431997E+01	779.	790.	783.	794.	747.	757.	749.	753.	729.
47.	0.001346	0.001000	-0.002294	0.376995	788.	789.	0.162465E+02	0.423094E+01	781.	792.	785.	796.	750.	759.	752.	756.	732.
48.	0.001338	0.001000	-0.002302	0.369186	791.	791.	0.162446E+02	0.414372E+01	783.	794.	787.	798.	753.	762.	755.	759.	736.
49.	0.001330	0.001000	-0.002310	0.361538	793.	794.	0.162347E+02	0.405811E+01	785.	796.	789.	800.	755.	764.	758.	762.	739.
50.	0.001322	0.001000	-0.002318	0.354061	795.	796.	0.162168E+02	0.397422E+01	788.	798.	792.	802.	758.	767.	761.	765.	741.
51.	0.001314	0.001000	-0.002326	0.346755	797.	798.	0.161914E+02	0.389207E+01	790.	800.	794.	804.	761.	769.	763.	768.	744.
52.	0.001307	0.001000	-0.002334	0.339629	799.	799.	0.161591E+02	0.381173E+01	792.	802.	796.	806.	763.	771.	766.	770.	747.
53.	0.001299	0.001000	-0.002341	0.332681	801.	801.	0.161207E+02	0.373321E+01	794.	804.	798.	808.	766.	774.	769.	773.	750.
54.	0.001291	0.001000	-0.002349	0.325892	802.	803.	0.160761E+02	0.365651E+01	796.	806.	800.	809.	768.	776.	771.	775.	753.
55.	0.001284	0.001000	-0.002356	0.319260	804.	805.	0.160260E+02	0.358157E+01	798.	808.	802.	811.	770.	778.	774.	778.	755.
56.	0.001276	0.001000	-0.002364	0.312784	806.	807.	0.159711E+02	0.350832E+01	800.	809.	804.	813.	773.	780.	776.	780.	758.
57.	0.001269	0.001000	-0.002371	0.306453	808.	809.	0.159113E+02	0.343674E+01	802.	811.	805.	815.	775.	782.	779.	783.	760.
58.	0.001262	0.001000	-0.002378	0.300257	809.	810.	0.158459E+02	0.336675E+01	804.	813.	807.	816.	777.	784.	781.	785.	763.
59.	0.001254	0.001000	-0.002386	0.294131	811.	812.	0.157754E+02	0.329818E+01	806.	814.	809.	818.	780.	787.	783.	787.	765.
60.	0.001247	0.001000	-0.002393	0.288150	813.	814.	0.157000E+02	0.323095E+01	807.	816.	811.	819.	782.	789.	785.	789.	768.
61.	0.001239	0.001000	-0.002401	0.282312	814.	815.	0.156202E+02	0.316514E+01	809.	817.	812.	821.	784.	790.	788.	791.	770.

62.	0.001232	0.001000	-0.002408	0.276616	816.	817.	0.155364E+02	0.310080E+01	811.	819.	814.	822.	786.	792.	790.	794.	773.
63.	0.001225	0.001000	-0.002415	0.271054	818.	818.	0.154490E+02	0.303793E+01	812.	820.	816.	824.	788.	794.	792.	796.	775.
64.	0.001218	0.001000	-0.002422	0.265614	819.	820.	0.153582E+02	0.297651E+01	814.	822.	817.	825.	790.	796.	794.	798.	777.
65.	0.001211	0.001000	-0.002429	0.260298	821.	821.	0.152639E+02	0.291646E+01	816.	823.	819.	827.	792.	798.	796.	800.	779.
66.	0.001204	0.001000	-0.002436	0.255115	822.	823.	0.151665E+02	0.285778E+01	817.	825.	820.	828.	794.	800.	798.	802.	782.
67.	0.001197	0.001000	-0.002443	0.250052	823.	824.	0.150661E+02	0.280044E+01	819.	826.	822.	829.	796.	802.	800.	803.	784.
68.	0.001190	0.001000	-0.002450	0.245104	825.	826.	0.149628E+02	0.274442E+01	820.	828.	823.	831.	798.	803.	802.	805.	786.
69.	0.001184	0.001000	-0.002456	0.240271	826.	827.	0.148568E+02	0.268969E+01	822.	829.	825.	832.	800.	805.	804.	807.	788.
70.	0.001177	0.001000	-0.002463	0.235543	828.	828.	0.147485E+02	0.263621E+01	823.	830.	826.	833.	801.	807.	805.	809.	790.
71.	0.001170	0.001000	-0.002470	0.230927	829.	830.	0.146380E+02	0.258395E+01	825.	832.	828.	834.	803.	808.	807.	811.	792.
72.	0.001164	0.001000	-0.002476	0.226414	830.	831.	0.145255E+02	0.253288E+01	826.	833.	829.	836.	805.	810.	809.	812.	794.
73.	0.001157	0.001000	-0.002483	0.221964	832.	832.	0.144110E+02	0.248291E+01	827.	834.	830.	837.	807.	812.	811.	814.	796.
74.	0.001150	0.001000	-0.002490	0.217607	833.	833.	0.142945E+02	0.243391E+01	829.	835.	831.	838.	808.	813.	812.	816.	798.
75.	0.001144	0.001000	-0.002496	0.213352	834.	835.	0.141764E+02	0.238597E+01	830.	836.	833.	839.	810.	815.	814.	817.	800.
76.	0.001138	0.001000	-0.002502	0.209202	835.	836.	0.140568E+02	0.233909E+01	831.	838.	834.	840.	812.	816.	816.	819.	801.
77.	0.001131	0.001000	-0.002509	0.205151	836.	837.	0.139357E+02	0.229327E+01	833.	839.	835.	841.	813.	818.	817.	820.	803.
78.	0.001125	0.001000	-0.002515	0.201189	838.	838.	0.138135E+02	0.224850E+01	834.	840.	836.	842.	815.	819.	819.	822.	805.
79.	0.001119	0.001000	-0.002521	0.197321	839.	839.	0.136902E+02	0.220475E+01	835.	841.	838.	843.	816.	821.	820.	823.	807.
80.	0.001113	0.001000	-0.002527	0.193542	840.	840.	0.135658E+02	0.216200E+01	836.	842.	839.	845.	818.	822.	822.	825.	808.
81.	0.001107	0.001000	-0.002533	0.189844	841.	841.	0.134406E+02	0.212021E+01	837.	843.	840.	846.	819.	823.	823.	826.	810.
82.	0.001101	0.001000	-0.002539	0.186229	842.	842.	0.133145E+02	0.207936E+01	839.	844.	841.	847.	821.	825.	825.	827.	812.
83.	0.001095	0.001000	-0.002545	0.182697	843.	843.	0.131878E+02	0.203941E+01	840.	845.	842.	847.	822.	826.	826.	829.	813.
84.	0.001089	0.001000	-0.002551	0.179235	844.	845.	0.130605E+02	0.200036E+01	841.	846.	843.	848.	824.	827.	827.	830.	815.
85.	0.001084	0.001000	-0.002556	0.175846	845.	846.	0.129326E+02	0.196215E+01	842.	847.	844.	849.	825.	829.	829.	831.	816.
86.	0.001078	0.001000	-0.002562	0.172532	846.	847.	0.128044E+02	0.192477E+01	843.	848.	845.	850.	826.	830.	830.	833.	818.
87.	0.001072	0.001000	-0.002568	0.169296	847.	847.	0.126758E+02	0.188821E+01	844.	849.	846.	851.	828.	831.	831.	834.	819.
88.	0.001067	0.001000	-0.002573	0.166132	848.	848.	0.125470E+02	0.185247E+01	845.	850.	847.	852.	829.	832.	833.	835.	821.
89.	0.001062	0.001000	-0.002578	0.163042	849.	849.	0.124181E+02	0.181754E+01	846.	851.	848.	853.	830.	834.	834.	836.	822.
90.	0.001056	0.001000	-0.002584	0.160015	850.	850.	0.122891E+02	0.178339E+01	847.	852.	849.	854.	831.	835.	835.	838.	823.
91.	0.001051	0.001000	-0.002589	0.157062	851.	851.	0.121600E+02	0.174999E+01	848.	853.	850.	855.	833.	836.	836.	839.	825.
92.	0.001046	0.001000	-0.002594	0.154164	852.	852.	0.120310E+02	0.171734E+01	849.	853.	851.	856.	834.	837.	837.	840.	826.
93.	0.001041	0.001000	-0.002599	0.151334	853.	853.	0.119022E+02	0.168539E+01	850.	854.	852.	856.	835.	838.	839.	841.	827.
94.	0.001035	0.001000	-0.002605	0.148544	853.	854.	0.117735E+02	0.165413E+01	851.	855.	853.	857.	836.	839.	840.	842.	829.
95.	0.001030	0.001000	-0.002610	0.145802	854.	855.	0.116449E+02	0.162344E+01	852.	856.	854.	858.	837.	840.	841.	843.	830.
96.	0.001025	0.001000	-0.002615	0.143126	855.	855.	0.115167E+02	0.159337E+01	852.	857.	854.	859.	838.	841.	842.	844.	831.
97.	0.001020	0.001000	-0.002620	0.140503	856.	856.	0.113887E+02	0.156391E+01	853.	858.	855.	859.	840.	842.	843.	845.	833.
98.	0.001015	0.001000	-0.002625	0.137948	857.	857.	0.112611E+02	0.153510E+01	854.	858.	856.	860.	841.	843.	844.	846.	834.
99.	0.001010	0.001000	-0.002630	0.135444	857.	858.	0.111340E+02	0.150693E+01	855.	859.	857.	861.	842.	844.	845.	847.	835.
100.	0.001006	0.001000	-0.002634	0.132994	858.	859.	0.110074E+02	0.147936E+01	856.	860.	858.	862.	843.	845.	846.	848.	836.
101.	0.001001	0.001000	-0.002639	0.130602	859.	859.	0.108813E+02	0.145239E+01	857.	860.	858.	862.	844.	846.	847.	849.	837.
102.	0.000996	0.001000	-0.002644	0.128252	860.	860.	0.107557E+02	0.142600E+01	857.	861.	859.	863.	845.	847.	848.	850.	838.
103.	0.000992	0.001000	-0.002648	0.125957	860.	861.	0.106308E+02	0.140015E+01	858.	862.	860.	864.	846.	848.	849.	851.	839.
104.	0.000988	0.001000	-0.002653	0.123710	861.	861.	0.105064E+02	0.137486E+01	859.	863.	861.	864.	847.	849.	850.	852.	841.
105.	0.000983	0.001000	-0.002657	0.121502	862.	862.	0.103827E+02	0.135010E+01	860.	863.	861.	865.	848.	850.	851.	853.	842.
106.	0.000979	0.001000	-0.002661	0.119344	863.	863.	0.102598E+02	0.132583E+01	860.	864.	862.	866.	849.	851.	852.	854.	843.
107.	0.000975	0.001000	-0.002666	0.117232	863.	864.	0.101375E+02	0.130208E+01	861.	865.	863.	866.	850.	852.	852.	854.	844.
108.	0.000970	0.001000	-0.002670	0.115157	864.	864.	0.100160E+02	0.127882E+01	862.	865.	863.	867.	850.	853.	853.	855.	845.
109.	0.000966	0.001000	-0.002674	0.113128	865.	865.	0.989529E+01	0.125604E+01	862.	866.	864.	867.	851.	854.	854.	856.	846.
110.	0.000962	0.001000	-0.002678	0.111140	865.	865.	0.977537E+01	0.123373E+01	863.	866.	865.	868.	852.	854.	855.	857.	847.
111.	0.000958	0.001000	-0.002682	0.109196	866.	866.	0.965628E+01	0.121189E+01	864.	867.	865.	869.	853.	855.	856.	858.	848.
112.	0.000954	0.001000	-0.002686	0.107282	866.	867.	0.953803E+01	0.119047E+01	865.	868.	866.	869.	854.	856.	857.	858.	849.
113.	0.000950	0.001000	-0.002690	0.105410	867.	867.	0.942064E+01	0.116949E+01	865.	868.	867.	870.	855.	857.	857.	859.	849.
114.	0.000946	0.001000	-0.002694	0.103579	868.	868.	0.930414E+01	0.114893E+01	866.	869.	867.	870.	856.	858.	858.	860.	850.
115.	0.000942	0.001000	-0.002698	0.101775	868.	869.	0.918854E+01	0.112879E+01	866.	869.	868.	871.	856.	858.	859.	861.	851.
116.	0.000939	0.001000	-0.002701	0.100014	869.	869.	0.907385E+01	0.110904E+01	867.	870.	868.	871.	857.	859.	860.	861.	852.
117.	0.000935	0.001000	-0.002705	0.098283	869.	870.	0.896009E+01	0.108969E+01	868.	871.	869.	872.	858.	860.	860.	862.	853.
118.	0.000931	0.001000	-0.002709	0.096593	870.	870.	0.884726E+01	0.107071E+01	868.	871.	870.	872.	859.	861.	861.	863.	854.
119.	0.000928	0.001000	-0.002712	0.094922	870.	871.	0.873541E+01	0.105211E+01	869.	872.	870.	873.	859.	861.	862.	863.	855.
120.	0.000924	0.001000	-0.002716	0.093296	871.	871.	0.862450E+01	0.103387E+01	869.	872.	871.	873.	860.	862.	863.	864.	855.
121.	0.000921	0.001000	-0.002719	0.091693	872.	872.	0.851457E+01	0.101599E+01	870.	873.	871.	874.	861.	863.	863.	865.	856.
122.	0.000917	0.001000	-0.002723	0.090129	872.	872.	0.840562E+01	0.998469E+00	870.	873.	872.	874.	862.	863.	864.	865.	857.
123.	0.000914	0.001000	-0.002726	0.088590	873.	873.	0.829768E+01	0.981393E+00	871.	874.	872.	875.	862.	864.	865.	866.	858.
124.	0.000910	0.001000	-0.002730	0.087083	873.	873.	0.819073E+01	0.964596E+00	872.	874.	873.	875.	863.	865.	865.	867.	859.
125.	0.000907	0.001000	-0.002733	0.085599	874.	874.	0.808478E+01	0.948104E+00	872.	875.	873.	876.	864.	865.	866.	867.	859.
126.	0.000904	0.001000	-0.002736	0.084150	874.	874.	0.797985E+01	0.931911E+00	873.	875.	874.	876.	864.	866.	866.	868.	860.
127.	0.000901	0.001000	-0.002739	0.082733	875.	875.	0.787593E+01	0.916040E+00	873.	876.	874.	877.	865.	866.	867.	868.	861.

128.	0.000898	0.001000	-0.002742	0.081337	875.	875.	0.777304E+01	0.900474E+00	874.	876.	875.	877.	866.	867.	868.	869.	861.
129.	0.000895	0.001000	-0.002745	0.079980	876.	876.	0.767119E+01	0.885226E+00	874.	876.	875.	878.	866.	868.	868.	870.	862.
130.	0.000892	0.001000	-0.002748	0.078633	876.	876.	0.757037E+01	0.870273E+00	875.	877.	876.	878.	867.	868.	869.	870.	863.
131.	0.000889	0.001000	-0.002751	0.077316	876.	877.	0.747057E+01	0.855592E+00	875.	877.	876.	878.	867.	869.	869.	871.	863.
132.	0.000886	0.001000	-0.002754	0.076025	877.	877.	0.737180E+01	0.841185E+00	876.	878.	877.	879.	868.	869.	870.	871.	864.
133.	0.000883	0.001000	-0.002757	0.074749	877.	878.	0.727406E+01	0.827044E+00	876.	878.	877.	879.	869.	870.	871.	872.	865.
134.	0.000880	0.001000	-0.002760	0.073498	878.	878.	0.717732E+01	0.813133E+00	876.	879.	877.	880.	869.	870.	871.	872.	865.
135.	0.000877	0.001000	-0.002763	0.072267	878.	878.	0.708160E+01	0.799474E+00	877.	879.	878.	880.	870.	871.	872.	873.	866.
136.	0.000874	0.001000	-0.002766	0.071059	879.	879.	0.698690E+01	0.786057E+00	877.	879.	878.	880.	870.	872.	872.	873.	867.
137.	0.000871	0.001000	-0.002769	0.069874	879.	879.	0.689324E+01	0.772875E+00	878.	880.	879.	881.	871.	872.	873.	874.	867.
138.	0.000869	0.001000	-0.002771	0.068713	879.	880.	0.680057E+01	0.759947E+00	878.	880.	879.	881.	871.	873.	873.	874.	868.
139.	0.000866	0.001000	-0.002774	0.067570	880.	880.	0.670893E+01	0.747248E+00	879.	881.	879.	881.	872.	873.	874.	875.	868.
140.	0.000863	0.001000	-0.002777	0.066457	880.	880.	0.661833E+01	0.734800E+00	879.	881.	880.	882.	872.	874.	874.	875.	869.
141.	0.000861	0.001000	-0.002779	0.065360	880.	881.	0.652874E+01	0.722591E+00	879.	881.	880.	882.	873.	874.	874.	876.	869.
142.	0.000859	0.001000	-0.002781	0.064288	881.	881.	0.644016E+01	0.710615E+00	880.	882.	881.	882.	873.	875.	875.	876.	870.
143.	0.000856	0.001000	-0.002784	0.063231	881.	881.	0.635260E+01	0.698864E+00	880.	882.	881.	883.	874.	875.	875.	876.	871.
144.	0.000854	0.001000	-0.002786	0.062195	882.	882.	0.626605E+01	0.687325E+00	880.	882.	881.	883.	874.	875.	876.	877.	871.
145.	0.000851	0.001000	-0.002789	0.061170	882.	882.	0.618048E+01	0.675986E+00	881.	883.	882.	883.	875.	876.	876.	877.	872.
146.	0.000849	0.001000	-0.002791	0.060171	882.	882.	0.609590E+01	0.664841E+00	881.	883.	882.	884.	875.	876.	877.	878.	872.
147.	0.000847	0.001000	-0.002793	0.059189	883.	883.	0.601231E+01	0.653914E+00	881.	883.	882.	884.	876.	877.	877.	878.	873.
148.	0.000844	0.001000	-0.002796	0.058223	883.	883.	0.592971E+01	0.643180E+00	882.	884.	883.	884.	876.	877.	878.	879.	873.
149.	0.000842	0.001000	-0.002798	0.057277	883.	883.	0.584810E+01	0.632645E+00	882.	884.	883.	885.	876.	878.	878.	879.	874.
150.	0.000840	0.001000	-0.002800	0.056350	884.	884.	0.576746E+01	0.622308E+00	883.	884.	883.	885.	877.	878.	878.	879.	874.
151.	0.000838	0.001000	-0.002802	0.055437	884.	884.	0.568781E+01	0.612167E+00	883.	884.	884.	885.	877.	878.	879.	880.	875.
152.	0.000836	0.001000	-0.002804	0.054532	884.	884.	0.560910E+01	0.602190E+00	883.	885.	884.	886.	878.	879.	879.	880.	875.
153.	0.000834	0.001000	-0.002806	0.053650	884.	885.	0.553134E+01	0.592372E+00	883.	885.	884.	886.	878.	879.	880.	880.	875.
154.	0.000832	0.001000	-0.002808	0.052783	885.	885.	0.545453E+01	0.582741E+00	884.	885.	884.	886.	879.	880.	880.	881.	876.
155.	0.000830	0.001000	-0.002810	0.051926	885.	885.	0.537865E+01	0.573269E+00	884.	886.	885.	886.	879.	880.	880.	881.	876.
156.	0.000828	0.001000	-0.002812	0.051091	885.	885.	0.530371E+01	0.563971E+00	884.	886.	885.	887.	879.	880.	881.	881.	877.
157.	0.000826	0.001000	-0.002814	0.050269	886.	886.	0.522970E+01	0.554843E+00	885.	886.	885.	887.	880.	881.	881.	882.	877.
158.	0.000824	0.001000	-0.002816	0.049460	886.	886.	0.515661E+01	0.545871E+00	885.	886.	886.	887.	880.	881.	881.	882.	878.
159.	0.000822	0.001000	-0.002818	0.048671	886.	886.	0.508442E+01	0.537068E+00	885.	887.	886.	887.	880.	881.	882.	882.	878.
160.	0.000821	0.001000	-0.002819	0.047892	886.	887.	0.501320E+01	0.528432E+00	886.	887.	886.	888.	881.	882.	882.	883.	878.
161.	0.000819	0.001000	-0.002821	0.047122	887.	887.	0.494283E+01	0.519926E+00	886.	887.	886.	888.	881.	882.	882.	883.	879.
162.	0.000817	0.001000	-0.002823	0.046369	887.	887.	0.487336E+01	0.511571E+00	886.	887.	887.	888.	881.	882.	883.	883.	879.
163.	0.000815	0.001000	-0.002825	0.045623	887.	887.	0.480476E+01	0.503351E+00	886.	888.	887.	888.	882.	883.	883.	884.	880.
164.	0.000813	0.001000	-0.002827	0.044895	887.	888.	0.473703E+01	0.495264E+00	887.	888.	887.	889.	882.	883.	883.	884.	880.
165.	0.000812	0.001000	-0.002828	0.044177	888.	888.	0.467016E+01	0.487318E+00	887.	888.	887.	889.	883.	883.	884.	884.	880.
166.	0.000810	0.001000	-0.002830	0.043473	888.	888.	0.460417E+01	0.479515E+00	887.	888.	888.	889.	883.	884.	884.	885.	881.
167.	0.000809	0.001000	-0.002831	0.042780	888.	888.	0.453902E+01	0.471841E+00	887.	889.	888.	889.	883.	884.	884.	885.	881.
168.	0.000807	0.001000	-0.002833	0.042102	888.	888.	0.447471E+01	0.464307E+00	888.	889.	888.	889.	883.	884.	885.	885.	881.
169.	0.000806	0.001000	-0.002834	0.041436	889.	889.	0.441125E+01	0.456911E+00	888.	889.	888.	890.	884.	885.	885.	885.	882.
170.	0.000804	0.001000	-0.002836	0.040777	889.	889.	0.434862E+01	0.449637E+00	888.	889.	889.	890.	884.	885.	885.	886.	882.
171.	0.000803	0.001000	-0.002837	0.040137	889.	889.	0.428681E+01	0.442490E+00	888.	890.	889.	890.	884.	885.	885.	886.	882.
172.	0.000801	0.001000	-0.002839	0.039501	889.	889.	0.422581E+01	0.435476E+00	889.	890.	889.	890.	885.	885.	886.	886.	883.
173.	0.000799	0.001000	-0.002841	0.038872	889.	890.	0.416559E+01	0.428560E+00	889.	890.	889.	890.	885.	886.	886.	887.	883.
174.	0.000798	0.001000	-0.002842	0.038255	890.	890.	0.410617E+01	0.421747E+00	889.	890.	890.	891.	885.	886.	886.	887.	883.
175.	0.000797	0.001000	-0.002843	0.037652	890.	890.	0.404753E+01	0.415055E+00	889.	890.	890.	891.	886.	886.	886.	887.	884.
176.	0.000795	0.001000	-0.002845	0.037057	890.	890.	0.398967E+01	0.408479E+00	889.	891.	890.	891.	886.	887.	887.	887.	884.
177.	0.000794	0.001000	-0.002846	0.036468	890.	890.	0.393258E+01	0.402004E+00	890.	891.	890.	891.	886.	887.	887.	888.	884.
178.	0.000792	0.001000	-0.002848	0.035893	891.	891.	0.387625E+01	0.395632E+00	890.	891.	890.	891.	886.	887.	887.	888.	885.
179.	0.000791	0.001000	-0.002849	0.035329	891.	891.	0.382067E+01	0.389377E+00	890.	891.	891.	892.	887.	887.	887.	888.	885.
180.	0.000790	0.001000	-0.002850	0.034777	891.	891.	0.376585E+01	0.383239E+00	890.	891.	891.	892.	887.	888.	888.	888.	885.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

ME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992								0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312								0.0
1.	0.002740	0.000099	0.000001	0.000169	566.	566.	0.299421E-03	0.437788E-03	566.	566.	566.	566.	566.	566.	566.	566.	566.
2.	0.002839	0.000198	0.000001	0.000488	566.	566.	0.948503E-03	0.133693E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
3.	0.002937	0.000297	0.000000	0.001793	566.	566.	0.315553E-02	0.443943E-02	566.	566.	566.	566.	566.	566.	566.	566.	566.
4.	0.003034	0.000396	-0.000002	0.008053	566.	566.	0.125706E-01	0.178729E-01	566.	566.	566.	566.	566.	566.	566.	566.	566.
5.	0.003119	0.000495	-0.000016	0.043955	566.	567.	0.615192E-01	0.884904E-01	567.	567.	567.	567.	566.	566.	566.	566.	566.
6.	0.003133	0.000594	-0.000103	0.271186	569.	571.	0.358536E+00	0.519874E+00	570.	572.	571.	572.	567.	567.	566.	566.	566.
7.	0.002782	0.000693	-0.000528	1.197372	583.	595.	0.193714E+01	0.279291E+01	588.	598.	594.	601.	574.	574.	567.	568.	567.
8.	0.002065	0.000792	-0.001372	1.387581	622.	641.	0.496988E+01	0.682671E+01	621.	644.	634.	653.	587.	590.	571.	573.	569.
9.	0.001836	0.000891	-0.001696	0.969917	655.	661.	0.642717E+01	0.809975E+01	638.	663.	648.	674.	598.	601.	577.	579.	573.
10.	0.001822	0.000990	-0.001809	0.886557	664.	667.	0.697387E+01	0.812009E+01	648.	672.	654.	680.	606.	610.	584.	586.	578.
11.	0.001838	0.001089	-0.001891	0.885229	671.	674.	0.731037E+01	0.803360E+01	655.	679.	661.	686.	612.	619.	590.	593.	583.
12.	0.001855	0.001188	-0.001973	0.902377	678.	681.	0.760869E+01	0.802773E+01	662.	687.	668.	693.	619.	627.	597.	600.	588.
13.	0.001865	0.001287	-0.002063	0.927565	686.	689.	0.802780E+01	0.815904E+01	669.	695.	676.	702.	625.	635.	604.	607.	594.
14.	0.001862	0.001386	-0.002165	0.966062	694.	698.	0.891254E+01	0.854197E+01	678.	704.	685.	711.	632.	644.	610.	614.	599.
15.	0.001842	0.001485	-0.002284	1.013141	704.	708.	0.101805E+02	0.909433E+01	687.	714.	694.	721.	638.	652.	617.	622.	605.
16.	0.001812	0.001584	-0.002413	1.047450	714.	719.	0.114190E+02	0.960499E+01	697.	724.	705.	732.	646.	661.	625.	629.	611.
17.	0.001786	0.001683	-0.002538	1.068220	725.	729.	0.124894E+02	0.100040E+02	706.	735.	715.	743.	653.	670.	632.	637.	617.
18.	0.001768	0.001782	-0.002655	1.083660	735.	740.	0.133883E+02	0.103042E+02	716.	746.	725.	754.	661.	678.	640.	645.	624.
19.	0.001756	0.001881	-0.002766	1.098250	745.	750.	0.141573E+02	0.105409E+02	726.	756.	734.	764.	669.	687.	648.	654.	631.
20.	0.001748	0.001980	-0.002873	1.113856	755.	760.	0.148851E+02	0.107505E+02	735.	766.	744.	774.	677.	696.	656.	662.	638.
21.	0.001741	0.002079	-0.002979	1.131612	765.	770.	0.156882E+02	0.109632E+02	745.	776.	754.	785.	685.	705.	664.	670.	645.
22.	0.001734	0.002178	-0.003085	1.151195	776.	780.	0.165902E+02	0.111892E+02	755.	786.	764.	795.	693.	714.	673.	679.	652.
23.	0.001725	0.002277	-0.003192	1.170553	786.	790.	0.175459E+02	0.114211E+02	765.	797.	774.	806.	701.	723.	681.	688.	659.
24.	0.001716	0.002376	-0.003300	1.188608	796.	801.	0.185035E+02	0.116473E+02	775.	808.	784.	817.	709.	732.	690.	697.	667.
25.	0.001708	0.002474	-0.003408	1.205090	807.	812.	0.194270E+02	0.118601E+02	785.	818.	795.	828.	718.	741.	699.	706.	674.
26.	0.001700	0.002573	-0.003515	1.220602	817.	822.	0.203019E+02	0.120575E+02	795.	829.	805.	839.	727.	750.	708.	715.	682.
27.	0.001693	0.002672	-0.003621	1.235273	828.	833.	0.211412E+02	0.122420E+02	806.	840.	816.	850.	735.	760.	717.	724.	690.
28.	0.001686	0.002771	-0.003726	1.249476	839.	843.	0.219722E+02	0.124167E+02	816.	851.	826.	861.	744.	769.	726.	734.	698.
29.	0.001680	0.002870	-0.003831	1.263462	849.	854.	0.228128E+02	0.125850E+02	826.	861.	837.	872.	753.	778.	735.	743.	706.
30.	0.001674	0.002969	-0.003936	1.277234	860.	865.	0.236666E+02	0.127489E+02	837.	872.	847.	883.	762.	788.	745.	753.	715.
31.	0.001610	0.003000	-0.004031	1.244695	871.	875.	0.244934E+02	0.128564E+02	847.	883.	858.	893.	772.	797.	754.	763.	723.
32.	0.001564	0.003000	-0.004076	1.177730	880.	883.	0.251378E+02	0.127118E+02	855.	890.	866.	901.	780.	806.	764.	772.	732.
33.	0.001543	0.003000	-0.004097	1.135035	887.	889.	0.256622E+02	0.124477E+02	863.	897.	872.	907.	788.	814.	773.	782.	740.
34.	0.001530	0.003000	-0.004110	1.102851	893.	895.	0.261340E+02	0.121704E+02	869.	903.	879.	912.	796.	822.	782.	791.	749.
35.	0.001518	0.003000	-0.004122	1.075050	899.	901.	0.265830E+02	0.119078E+02	876.	908.	885.	918.	803.	829.	791.	800.	757.
36.	0.001506	0.003000	-0.004134	1.049387	904.	907.	0.270253E+02	0.116644E+02	882.	914.	892.	923.	810.	837.	799.	808.	765.
37.	0.001494	0.003000	-0.004146	1.024931	910.	913.	0.274678E+02	0.114376E+02	889.	919.	898.	929.	817.	843.	808.	817.	773.
38.	0.001481	0.003000	-0.004159	1.001310	916.	918.	0.278923E+02	0.112158E+02	895.	925.	904.	934.	824.	850.	816.	825.	781.
39.	0.001468	0.003000	-0.004172	0.977575	921.	924.	0.282697E+02	0.109861E+02	901.	930.	910.	939.	831.	857.	824.	833.	788.
40.	0.001456	0.003000	-0.004184	0.953579	927.	929.	0.285938E+02	0.107474E+02	907.	935.	916.	944.	838.	863.	832.	841.	796.
41.	0.001445	0.003000	-0.004195	0.930062	932.	934.	0.288708E+02	0.105037E+02	912.	940.	921.	949.	844.	869.	839.	848.	803.
42.	0.001435	0.003000	-0.004206	0.907259	937.	939.	0.291113E+02	0.102603E+02	918.	945.	927.	954.	851.	875.	847.	856.	810.
43.	0.001424	0.003000	-0.004216	0.885039	942.	944.	0.293259E+02	0.100204E+02	923.	950.	932.	959.	857.	881.	854.	863.	817.
44.	0.001414	0.003000	-0.004226	0.863559	947.	949.	0.295220E+02	0.978550E+01	929.	955.	937.	963.	863.	886.	861.	870.	824.
45.	0.001405	0.003000	-0.004235	0.842848	951.	953.	0.296995E+02	0.955638E+01	934.	959.	942.	968.	869.	892.	868.	877.	831.
46.	0.001395	0.003000	-0.004245	0.822693	956.	958.	0.298545E+02	0.933261E+01	939.	964.	947.	972.	875.	897.	875.	883.	838.
47.	0.001385	0.003000	-0.004255	0.802841	960.	962.	0.299831E+02	0.911300E+01	944.	968.	952.	976.	881.	902.	881.	890.	844.
48.	0.001375	0.003000	-0.004265	0.783458	965.	967.	0.300843E+02	0.889715E+01	949.	972.	957.	980.	887.	907.	887.	896.	850.
49.	0.001366	0.003000	-0.004274	0.764581	969.	971.	0.301599E+02	0.868546E+01	953.	976.	961.	984.	892.	912.	894.	902.	857.
50.	0.001356	0.003000	-0.004284	0.746143	973.	975.	0.302132E+02	0.847821E+01	958.	980.	966.	988.	898.	917.	900.	908.	863.
51.	0.001347	0.003000	-0.004293	0.728061	977.	979.	0.302471E+02	0.827524E+01	962.	984.	970.	992.	903.	922.	906.	914.	869.
52.	0.001337	0.003000	-0.004303	0.710483	981.	983.	0.302635E+02	0.807679E+01	966.	988.	974.	995.	908.	927.	911.	920.	875.
53.	0.001328	0.003000	-0.004312	0.693379	985.	986.	0.302637E+02	0.788305E+01	971.	991.	978.	999.	913.	931.	917.	925.	881.
54.	0.001319	0.003000	-0.004321	0.676739	988.	990.	0.302466E+02	0.769405E+01	975.	995.	982.	1002.	918.	936.	922.	930.	886.
55.	0.001309	0.003000	-0.004331	0.660385	992.	994.	0.302126E+02	0.750945E+01	979.	999.	986.	1006.	923.	940.	928.	936.	892.
56.	0.001300	0.003000	-0.004340	0.644456	996.	997.	0.301618E+02	0.732899E+01	983.	1002.	990.	1009.	928.	944.	933.	941.	897.
57.	0.001291	0.003000	-0.004349	0.628960	999.	1000.	0.300953E+02	0.715281E+01	986.	1005.	993.	1012.	933.	949.	938.	946.	903.
58.	0.001282	0.003000	-0.004359	0.613834	1002.	1004.	0.300144E+02	0.698089E+01	990.	1009.	997.	1016.	937.	953.	943.	951.	908.
59.	0.001272	0.003000	-0.004368	0.599095	1006.	1007.	0.299199E+02	0.681315E+01	994.	1012.	1001.	1019.	942.	957.	948.	955.	913.
60.	0.001263	0.003000	-0.004377	0.584632	1009.	1010.	0.298133E+02	0.664933E+01	997.	1015.	1004.	1022.	946.	961.	952.	960.	918.
61.	0.001254	0.003000	-0.004386	0.570572	1012.	1013.	0.296949E+02	0.648937E+01	1001.	1018.	1007.	1024.	950.	964.	957.	964.	923.

62.	0.001245	0.003000	-0.004395	0.5569021015.1016.	0.295651E+02	0.633338E+011004.1021.1010.1027. 955. 968. 961. 969. 927.
63.	0.001236	0.003000	-0.004404	0.5435981018.1019.	0.294246E+02	0.618138E+011007.1024.1014.1030. 959. 972. 965. 973. 932.
64.	0.001227	0.003000	-0.004414	0.5306191021.1022.	0.292736E+02	0.603325E+011010.1026.1017.1033. 963. 976. 970. 977. 937.
65.	0.001217	0.003000	-0.004423	0.5179021024.1025.	0.291129E+02	0.588874E+011013.1029.1020.1035. 967. 979. 974. 981. 941.
66.	0.001208	0.003000	-0.004432	0.5054891026.1028.	0.289429E+02	0.574757E+011017.1032.1023.1038. 970. 983. 978. 985. 946.
67.	0.001199	0.003000	-0.004441	0.4934331029.1030.	0.287644E+02	0.560989E+011019.1034.1025.1040. 974. 986. 982. 989. 950.
68.	0.001190	0.003000	-0.004450	0.4817121032.1033.	0.285779E+02	0.547575E+011022.1037.1028.1043. 978. 989. 986. 992. 954.
69.	0.001181	0.003000	-0.004459	0.4703001034.1035.	0.283842E+02	0.534509E+011025.1039.1031.1045. 982. 993. 989. 996. 958.
70.	0.001173	0.003000	-0.004468	0.4591891037.1038.	0.281837E+02	0.521786E+011028.1042.1034.1047. 985. 996. 993.1000. 962.
71.	0.001164	0.003000	-0.004476	0.4483531039.1040.	0.279767E+02	0.509394E+011031.1044.1036.1050. 989. 999. 996.1003. 966.
72.	0.001155	0.003000	-0.004485	0.4376981042.1043.	0.277634E+02	0.497297E+011033.1046.1039.1052. 992.1002.1000.1006. 970.
73.	0.001146	0.003000	-0.004494	0.4273521044.1045.	0.275443E+02	0.485487E+011036.1049.1041.1054. 995.1005.1003.1010. 974.
74.	0.001137	0.003000	-0.004503	0.4173031046.1047.	0.273199E+02	0.473977E+011038.1051.1043.1056. 999.1008.1006.1013. 978.
75.	0.001128	0.003000	-0.004512	0.4075341048.1049.	0.270907E+02	0.462771E+011041.1053.1046.1058.1002.1011.1010.1016. 981.
76.	0.001120	0.003000	-0.004520	0.3980301051.1051.	0.268572E+02	0.451865E+011043.1055.1048.1060.1005.1014.1013.1019. 985.
77.	0.001111	0.003000	-0.004529	0.3887781053.1054.	0.266197E+02	0.441251E+011045.1057.1050.1062.1008.1017.1016.1022. 988.
78.	0.001103	0.003000	-0.004537	0.3797731055.1056.	0.263786E+02	0.430918E+011048.1059.1052.1064.1011.1019.1019.1025. 992.
79.	0.001094	0.003000	-0.004546	0.3709631057.1058.	0.261341E+02	0.420853E+011050.1061.1055.1066.1014.1022.1022.1028. 995.
80.	0.001086	0.003000	-0.004554	0.3623461059.1060.	0.258862E+02	0.411027E+011052.1063.1057.1068.1017.1025.1025.1030. 998.
81.	0.001077	0.003000	-0.004563	0.3539621061.1061.	0.256357E+02	0.401443E+011054.1065.1059.1069.1019.1027.1027.1033.1001.
82.	0.001069	0.003000	-0.004571	0.3458061063.1063.	0.253824E+02	0.392103E+011056.1066.1061.1071.1022.1030.1030.1036.1004.
83.	0.001061	0.003000	-0.004579	0.3378861064.1065.	0.251271E+02	0.383010E+011058.1068.1063.1073.1025.1032.1033.1038.1007.
84.	0.001053	0.003000	-0.004587	0.3301811066.1067.	0.248698E+02	0.374162E+011060.1070.1064.1074.1027.1034.1035.1041.1010.
85.	0.001045	0.003000	-0.004595	0.3226841068.1069.	0.246110E+02	0.365553E+011062.1072.1066.1076.1030.1037.1038.1043.1013.
86.	0.001037	0.003000	-0.004603	0.3153891070.1070.	0.243509E+02	0.357174E+011064.1073.1068.1078.1032.1039.1040.1045.1016.
87.	0.001029	0.003000	-0.004611	0.3082841071.1072.	0.240895E+02	0.349017E+011066.1075.1070.1079.1035.1041.1043.1048.1019.
88.	0.001021	0.003000	-0.004619	0.3013641073.1074.	0.238272E+02	0.341075E+011067.1076.1072.1081.1037.1044.1045.1050.1022.
89.	0.001013	0.003000	-0.004627	0.2945691075.1075.	0.235641E+02	0.333331E+011069.1078.1073.1082.1040.1046.1047.1052.1024.
90.	0.001005	0.003000	-0.004635	0.2879501076.1077.	0.233002E+02	0.325770E+011071.1080.1075.1084.1042.1048.1049.1054.1027.
91.	0.000997	0.003000	-0.004643	0.2815141078.1078.	0.230360E+02	0.318402E+011073.1081.1076.1085.1044.1050.1052.1056.1030.
92.	0.000990	0.003000	-0.004650	0.2752531079.1080.	0.227716E+02	0.311227E+011074.1082.1078.1086.1046.1052.1054.1058.1032.
93.	0.000982	0.003000	-0.004658	0.2691601081.1081.	0.225072E+02	0.304240E+011076.1084.1080.1088.1048.1054.1056.1060.1035.
94.	0.000975	0.003000	-0.004665	0.2632141082.1083.	0.222429E+02	0.297435E+011077.1085.1081.1089.1051.1056.1058.1062.1037.
95.	0.000967	0.003000	-0.004673	0.2574291084.1084.	0.219790E+02	0.290806E+011079.1087.1082.1090.1053.1058.1060.1064.1039.
96.	0.000960	0.003000	-0.004680	0.2518011085.1086.	0.217155E+02	0.284351E+011080.1088.1084.1092.1055.1060.1062.1066.1042.
97.	0.000953	0.003000	-0.004687	0.2463201086.1087.	0.214527E+02	0.278065E+011082.1089.1085.1093.1057.1062.1064.1068.1044.
98.	0.000946	0.003000	-0.004694	0.2409821088.1088.	0.211905E+02	0.271944E+011083.1091.1087.1094.1059.1063.1065.1070.1046.
99.	0.000939	0.003000	-0.004701	0.2357811089.1090.	0.209292E+02	0.265981E+011085.1092.1088.1095.1060.1065.1067.1071.1048.
100.	0.000932	0.003000	-0.004708	0.2307131090.1091.	0.206689E+02	0.260173E+011086.1093.1089.1096.1062.1067.1069.1073.1050.
101.	0.000925	0.003000	-0.004715	0.2257691092.1092.	0.204096E+02	0.254514E+011087.1094.1091.1097.1064.1069.1071.1075.1052.
102.	0.000918	0.003000	-0.004722	0.2209121093.1093.	0.201516E+02	0.248993E+011089.1095.1092.1099.1066.1070.1072.1076.1054.
103.	0.000911	0.003000	-0.004729	0.2161791094.1094.	0.198947E+02	0.243601E+011090.1097.1093.1100.1068.1072.1074.1078.1056.
104.	0.000904	0.003000	-0.004736	0.2115731095.1096.	0.196391E+02	0.238341E+011091.1098.1094.1101.1069.1073.1076.1079.1058.
105.	0.000898	0.003000	-0.004742	0.2070841096.1097.	0.193850E+02	0.233214E+011093.1099.1095.1102.1071.1075.1077.1081.1060.
106.	0.000891	0.003000	-0.004749	0.2027131097.1098.	0.191324E+02	0.228218E+011094.1100.1097.1103.1073.1077.1079.1082.1062.
107.	0.000885	0.003000	-0.004755	0.1984531098.1099.	0.188814E+02	0.223349E+011095.1101.1098.1104.1074.1078.1080.1084.1064.
108.	0.000879	0.003000	-0.004761	0.1942971100.1100.	0.186321E+02	0.218604E+011096.1102.1099.1105.1076.1079.1082.1085.1066.
109.	0.000872	0.003000	-0.004768	0.1902471101.1101.	0.183846E+02	0.213978E+011097.1103.1100.1106.1077.1081.1083.1087.1067.
110.	0.000866	0.003000	-0.004774	0.1862951102.1102.	0.181388E+02	0.209466E+011098.1104.1101.1107.1079.1082.1085.1088.1069.
111.	0.000860	0.003000	-0.004780	0.1824381103.1103.	0.178949E+02	0.205067E+011099.1105.1102.1108.1080.1084.1086.1089.1071.
112.	0.000854	0.003000	-0.004786	0.1786751104.1104.	0.176529E+02	0.200775E+011100.1106.1103.1108.1082.1085.1087.1090.1072.
113.	0.000848	0.003000	-0.004792	0.1749941105.1105.	0.174128E+02	0.196587E+011102.1107.1104.1109.1083.1086.1089.1092.1074.
114.	0.000843	0.003000	-0.004797	0.1714081106.1106.	0.171748E+02	0.192500E+011103.1108.1105.1110.1085.1088.1090.1093.1076.
115.	0.000837	0.003000	-0.004803	0.1679091107.1107.	0.169388E+02	0.188514E+011104.1109.1106.1111.1086.1089.1091.1094.1077.
116.	0.000831	0.003000	-0.004809	0.1644981107.1108.	0.167049E+02	0.184625E+011105.1109.1107.1112.1087.1090.1092.1095.1079.
117.	0.000826	0.003000	-0.004814	0.1611681108.1109.	0.164732E+02	0.180833E+011105.1110.1108.1113.1089.1092.1094.1097.1080.
118.	0.000820	0.003000	-0.004820	0.1579151109.1110.	0.162436E+02	0.177130E+011106.1111.1109.1114.1090.1093.1095.1098.1081.
119.	0.000815	0.003000	-0.004825	0.1547471110.1110.	0.160162E+02	0.173520E+011107.1112.1110.1114.1091.1094.1096.1099.1083.
120.	0.000810	0.003000	-0.004830	0.1516511111.1111.	0.157927E+02	0.169997E+011108.1113.1111.1115.1092.1095.1097.1100.1084.
121.	0.000804	0.003000	-0.004836	0.1486211112.1112.	0.155710E+02	0.166558E+011109.1114.1111.1116.1093.1096.1098.1101.1086.
122.	0.000799	0.003000	-0.004841	0.1456461113.1113.	0.153512E+02	0.163195E+011110.1114.1112.1117.1095.1097.1099.1102.1087.
123.	0.000794	0.003000	-0.004846	0.1427421113.1114.	0.151334E+02	0.159905E+011111.1115.1113.1117.1096.1098.1100.1103.1088.
124.	0.000789	0.003000	-0.004851	0.1399111114.1115.	0.149177E+02	0.156693E+011112.1116.1114.1118.1097.1099.1101.1104.1090.
125.	0.000784	0.003000	-0.004856	0.1371411115.1115.	0.147041E+02	0.153555E+011113.1117.1115.1119.1098.1101.1102.1105.1091.
126.	0.000779	0.003000	-0.004861	0.1344421116.1116.	0.144929E+02	0.150491E+011113.1117.1115.1119.1099.1102.1103.1106.1092.
127.	0.000774	0.003000	-0.004866	0.1318061116.1117.	0.142842E+02	0.147500E+011114.1118.1116.1120.1100.1103.1104.1107.1093.

128.	0.000769	0.003000	-0.004871	0.1292301117.1117.	0.140779E+02	0.144578E+011115.1119.1117.1121.1101.1104.1105.1108.1094.
129.	0.000765	0.003000	-0.004875	0.1267131118.1118.	0.138739E+02	0.141725E+011116.1119.1118.1121.1102.1105.1106.1109.1096.
130.	0.000760	0.003000	-0.004880	0.1242521119.1119.	0.136722E+02	0.138938E+011116.1120.1118.1122.1103.1105.1107.1110.1097.
131.	0.000756	0.003000	-0.004884	0.1218451119.1120.	0.134727E+02	0.136213E+011117.1121.1119.1123.1104.1106.1108.1110.1098.
132.	0.000751	0.003000	-0.004889	0.1194951120.1120.	0.132755E+02	0.133551E+011118.1121.1120.1123.1105.1107.1109.1111.1099.
133.	0.000747	0.003000	-0.004893	0.1171961121.1121.	0.130806E+02	0.130949E+011119.1122.1120.1124.1106.1108.1110.1112.1100.
134.	0.000743	0.003000	-0.004897	0.1149431121.1122.	0.128880E+02	0.128406E+011119.1123.1121.1124.1107.1109.1111.1113.1101.
135.	0.000739	0.003000	-0.004901	0.1127431122.1122.	0.126978E+02	0.125918E+011120.1123.1122.1125.1108.1110.1112.1114.1102.
136.	0.000735	0.003000	-0.004905	0.1105941122.1123.	0.125099E+02	0.123487E+011121.1124.1122.1125.1109.1111.1112.1114.1103.
137.	0.000731	0.003000	-0.004910	0.1084881123.1123.	0.123243E+02	0.121113E+011121.1124.1123.1126.1110.1112.1113.1115.1104.
138.	0.000726	0.003000	-0.004914	0.1064261124.1124.	0.121410E+02	0.118787E+011122.1125.1123.1127.1111.1112.1114.1116.1105.
139.	0.000723	0.003000	-0.004917	0.1044111124.1125.	0.119599E+02	0.116512E+011122.1126.1124.1127.1111.1113.1115.1117.1106.
140.	0.000719	0.003000	-0.004921	0.1024431125.1125.	0.117811E+02	0.114288E+011123.1126.1125.1128.1112.1114.1116.1117.1107.
141.	0.000715	0.003000	-0.004925	0.1005091125.1126.	0.116046E+02	0.112111E+011124.1127.1125.1128.1113.1115.1116.1118.1108.
142.	0.000711	0.003000	-0.004929	0.0986181126.1126.	0.114303E+02	0.109981E+011124.1127.1126.1129.1114.1116.1117.1119.1109.
143.	0.000708	0.003000	-0.004932	0.0967671127.1127.	0.112582E+02	0.107896E+011125.1128.1126.1129.1115.1116.1118.1120.1110.
144.	0.000704	0.003000	-0.004936	0.0949601127.1127.	0.110884E+02	0.105857E+011125.1128.1127.1130.1115.1117.1118.1120.1110.
145.	0.000700	0.003000	-0.004940	0.0931851128.1128.	0.109208E+02	0.103863E+011126.1129.1127.1130.1116.1118.1119.1121.1111.
146.	0.000697	0.003000	-0.004943	0.0914471128.1128.	0.107553E+02	0.101908E+011126.1129.1128.1131.1117.1119.1120.1121.1112.
147.	0.000693	0.003000	-0.004947	0.0897461129.1129.	0.105921E+02	0.999964E+001127.1130.1128.1131.1118.1119.1120.1122.1113.
148.	0.000690	0.003000	-0.004950	0.0880811129.1129.	0.104310E+02	0.981330E+001128.1130.1129.1132.1118.1120.1121.1123.1114.
149.	0.000687	0.003000	-0.004953	0.0864581130.1130.	0.102720E+02	0.963079E+001128.1131.1129.1132.1119.1121.1122.1123.1114.
150.	0.000684	0.003000	-0.004956	0.0848621130.1130.	0.101152E+02	0.945186E+001129.1131.1130.1132.1120.1121.1122.1124.1115.
151.	0.000680	0.003000	-0.004960	0.0832971131.1131.	0.996056E+01	0.927654E+001129.1132.1130.1133.1120.1122.1123.1125.1116.
152.	0.000677	0.003000	-0.004963	0.0817651131.1131.	0.980797E+01	0.910466E+001130.1132.1131.1133.1121.1122.1124.1125.1117.
153.	0.000674	0.003000	-0.004966	0.0802711131.1132.	0.965747E+01	0.893641E+001130.1132.1131.1134.1122.1123.1124.1126.1117.
154.	0.000671	0.003000	-0.004969	0.0788021132.1132.	0.950903E+01	0.877164E+001131.1133.1132.1134.1122.1124.1125.1126.1118.
155.	0.000668	0.003000	-0.004972	0.0773721132.1133.	0.936265E+01	0.861045E+001131.1133.1132.1134.1123.1124.1125.1127.1119.
156.	0.000666	0.003000	-0.004974	0.0759661133.1133.	0.921829E+01	0.845267E+001131.1134.1133.1135.1123.1125.1126.1127.1119.
157.	0.000663	0.003000	-0.004978	0.0745781133.1133.	0.907595E+01	0.829802E+001132.1134.1133.1135.1124.1125.1126.1128.1120.
158.	0.000659	0.003000	-0.004981	0.0732161134.1134.	0.893557E+01	0.814612E+001132.1135.1133.1136.1125.1126.1127.1128.1121.
159.	0.000656	0.003000	-0.004984	0.0718771134.1134.	0.879713E+01	0.799689E+001133.1135.1134.1136.1125.1126.1128.1129.1121.
160.	0.000654	0.003000	-0.004986	0.0705741134.1135.	0.866063E+01	0.785066E+001133.1135.1134.1136.1126.1127.1128.1129.1122.
161.	0.000651	0.003000	-0.004989	0.0692971135.1135.	0.852607E+01	0.770748E+001134.1136.1135.1137.1126.1128.1129.1130.1123.
162.	0.000648	0.003000	-0.004992	0.0680441135.1135.	0.839343E+01	0.756721E+001134.1136.1135.1137.1127.1128.1129.1130.1123.
163.	0.000646	0.003000	-0.004994	0.0668231136.1136.	0.826269E+01	0.742993E+001134.1136.1135.1137.1127.1129.1129.1131.1124.
164.	0.000643	0.003000	-0.004997	0.0656151136.1136.	0.813382E+01	0.729540E+001135.1137.1136.1138.1128.1129.1130.1131.1124.
165.	0.000641	0.003000	-0.004999	0.0644371136.1136.	0.800679E+01	0.716340E+001135.1137.1136.1138.1128.1130.1130.1132.1125.
166.	0.000638	0.003000	-0.005002	0.0632831137.1137.	0.788157E+01	0.703405E+001135.1137.1136.1138.1129.1130.1131.1132.1126.
167.	0.000636	0.003000	-0.005004	0.0621521137.1137.	0.775817E+01	0.690733E+001136.1138.1137.1139.1129.1130.1131.1132.1126.
168.	0.000634	0.003000	-0.005006	0.0610401137.1137.	0.763657E+01	0.678305E+001136.1138.1137.1139.1130.1131.1132.1133.1127.
169.	0.000632	0.003000	-0.005008	0.0599591138.1138.	0.751674E+01	0.666137E+001137.1138.1137.1139.1130.1131.1132.1133.1127.
170.	0.000629	0.003000	-0.005011	0.0588901138.1138.	0.739867E+01	0.654219E+001137.1139.1138.1140.1131.1132.1133.1134.1128.
171.	0.000627	0.003000	-0.005013	0.0578451138.1138.	0.728232E+01	0.642524E+001137.1139.1138.1140.1131.1132.1133.1134.1128.
172.	0.000625	0.003000	-0.005015	0.0568191139.1139.	0.716768E+01	0.631059E+001138.1139.1138.1140.1132.1133.1133.1134.1129.
173.	0.000623	0.003000	-0.005017	0.0558101139.1139.	0.705472E+01	0.619806E+001138.1140.1139.1140.1132.1133.1134.1135.1129.
174.	0.000621	0.003000	-0.005019	0.0548191139.1139.	0.694342E+01	0.608765E+001138.1140.1139.1141.1132.1133.1134.1135.1130.
175.	0.000619	0.003000	-0.005021	0.0538501139.1140.	0.683376E+01	0.597932E+001138.1140.1139.1141.1133.1134.1135.1136.1130.
176.	0.000617	0.003000	-0.005023	0.0529031140.1140.	0.672575E+01	0.587324E+001139.1140.1140.1141.1133.1134.1135.1136.1131.
177.	0.000615	0.003000	-0.005025	0.0519691140.1140.	0.661934E+01	0.576920E+001139.1141.1140.1141.1134.1135.1135.1136.1131.
178.	0.000613	0.003000	-0.005027	0.0510571140.1140.	0.651452E+01	0.566715E+001139.1141.1140.1142.1134.1135.1136.1137.1131.
179.	0.000611	0.003000	-0.005029	0.0501651141.1141.	0.641128E+01	0.556716E+001140.1141.1140.1142.1134.1135.1136.1137.1132.
180.	0.000609	0.003000	-0.005031	0.0492841141.1141.	0.630958E+01	0.546907E+001140.1141.1141.1142.1135.1136.1136.1137.1132.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

Ramp. 0.005

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992	0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312	0.0
1.	0.002740	0.000099	0.000001	0.000169	566.	566.	0.299421E-03	0.437788E-03	566. 566. 566. 566. 566. 566. 566. 566. 566.	
2.	0.002839	0.000198	0.000001	0.000488	566.	566.	0.948503E-03	0.133693E-02	566. 566. 566. 566. 566. 566. 566. 566. 566.	
3.	0.002937	0.000297	0.000000	0.001793	566.	566.	0.315553E-02	0.443943E-02	566. 566. 566. 566. 566. 566. 566. 566. 566.	
4.	0.003034	0.000396	-0.000002	0.008053	566.	566.	0.125706E-01	0.178729E-01	566. 566. 566. 566. 566. 566. 566. 566. 566.	
5.	0.003119	0.000495	-0.000016	0.043955	566.	567.	0.615192E-01	0.884904E-01	567. 567. 567. 567. 566. 566. 566. 566. 566.	
6.	0.003133	0.000594	-0.000103	0.271186	569.	571.	0.358536E+00	0.519874E+00	570. 572. 571. 572. 567. 567. 566. 566. 566.	
7.	0.002782	0.000693	-0.000558	1.197372	583.	595.	0.193714E+01	0.279291E+01	588. 598. 594. 601. 574. 574. 567. 568. 567.	
8.	0.002065	0.000792	-0.001372	1.387581	622.	641.	0.496988E+01	0.682671E+01	621. 644. 634. 653. 587. 590. 571. 573. 569.	
9.	0.001836	0.000891	-0.001696	0.969917	653.	661.	0.642717E+01	0.809975E+01	638. 663. 648. 674. 598. 601. 577. 579. 573.	
10.	0.001822	0.000990	-0.001809	0.886557	664.	667.	0.697387E+01	0.812009E+01	648. 672. 654. 680. 606. 610. 584. 586. 578.	
11.	0.001838	0.001089	-0.001891	0.865229	671.	674.	0.731037E+01	0.803360E+01	655. 679. 661. 686. 612. 619. 590. 593. 583.	
12.	0.001855	0.001188	-0.001973	0.902377	678.	681.	0.760869E+01	0.802773E+01	662. 687. 668. 693. 619. 627. 597. 600. 588.	
13.	0.001865	0.001287	-0.002063	0.927565	686.	689.	0.802780E+01	0.815904E+01	669. 695. 676. 702. 625. 635. 604. 607. 594.	
14.	0.001862	0.001386	-0.002165	0.966062	694.	698.	0.891254E+01	0.854197E+01	678. 704. 685. 711. 632. 644. 610. 614. 599.	
15.	0.001842	0.001485	-0.002284	1.013141	704.	708.	0.101805E+02	0.909433E+01	687. 714. 694. 721. 638. 652. 617. 622. 605.	
16.	0.001812	0.001584	-0.002413	1.047450	714.	719.	0.114190E+02	0.960499E+01	697. 724. 705. 732. 646. 661. 625. 629. 611.	
17.	0.001786	0.001683	-0.002538	1.068220	725.	729.	0.124894E+02	0.100040E+02	706. 735. 715. 743. 653. 670. 632. 637. 617.	
18.	0.001768	0.001782	-0.002655	1.083660	735.	740.	0.133883E+02	0.103042E+02	716. 746. 725. 754. 661. 678. 640. 645. 624.	
19.	0.001756	0.001881	-0.002766	1.098250	745.	750.	0.141573E+02	0.105409E+02	726. 756. 734. 764. 669. 687. 648. 654. 631.	
20.	0.001748	0.001980	-0.002873	1.113856	755.	760.	0.148851E+02	0.107505E+02	735. 766. 744. 774. 677. 696. 656. 662. 638.	
21.	0.001741	0.002079	-0.002979	1.131612	765.	770.	0.156882E+02	0.109632E+02	745. 776. 754. 785. 685. 705. 664. 670. 645.	
22.	0.001734	0.002178	-0.003085	1.151195	776.	780.	0.165902E+02	0.111892E+02	755. 786. 764. 795. 693. 714. 673. 679. 652.	
23.	0.001725	0.002277	-0.003192	1.170553	786.	790.	0.175459E+02	0.114211E+02	765. 797. 774. 806. 701. 723. 681. 688. 659.	
24.	0.001716	0.002376	-0.003300	1.188608	796.	801.	0.185035E+02	0.116473E+02	775. 808. 784. 817. 709. 732. 690. 697. 667.	
25.	0.001708	0.002474	-0.003408	1.205090	807.	812.	0.194270E+02	0.118601E+02	785. 818. 795. 828. 718. 741. 699. 706. 674.	
26.	0.001700	0.002573	-0.003515	1.220602	817.	822.	0.203019E+02	0.120575E+02	795. 829. 805. 839. 727. 750. 708. 715. 682.	
27.	0.001693	0.002672	-0.003621	1.235273	828.	833.	0.211412E+02	0.122420E+02	806. 840. 816. 850. 735. 760. 717. 724. 690.	
28.	0.001686	0.002771	-0.003726	1.249476	839.	843.	0.219722E+02	0.124167E+02	816. 851. 826. 861. 744. 769. 726. 734. 698.	
29.	0.001680	0.002870	-0.003831	1.263462	849.	854.	0.228128E+02	0.125850E+02	826. 861. 837. 872. 753. 778. 735. 743. 706.	
30.	0.001674	0.002969	-0.003936	1.277234	860.	865.	0.236666E+02	0.127489E+02	837. 872. 847. 883. 762. 788. 745. 753. 715.	
31.	0.001668	0.003068	-0.004041	1.290715	871.	876.	0.245261E+02	0.129085E+02	847. 883. 858. 894. 772. 797. 754. 763. 723.	
32.	0.001662	0.003167	-0.004146	1.303690	882.	887.	0.253806E+02	0.130635E+02	858. 894. 869. 905. 781. 807. 764. 773. 732.	
33.	0.001656	0.003266	-0.004251	1.315906	893.	898.	0.262202E+02	0.132124E+02	869. 906. 880. 916. 790. 817. 774. 783. 741.	
34.	0.001651	0.003365	-0.004356	1.327525	904.	909.	0.270424E+02	0.133546E+02	880. 917. 891. 928. 800. 827. 783. 793. 749.	
35.	0.001645	0.003464	-0.004460	1.338680	915.	920.	0.278504E+02	0.134905E+02	890. 928. 902. 939. 809. 837. 793. 803. 758.	
36.	0.001640	0.003563	-0.004564	1.349415	926.	931.	0.286494E+02	0.136206E+02	901. 939. 913. 950. 819. 847. 803. 813. 768.	
37.	0.001635	0.003662	-0.004668	1.359934	937.	942.	0.294431E+02	0.137459E+02	912. 950. 924. 962. 829. 857. 814. 823. 777.	
38.	0.001631	0.003761	-0.004772	1.370264	948.	953.	0.302328E+02	0.138675E+02	923. 962. 935. 973. 839. 867. 824. 834. 786.	
39.	0.001626	0.003860	-0.004876	1.379983	960.	965.	0.310163E+02	0.139850E+02	934. 973. 946. 985. 849. 877. 834. 844. 795.	
40.	0.001621	0.003959	-0.004979	1.389164	971.	976.	0.317907E+02	0.140977E+02	945. 984. 958. 996. 859. 887. 844. 855. 805.	
41.	0.001616	0.004058	-0.005083	1.397873	982.	987.	0.325535E+02	0.142051E+02	956. 996. 969. 1008. 869. 898. 855. 865. 814.	
42.	0.001611	0.004157	-0.005186	1.406241	994.	999.	0.333044E+02	0.143077E+02	968. 1007. 980. 1019. 879. 908. 865. 876. 824.	
43.	0.001607	0.004256	-0.005290	1.414278	1005.	1010.	0.340443E+02	0.144059E+02	979. 1019. 991. 1031. 889. 918. 876. 887. 834.	
44.	0.001603	0.004354	-0.005393	1.422000	1016.	1021.	0.347742E+02	0.145001E+02	990. 1030. 1003. 1043. 899. 929. 886. 897. 844.	
45.	0.001598	0.004453	-0.005496	1.429424	1028.	1033.	0.354951E+02	0.145905E+02	1001. 1042. 1014. 1054. 910. 939. 897. 908. 854.	
46.	0.001594	0.004552	-0.005599	1.436743	1039.	1044.	0.362071E+02	0.146776E+02	1013. 1053. 1025. 1066. 920. 950. 908. 919. 863.	
47.	0.001590	0.004651	-0.005702	1.443858	1051.	1056.	0.369102E+02	0.147622E+02	1024. 1065. 1037. 1078. 931. 961. 919. 930. 874.	
48.	0.001586	0.004750	-0.005805	1.450471	1062.	1067.	0.376034E+02	0.148434E+02	1035. 1076. 1048. 1089. 941. 971. 930. 941. 884.	
49.	0.001582	0.004849	-0.005907	1.456676	1074.	1079.	0.382857E+02	0.149208E+02	1047. 1088. 1060. 1101. 952. 982. 940. 952. 894.	
50.	0.001578	0.004947	-0.006010	1.462585	1085.	1090.	0.389570E+02	0.149944E+02	1058. 1099. 1071. 1113. 962. 993. 951. 963. 904.	
51.	0.001532	0.005000	-0.006108	1.439833	1097.	1102.	0.396041E+02	0.150439E+02	1069. 1111. 1083. 1124. 973. 1003. 962. 974. 914.	
52.	0.001481	0.005000	-0.006159	1.359642	1106.	1110.	0.400747E+02	0.148490E+02	1079. 1119. 1092. 1133. 983. 1013. 973. 986. 925.	
53.	0.001460	0.005000	-0.006180	1.308335	1114.	1117.	0.404126E+02	0.145109E+02	1087. 1126. 1099. 1139. 992. 1023. 984. 996. 935.	
54.	0.001447	0.005000	-0.006194	1.269833	1121.	1124.	0.407011E+02	0.141581E+02	1095. 1133. 1107. 1145. 1001. 1032. 994. 1007. 945.	
55.	0.001435	0.005000	-0.006205	1.235916	1128.	1131.	0.409697E+02	0.138229E+02	1102. 1139. 1114. 1151. 1010. 1040. 1005. 1017. 955.	
56.	0.001423	0.005000	-0.006217	1.204432	1134.	1137.	0.412290E+02	0.135095E+02	1109. 1145. 1121. 1157. 1019. 1049. 1014. 1027. 964.	
57.	0.001410	0.005000	-0.006230	1.174275	1140.	1143.	0.414836E+02	0.132153E+02	1116. 1151. 1128. 1163. 1027. 1057. 1024. 1036. 974.	
58.	0.001398	0.005000	-0.006243	1.145112	1147.	1149.	0.417202E+02	0.129303E+02	1123. 1157. 1134. 1169. 1035. 1064. 1033. 1045. 983.	
59.	0.001385	0.005000	-0.006255	1.116049	1153.	1155.	0.419079E+02	0.126398E+02	1130. 1163. 1141. 1175. 1043. 1072. 1042. 1054. 992.	
60.	0.001373	0.005000	-0.006268	1.087105	1159.	1161.	0.420408E+02	0.123418E+02	1136. 1169. 1147. 1180. 1051. 1079. 1051. 1063. 1001.	
61.	0.001361	0.005000	-0.006279	1.058807	1164.	1167.	0.421272E+02	0.120410E+02	1143. 1175. 1154. 1186. 1059. 1086. 1060. 1072. 1010.	

62.	0.001350	0.005000	-0.006290	1.0311991170.1172.	0.421777E+02	0.117421E+021149.1180.1160.1191.1066.1093.1068.1090.1018.
63.	0.001340	0.005000	-0.006300	1.0045551175.1178.	0.422023E+02	0.114484E+021155.1185.1165.1196.1073.1100.1076.1088.1027.
64.	0.001329	0.005000	-0.006311	0.9788511181.1183.	0.422084E+02	0.111621E+021161.1190.1171.1201.1081.1106.1084.1096.1035.
65.	0.001319	0.005000	-0.006321	0.9537491186.1188.	0.421960E+02	0.108832E+021166.1195.1177.1205.1088.1112.1092.1103.1043.
66.	0.001309	0.005000	-0.006331	0.9294321191.1193.	0.421608E+02	0.106107E+021172.1200.1182.1210.1094.1118.1100.1111.1050.
67.	0.001298	0.005000	-0.006342	0.9057771196.1198.	0.420996E+02	0.103444E+021177.1205.1187.1215.1101.1125.1107.1118.1058.
68.	0.001288	0.005000	-0.006352	0.8825411200.1203.	0.420121E+02	0.100837E+021183.1209.1192.1219.1108.1130.1114.1125.1066.
69.	0.001278	0.005000	-0.006362	0.8599031205.1207.	0.418996E+02	0.982821E+011188.1214.1197.1223.1114.1136.1121.1132.1073.
70.	0.001268	0.005000	-0.006372	0.8379291210.1212.	0.417653E+02	0.957861E+011193.1218.1202.1228.1120.1142.1128.1138.1080.
71.	0.001258	0.005000	-0.006382	0.8165041214.1216.	0.416130E+02	0.933520E+011198.1222.1207.1232.1126.1147.1134.1145.1087.
72.	0.001248	0.005000	-0.006392	0.7955701218.1220.	0.414447E+02	0.909759E+011202.1226.1211.1235.1132.1153.1141.1151.1094.
73.	0.001238	0.005000	-0.006402	0.7752601222.1224.	0.412605E+02	0.886587E+011207.1230.1216.1239.1138.1158.1147.1157.1101.
74.	0.001228	0.005000	-0.006412	0.7555491226.1228.	0.410608E+02	0.864026E+011211.1234.1220.1243.1144.1163.1153.1163.1107.
75.	0.001218	0.005000	-0.006422	0.7362591230.1232.	0.408453E+02	0.842045E+011216.1238.1224.1247.1150.1168.1159.1169.1113.
76.	0.001208	0.005000	-0.006432	0.7174711234.1236.	0.406145E+02	0.820600E+011220.1242.1228.1250.1155.1173.1165.1175.1120.
77.	0.001198	0.005000	-0.006442	0.6991911238.1239.	0.403694E+02	0.799696E+011224.1245.1232.1254.1160.1177.1170.1180.1126.
78.	0.001188	0.005000	-0.006452	0.6814441241.1243.	0.401114E+02	0.779339E+011228.1249.1236.1257.1166.1182.1176.1185.1132.
79.	0.001178	0.005000	-0.006462	0.6640941245.1246.	0.398419E+02	0.759513E+011232.1252.1240.1260.1171.1187.1181.1190.1138.
80.	0.001168	0.005000	-0.006472	0.6472011248.1250.	0.395616E+02	0.740181E+011236.1255.1244.1263.1176.1191.1186.1195.1143.
81.	0.001158	0.005000	-0.006482	0.6308081252.1253.	0.392711E+02	0.721360E+011239.1258.1247.1266.1180.1196.1191.1200.1149.
82.	0.001149	0.005000	-0.006492	0.6148561255.1256.	0.389712E+02	0.703043E+011243.1262.1251.1269.1185.1200.1196.1205.1154.
83.	0.001139	0.005000	-0.006501	0.5993431258.1260.	0.386622E+02	0.685218E+011247.1265.1254.1272.1190.1204.1201.1210.1160.
84.	0.001129	0.005000	-0.006511	0.5841551261.1263.	0.383446E+02	0.667851E+011250.1268.1257.1275.1194.1208.1205.1214.1165.
85.	0.001119	0.005000	-0.006521	0.5694211264.1266.	0.380191E+02	0.650934E+011253.1271.1261.1278.1199.1212.1210.1219.1170.
86.	0.001109	0.005000	-0.006531	0.5551161267.1269.	0.376866E+02	0.634473E+011257.1273.1264.1281.1203.1216.1214.1223.1175.
87.	0.001100	0.005000	-0.006540	0.5412201270.1271.	0.373475E+02	0.618464E+011260.1276.1267.1283.1207.1220.1219.1227.1180.
88.	0.001090	0.005000	-0.006550	0.5276881273.1274.	0.370026E+02	0.602893E+011263.1279.1270.1286.1211.1224.1223.1231.1185.
89.	0.001080	0.005000	-0.006560	0.5144461276.1277.	0.366522E+02	0.587731E+011266.1281.1273.1288.1216.1227.1227.1235.1189.
90.	0.001071	0.005000	-0.006570	0.5015851278.1279.	0.362968E+02	0.572958E+011269.1284.1275.1291.1219.1231.1231.1239.1194.
91.	0.001061	0.005000	-0.006579	0.4891081281.1282.	0.359368E+02	0.558585E+011272.1286.1278.1293.1223.1234.1235.1242.1198.
92.	0.001052	0.005000	-0.006589	0.4769921283.1285.	0.355729E+02	0.544611E+011274.1289.1281.1295.1227.1238.1238.1246.1203.
93.	0.001042	0.005000	-0.006598	0.4652221286.1287.	0.352055E+02	0.531028E+011277.1291.1283.1297.1231.1241.1242.1250.1207.
94.	0.001033	0.005000	-0.006607	0.4537791288.1289.	0.348349E+02	0.517825E+011280.1293.1286.1300.1234.1244.1246.1253.1211.
95.	0.001023	0.005000	-0.006617	0.4425721291.1292.	0.344619E+02	0.504978E+011282.1296.1288.1302.1238.1248.1249.1256.1215.
96.	0.001014	0.005000	-0.006626	0.4316671293.1294.	0.340861E+02	0.492455E+011285.1298.1291.1304.1241.1251.1252.1260.1219.
97.	0.001004	0.005000	-0.006636	0.4210921295.1296.	0.337083E+02	0.480270E+011287.1300.1293.1306.1245.1254.1256.1263.1223.
98.	0.000995	0.005000	-0.006645	0.4108331297.1298.	0.333289E+02	0.468423E+011290.1302.1295.1308.1248.1257.1259.1266.1227.
99.	0.000986	0.005000	-0.006654	0.4008641300.1300.	0.329482E+02	0.456910E+011292.1304.1298.1310.1251.1260.1262.1269.1230.
100.	0.000977	0.005000	-0.006663	0.3911801302.1303.	0.325667E+02	0.445721E+011294.1306.1300.1312.1254.1263.1265.1272.1234.
101.	0.000968	0.005000	-0.006672	0.3817661304.1305.	0.321846E+02	0.434851E+011297.1308.1302.1314.1257.1265.1268.1275.1237.
102.	0.000959	0.005000	-0.006681	0.3725881306.1307.	0.318021E+02	0.424281E+011299.1310.1304.1315.1260.1268.1271.1277.1241.
103.	0.000950	0.005000	-0.006690	0.3636161308.1308.	0.314194E+02	0.413985E+011301.1312.1306.1317.1263.1271.1274.1280.1244.
104.	0.000941	0.005000	-0.006699	0.3549001309.1310.	0.310366E+02	0.403959E+011303.1314.1308.1319.1266.1273.1276.1283.1247.
105.	0.000933	0.005000	-0.006708	0.3464291311.1312.	0.306542E+02	0.394201E+011305.1315.1310.1320.1269.1276.1279.1285.1251.
106.	0.000924	0.005000	-0.006716	0.3382091313.1314.	0.302724E+02	0.384713E+011307.1317.1312.1322.1272.1279.1282.1288.1254.
107.	0.000915	0.005000	-0.006725	0.3302271315.1316.	0.298914E+02	0.375493E+011309.1319.1314.1324.1274.1281.1284.1290.1257.
108.	0.000907	0.005000	-0.006733	0.3224701317.1317.	0.295116E+02	0.366535E+011311.1321.1315.1325.1277.1283.1287.1292.1260.
109.	0.000899	0.005000	-0.006741	0.3149281318.1319.	0.291331E+02	0.357828E+011313.1322.1317.1327.1279.1286.1289.1295.1263.
110.	0.000890	0.005000	-0.006750	0.3075941320.1321.	0.287561E+02	0.349363E+011314.1324.1319.1328.1282.1288.1292.1297.1266.
111.	0.000882	0.005000	-0.006758	0.3004571322.1322.	0.283807E+02	0.341131E+011316.1325.1321.1330.1284.1290.1294.1299.1268.
112.	0.000874	0.005000	-0.006766	0.2934591323.1324.	0.280070E+02	0.333114E+011318.1327.1322.1331.1287.1293.1296.1301.1271.
113.	0.000866	0.005000	-0.006775	0.2866581325.1325.	0.276349E+02	0.325302E+011320.1328.1324.1332.1289.1295.1298.1304.1274.
114.	0.000858	0.005000	-0.006783	0.2800521326.1327.	0.272650E+02	0.317697E+011321.1330.1325.1334.1291.1297.1300.1306.1276.
115.	0.000850	0.005000	-0.006790	0.2736301328.1328.	0.268972E+02	0.310300E+011323.1331.1327.1335.1294.1299.1303.1308.1279.
116.	0.000842	0.005000	-0.006798	0.2673811329.1330.	0.265317E+02	0.303107E+011324.1332.1328.1336.1296.1301.1305.1309.1282.
117.	0.000834	0.005000	-0.006806	0.2612981331.1331.	0.261687E+02	0.296107E+011326.1334.1330.1338.1298.1303.1307.1311.1284.
118.	0.000826	0.005000	-0.006814	0.2553841332.1333.	0.258083E+02	0.289298E+011327.1335.1331.1339.1300.1305.1308.1313.1286.
119.	0.000819	0.005000	-0.006821	0.2496331333.1334.	0.254505E+02	0.282674E+011329.1336.1333.1340.1302.1307.1310.1315.1289.
120.	0.000812	0.005000	-0.006829	0.2440361335.1335.	0.250955E+02	0.276231E+011330.1338.1334.1341.1304.1309.1312.1317.1291.
121.	0.000804	0.005000	-0.006836	0.2385901336.1337.	0.247433E+02	0.269962E+011332.1339.1335.1343.1306.1310.1314.1319.1293.
122.	0.000797	0.005000	-0.006843	0.2332881337.1338.	0.243940E+02	0.263862E+011333.1340.1337.1344.1308.1312.1316.1320.1295.
123.	0.000790	0.005000	-0.006850	0.2281251338.1339.	0.240477E+02	0.257924E+011334.1341.1338.1345.1310.1314.1318.1322.1298.
124.	0.000783	0.005000	-0.006857	0.2230751340.1340.	0.237045E+02	0.252143E+011336.1342.1339.1346.1312.1316.1319.1324.1300.
125.	0.000776	0.005000	-0.006865	0.2181371341.1341.	0.233642E+02	0.246501E+011337.1344.1340.1347.1313.1317.1321.1325.1302.
126.	0.000769	0.005000	-0.006872	0.2133371342.1343.	0.230271E+02	0.241002E+011338.1345.1342.1348.1315.1319.1323.1327.1304.
127.	0.000762	0.005000	-0.006878	0.2086641343.1344.	0.226933E+02	0.235646E+011340.1346.1343.1349.1317.1321.1324.1328.1306.

128.	0.000755	0.005000	-0.006885	0.2041161344.1345.	0.223626E+02	0.230431E+011341.1347.1344.1350.1319.1322.1326.1330.1308.
129.	0.000748	0.005000	-0.006892	0.1996921345.1346.	0.220354E+02	0.225353E+011342.1348.1345.1351.1320.1324.1327.1331.1309.
130.	0.000742	0.005000	-0.006898	0.1953761346.1347.	0.217114E+02	0.220409E+011343.1349.1346.1352.1322.1325.1329.1332.1311.
131.	0.000735	0.005000	-0.006905	0.1911731348.1348.	0.213908E+02	0.215594E+011344.1350.1347.1353.1323.1327.1330.1334.1313.
132.	0.000729	0.005000	-0.006911	0.1870751349.1349.	0.210736E+02	0.210901E+011345.1351.1348.1354.1325.1328.1331.1335.1315.
133.	0.000723	0.005000	-0.006917	0.1830811350.1350.	0.207599E+02	0.206329E+011346.1352.1349.1355.1326.1330.1333.1336.1317.
134.	0.000717	0.005000	-0.006923	0.1791881351.1351.	0.204496E+02	0.201872E+011347.1353.1350.1356.1328.1331.1334.1338.1318.
135.	0.000711	0.005000	-0.006929	0.1753801351.1352.	0.201428E+02	0.197528E+011348.1354.1351.1356.1329.1332.1336.1339.1320.
136.	0.000705	0.005000	-0.006935	0.1716741352.1353.	0.198394E+02	0.193291E+011349.1355.1352.1357.1331.1334.1337.1340.1321.
137.	0.000699	0.005000	-0.006941	0.1680601353.1354.	0.195396E+02	0.189162E+011350.1355.1353.1358.1332.1335.1338.1341.1323.
138.	0.000693	0.005000	-0.006947	0.1645371354.1355.	0.192432E+02	0.185136E+011351.1356.1354.1359.1333.1336.1339.1343.1325.
139.	0.000688	0.005000	-0.006953	0.1611051355.1356.	0.189506E+02	0.181213E+011352.1357.1355.1360.1335.1338.1341.1344.1326.
140.	0.000682	0.005000	-0.006958	0.1577531356.1356.	0.186612E+02	0.177387E+011353.1358.1356.1360.1336.1339.1342.1345.1328.
141.	0.000677	0.005000	-0.006963	0.1544881357.1357.	0.183754E+02	0.173657E+011354.1359.1357.1361.1337.1340.1343.1346.1329.
142.	0.000671	0.005000	-0.006969	0.1512941358.1358.	0.180931E+02	0.170019E+011355.1360.1357.1362.1339.1341.1344.1347.1330.
143.	0.000666	0.005000	-0.006974	0.1481651359.1359.	0.178143E+02	0.166468E+011356.1360.1358.1363.1340.1342.1345.1348.1332.
144.	0.000660	0.005000	-0.006980	0.1451021359.1360.	0.175390E+02	0.162996E+011357.1361.1359.1363.1341.1344.1346.1349.1333.
145.	0.000655	0.005000	-0.006985	0.1421141360.1361.	0.172671E+02	0.159604E+011358.1362.1360.1364.1342.1345.1347.1350.1334.
146.	0.000650	0.005000	-0.006990	0.1392061361.1361.	0.169987E+02	0.156293E+011359.1363.1361.1365.1343.1346.1348.1351.1336.
147.	0.000645	0.005000	-0.006995	0.1363651362.1362.	0.167338E+02	0.153063E+011359.1363.1361.1366.1344.1347.1349.1352.1337.
148.	0.000640	0.005000	-0.007000	0.1335931362.1363.	0.164723E+02	0.149910E+011360.1364.1362.1366.1345.1348.1350.1353.1338.
149.	0.000635	0.005000	-0.007005	0.1308901363.1363.	0.162142E+02	0.146835E+011361.1365.1363.1367.1347.1349.1351.1354.1339.
150.	0.000630	0.005000	-0.007010	0.1282451364.1364.	0.159601E+02	0.143833E+011362.1365.1364.1367.1348.1350.1352.1355.1341.
151.	0.000626	0.005000	-0.007014	0.1256721365.1365.	0.157105E+02	0.140903E+011362.1366.1364.1368.1349.1351.1353.1356.1342.
152.	0.000621	0.005000	-0.007019	0.1231621365.1366.	0.154639E+02	0.138043E+011363.1367.1365.1369.1350.1352.1354.1356.1343.
153.	0.000617	0.005000	-0.007023	0.1207011366.1366.	0.152204E+02	0.135252E+011364.1367.1366.1369.1351.1353.1355.1357.1344.
154.	0.000612	0.005000	-0.007028	0.1182951367.1367.	0.149800E+02	0.132525E+011364.1368.1366.1370.1352.1354.1356.1358.1345.
155.	0.000608	0.005000	-0.007032	0.1159481367.1367.	0.147427E+02	0.129861E+011365.1369.1367.1370.1353.1355.1357.1359.1346.
156.	0.000604	0.005000	-0.007036	0.1136551368.1368.	0.145086E+02	0.127259E+011366.1369.1368.1371.1353.1355.1358.1360.1347.
157.	0.000599	0.005000	-0.007041	0.1114041368.1369.	0.142778E+02	0.124716E+011366.1370.1368.1372.1354.1356.1358.1360.1348.
158.	0.000595	0.005000	-0.007045	0.1092111369.1369.	0.140502E+02	0.122230E+011367.1370.1369.1372.1355.1357.1359.1361.1349.
159.	0.000591	0.005000	-0.007049	0.1070681370.1370.	0.138265E+02	0.119802E+011368.1371.1369.1373.1356.1358.1360.1362.1350.
160.	0.000587	0.005000	-0.007053	0.1049691370.1370.	0.136056E+02	0.117428E+011368.1372.1370.1373.1357.1359.1361.1363.1351.
161.	0.000583	0.005000	-0.007057	0.1029181371.1371.	0.133878E+02	0.115109E+011369.1372.1371.1374.1358.1360.1361.1363.1352.
162.	0.000580	0.005000	-0.007060	0.1009101371.1372.	0.131731E+02	0.112841E+011370.1373.1371.1374.1359.1360.1362.1364.1353.
163.	0.000576	0.005000	-0.007064	0.0989501372.1372.	0.129614E+02	0.110624E+011370.1373.1372.1375.1359.1361.1363.1365.1354.
164.	0.000572	0.005000	-0.007068	0.0970281372.1373.	0.127528E+02	0.108456E+011371.1374.1372.1375.1360.1362.1364.1366.1355.
165.	0.000568	0.005000	-0.007072	0.0951471373.1373.	0.125472E+02	0.106335E+011371.1374.1373.1376.1361.1363.1364.1366.1356.
166.	0.000565	0.005000	-0.007075	0.0933091373.1374.	0.123447E+02	0.104261E+011372.1375.1373.1376.1362.1363.1365.1367.1357.
167.	0.000561	0.005000	-0.007079	0.0915121374.1374.	0.121451E+02	0.102231E+011372.1375.1374.1377.1363.1364.1366.1367.1358.
168.	0.000558	0.005000	-0.007082	0.0897541375.1375.	0.119485E+02	0.100247E+011373.1376.1374.1377.1363.1365.1366.1368.1358.
169.	0.000555	0.005000	-0.007086	0.0880281375.1375.	0.117547E+02	0.983144E+001373.1376.1375.1377.1364.1365.1367.1369.1359.
170.	0.000551	0.005000	-0.007089	0.0863411375.1376.	0.115639E+02	0.964208E+001374.1377.1375.1378.1365.1366.1368.1369.1360.
171.	0.000548	0.005000	-0.007092	0.0846941376.1376.	0.113758E+02	0.945658E+001374.1377.1376.1378.1365.1367.1368.1370.1361.
172.	0.000545	0.005000	-0.007095	0.0830791376.1377.	0.111906E+02	0.927496E+001375.1377.1376.1379.1366.1367.1369.1371.1362.
173.	0.000542	0.005000	-0.007098	0.0815021377.1377.	0.110082E+02	0.909725E+001375.1378.1377.1379.1367.1368.1370.1371.1362.
174.	0.000539	0.005000	-0.007101	0.0799611377.1378.	0.108285E+02	0.892340E+001376.1378.1377.1380.1367.1369.1370.1372.1363.
175.	0.000536	0.005000	-0.007104	0.0784511378.1378.	0.106516E+02	0.875330E+001376.1379.1378.1380.1368.1369.1371.1372.1364.
176.	0.000533	0.005000	-0.007107	0.0769681378.1378.	0.104773E+02	0.858688E+001377.1379.1378.1380.1369.1370.1371.1373.1364.
177.	0.000530	0.005000	-0.007110	0.0755161379.1379.	0.103057E+02	0.842378E+001377.1380.1378.1381.1369.1370.1372.1373.1365.
178.	0.000527	0.005000	-0.007113	0.0740891379.1379.	0.101367E+02	0.826400E+001378.1380.1379.1381.1370.1371.1372.1374.1366.
179.	0.000524	0.005000	-0.007116	0.0726841379.1380.	0.997023E+01	0.810721E+001378.1380.1379.1381.1370.1372.1373.1374.1366.
180.	0.000521	0.005000	-0.007119	0.0713171380.1380.	0.980635E+01	0.795352E+001379.1381.1380.1382.1371.1372.1373.1375.1367.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE					GRAPHITE TEMP.				
	0.00099714		0.00171959			0.00324059		0.00271544				0.01475992				0.00159996		
	0.00945175		0.00422059			0.49659890		0.10774821				0.02219312				3.07586956		
1.	0.001791	0.001000	-0.000615	2.042085	583.	737.	0.471585E+02	0.135230E+02	625.	670.	702.	742.	645.	713.	606.	675.	639.	
2.	0.001516	0.001000	-0.000885	1.515331	609.	754.	0.483611E+02	0.148050E+02	637.	685.	713.	762.	652.	721.	609.	679.	641.	
3.	0.001485	0.001000	-0.000915	1.409277	616.	755.	0.485865E+02	0.146448E+02	642.	688.	714.	762.	656.	725.	612.	683.	644.	
4.	0.001484	0.001000	-0.000916	1.379848	617.	756.	0.486216E+02	0.143605E+02	644.	690.	716.	762.	659.	729.	615.	686.	646.	
5.	0.001487	0.001000	-0.000913	1.364880	618.	757.	0.485981E+02	0.141173E+02	645.	691.	717.	763.	661.	733.	619.	690.	649.	
6.	0.001489	0.001000	-0.000911	1.353293	619.	759.	0.485498E+02	0.139251E+02	647.	692.	719.	764.	664.	736.	622.	693.	651.	
7.	0.001489	0.001000	-0.000911	1.344708	621.	760.	0.486359E+02	0.138352E+02	649.	693.	721.	765.	666.	739.	624.	696.	654.	
8.	0.001483	0.001000	-0.000917	1.346207	623.	762.	0.491145E+02	0.139267E+02	651.	695.	723.	767.	668.	741.	627.	698.	656.	
9.	0.001471	0.001000	-0.000929	1.343896	625.	764.	0.496056E+02	0.140071E+02	653.	697.	725.	769.	670.	744.	630.	701.	658.	
10.	0.001460	0.001000	-0.000940	1.335971	627.	767.	0.499813E+02	0.140223E+02	656.	699.	728.	771.	672.	747.	633.	704.	661.	
11.	0.001452	0.001000	-0.000948	1.326193	629.	769.	0.502384E+02	0.139842E+02	658.	701.	730.	773.	674.	749.	635.	707.	663.	
12.	0.001446	0.001000	-0.000954	1.316323	631.	770.	0.503973E+02	0.139140E+02	660.	703.	732.	775.	677.	751.	638.	709.	665.	
13.	0.001442	0.001000	-0.000958	1.306955	633.	772.	0.504859E+02	0.138285E+02	662.	705.	733.	776.	679.	753.	640.	712.	667.	
14.	0.001440	0.001000	-0.000960	1.298805	634.	774.	0.505868E+02	0.137459E+02	664.	706.	735.	778.	681.	755.	643.	714.	670.	
15.	0.001437	0.001000	-0.000963	1.292051	636.	775.	0.507479E+02	0.136754E+02	665.	708.	737.	779.	682.	757.	645.	717.	672.	
16.	0.001434	0.001000	-0.000966	1.285850	638.	777.	0.509431E+02	0.136131E+02	667.	709.	739.	781.	684.	759.	648.	719.	674.	
17.	0.001430	0.001000	-0.000970	1.279532	639.	779.	0.511391E+02	0.135528E+02	669.	711.	741.	783.	686.	761.	650.	721.	676.	
18.	0.001427	0.001000	-0.000973	1.272882	641.	780.	0.513124E+02	0.134903E+02	671.	712.	742.	784.	688.	763.	652.	724.	678.	
19.	0.001423	0.001000	-0.000977	1.266159	642.	782.	0.514502E+02	0.134245E+02	672.	714.	744.	785.	690.	764.	654.	726.	680.	
20.	0.001421	0.001000	-0.000979	1.259513	644.	783.	0.515536E+02	0.133562E+02	674.	715.	745.	787.	692.	766.	656.	728.	682.	
21.	0.001418	0.001000	-0.000982	1.253000	645.	784.	0.516404E+02	0.132874E+02	675.	717.	747.	788.	693.	768.	659.	730.	684.	
22.	0.001416	0.001000	-0.000984	1.246781	647.	786.	0.517259E+02	0.132194E+02	677.	718.	748.	789.	695.	769.	661.	732.	686.	
23.	0.001414	0.001000	-0.000986	1.240852	648.	787.	0.518154E+02	0.131535E+02	678.	719.	750.	791.	697.	771.	663.	734.	688.	
24.	0.001412	0.001000	-0.000988	1.235116	649.	788.	0.519061E+02	0.130897E+02	680.	721.	751.	792.	698.	772.	664.	736.	690.	
25.	0.001410	0.001000	-0.000990	1.229488	650.	790.	0.519921E+02	0.130274E+02	681.	722.	753.	793.	700.	774.	666.	738.	691.	
26.	0.001408	0.001000	-0.000992	1.223935	652.	791.	0.520674E+02	0.129662E+02	683.	723.	754.	794.	702.	775.	668.	740.	693.	
27.	0.001406	0.001000	-0.000994	1.218416	653.	792.	0.521292E+02	0.129058E+02	684.	724.	755.	796.	703.	777.	670.	741.	695.	
28.	0.001404	0.001000	-0.000996	1.212978	654.	793.	0.521793E+02	0.128461E+02	685.	725.	757.	797.	705.	778.	672.	743.	697.	
29.	0.001402	0.001000	-0.000998	1.207635	655.	794.	0.522213E+02	0.127871E+02	686.	726.	758.	798.	706.	779.	673.	745.	698.	
30.	0.001400	0.001000	-0.001000	1.202283	656.	795.	0.522581E+02	0.127290E+02	688.	727.	759.	799.	708.	780.	675.	746.	700.	
31.	0.001398	0.001000	-0.001002	1.196960	657.	796.	0.522907E+02	0.126713E+02	689.	728.	760.	800.	709.	782.	677.	748.	701.	
32.	0.001397	0.001000	-0.001003	1.191861	658.	797.	0.523190E+02	0.126146E+02	690.	729.	761.	801.	710.	783.	678.	750.	703.	
33.	0.001395	0.001000	-0.001005	1.186905	659.	798.	0.523421E+02	0.125591E+02	691.	730.	762.	802.	712.	784.	680.	751.	705.	
34.	0.001394	0.001000	-0.001006	1.182058	660.	799.	0.523590E+02	0.125049E+02	692.	731.	763.	803.	713.	785.	681.	752.	706.	
35.	0.001392	0.001000	-0.001008	1.177303	661.	800.	0.523693E+02	0.124518E+02	693.	732.	764.	803.	714.	786.	683.	754.	708.	
36.	0.001391	0.001000	-0.001009	1.172612	662.	801.	0.523737E+02	0.123997E+02	694.	733.	765.	804.	716.	788.	684.	755.	709.	
37.	0.001389	0.001000	-0.001011	1.168029	663.	802.	0.523733E+02	0.123486E+02	695.	734.	766.	805.	717.	789.	685.	757.	710.	
38.	0.001388	0.001000	-0.001012	1.163465	664.	803.	0.523679E+02	0.122982E+02	696.	735.	767.	806.	718.	790.	687.	758.	712.	
39.	0.001387	0.001000	-0.001013	1.159060	665.	804.	0.523584E+02	0.122488E+02	697.	736.	768.	807.	719.	791.	688.	759.	713.	
40.	0.001386	0.001000	-0.001014	1.154749	665.	804.	0.523449E+02	0.122004E+02	698.	736.	769.	807.	720.	792.	689.	760.	714.	
41.	0.001385	0.001000	-0.001015	1.150555	666.	805.	0.523276E+02	0.121531E+02	699.	737.	770.	808.	721.	793.	690.	762.	716.	
42.	0.001383	0.001000	-0.001017	1.146426	667.	806.	0.523064E+02	0.121068E+02	700.	738.	771.	809.	723.	794.	691.	763.	717.	
43.	0.001382	0.001000	-0.001018	1.142380	668.	807.	0.522809E+02	0.120615E+02	701.	738.	771.	809.	724.	795.	693.	764.	718.	
44.	0.001382	0.001000	-0.001018	1.138427	668.	807.	0.522521E+02	0.120171E+02	701.	739.	772.	810.	725.	795.	694.	765.	719.	
45.	0.001381	0.001000	-0.001019	1.134541	669.	808.	0.522197E+02	0.119736E+02	702.	740.	773.	811.	726.	796.	695.	766.	720.	
46.	0.001380	0.001000	-0.001020	1.130748	670.	809.	0.521841E+02	0.119310E+02	703.	740.	774.	811.	727.	797.	696.	767.	722.	
47.	0.001379	0.001000	-0.001021	1.126841	670.	809.	0.521454E+02	0.118890E+02	704.	741.	774.	812.	728.	798.	697.	768.	723.	
48.	0.001378	0.001000	-0.001022	1.122994	671.	810.	0.521034E+02	0.118472E+02	704.	742.	775.	812.	728.	799.	698.	769.	724.	
49.	0.001377	0.001000	-0.001023	1.119371	672.	810.	0.520585E+02	0.118061E+02	705.	742.	776.	813.	729.	800.	699.	770.	725.	
50.	0.001376	0.001000	-0.001024	1.115851	672.	811.	0.520110E+02	0.117661E+02	706.	743.	776.	813.	730.	800.	700.	771.	726.	
51.	0.001376	0.001000	-0.001024	1.112389	673.	812.	0.519611E+02	0.117272E+02	706.	743.	777.	814.	731.	801.	701.	772.	727.	
52.	0.001375	0.001000	-0.001025	1.109040	673.	812.	0.519091E+02	0.116892E+02	707.	744.	777.	814.	732.	802.	701.	772.	728.	
53.	0.001374	0.001000	-0.001026	1.105761	674.	813.	0.518549E+02	0.116521E+02	707.	744.	778.	815.	733.	803.	702.	773.	729.	
54.	0.001374	0.001000	-0.001026	1.102540	674.	813.	0.517986E+02	0.116159E+02	708.	745.	779.	815.	734.	803.	703.	774.	730.	
55.	0.001373	0.001000	-0.001027	1.099419	675.	814.	0.517403E+02	0.115805E+02	708.	745.	779.	816.	734.	804.	704.	775.	731.	
56.	0.001373	0.001000	-0.001027	1.096322	675.	814.	0.516802E+02	0.115457E+02	709.	746.	780.	816.	735.	805.	705.	776.	732.	
57.	0.001372	0.001000	-0.001028	1.093341	676.	814.	0.516183E+02	0.115118E+02	709.	746.	780.	816.	736.	805.	705.	776.	732.	
58.	0.001372	0.001000	-0.001028	1.090406	676.	815.	0.515548E+02	0.114786E+02	710.	746.	780.	817.	736.	806.	706.	777.	733.	
59.	0.001372	0.001000	-0.001028	1.087528	676.	815.	0.514899E+02	0.114462E+02	710.	747.	781.	817.	737.	806.	707.	778.	734.	
60.	0.001371	0.001000	-0.001029	1.084751	677.	816.	0.514236E+02	0.114145E+02	711.	747.	781.	818.	738.	807.	707.	778.	735.	
61.	0.001371	0.001000	-0.001029	1.082009	677.	816.	0.513560E+02	0.113836E+02	711.	747.	782.	818.	738.	808.	708.	779.	736.	

62.	0.001371	0.001000	-0.001029	1.079369	678.	816.	0.512873E+02	0.113533E+02	712.	748.	782.	818.	739.	808.	709.	779.	736.
63.	0.001370	0.001000	-0.001030	1.076681	678.	817.	0.512175E+02	0.113237E+02	712.	748.	782.	818.	740.	809.	709.	780.	737.
64.	0.001370	0.001000	-0.001030	1.074110	678.	817.	0.511465E+02	0.112947E+02	712.	748.	783.	819.	740.	809.	710.	781.	738.
65.	0.001370	0.001000	-0.001030	1.071656	679.	817.	0.510748E+02	0.112665E+02	713.	749.	783.	819.	741.	810.	711.	781.	738.
66.	0.001370	0.001000	-0.001030	1.069261	679.	818.	0.510023E+02	0.112390E+02	713.	749.	783.	819.	741.	810.	711.	782.	739.
67.	0.001370	0.001000	-0.001030	1.066972	679.	818.	0.509291E+02	0.112123E+02	714.	749.	784.	820.	742.	811.	712.	782.	740.
68.	0.001369	0.001000	-0.001031	1.064645	679.	818.	0.508554E+02	0.111863E+02	714.	749.	784.	820.	742.	811.	712.	783.	740.
69.	0.001369	0.001000	-0.001031	1.062452	680.	818.	0.507811E+02	0.111610E+02	714.	750.	784.	820.	743.	812.	713.	783.	741.
70.	0.001369	0.001000	-0.001031	1.060358	680.	819.	0.507064E+02	0.111364E+02	714.	750.	785.	820.	743.	812.	713.	784.	741.
71.	0.001369	0.001000	-0.001031	1.058201	680.	819.	0.506312E+02	0.111124E+02	715.	750.	785.	820.	744.	812.	714.	784.	742.
72.	0.001369	0.001000	-0.001031	1.056184	680.	819.	0.505557E+02	0.110890E+02	715.	750.	785.	821.	744.	813.	714.	784.	743.
73.	0.001369	0.001000	-0.001031	1.054228	681.	819.	0.504799E+02	0.110663E+02	715.	751.	785.	821.	745.	813.	714.	785.	743.
74.	0.001369	0.001000	-0.001031	1.051980	681.	820.	0.504036E+02	0.110435E+02	716.	751.	786.	821.	745.	814.	715.	785.	744.
75.	0.001369	0.001000	-0.001031	1.050028	681.	820.	0.503268E+02	0.110209E+02	716.	751.	786.	821.	745.	814.	715.	785.	744.
76.	0.001369	0.001000	-0.001031	1.048136	681.	820.	0.502499E+02	0.109990E+02	716.	751.	786.	821.	746.	814.	716.	786.	745.
77.	0.001369	0.001000	-0.001031	1.046272	681.	820.	0.501731E+02	0.109779E+02	716.	751.	786.	821.	746.	815.	716.	786.	745.
78.	0.001369	0.001000	-0.001031	1.044567	682.	820.	0.500964E+02	0.109575E+02	716.	751.	786.	822.	747.	815.	716.	786.	745.
79.	0.001369	0.001000	-0.001031	1.042900	682.	820.	0.500199E+02	0.109379E+02	717.	752.	787.	822.	747.	815.	717.	787.	746.
80.	0.001370	0.001000	-0.001030	1.041260	682.	821.	0.499436E+02	0.109188E+02	717.	752.	787.	822.	747.	815.	717.	787.	746.
81.	0.001370	0.001000	-0.001030	1.039603	682.	821.	0.498674E+02	0.109003E+02	717.	752.	787.	822.	748.	816.	717.	787.	747.
82.	0.001370	0.001000	-0.001030	1.038121	682.	821.	0.497913E+02	0.108822E+02	717.	752.	787.	822.	748.	816.	717.	788.	747.
83.	0.001370	0.001000	-0.001030	1.036613	682.	821.	0.497157E+02	0.108649E+02	717.	752.	787.	822.	748.	816.	718.	788.	748.
84.	0.001370	0.001000	-0.001030	1.035100	682.	821.	0.496401E+02	0.108478E+02	717.	752.	787.	822.	749.	817.	718.	788.	748.
85.	0.001370	0.001000	-0.001030	1.033656	683.	821.	0.495648E+02	0.108313E+02	718.	752.	787.	822.	749.	817.	718.	788.	748.
86.	0.001371	0.001000	-0.001029	1.032302	683.	821.	0.494899E+02	0.108150E+02	718.	752.	788.	822.	749.	817.	718.	789.	749.
87.	0.001371	0.001000	-0.001029	1.031026	683.	821.	0.494157E+02	0.107997E+02	718.	752.	788.	822.	749.	817.	719.	789.	749.
88.	0.001371	0.001000	-0.001029	1.029640	683.	821.	0.493417E+02	0.107845E+02	718.	753.	788.	822.	750.	817.	719.	789.	749.
89.	0.001371	0.001000	-0.001029	1.028374	683.	822.	0.492681E+02	0.107698E+02	718.	753.	788.	822.	750.	818.	719.	789.	750.
90.	0.001372	0.001000	-0.001028	1.027121	683.	822.	0.491951E+02	0.107555E+02	718.	753.	788.	822.	750.	818.	719.	789.	750.
91.	0.001372	0.001000	-0.001028	1.025964	683.	822.	0.491225E+02	0.107415E+02	718.	753.	788.	823.	750.	818.	719.	789.	750.
92.	0.001372	0.001000	-0.001028	1.024902	683.	822.	0.490507E+02	0.107284E+02	718.	753.	788.	823.	750.	818.	720.	790.	750.
93.	0.001372	0.001000	-0.001028	1.023645	683.	822.	0.489793E+02	0.107153E+02	718.	753.	788.	823.	751.	818.	720.	790.	751.
94.	0.001373	0.001000	-0.001027	1.022598	683.	822.	0.489084E+02	0.107025E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
95.	0.001373	0.001000	-0.001027	1.021541	683.	822.	0.488382E+02	0.106902E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
96.	0.001373	0.001000	-0.001027	1.020572	683.	822.	0.487686E+02	0.106784E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
97.	0.001374	0.001000	-0.001026	1.019559	683.	822.	0.486996E+02	0.106670E+02	719.	753.	788.	823.	751.	819.	720.	790.	752.
98.	0.001374	0.001000	-0.001026	1.018737	683.	822.	0.486315E+02	0.106561E+02	719.	753.	788.	823.	752.	819.	721.	790.	752.
99.	0.001374	0.001000	-0.001026	1.017691	683.	822.	0.485641E+02	0.106455E+02	719.	753.	789.	823.	752.	819.	721.	791.	752.
100.	0.001374	0.001000	-0.001026	1.016759	683.	822.	0.484971E+02	0.106346E+02	719.	753.	789.	823.	752.	819.	721.	791.	752.
101.	0.001375	0.001000	-0.001025	1.015981	684.	822.	0.484308E+02	0.106245E+02	719.	753.	789.	823.	752.	820.	721.	791.	752.
102.	0.001375	0.001000	-0.001025	1.015070	684.	822.	0.483654E+02	0.106147E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
103.	0.001375	0.001000	-0.001025	1.014306	684.	822.	0.483006E+02	0.106052E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
104.	0.001376	0.001000	-0.001024	1.013566	684.	822.	0.482368E+02	0.105961E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
105.	0.001376	0.001000	-0.001024	1.012817	684.	822.	0.481737E+02	0.105874E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
106.	0.001376	0.001000	-0.001024	1.012127	684.	822.	0.481114E+02	0.105790E+02	719.	753.	789.	823.	753.	820.	721.	791.	753.
107.	0.001377	0.001000	-0.001023	1.011410	684.	822.	0.480500E+02	0.105708E+02	719.	753.	789.	823.	753.	820.	721.	791.	753.
108.	0.001377	0.001000	-0.001023	1.010599	684.	822.	0.479889E+02	0.105627E+02	719.	753.	789.	823.	753.	820.	722.	791.	753.
109.	0.001377	0.001000	-0.001023	1.010025	684.	822.	0.479285E+02	0.105546E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
110.	0.001378	0.001000	-0.001022	1.009398	684.	822.	0.478693E+02	0.105472E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
111.	0.001378	0.001000	-0.001022	1.008739	684.	822.	0.478109E+02	0.105400E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
112.	0.001378	0.001000	-0.001022	1.008148	684.	822.	0.477531E+02	0.105328E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
113.	0.001379	0.001000	-0.001021	1.007635	684.	822.	0.476962E+02	0.105262E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
114.	0.001379	0.001000	-0.001021	1.007134	684.	822.	0.476403E+02	0.105198E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
115.	0.001379	0.001000	-0.001021	1.006638	684.	822.	0.475851E+02	0.105138E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
116.	0.001380	0.001000	-0.001020	1.006133	684.	822.	0.475308E+02	0.105079E+02	719.	753.	789.	823.	753.	821.	722.	792.	754.
117.	0.001380	0.001000	-0.001020	1.005669	684.	822.	0.474772E+02	0.105023E+02	719.	753.	789.	823.	753.	821.	722.	792.	754.
118.	0.001381	0.001000	-0.001019	1.005216	684.	822.	0.474244E+02	0.104968E+02	719.	753.	789.	822.	753.	821.	722.	792.	755.
119.	0.001381	0.001000	-0.001019	1.004786	684.	822.	0.473725E+02	0.104916E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
120.	0.001381	0.001000	-0.001019	1.004247	684.	822.	0.473212E+02	0.104864E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
121.	0.001381	0.001000	-0.001019	1.003736	684.	822.	0.472706E+02	0.104810E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
122.	0.001382	0.001000	-0.001018	1.003431	683.	822.	0.472208E+02	0.104760E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
123.	0.001382	0.001000	-0.001018	1.002996	683.	822.	0.471720E+02	0.104714E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
124.	0.001382	0.001000	-0.001018	1.002618	683.	822.	0.471237E+02	0.104667E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
125.	0.001383	0.001000	-0.001017	1.002263	683.	822.	0.470767E+02	0.104623E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
126.	0.001383	0.001000	-0.001017	1.001857	683.	822.	0.470299E+02	0.104581E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
127.	0.001383	0.001000	-0.001017	1.001595	683.	822.	0.469843E+02	0.104540E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.

128.	0.001384	0.001000	-0.001016	1.001386	683.	822.	0.469393E+02	0.104504E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
129.	0.001384	0.001000	-0.001016	1.001184	683.	822.	0.468958E+02	0.104473E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
130.	0.001384	0.001000	-0.001016	1.000913	683.	822.	0.468524E+02	0.104443E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
131.	0.001385	0.001000	-0.001015	1.000700	683.	822.	0.468103E+02	0.104414E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
132.	0.001385	0.001000	-0.001015	1.000328	683.	822.	0.467685E+02	0.104383E+02	719.	753.	788.	822.	754.	821.	722.	791.	755.
133.	0.001385	0.001000	-0.001015	1.000134	683.	822.	0.467278E+02	0.104352E+02	719.	753.	788.	822.	754.	821.	722.	791.	755.
134.	0.001385	0.001000	-0.001015	0.999845	683.	822.	0.466872E+02	0.104323E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
135.	0.001386	0.001000	-0.001014	0.999634	683.	822.	0.466478E+02	0.104295E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
136.	0.001386	0.001000	-0.001014	0.999374	683.	822.	0.466087E+02	0.104267E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
137.	0.001386	0.001000	-0.001014	0.999268	683.	822.	0.465706E+02	0.104242E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
138.	0.001387	0.001000	-0.001013	0.999177	683.	822.	0.465338E+02	0.104223E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
139.	0.001387	0.001000	-0.001013	0.998961	683.	822.	0.464978E+02	0.104204E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
140.	0.001387	0.001000	-0.001013	0.998877	683.	821.	0.464616E+02	0.104185E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
141.	0.001388	0.001000	-0.001012	0.998906	683.	821.	0.464266E+02	0.104170E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
142.	0.001388	0.001000	-0.001012	0.999045	683.	821.	0.463934E+02	0.104165E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
143.	0.001389	0.001000	-0.001011	0.998986	683.	821.	0.463613E+02	0.104161E+02	719.	752.	788.	821.	754.	821.	722.	791.	755.
144.	0.001389	0.001000	-0.001011	0.998727	683.	821.	0.463285E+02	0.104151E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
145.	0.001389	0.001000	-0.001011	0.998392	683.	821.	0.462964E+02	0.104133E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
146.	0.001389	0.001000	-0.001011	0.998200	683.	821.	0.462643E+02	0.104112E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
147.	0.001389	0.001000	-0.001011	0.997953	683.	821.	0.462332E+02	0.104090E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
148.	0.001390	0.001000	-0.001010	0.998032	683.	821.	0.462030E+02	0.104075E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
149.	0.001390	0.001000	-0.001010	0.998040	683.	821.	0.461740E+02	0.104066E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
150.	0.001390	0.001000	-0.001010	0.997937	683.	821.	0.461460E+02	0.104059E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
151.	0.001390	0.001000	-0.001010	0.997877	683.	821.	0.461173E+02	0.104051E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
152.	0.001390	0.001000	-0.001010	0.997694	683.	821.	0.460893E+02	0.104041E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
153.	0.001390	0.001000	-0.001010	0.997413	682.	821.	0.460620E+02	0.104024E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
154.	0.001391	0.001000	-0.001009	0.997268	682.	821.	0.460344E+02	0.104006E+02	718.	752.	787.	821.	754.	821.	722.	791.	755.
155.	0.001391	0.001000	-0.001009	0.997221	682.	821.	0.460076E+02	0.103991E+02	718.	752.	787.	821.	754.	821.	722.	791.	755.
156.	0.001391	0.001000	-0.001009	0.997223	682.	821.	0.459819E+02	0.103981E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
157.	0.001391	0.001000	-0.001009	0.997181	682.	821.	0.459571E+02	0.103974E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
158.	0.001392	0.001000	-0.001008	0.997134	682.	821.	0.459328E+02	0.103967E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
159.	0.001392	0.001000	-0.001008	0.997094	682.	821.	0.459093E+02	0.103961E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
160.	0.001392	0.001000	-0.001008	0.997058	682.	821.	0.458861E+02	0.103955E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
161.	0.001392	0.001000	-0.001008	0.997026	682.	821.	0.458633E+02	0.103949E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
162.	0.001393	0.001000	-0.001007	0.997016	682.	821.	0.458410E+02	0.103944E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
163.	0.001393	0.001000	-0.001007	0.997016	682.	821.	0.458194E+02	0.103941E+02	718.	751.	787.	821.	754.	821.	721.	791.	755.
164.	0.001393	0.001000	-0.001007	0.997020	682.	821.	0.457982E+02	0.103939E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
165.	0.001393	0.001000	-0.001007	0.997030	682.	821.	0.457777E+02	0.103937E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
166.	0.001393	0.001000	-0.001007	0.997046	682.	821.	0.457577E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
167.	0.001394	0.001000	-0.001006	0.997073	682.	821.	0.457381E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
168.	0.001394	0.001000	-0.001006	0.997106	682.	821.	0.457190E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
169.	0.001394	0.001000	-0.001006	0.997149	682.	821.	0.457002E+02	0.103937E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
170.	0.001394	0.001000	-0.001006	0.997204	682.	821.	0.456819E+02	0.103940E+02	718.	751.	787.	821.	753.	820.	721.	791.	755.
171.	0.001394	0.001000	-0.001006	0.997268	682.	821.	0.456642E+02	0.103944E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
172.	0.001395	0.001000	-0.001005	0.997337	682.	821.	0.456468E+02	0.103948E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
173.	0.001395	0.001000	-0.001005	0.997417	682.	821.	0.456303E+02	0.103953E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
174.	0.001395	0.001000	-0.001005	0.997513	682.	821.	0.456150E+02	0.103959E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
175.	0.001395	0.001000	-0.001005	0.997598	682.	820.	0.455997E+02	0.103966E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
176.	0.001395	0.001000	-0.001005	0.997710	682.	820.	0.455846E+02	0.103974E+02	718.	751.	787.	820.	753.	820.	721.	790.	755.
177.	0.001396	0.001000	-0.001004	0.997831	682.	820.	0.455697E+02	0.103984E+02	718.	751.	787.	820.	753.	820.	721.	790.	755.
178.	0.001396	0.001000	-0.001004	0.997960	682.	820.	0.455553E+02	0.103994E+02	718.	751.	787.	820.	753.	820.	721.	790.	755.
179.	0.001396	0.001000	-0.001004	0.997996	682.	820.	0.455422E+02	0.104004E+02	718.	751.	787.	820.	753.	820.	721.	790.	755.
180.	0.001396	0.001000	-0.001004	0.997997	682.	820.	0.455292E+02	0.104010E+02	718.	751.	787.	820.	753.	820.	721.	790.	755.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IRE	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992	0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312	3.07586956
1.	0.000820	0.003000	-0.003582	3.346107	681.	899.	0.575145E+02	0.286428E+02	735. 843. 853. 932. 685. 758. 613. 684. 643.
2.	0.001375	0.003000	-0.003021	1.909885	741.	876.	0.567759E+02	0.250439E+02	730. 805. 811. 901. 695. 768. 624. 698. 651.
3.	0.001540	0.003000	-0.002859	2.112583	728.	863.	0.562497E+02	0.229518E+02	735. 803. 808. 882. 703. 778. 635. 709. 659.
4.	0.001573	0.003000	-0.002827	2.134062	726.	865.	0.560865E+02	0.219997E+02	736. 806. 814. 883. 711. 789. 645. 719. 667.
5.	0.001581	0.003000	-0.002819	2.109593	730.	871.	0.559472E+02	0.213928E+02	741. 810. 819. 887. 717. 799. 655. 729. 675.
6.	0.001581	0.003000	-0.002819	2.072773	735.	876.	0.557655E+02	0.209100E+02	747. 814. 825. 891. 724. 808. 664. 738. 683.
7.	0.001578	0.003000	-0.002822	2.053758	740.	881.	0.565582E+02	0.209378E+02	753. 819. 830. 896. 731. 816. 672. 747. 690.
8.	0.001546	0.003000	-0.002854	2.065822	746.	888.	0.586899E+02	0.214836E+02	760. 825. 837. 902. 737. 825. 681. 756. 698.
9.	0.001514	0.003000	-0.002886	2.031137	753.	894.	0.600504E+02	0.215777E+02	767. 831. 844. 909. 744. 833. 689. 765. 705.
10.	0.001497	0.003000	-0.002904	1.993468	759.	900.	0.608985E+02	0.214174E+02	773. 837. 850. 914. 751. 840. 697. 773. 712.
11.	0.001487	0.003000	-0.002913	1.961411	764.	905.	0.614128E+02	0.211558E+02	779. 842. 856. 919. 757. 847. 705. 781. 719.
12.	0.001481	0.003000	-0.002919	1.932222	770.	910.	0.616878E+02	0.208599E+02	785. 847. 862. 923. 763. 853. 713. 789. 726.
13.	0.001477	0.003000	-0.002923	1.905240	774.	915.	0.618174E+02	0.205612E+02	790. 851. 867. 928. 769. 859. 721. 797. 733.
14.	0.001473	0.003000	-0.002927	1.883171	779.	920.	0.622019E+02	0.203170E+02	796. 856. 872. 932. 775. 865. 728. 804. 739.
15.	0.001467	0.003000	-0.002933	1.863265	784.	925.	0.628055E+02	0.201158E+02	801. 860. 877. 937. 781. 871. 735. 811. 746.
16.	0.001459	0.003000	-0.002941	1.842944	789.	929.	0.634344E+02	0.199210E+02	806. 865. 882. 941. 786. 876. 742. 818. 752.
17.	0.001452	0.003000	-0.002948	1.822031	793.	934.	0.639930E+02	0.197183E+02	811. 869. 887. 946. 792. 882. 749. 825. 758.
18.	0.001445	0.003000	-0.002955	1.800883	798.	938.	0.644389E+02	0.195055E+02	816. 874. 892. 950. 797. 887. 756. 832. 764.
19.	0.001440	0.003000	-0.002961	1.779564	802.	942.	0.647579E+02	0.192848E+02	821. 878. 897. 954. 803. 892. 762. 838. 770.
20.	0.001435	0.003000	-0.002965	1.758986	806.	947.	0.649864E+02	0.190615E+02	826. 882. 902. 958. 808. 897. 768. 844. 776.
21.	0.001431	0.003000	-0.002970	1.739489	810.	951.	0.652099E+02	0.188434E+02	830. 886. 906. 962. 813. 901. 774. 851. 782.
22.	0.001426	0.003000	-0.002974	1.720703	814.	954.	0.654579E+02	0.186330E+02	834. 890. 910. 966. 818. 906. 780. 856. 788.
23.	0.001421	0.003000	-0.002979	1.702427	818.	958.	0.657207E+02	0.184291E+02	839. 893. 914. 969. 823. 910. 786. 862. 793.
24.	0.001417	0.003000	-0.002983	1.684662	822.	962.	0.659771E+02	0.182305E+02	843. 897. 919. 973. 828. 914. 792. 868. 799.
25.	0.001412	0.003000	-0.002988	1.667251	825.	965.	0.662050E+02	0.180363E+02	847. 901. 922. 976. 833. 919. 797. 873. 804.
26.	0.001408	0.003000	-0.002992	1.649959	829.	969.	0.663879E+02	0.178450E+02	851. 904. 926. 980. 837. 923. 803. 879. 809.
27.	0.001404	0.003000	-0.002996	1.632736	832.	972.	0.665269E+02	0.176557E+02	855. 907. 930. 983. 842. 927. 808. 884. 815.
28.	0.001400	0.003000	-0.003000	1.616067	836.	976.	0.666369E+02	0.174694E+02	858. 911. 934. 986. 846. 931. 813. 889. 820.
29.	0.001396	0.003000	-0.003004	1.599777	839.	979.	0.667311E+02	0.172868E+02	862. 914. 937. 989. 851. 934. 818. 894. 826.
30.	0.001392	0.003000	-0.003008	1.584003	842.	982.	0.668158E+02	0.171084E+02	865. 917. 941. 992. 855. 938. 823. 898. 829.
31.	0.001388	0.003000	-0.003012	1.568377	845.	985.	0.668913E+02	0.169341E+02	869. 920. 944. 995. 859. 942. 827. 903. 834.
32.	0.001385	0.003000	-0.003015	1.553136	848.	988.	0.669527E+02	0.167632E+02	872. 922. 947. 997. 863. 945. 832. 907. 839.
33.	0.001381	0.003000	-0.003019	1.538307	851.	991.	0.669953E+02	0.165961E+02	875. 925. 950.1000. 867. 949. 836. 912. 843.
34.	0.001378	0.003000	-0.003022	1.523750	853.	993.	0.670171E+02	0.164326E+02	878. 928. 953.1003. 871. 952. 840. 916. 847.
35.	0.001374	0.003000	-0.003026	1.509445	856.	996.	0.670193E+02	0.162723E+02	881. 930. 956.1005. 874. 955. 845. 920. 852.
36.	0.001371	0.003000	-0.003029	1.495292	859.	998.	0.670050E+02	0.161150E+02	884. 933. 959.1008. 878. 959. 849. 924. 856.
37.	0.001368	0.003000	-0.003032	1.481498	861.1001.		0.669772E+02	0.159609E+02	887. 935. 962.1010. 882. 962. 852. 928. 860.
38.	0.001365	0.003000	-0.003035	1.468196	864.1003.		0.669381E+02	0.158113E+02	890. 938. 964.1012. 885. 965. 856. 931. 864.
39.	0.001362	0.003000	-0.003038	1.455180	866.1006.		0.668883E+02	0.156649E+02	892. 940. 967.1014. 888. 968. 860. 935. 868.
40.	0.001359	0.003000	-0.003041	1.442422	868.1008.		0.668271E+02	0.155216E+02	895. 942. 969.1016. 892. 971. 864. 939. 872.
41.	0.001356	0.003000	-0.003044	1.429874	870.1010.		0.667535E+02	0.153811E+02	897. 944. 972.1018. 895. 973. 867. 942. 875.
42.	0.001354	0.003000	-0.003046	1.417335	873.1012.		0.666678E+02	0.152428E+02	900. 946. 974.1020. 898. 976. 870. 945. 879.
43.	0.001351	0.003000	-0.003049	1.405254	875.1014.		0.665704E+02	0.151069E+02	902. 948. 976.1022. 901. 979. 874. 949. 883.
44.	0.001349	0.003000	-0.003051	1.393521	877.1016.		0.664627E+02	0.149742E+02	904. 950. 978.1024. 904. 982. 877. 952. 886.
45.	0.001346	0.003000	-0.003054	1.382092	878.1018.		0.663460E+02	0.148447E+02	907. 952. 980.1026. 907. 984. 880. 955. 889.
46.	0.001344	0.003000	-0.003056	1.370929	880.1020.		0.662209E+02	0.147183E+02	909. 954. 982.1027. 910. 987. 883. 958. 893.
47.	0.001342	0.003000	-0.003058	1.360005	882.1022.		0.660878E+02	0.145949E+02	911. 955. 984.1029. 913. 989. 886. 960. 896.
48.	0.001340	0.003000	-0.003060	1.349178	884.1023.		0.659468E+02	0.144741E+02	913. 957. 986.1031. 915. 991. 889. 963. 899.
49.	0.001338	0.003000	-0.003062	1.338484	886.1025.		0.657974E+02	0.143551E+02	915. 958. 988.1032. 918. 994. 891. 966. 902.
50.	0.001336	0.003000	-0.003064	1.328190	887.1026.		0.656405E+02	0.142386E+02	916. 960. 990.1033. 920. 996. 894. 968. 905.
51.	0.001334	0.003000	-0.003066	1.318208	889.1028.		0.654767E+02	0.141250E+02	918. 961. 991.1035. 923. 998. 897. 971. 908.
52.	0.001332	0.003000	-0.003068	1.308492	890.1029.		0.653069E+02	0.140142E+02	920. 963. 993.1036. 925.1000. 899. 973. 911.
53.	0.001331	0.003000	-0.003069	1.299012	892.1031.		0.651314E+02	0.139064E+02	921. 964. 995.1037. 928.1002. 901. 976. 914.
54.	0.001329	0.003000	-0.003071	1.289742	893.1032.		0.649507E+02	0.138011E+02	923. 966. 996.1039. 930.1004. 904. 978. 916.
55.	0.001328	0.003000	-0.003072	1.280703	894.1034.		0.647649E+02	0.136984E+02	925. 967. 998.1040. 932.1006. 906. 980. 919.
56.	0.001326	0.003000	-0.003074	1.271638	896.1035.		0.645740E+02	0.135977E+02	926. 968. 999.1041. 934.1008. 908. 982. 921.
57.	0.001325	0.003000	-0.003075	1.262854	897.1036.		0.643781E+02	0.134987E+02	927. 969.1000.1042. 936.1010. 910. 984. 924.
58.	0.001324	0.003000	-0.003076	1.254353	898.1037.		0.641778E+02	0.134021E+02	929. 970.1002.1043. 938.1012. 912. 986. 926.
59.	0.001322	0.003000	-0.003078	1.246078	899.1038.		0.639737E+02	0.133078E+02	930. 971.1003.1044. 940.1013. 914. 988. 929.
60.	0.001321	0.003000	-0.003079	1.238070	900.1039.		0.637664E+02	0.132161E+02	931. 972.1004.1045. 942.1015. 916. 990. 931.
61.	0.001321	0.003000	-0.003079	1.230267	901.1040.		0.635560E+02	0.131268E+02	933. 973.1005.1046. 944.1017. 918. 991. 933.

62.	0.001320	0.003000	-0.003080	1.222674	902.1041.	0.633429E+02	0.130399E+02	934.	974.1006.1047.	946.1018.	920.	993.	935.
63.	0.001319	0.003000	-0.003081	1.215266	903.1042.	0.631272E+02	0.129553E+02	935.	975.1007.1048.	947.1020.	922.	995.	937.
64.	0.001318	0.003000	-0.003082	1.208037	904.1043.	0.629090E+02	0.128727E+02	936.	976.1008.1048.	949.1021.	923.	996.	939.
65.	0.001317	0.003000	-0.003083	1.200870	905.1044.	0.626885E+02	0.127921E+02	937.	977.1009.1049.	951.1023.	925.	998.	941.
66.	0.001317	0.003000	-0.003083	1.193801	906.1045.	0.624656E+02	0.127127E+02	938.	978.1010.1050.	952.1024.	926.	999.	943.
67.	0.001316	0.003000	-0.003084	1.187015	907.1046.	0.622408E+02	0.126353E+02	939.	978.1011.1051.	954.1025.	928.1001.	945.	
68.	0.001316	0.003000	-0.003084	1.180458	908.1047.	0.620147E+02	0.125599E+02	940.	979.1012.1051.	955.1027.	929.1002.	947.	
69.	0.001315	0.003000	-0.003085	1.174096	908.1047.	0.617876E+02	0.124867E+02	941.	980.1013.1052.	957.1028.	931.1003.	948.	
70.	0.001315	0.003000	-0.003085	1.167898	909.1048.	0.615596E+02	0.124155E+02	942.	981.1014.1052.	958.1029.	932.1005.	950.	
71.	0.001314	0.003000	-0.003086	1.161814	910.1049.	0.613307E+02	0.123462E+02	942.	981.1014.1053.	959.1030.	933.1006.	952.	
72.	0.001314	0.003000	-0.003086	1.155946	911.1049.	0.611012E+02	0.122787E+02	943.	982.1015.1054.	961.1031.	935.1007.	953.	
73.	0.001314	0.003000	-0.003086	1.150246	911.1050.	0.608712E+02	0.122130E+02	944.	982.1016.1054.	962.1032.	936.1008.	955.	
74.	0.001314	0.003000	-0.003086	1.144710	912.1051.	0.606409E+02	0.121491E+02	945.	983.1016.1055.	963.1033.	937.1009.	956.	
75.	0.001314	0.003000	-0.003086	1.139320	912.1051.	0.604106E+02	0.120870E+02	945.	983.1017.1055.	964.1035.	938.1010.	958.	
76.	0.001314	0.003000	-0.003086	1.134089	913.1052.	0.601803E+02	0.120267E+02	946.	984.1018.1055.	965.1035.	939.1011.	959.	
77.	0.001314	0.003000	-0.003086	1.128975	913.1052.	0.599503E+02	0.119680E+02	947.	984.1018.1056.	966.1036.	940.1012.	960.	
78.	0.001314	0.003000	-0.003086	1.123802	914.1053.	0.597203E+02	0.119103E+02	947.	985.1019.1056.	967.1037.	941.1013.	962.	
79.	0.001314	0.003000	-0.003086	1.118855	914.1053.	0.594904E+02	0.118539E+02	948.	985.1019.1057.	969.1038.	942.1014.	963.	
80.	0.001314	0.003000	-0.003086	1.114114	915.1054.	0.592612E+02	0.117990E+02	948.	986.1020.1057.	969.1039.	943.1015.	964.	
81.	0.001314	0.003000	-0.003085	1.109534	915.1054.	0.590327E+02	0.117458E+02	949.	986.1020.1057.	970.1040.	944.1016.	965.	
82.	0.001315	0.003000	-0.003085	1.105115	916.1054.	0.588053E+02	0.116943E+02	949.	986.1020.1057.	971.1041.	944.1016.	966.	
83.	0.001315	0.003000	-0.003085	1.100815	916.1055.	0.585789E+02	0.116444E+02	950.	987.1021.1058.	972.1041.	945.1017.	968.	
84.	0.001315	0.003000	-0.003085	1.096623	916.1055.	0.583537E+02	0.115960E+02	950.	987.1021.1058.	973.1042.	946.1018.	969.	
85.	0.001316	0.003000	-0.003084	1.092578	917.1055.	0.581297E+02	0.115489E+02	951.	987.1022.1058.	974.1043.	947.1018.	970.	
86.	0.001316	0.003000	-0.003084	1.088641	917.1056.	0.579068E+02	0.115032E+02	951.	987.1022.1058.	975.1044.	947.1019.	971.	
87.	0.001317	0.003000	-0.003083	1.084796	917.1056.	0.576853E+02	0.114588E+02	951.	988.1022.1059.	975.1044.	948.1020.	972.	
88.	0.001317	0.003000	-0.003083	1.081106	917.1056.	0.574652E+02	0.114157E+02	952.	988.1023.1059.	976.1045.	949.1020.	972.	
89.	0.001318	0.003000	-0.003082	1.077468	918.1056.	0.572466E+02	0.113738E+02	952.	988.1023.1059.	977.1045.	949.1021.	973.	
90.	0.001318	0.003000	-0.003082	1.073930	918.1057.	0.570296E+02	0.113331E+02	952.	988.1023.1059.	977.1046.	950.1021.	974.	
91.	0.001319	0.003000	-0.003081	1.070541	918.1057.	0.568143E+02	0.112935E+02	953.	988.1023.1059.	978.1047.	950.1022.	975.	
92.	0.001320	0.003000	-0.003080	1.067285	918.1057.	0.566008E+02	0.112552E+02	953.	989.1024.1059.	979.1047.	951.1022.	976.	
93.	0.001320	0.003000	-0.003080	1.064114	919.1057.	0.563892E+02	0.112182E+02	953.	989.1024.1059.	979.1048.	951.1023.	976.	
94.	0.001321	0.003000	-0.003079	1.061097	919.1057.	0.561795E+02	0.111824E+02	953.	989.1024.1060.	980.1048.	952.1023.	977.	
95.	0.001322	0.003000	-0.003078	1.058115	919.1058.	0.559719E+02	0.111478E+02	954.	989.1024.1060.	980.1049.	952.1023.	978.	
96.	0.001323	0.003000	-0.003077	1.055293	919.1058.	0.557662E+02	0.111142E+02	954.	989.1024.1060.	981.1049.	953.1024.	978.	
97.	0.001323	0.003000	-0.003077	1.052342	919.1058.	0.555625E+02	0.110815E+02	954.	989.1024.1060.	981.1049.	953.1024.	979.	
98.	0.001324	0.003000	-0.003076	1.049480	919.1058.	0.553604E+02	0.110492E+02	954.	989.1025.1060.	982.1050.	954.1025.	980.	
99.	0.001324	0.003000	-0.003076	1.046828	919.1058.	0.551603E+02	0.110179E+02	954.	989.1025.1060.	982.1050.	954.1025.	980.	
100.	0.001325	0.003000	-0.003075	1.044264	920.1058.	0.549626E+02	0.109877E+02	954.	990.1025.1060.	983.1051.	954.1025.	981.	
101.	0.001326	0.003000	-0.003074	1.041870	920.1058.	0.547671E+02	0.109586E+02	955.	990.1025.1060.	983.1051.	955.1025.	981.	
102.	0.001327	0.003000	-0.003073	1.039482	920.1058.	0.545740E+02	0.109308E+02	955.	990.1025.1060.	983.1051.	955.1026.	982.	
103.	0.001328	0.003000	-0.003072	1.037202	920.1058.	0.543833E+02	0.109038E+02	955.	990.1025.1060.	984.1052.	955.1026.	982.	
104.	0.001329	0.003000	-0.003071	1.035065	920.1058.	0.541949E+02	0.108779E+02	955.	990.1025.1060.	984.1052.	955.1026.	983.	
105.	0.001330	0.003000	-0.003070	1.032904	920.1058.	0.540088E+02	0.108528E+02	955.	990.1025.1060.	984.1052.	956.1026.	983.	
106.	0.001331	0.003000	-0.003069	1.030849	920.1058.	0.538249E+02	0.108285E+02	955.	990.1025.1060.	985.1052.	956.1026.	984.	
107.	0.001332	0.003000	-0.003068	1.028919	920.1058.	0.536434E+02	0.108050E+02	955.	990.1025.1060.	985.1053.	956.1027.	984.	
108.	0.001332	0.003000	-0.003068	1.027020	920.1058.	0.534644E+02	0.107825E+02	955.	990.1025.1060.	985.1053.	956.1027.	985.	
109.	0.001333	0.003000	-0.003067	1.025153	920.1058.	0.532876E+02	0.107606E+02	955.	990.1025.1060.	985.1053.	956.1027.	985.	
110.	0.001334	0.003000	-0.003066	1.023376	920.1058.	0.531133E+02	0.107395E+02	955.	990.1025.1060.	986.1053.	957.1027.	985.	
111.	0.001335	0.003000	-0.003065	1.021692	920.1058.	0.529415E+02	0.107192E+02	955.	990.1025.1060.	986.1053.	957.1027.	986.	
112.	0.001336	0.003000	-0.003064	1.020086	920.1058.	0.527723E+02	0.106997E+02	955.	990.1025.1060.	986.1054.	957.1027.	986.	
113.	0.001337	0.003000	-0.003063	1.018453	920.1058.	0.526054E+02	0.106808E+02	955.	989.1025.1059.	986.1054.	957.1027.	986.	
114.	0.001338	0.003000	-0.003062	1.016915	920.1058.	0.524408E+02	0.106626E+02	955.	989.1025.1059.	987.1054.	957.1027.	986.	
115.	0.001339	0.003000	-0.003061	1.015444	920.1058.	0.522786E+02	0.106449E+02	955.	989.1025.1059.	987.1054.	957.1027.	987.	
116.	0.001340	0.003000	-0.003060	1.014124	920.1058.	0.521190E+02	0.106281E+02	955.	989.1025.1059.	987.1054.	957.1028.	987.	
117.	0.001341	0.003000	-0.003059	1.012733	920.1058.	0.519619E+02	0.106121E+02	955.	989.1025.1059.	987.1054.	957.1028.	987.	
118.	0.001342	0.003000	-0.003058	1.011415	920.1058.	0.518073E+02	0.105964E+02	955.	989.1025.1059.	987.1054.	958.1028.	987.	
119.	0.001343	0.003000	-0.003057	1.010153	920.1058.	0.516549E+02	0.105813E+02	955.	989.1025.1059.	987.1055.	958.1028.	988.	
120.	0.001344	0.003000	-0.003056	1.008912	920.1058.	0.515049E+02	0.105667E+02	955.	989.1025.1059.	987.1055.	958.1028.	988.	
121.	0.001345	0.003000	-0.003055	1.007816	919.1058.	0.513573E+02	0.105526E+02	955.	989.1025.1059.	988.1055.	958.1028.	988.	
122.	0.001346	0.003000	-0.003054	1.006800	919.1058.	0.512125E+02	0.105396E+02	955.	989.1025.1059.	988.1055.	958.1028.	988.	
123.	0.001346	0.003000	-0.003053	1.005667	919.1058.	0.510698E+02	0.105269E+02	955.	989.1025.1059.	988.1055.	958.1028.	988.	
124.	0.001347	0.003000	-0.003053	1.004662	919.1058.	0.509296E+02	0.105145E+02	955.	989.1025.1058.	988.1055.	958.1028.	989.	
125.	0.001348	0.003000	-0.003052	1.003673	919.1058.	0.507917E+02	0.105027E+02	955.	989.1025.1058.	988.1055.	958.1028.	989.	
126.	0.001349	0.003000	-0.003051	1.002683	919.1058.	0.506561E+02	0.104912E+02	955.	989.1024.1058.	988.1055.	958.1028.	989.	
127.	0.001350	0.003000	-0.003050	1.001746	919.1058.	0.505227E+02	0.104800E+02	955.	988.1024.1058.	988.1055.	958.1028.	989.	

128.	0.001351	0.003000	-0.003049	1.001016	919.1057.	0.503917E+02	0.104695E+02	955.	988.	1024.	1058.	988.	1055.	958.	1028.	989.
129.	0.001352	0.003000	-0.003048	1.000285	919.1057.	0.502634E+02	0.104600E+02	955.	988.	1024.	1058.	988.	1055.	958.	1028.	989.
130.	0.001353	0.003000	-0.003047	0.999422	919.1057.	0.501373E+02	0.104506E+02	954.	988.	1024.	1058.	988.	1055.	958.	1028.	989.
131.	0.001354	0.003000	-0.003046	0.998746	919.1057.	0.500132E+02	0.104414E+02	954.	988.	1024.	1058.	988.	1055.	958.	1028.	989.
132.	0.001355	0.003000	-0.003045	0.998166	919.1057.	0.498919E+02	0.104332E+02	954.	988.	1024.	1058.	988.	1055.	958.	1027.	989.
133.	0.001356	0.003000	-0.003044	0.997472	918.1057.	0.497728E+02	0.104253E+02	954.	988.	1024.	1057.	988.	1055.	958.	1027.	989.
134.	0.001356	0.003000	-0.003044	0.996732	918.1057.	0.496555E+02	0.104173E+02	954.	988.	1024.	1057.	988.	1055.	958.	1027.	989.
135.	0.001357	0.003000	-0.003043	0.996064	918.1057.	0.495403E+02	0.104095E+02	954.	988.	1024.	1057.	988.	1055.	958.	1027.	990.
136.	0.001358	0.003000	-0.003042	0.995417	918.1057.	0.494272E+02	0.104018E+02	954.	988.	1023.	1057.	988.	1055.	958.	1027.	990.
137.	0.001359	0.003000	-0.003041	0.994818	918.1057.	0.493163E+02	0.103946E+02	954.	987.	1023.	1057.	988.	1055.	957.	1027.	990.
138.	0.001360	0.003000	-0.003040	0.994374	918.1057.	0.492074E+02	0.103877E+02	954.	987.	1023.	1057.	988.	1055.	957.	1027.	990.
139.	0.001361	0.003000	-0.003039	0.993999	918.1056.	0.491012E+02	0.103818E+02	954.	987.	1023.	1057.	988.	1055.	957.	1027.	990.
140.	0.001361	0.003000	-0.003039	0.993529	918.1056.	0.489972E+02	0.103763E+02	954.	987.	1023.	1057.	988.	1055.	957.	1027.	990.
141.	0.001362	0.003000	-0.003038	0.993102	918.1056.	0.488952E+02	0.103709E+02	954.	987.	1023.	1056.	988.	1055.	957.	1027.	990.
142.	0.001363	0.003000	-0.003037	0.992511	918.1056.	0.487948E+02	0.103654E+02	953.	987.	1023.	1056.	988.	1055.	957.	1027.	990.
143.	0.001364	0.003000	-0.003036	0.992175	917.1056.	0.486961E+02	0.103599E+02	953.	987.	1023.	1056.	988.	1055.	957.	1027.	990.
144.	0.001365	0.003000	-0.003035	0.991926	917.1056.	0.485999E+02	0.103553E+02	953.	987.	1023.	1056.	988.	1055.	957.	1027.	990.
145.	0.001366	0.003000	-0.003034	0.991728	917.1056.	0.485056E+02	0.103514E+02	953.	987.	1023.	1056.	988.	1055.	957.	1026.	990.
146.	0.001366	0.003000	-0.003034	0.991359	917.1056.	0.484138E+02	0.103476E+02	953.	986.	1022.	1056.	988.	1055.	957.	1026.	990.
147.	0.001367	0.003000	-0.003033	0.991088	917.1056.	0.483236E+02	0.103439E+02	953.	986.	1022.	1056.	988.	1055.	957.	1026.	990.
148.	0.001368	0.003000	-0.003032	0.990914	917.1055.	0.482360E+02	0.103406E+02	953.	986.	1022.	1056.	988.	1055.	957.	1026.	990.
149.	0.001368	0.003000	-0.003032	0.990491	917.1055.	0.481493E+02	0.103372E+02	953.	986.	1022.	1055.	988.	1055.	957.	1026.	990.
150.	0.001369	0.003000	-0.003031	0.990241	917.1055.	0.480643E+02	0.103337E+02	953.	986.	1022.	1055.	988.	1055.	957.	1026.	990.
151.	0.001370	0.003000	-0.003030	0.990109	917.1055.	0.479812E+02	0.103305E+02	952.	986.	1022.	1055.	988.	1055.	956.	1026.	990.
152.	0.001371	0.003000	-0.003029	0.990128	916.1055.	0.479005E+02	0.103284E+02	952.	986.	1022.	1055.	988.	1055.	956.	1026.	990.
153.	0.001372	0.003000	-0.003028	0.990094	916.1055.	0.478219E+02	0.103269E+02	952.	986.	1022.	1055.	988.	1055.	956.	1026.	989.
154.	0.001372	0.003000	-0.003028	0.989951	916.1055.	0.477454E+02	0.103254E+02	952.	986.	1022.	1055.	988.	1055.	956.	1026.	989.
155.	0.001373	0.003000	-0.003027	0.989748	916.1055.	0.476700E+02	0.103236E+02	952.	985.	1021.	1055.	988.	1054.	956.	1026.	989.
156.	0.001374	0.003000	-0.003026	0.989649	916.1055.	0.475960E+02	0.103219E+02	952.	985.	1021.	1055.	988.	1054.	956.	1025.	989.
157.	0.001374	0.003000	-0.003026	0.989608	916.1055.	0.475239E+02	0.103204E+02	952.	985.	1021.	1055.	987.	1054.	956.	1025.	989.
158.	0.001375	0.003000	-0.003025	0.989482	916.1054.	0.474536E+02	0.103191E+02	952.	985.	1021.	1054.	987.	1054.	956.	1025.	989.
159.	0.001375	0.003000	-0.003025	0.989342	916.1054.	0.473851E+02	0.103176E+02	952.	985.	1021.	1054.	987.	1054.	956.	1025.	989.
160.	0.001376	0.003000	-0.003024	0.989321	916.1054.	0.473185E+02	0.103164E+02	952.	985.	1021.	1054.	987.	1054.	956.	1025.	989.
161.	0.001377	0.003000	-0.003023	0.989325	916.1054.	0.472535E+02	0.103156E+02	951.	985.	1021.	1054.	987.	1054.	955.	1025.	989.
162.	0.001377	0.003000	-0.003023	0.989096	915.1054.	0.471888E+02	0.103146E+02	951.	985.	1021.	1054.	987.	1054.	955.	1025.	989.
163.	0.001378	0.003000	-0.003022	0.988965	915.1054.	0.471257E+02	0.103133E+02	951.	985.	1021.	1054.	987.	1054.	955.	1025.	989.
164.	0.001378	0.003000	-0.003022	0.988926	915.1054.	0.470643E+02	0.103121E+02	951.	985.	1021.	1054.	987.	1054.	955.	1025.	989.
165.	0.001379	0.003000	-0.003021	0.988885	915.1054.	0.470045E+02	0.103111E+02	951.	984.	1020.	1054.	987.	1054.	955.	1025.	989.
166.	0.001379	0.003000	-0.003021	0.988864	915.1054.	0.469463E+02	0.103104E+02	951.	984.	1020.	1054.	987.	1054.	955.	1024.	989.
167.	0.001380	0.003000	-0.003020	0.988868	915.1054.	0.468896E+02	0.103098E+02	951.	984.	1020.	1054.	987.	1054.	955.	1024.	989.
168.	0.001380	0.003000	-0.003020	0.988897	915.1053.	0.468343E+02	0.103095E+02	951.	984.	1020.	1053.	987.	1054.	955.	1024.	989.
169.	0.001381	0.003000	-0.003019	0.988948	915.1053.	0.467802E+02	0.103094E+02	951.	984.	1020.	1053.	987.	1054.	955.	1024.	989.
170.	0.001382	0.003000	-0.003018	0.989032	915.1053.	0.467273E+02	0.103095E+02	951.	984.	1020.	1053.	987.	1053.	955.	1024.	988.
171.	0.001382	0.003000	-0.003018	0.989223	915.1053.	0.466756E+02	0.103100E+02	951.	984.	1020.	1053.	987.	1053.	955.	1024.	988.
172.	0.001383	0.003000	-0.003017	0.989456	915.1053.	0.466260E+02	0.103110E+02	950.	984.	1020.	1053.	986.	1053.	954.	1024.	988.
173.	0.001383	0.003000	-0.003017	0.989662	914.1053.	0.465779E+02	0.103124E+02	950.	984.	1020.	1053.	986.	1053.	954.	1024.	988.
174.	0.001384	0.003000	-0.003016	0.989640	914.1053.	0.465308E+02	0.103135E+02	950.	984.	1020.	1053.	986.	1053.	954.	1024.	988.
175.	0.001384	0.003000	-0.003016	0.989644	914.1053.	0.464846E+02	0.103141E+02	950.	984.	1019.	1053.	986.	1053.	954.	1024.	988.
176.	0.001384	0.003000	-0.003016	0.989643	914.1053.	0.464393E+02	0.103145E+02	950.	983.	1019.	1053.	986.	1053.	954.	1024.	988.
177.	0.001385	0.003000	-0.003015	0.989641	914.1053.	0.463951E+02	0.103147E+02	950.	983.	1019.	1053.	986.	1053.	954.	1023.	988.
178.	0.001385	0.003000	-0.003015	0.989670	914.1053.	0.463519E+02	0.103149E+02	950.	983.	1019.	1053.	986.	1053.	954.	1023.	988.
179.	0.001386	0.003000	-0.003014	0.989803	914.1053.	0.463097E+02	0.103154E+02	950.	983.	1019.	1052.	986.	1053.	954.	1023.	988.
180.	0.001386	0.003000	-0.003014	0.990020	914.1052.	0.462699E+02	0.103164E+02	950.	983.	1019.	1052.	986.	1053.	954.	1023.	988.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992	0.00159996
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312	3.07586956
1.	-0.000068	0.005000	-0.006440	1.719515	833.1070.		0.683117E+02		0.435469E+02 828.1010. 994.1129. 728. 808. 624. 698. 650.	
2.	0.001400	0.005000	-0.004995	2.428214	867. 987.		0.646628E+02		0.340337E+02 824. 917. 900.1025. 739. 816. 643. 720. 663.	
3.	0.001611	0.005000	-0.004789	2.927588	836. 969.		0.638245E+02		0.309393E+02 827. 920. 903.1000. 753. 833. 661. 738. 677.	
4.	0.001623	0.005000	-0.004777	2.932146	837. 979.		0.636679E+02		0.297056E+02 831. 926. 915.1008. 765. 851. 677. 755. 690.	
5.	0.001625	0.005000	-0.004775	2.868567	846. 988.		0.634442E+02		0.287974E+02 841. 932. 925.1016. 776. 868. 693. 771. 704.	
6.	0.001625	0.005000	-0.004775	2.800645	855. 997.		0.631154E+02		0.280096E+02 851. 940. 934.1023. 787. 883. 708. 787. 716.	
7.	0.001617	0.005000	-0.004784	2.787168	863.1006.		0.653622E+02		0.284698E+02 861. 948. 943.1031. 798. 898. 723. 802. 729.	
8.	0.001561	0.005000	-0.004840	2.777143	874.1017.		0.688519E+02		0.292599E+02 873. 959. 956.1042. 809. 911. 737. 817. 741.	
9.	0.001527	0.005000	-0.004873	2.701177	884.1027.		0.708215E+02		0.291797E+02 884. 968. 966.1051. 821. 924. 751. 831. 754.	
10.	0.001513	0.005000	-0.004887	2.643195	894.1036.		0.720317E+02		0.287850E+02 894. 977. 976.1059. 831. 936. 765. 845. 766.	
11.	0.001504	0.005000	-0.004896	2.592969	902.1045.		0.727631E+02		0.283004E+02 903. 985. 985.1067. 842. 947. 778. 859. 777.	
12.	0.001498	0.005000	-0.004902	2.545901	911.1053.		0.731310E+02		0.277884E+02 912. 993. 994.1075. 852. 958. 791. 872. 789.	
13.	0.001494	0.005000	-0.004906	2.501464	919.1061.		0.733269E+02		0.272889E+02 921.1000.1003.1082. 862. 968. 804. 884. 800.	
14.	0.001489	0.005000	-0.004911	2.465545	926.1068.		0.741046E+02		0.269000E+02 930.1008.1011.1089. 872. 978. 816. 897. 811.	
15.	0.001479	0.005000	-0.004921	2.431016	934.1076.		0.751643E+02		0.265622E+02 939.1016.1020.1097. 881. 987. 828. 909. 822.	
16.	0.001469	0.005000	-0.004931	2.394669	942.1084.		0.761935E+02		0.262183E+02 948.1023.1029.1104. 891. 996. 840. 920. 833.	
17.	0.001461	0.005000	-0.004940	2.357993	949.1091.		0.770708E+02		0.258557E+02 956.1030.1037.1111. 900.1005. 851. 931. 843.	
18.	0.001453	0.005000	-0.004947	2.321898	957.1099.		0.777490E+02		0.254801E+02 964.1037.1045.1118. 909.1013. 862. 942. 853.	
19.	0.001446	0.005000	-0.004954	2.286224	964.1105.		0.782156E+02		0.250970E+02 972.1044.1052.1125. 918.1021. 872. 953. 863.	
20.	0.001440	0.005000	-0.004960	2.251940	971.1112.		0.785624E+02		0.247164E+02 979.1051.1060.1131. 927.1029. 883. 963. 873.	
21.	0.001435	0.005000	-0.004965	2.218987	977.1119.		0.789304E+02		0.243473E+02 987.1057.1067.1137. 935.1037. 893. 974. 883.	
22.	0.001429	0.005000	-0.004971	2.187636	984.1125.		0.793436E+02		0.239917E+02 994.1063.1074.1143. 943.1044. 903. 983. 892.	
23.	0.001423	0.005000	-0.004977	2.156828	990.1131.		0.797741E+02		0.236472E+021001.1069.1081.1149. 952.1051. 912. 993. 901.	
24.	0.001417	0.005000	-0.004983	2.126653	996.1137.		0.801823E+02		0.233104E+021008.1075.1088.1155. 959.1059. 922.1002. 910.	
25.	0.001411	0.005000	-0.004989	2.0970191002.1143.			0.805330E+02		0.229799E+021014.1081.1094.1161. 967.1065. 931.1011. 919.	
26.	0.001405	0.005000	-0.004995	2.0676941008.1149.			0.808035E+02		0.226540E+021021.1086.1100.1166. 975.1072. 939.1020. 928.	
27.	0.001400	0.005000	-0.005000	2.0390771013.1154.			0.810054E+02		0.223335E+021027.1092.1106.1171. 982.1079. 948.1028. 936.	
28.	0.001395	0.005000	-0.005005	2.0110021018.1159.			0.811663E+02		0.220193E+021033.1097.1112.1176. 990.1085. 956.1036. 944.	
29.	0.001390	0.005000	-0.005010	1.9837941024.1165.			0.813056E+02		0.217119E+021039.1102.1118.1181. 997.1091. 964.1044. 953.	
30.	0.001385	0.005000	-0.005015	1.9572891029.1170.			0.814310E+02		0.214116E+021044.1107.1123.1186.1004.1097. 972.1052. 961.	
31.	0.001380	0.005000	-0.005020	1.9311511034.1174.			0.815395E+02		0.211185E+021050.1112.1129.1191.1010.1103. 980.1060. 968.	
32.	0.001375	0.005000	-0.005025	1.9057981038.1179.			0.816226E+02		0.208318E+021055.1116.1134.1195.1017.1109. 987.1067. 976.	
33.	0.001370	0.005000	-0.005030	1.8810321043.1184.			0.816727E+02		0.205518E+021060.1121.1139.1199.1023.1115. 994.1074. 983.	
34.	0.001365	0.005000	-0.005035	1.8563791047.1188.			0.816872E+02		0.202772E+021065.1125.1144.1204.1030.1120.1001.1081. 990.	
35.	0.001361	0.005000	-0.005039	1.8325281052.1192.			0.816702E+02		0.200080E+021070.1129.1149.1208.1036.1126.1008.1088. 998.	
36.	0.001356	0.005000	-0.005044	1.8093251056.1196.			0.816281E+02		0.197450E+021075.1133.1153.1211.1042.1131.1015.1094.1004.	
37.	0.001352	0.005000	-0.005048	1.7863441060.1200.			0.815655E+02		0.194878E+021080.1137.1158.1215.1048.1136.1021.1100.1011.	
38.	0.001347	0.005000	-0.005053	1.7640151064.1204.			0.814843E+02		0.192357E+021084.1141.1162.1219.1053.1141.1027.1107.1018.	
39.	0.001343	0.005000	-0.005057	1.7423711068.1208.			0.813852E+02		0.189897E+021088.1144.1166.1222.1059.1146.1033.1112.1024.	
40.	0.001339	0.005000	-0.005061	1.7210791071.1212.			0.812671E+02		0.187498E+021092.1148.1170.1226.1064.1150.1039.1118.1030.	
41.	0.001335	0.005000	-0.005065	1.7001341075.1215.			0.811285E+02		0.185145E+021096.1151.1174.1229.1070.1155.1045.1124.1037.	
42.	0.001332	0.005000	-0.005068	1.6797901078.1218.			0.809699E+02		0.182843E+021100.1155.1178.1232.1075.1160.1051.1129.1043.	
43.	0.001328	0.005000	-0.005072	1.6600281082.1222.			0.807935E+02		0.180597E+021104.1158.1181.1235.1080.1164.1056.1134.1048.	
44.	0.001324	0.005000	-0.005076	1.6404821085.1225.			0.806007E+02		0.178401E+021108.1161.1185.1238.1084.1168.1061.1139.1054.	
45.	0.001321	0.005000	-0.005079	1.6214841088.1228.			0.803928E+02		0.176251E+021111.1164.1188.1241.1089.1172.1066.1144.1060.	
46.	0.001317	0.005000	-0.005083	1.6029791091.1231.			0.801715E+02		0.174153E+021115.1167.1191.1243.1094.1176.1071.1149.1065.	
47.	0.001314	0.005000	-0.005086	1.5849811094.1234.			0.799373E+02		0.172104E+021118.1169.1194.1246.1098.1180.1076.1154.1070.	
48.	0.001311	0.005000	-0.005089	1.5672101097.1237.			0.796905E+02		0.170104E+021121.1172.1197.1249.1103.1184.1080.1158.1075.	
49.	0.001308	0.005000	-0.005092	1.5499081099.1239.			0.794307E+02		0.168145E+021124.1175.1200.1251.1107.1188.1085.1162.1080.	
50.	0.001305	0.005000	-0.005095	1.5331401102.1242.			0.791593E+02		0.166235E+021127.1177.1203.1253.1111.1192.1089.1167.1085.	
51.	0.001302	0.005000	-0.005098	1.5167521105.1244.			0.788771E+02		0.164372E+021130.1179.1206.1255.1115.1195.1093.1171.1090.	
52.	0.001300	0.005000	-0.005100	1.5007331107.1247.			0.785850E+02		0.162554E+021133.1182.1209.1258.1119.1199.1097.1174.1095.	
53.	0.001297	0.005000	-0.005103	1.4849391109.1249.			0.782833E+02		0.160774E+021135.1184.1211.1260.1123.1202.1101.1178.1099.	
54.	0.001295	0.005000	-0.005105	1.4697211112.1251.			0.779731E+02		0.159045E+021138.1186.1214.1262.1126.1205.1105.1182.1103.	
55.	0.001292	0.005000	-0.005108	1.4549771114.1253.			0.776552E+02		0.157367E+021141.1188.1216.1264.1130.1208.1109.1185.1108.	
56.	0.001290	0.005000	-0.005110	1.4405681116.1255.			0.773300E+02		0.155728E+021143.1190.1218.1265.1134.1211.1112.1189.1112.	
57.	0.001288	0.005000	-0.005112	1.4263851118.1257.			0.769977E+02		0.154127E+021145.1192.1220.1267.1137.1214.1116.1192.1116.	
58.	0.001286	0.005000	-0.005114	1.4124011120.1259.			0.766585E+02		0.152555E+021147.1194.1222.1269.1140.1217.1119.1195.1120.	
59.	0.001284	0.005000	-0.005116	1.3989421122.1261.			0.763131E+02		0.151020E+021150.1195.1224.1270.1143.1220.1122.1198.1123.	
60.	0.001282	0.005000	-0.005118	1.3858931123.1263.			0.759624E+02		0.149524E+021152.1197.1226.1272.1146.1223.1125.1201.1127.	
61.	0.001280	0.005000	-0.005120	1.3731991125.1264.			0.756071E+02		0.148069E+021154.1199.1228.1273.1149.1225.1128.1204.1131.	

62.	0.001279	0.005000	-0.005121	1.3608381127.1266.	0.752475E+02	0.146654E+021156.1200.1230.1275.1152.1228.1131.1207.1134.
63.	0.001277	0.005000	-0.005123	1.3486461128.1268.	0.748840E+02	0.145274E+021157.1202.1232.1276.1155.1230.1134.1209.1138.
64.	0.001276	0.005000	-0.005124	1.3366511130.1269.	0.745165E+02	0.143921E+021159.1203.1233.1277.1158.1233.1136.1212.1141.
65.	0.001274	0.005000	-0.005125	1.3251191131.1271.	0.741455E+02	0.142601E+021161.1204.1235.1279.1161.1235.1139.1214.1144.
66.	0.001273	0.005000	-0.005127	1.3139541133.1272.	0.737718E+02	0.141316E+021162.1206.1236.1280.1163.1237.1142.1217.1147.
67.	0.001272	0.005000	-0.005128	1.3031161134.1273.	0.733958E+02	0.140067E+021164.1207.1238.1281.1166.1240.1144.1219.1150.
68.	0.001272	0.005000	-0.005129	1.2925801135.1275.	0.730179E+02	0.138854E+021166.1208.1239.1282.1168.1242.1146.1221.1153.
69.	0.001271	0.005000	-0.005129	1.2823141137.1276.	0.726387E+02	0.137674E+021167.1209.1241.1283.1170.1244.1149.1223.1156.
70.	0.001270	0.005000	-0.005130	1.2721221138.1277.	0.722579E+02	0.136523E+021168.1210.1242.1284.1173.1246.1151.1226.1159.
71.	0.001269	0.005000	-0.005131	1.2622211139.1278.	0.718756E+02	0.135396E+021170.1211.1243.1285.1175.1248.1153.1227.1161.
72.	0.001268	0.005000	-0.005132	1.2526371140.1279.	0.714924E+02	0.134297E+021171.1212.1244.1286.1177.1249.1155.1229.1164.
73.	0.001268	0.005000	-0.005132	1.2433581141.1280.	0.711086E+02	0.133228E+021172.1213.1245.1287.1179.1251.1157.1231.1166.
74.	0.001267	0.005000	-0.005133	1.2343791142.1281.	0.707248E+02	0.132190E+021173.1214.1246.1287.1181.1253.1159.1233.1169.
75.	0.001267	0.005000	-0.005133	1.2256821143.1282.	0.703413E+02	0.131182E+021174.1215.1247.1288.1183.1255.1160.1235.1171.
76.	0.001267	0.005000	-0.005133	1.2172151144.1283.	0.699583E+02	0.130204E+021175.1216.1248.1289.1185.1256.1162.1236.1173.
77.	0.001267	0.005000	-0.005133	1.2089881145.1284.	0.695761E+02	0.129254E+021176.1217.1249.1289.1186.1258.1164.1238.1175.
78.	0.001267	0.005000	-0.005133	1.2008851145.1284.	0.691946E+02	0.128329E+021177.1217.1250.1290.1188.1259.1165.1239.1178.
79.	0.001266	0.005000	-0.005134	1.1928921146.1285.	0.688136E+02	0.127423E+021178.1218.1251.1291.1190.1261.1167.1241.1180.
80.	0.001266	0.005000	-0.005134	1.1852291147.1286.	0.684335E+02	0.126540E+021179.1219.1252.1291.1191.1262.1168.1242.1182.
81.	0.001267	0.005000	-0.005133	1.1778461148.1286.	0.680549E+02	0.125682E+021180.1219.1252.1292.1193.1264.1170.1243.1183.
82.	0.001267	0.005000	-0.005133	1.1706961148.1287.	0.676780E+02	0.124851E+021181.1220.1253.1292.1194.1265.1171.1244.1185.
83.	0.001267	0.005000	-0.005133	1.1637141149.1288.	0.673032E+02	0.124045E+021182.1220.1254.1293.1196.1266.1172.1246.1187.
84.	0.001267	0.005000	-0.005133	1.1569461149.1288.	0.669303E+02	0.123261E+021182.1221.1254.1293.1197.1267.1174.1247.1189.
85.	0.001268	0.005000	-0.005132	1.1504031150.1289.	0.665596E+02	0.122501E+021183.1221.1255.1293.1198.1268.1175.1248.1190.
86.	0.001268	0.005000	-0.005132	1.1440701150.1289.	0.661913E+02	0.121763E+021184.1222.1256.1294.1200.1270.1176.1249.1192.
87.	0.001269	0.005000	-0.005131	1.1379321151.1290.	0.658253E+02	0.121048E+021184.1222.1256.1294.1201.1271.1177.1250.1194.
88.	0.001270	0.005000	-0.005130	1.1319651151.1290.	0.654619E+02	0.120354E+021185.1223.1257.1294.1202.1272.1178.1251.1195.
89.	0.001270	0.005000	-0.005130	1.1260531152.1291.	0.651011E+02	0.119679E+021185.1223.1257.1295.1203.1273.1179.1252.1196.
90.	0.001271	0.005000	-0.005129	1.1202491152.1291.	0.647427E+02	0.119018E+021186.1223.1258.1295.1204.1274.1180.1253.1198.
91.	0.001271	0.005000	-0.005129	1.1147181153.1291.	0.643871E+02	0.118375E+021186.1224.1258.1295.1205.1275.1181.1253.1199.
92.	0.001272	0.005000	-0.005128	1.1094041153.1292.	0.640345E+02	0.117753E+021187.1224.1258.1295.1206.1275.1182.1254.1200.
93.	0.001273	0.005000	-0.005127	1.1042731153.1292.	0.636852E+02	0.117151E+021187.1224.1259.1296.1207.1276.1182.1255.1202.
94.	0.001274	0.005000	-0.005126	1.0993191154.1292.	0.633393E+02	0.116569E+021188.1224.1259.1296.1208.1277.1183.1255.1203.
95.	0.001275	0.005000	-0.005125	1.0945011154.1293.	0.629967E+02	0.116006E+021188.1225.1259.1296.1209.1278.1184.1256.1204.
96.	0.001276	0.005000	-0.005124	1.0898301154.1293.	0.626576E+02	0.115461E+021188.1225.1259.1296.1210.1279.1185.1257.1205.
97.	0.001277	0.005000	-0.005123	1.0853261154.1293.	0.623218E+02	0.114932E+021189.1225.1260.1296.1211.1279.1185.1257.1206.
98.	0.001278	0.005000	-0.005122	1.0809451155.1293.	0.619895E+02	0.114420E+021189.1225.1260.1296.1211.1280.1186.1258.1207.
99.	0.001279	0.005000	-0.005121	1.0766751155.1293.	0.616607E+02	0.113923E+021189.1225.1260.1296.1212.1281.1187.1258.1208.
100.	0.001280	0.005000	-0.005120	1.0725611155.1294.	0.613355E+02	0.113441E+021189.1225.1260.1296.1213.1281.1187.1259.1209.
101.	0.001281	0.005000	-0.005118	1.0685831155.1294.	0.610139E+02	0.112974E+021190.1225.1261.1296.1213.1282.1188.1259.1210.
102.	0.001283	0.005000	-0.005117	1.0647861155.1294.	0.606963E+02	0.112523E+021190.1226.1261.1296.1214.1282.1188.1260.1211.
103.	0.001284	0.005000	-0.005116	1.0610951155.1294.	0.603826E+02	0.112088E+021190.1226.1261.1296.1215.1283.1189.1260.1212.
104.	0.001285	0.005000	-0.005115	1.0575591155.1294.	0.600726E+02	0.111669E+021190.1226.1261.1296.1215.1283.1189.1261.1212.
105.	0.001286	0.005000	-0.005114	1.0540881155.1294.	0.597666E+02	0.111263E+021190.1226.1261.1296.1216.1284.1189.1261.1213.
106.	0.001288	0.005000	-0.005112	1.0506001156.1294.	0.594642E+02	0.110866E+021190.1226.1261.1296.1216.1284.1190.1261.1214.
107.	0.001289	0.005000	-0.005111	1.0472611156.1294.	0.591655E+02	0.110479E+021191.1226.1261.1296.1217.1285.1190.1261.1214.
108.	0.001290	0.005000	-0.005110	1.0441221156.1294.	0.588705E+02	0.110105E+021191.1226.1261.1296.1217.1285.1191.1262.1215.
109.	0.001292	0.005000	-0.005108	1.0411211156.1294.	0.585796E+02	0.109746E+021191.1226.1261.1296.1218.1285.1191.1262.1216.
110.	0.001293	0.005000	-0.005107	1.0382421156.1294.	0.582929E+02	0.109400E+021191.1226.1261.1296.1218.1286.1191.1262.1216.
111.	0.001294	0.005000	-0.005106	1.0354911156.1294.	0.580105E+02	0.109069E+021191.1226.1261.1296.1218.1286.1191.1262.1217.
112.	0.001296	0.005000	-0.005104	1.0327741156.1294.	0.577320E+02	0.108749E+021191.1226.1261.1296.1219.1286.1192.1263.1217.
113.	0.001297	0.005000	-0.005103	1.0302191156.1294.	0.574576E+02	0.108441E+021191.1226.1261.1296.1219.1287.1192.1263.1218.
114.	0.001299	0.005000	-0.005101	1.0277461156.1294.	0.571871E+02	0.108144E+021191.1225.1261.1296.1219.1287.1192.1263.1218.
115.	0.001300	0.005000	-0.005100	1.0253201155.1294.	0.569206E+02	0.107858E+021191.1225.1261.1296.1220.1287.1192.1263.1219.
116.	0.001302	0.005000	-0.005098	1.0230501155.1294.	0.566580E+02	0.107582E+021191.1225.1261.1296.1220.1287.1192.1263.1219.
117.	0.001303	0.005000	-0.005097	1.0208741155.1294.	0.563996E+02	0.107316E+021191.1225.1261.1295.1220.1288.1192.1263.1220.
118.	0.001305	0.005000	-0.005095	1.0186951155.1294.	0.561452E+02	0.107062E+021191.1225.1261.1295.1221.1288.1193.1263.1220.
119.	0.001306	0.005000	-0.005094	1.0166691155.1294.	0.558949E+02	0.106815E+021191.1225.1261.1295.1221.1288.1193.1263.1220.
120.	0.001308	0.005000	-0.005092	1.0146891155.1294.	0.556485E+02	0.106578E+021191.1225.1261.1295.1221.1288.1193.1263.1221.
121.	0.001309	0.005000	-0.005091	1.0128631155.1294.	0.554062E+02	0.106353E+021191.1225.1261.1295.1221.1288.1193.1263.1221.
122.	0.001310	0.005000	-0.005090	1.0110111155.1294.	0.551676E+02	0.106134E+021191.1225.1261.1295.1221.1288.1193.1263.1221.
123.	0.001312	0.005000	-0.005088	1.0092681155.1293.	0.549331E+02	0.105924E+021190.1225.1260.1294.1222.1289.1193.1263.1221.
124.	0.001313	0.005000	-0.005087	1.0076241155.1293.	0.547024E+02	0.105721E+021190.1224.1260.1294.1222.1289.1193.1263.1222.
125.	0.001315	0.005000	-0.005085	1.0060941155.1293.	0.544758E+02	0.105530E+021190.1224.1260.1294.1222.1289.1193.1263.1222.
126.	0.001316	0.005000	-0.005084	1.0045621154.1293.	0.542532E+02	0.105346E+021190.1224.1260.1294.1222.1289.1193.1263.1222.
127.	0.001318	0.005000	-0.005082	1.0030571154.1293.	0.540342E+02	0.105168E+021190.1224.1260.1294.1222.1289.1193.1263.1222.

128.	0.001319	0.005000	-0.005081	1.0016291154.1293.	0.538192E+02	0.104996E+021190.1224.1260.1294.1222.1289.1193.1263.1223.
129.	0.001321	0.005000	-0.005079	1.0003381154.1293.	0.536078E+02	0.104832E+021190.1224.1260.1293.1222.1289.1193.1263.1223.
130.	0.001322	0.005000	-0.005078	0.9990811154.1292.	0.534003E+02	0.104676E+021190.1223.1260.1293.1222.1289.1193.1263.1223.
131.	0.001324	0.005000	-0.005076	0.9979611154.1292.	0.531967E+02	0.104529E+021190.1223.1259.1293.1222.1289.1193.1263.1223.
132.	0.001325	0.005000	-0.005075	0.9967021154.1292.	0.529967E+02	0.104387E+021190.1223.1259.1293.1222.1289.1193.1263.1223.
133.	0.001326	0.005000	-0.005074	0.9956431154.1292.	0.528004E+02	0.104250E+021189.1223.1259.1293.1222.1289.1193.1263.1223.
134.	0.001328	0.005000	-0.005072	0.9944731153.1292.	0.526075E+02	0.104118E+021189.1223.1259.1293.1222.1289.1193.1263.1223.
135.	0.001329	0.005000	-0.005071	0.9935141153.1292.	0.524183E+02	0.103991E+021189.1223.1259.1292.1222.1289.1193.1263.1223.
136.	0.001330	0.005000	-0.005070	0.9925301153.1292.	0.522327E+02	0.103871E+021189.1222.1259.1292.1222.1289.1193.1263.1224.
137.	0.001332	0.005000	-0.005068	0.9917661153.1291.	0.520506E+02	0.103759E+021189.1222.1258.1292.1222.1289.1193.1263.1224.
138.	0.001333	0.005000	-0.005067	0.9909101153.1291.	0.518725E+02	0.103655E+021189.1222.1258.1292.1222.1289.1193.1263.1224.
139.	0.001335	0.005000	-0.005065	0.9900321153.1291.	0.516975E+02	0.103553E+021189.1222.1258.1292.1222.1289.1193.1262.1224.
140.	0.001336	0.005000	-0.005064	0.9894231152.1291.	0.515261E+02	0.103458E+021188.1222.1258.1291.1222.1289.1192.1262.1224.
141.	0.001337	0.005000	-0.005063	0.9887971152.1291.	0.513585E+02	0.103372E+021188.1222.1258.1291.1222.1289.1192.1262.1224.
142.	0.001339	0.005000	-0.005061	0.9880651152.1291.	0.511939E+02	0.103288E+021188.1221.1258.1291.1222.1289.1192.1262.1224.
143.	0.001340	0.005000	-0.005060	0.9872971152.1290.	0.510323E+02	0.103203E+021188.1221.1257.1291.1222.1289.1192.1262.1224.
144.	0.001341	0.005000	-0.005059	0.9866121152.1290.	0.508739E+02	0.103122E+021188.1221.1257.1291.1222.1289.1192.1262.1224.
145.	0.001342	0.005000	-0.005058	0.9861201152.1290.	0.507188E+02	0.103046E+021188.1221.1257.1290.1222.1289.1192.1262.1224.
146.	0.001344	0.005000	-0.005056	0.9856271151.1290.	0.505670E+02	0.102977E+021187.1221.1257.1290.1222.1289.1192.1261.1224.
147.	0.001345	0.005000	-0.005055	0.9852751151.1290.	0.504186E+02	0.102916E+021187.1221.1257.1290.1222.1289.1192.1261.1224.
148.	0.001346	0.005000	-0.005054	0.9850451151.1290.	0.502742E+02	0.102864E+021187.1220.1257.1290.1222.1289.1192.1261.1224.
149.	0.001348	0.005000	-0.005052	0.9845811151.1289.	0.501324E+02	0.102814E+021187.1220.1256.1290.1222.1289.1191.1261.1224.
150.	0.001349	0.005000	-0.005051	0.9841871151.1289.	0.499936E+02	0.102766E+021187.1220.1256.1289.1222.1288.1191.1261.1223.
151.	0.001350	0.005000	-0.005050	0.9836891151.1289.	0.498571E+02	0.102715E+021187.1220.1256.1289.1222.1288.1191.1261.1223.
152.	0.001351	0.005000	-0.005049	0.9832971150.1289.	0.497237E+02	0.102666E+021186.1220.1256.1289.1222.1288.1191.1261.1223.
153.	0.001352	0.005000	-0.005048	0.9831511150.1289.	0.495929E+02	0.102620E+021186.1219.1256.1289.1221.1288.1191.1260.1223.
154.	0.001353	0.005000	-0.005047	0.9830631150.1289.	0.494659E+02	0.102589E+021186.1219.1255.1289.1221.1288.1191.1260.1223.
155.	0.001355	0.005000	-0.005045	0.9828481150.1288.	0.493423E+02	0.102559E+021186.1219.1255.1288.1221.1288.1190.1260.1223.
156.	0.001355	0.005000	-0.005044	0.9826171150.1288.	0.492207E+02	0.102532E+021186.1219.1255.1288.1221.1288.1190.1260.1223.
157.	0.001356	0.005000	-0.005044	0.9823281150.1288.	0.491022E+02	0.102503E+021186.1219.1255.1288.1221.1288.1190.1260.1223.
158.	0.001358	0.005000	-0.005042	0.9822841149.1288.	0.489855E+02	0.102476E+021185.1219.1255.1288.1221.1288.1190.1259.1223.
159.	0.001359	0.005000	-0.005041	0.9822721149.1288.	0.488717E+02	0.102457E+021185.1218.1255.1288.1221.1288.1190.1259.1223.
160.	0.001360	0.005000	-0.005040	0.9821691149.1288.	0.487609E+02	0.102442E+021185.1218.1254.1288.1221.1287.1190.1259.1223.
161.	0.001361	0.005000	-0.005039	0.9821481149.1287.	0.486530E+02	0.102427E+021185.1218.1254.1287.1221.1287.1190.1259.1223.
162.	0.001362	0.005000	-0.005038	0.9822531149.1287.	0.485478E+02	0.102419E+021185.1218.1254.1287.1221.1287.1189.1259.1222.
163.	0.001363	0.005000	-0.005037	0.9821911149.1287.	0.484452E+02	0.102415E+021185.1218.1254.1287.1220.1287.1189.1259.1222.
164.	0.001364	0.005000	-0.005036	0.9819881148.1287.	0.483450E+02	0.102404E+021185.1218.1254.1287.1220.1287.1189.1259.1222.
165.	0.001365	0.005000	-0.005035	0.9820001148.1287.	0.482471E+02	0.102393E+021184.1217.1254.1287.1220.1287.1189.1258.1222.
166.	0.001366	0.005000	-0.005034	0.9820101148.1287.	0.481514E+02	0.102386E+021184.1217.1253.1287.1220.1287.1189.1258.1222.
167.	0.001366	0.005000	-0.005034	0.9819721148.1286.	0.480580E+02	0.102381E+021184.1217.1253.1286.1220.1287.1189.1258.1222.
168.	0.001367	0.005000	-0.005033	0.9819561148.1286.	0.479669E+02	0.102375E+021184.1217.1253.1286.1220.1287.1189.1258.1222.
169.	0.001368	0.005000	-0.005032	0.9821251148.1286.	0.478780E+02	0.102375E+021184.1217.1253.1286.1220.1286.1188.1258.1222.
170.	0.001369	0.005000	-0.005031	0.9823451147.1286.	0.477916E+02	0.102381E+021184.1217.1253.1286.1220.1286.1188.1257.1222.
171.	0.001370	0.005000	-0.005030	0.9825841147.1286.	0.477081E+02	0.102392E+021183.1217.1253.1286.1219.1286.1188.1257.1221.
172.	0.001371	0.005000	-0.005029	0.9826901147.1286.	0.476264E+02	0.102405E+021183.1216.1253.1286.1219.1286.1188.1257.1221.
173.	0.001372	0.005000	-0.005028	0.9828181147.1286.	0.475464E+02	0.102417E+021183.1216.1252.1286.1219.1286.1188.1257.1221.
174.	0.001373	0.005000	-0.005027	0.9828551147.1286.	0.474684E+02	0.102426E+021183.1216.1252.1285.1219.1286.1188.1257.1221.
175.	0.001373	0.005000	-0.005027	0.9828891147.1285.	0.473931E+02	0.102433E+021183.1216.1252.1285.1219.1286.1188.1257.1221.
176.	0.001374	0.005000	-0.005026	0.9830511147.1285.	0.473193E+02	0.102439E+021183.1216.1252.1285.1219.1286.1187.1257.1221.
177.	0.001375	0.005000	-0.005025	0.9833341147.1285.	0.472472E+02	0.102453E+021183.1216.1252.1285.1219.1285.1187.1256.1221.
178.	0.001375	0.005000	-0.005025	0.9833911146.1285.	0.471776E+02	0.102468E+021183.1216.1252.1285.1219.1285.1187.1256.1221.
179.	0.001376	0.005000	-0.005024	0.9833691146.1285.	0.471095E+02	0.102478E+021182.1216.1252.1285.1218.1285.1187.1256.1220.
180.	0.001377	0.005000	-0.005023	0.9834351146.1285.	0.470426E+02	0.102485E+021182.1215.1251.1285.1218.1285.1187.1256.1220.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

ME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE							GRAPHITE TEMP.						
	0.00099714		0.00171959			0.00324059		0.00271544		0.01475992						0.00159996						
	0.00945175		0.00422059			0.49659890		0.10774821		0.02219312						3.07586956						
1.	0.001482	0.000099	-0.000018	1.054839	566.	705.	0.451160E+02	0.105088E+02	602.	636.	672.	705.	637.	705.	605.	674.	639.					
2.	0.001524	0.000198	-0.000075	1.120278	568.	708.	0.453196E+02	0.107946E+02	604.	639.	674.	709.	638.	706.	605.	674.	639.					
3.	0.001544	0.000297	-0.000153	1.174695	572.	713.	0.456151E+02	0.111770E+02	608.	644.	678.	714.	639.	707.	605.	675.	639.					
4.	0.001555	0.000396	-0.000242	1.220991	577.	718.	0.459548E+02	0.115838E+02	611.	649.	682.	720.	641.	709.	606.	676.	639.					
5.	0.001561	0.000495	-0.000335	1.262576	582.	723.	0.463121E+02	0.119838E+02	616.	654.	687.	725.	643.	712.	607.	677.	640.					
6.	0.001567	0.000594	-0.000428	1.301488	587.	728.	0.466738E+02	0.123671E+02	620.	660.	692.	731.	646.	714.	608.	678.	641.					
7.	0.001572	0.000693	-0.000522	1.338774	593.	734.	0.470361E+02	0.127344E+02	625.	666.	697.	738.	649.	718.	610.	680.	642.					
8.	0.001576	0.000792	-0.000616	1.375329	598.	740.	0.474186E+02	0.130967E+02	630.	672.	702.	744.	652.	721.	612.	682.	644.					
9.	0.001580	0.000891	-0.000712	1.411717	604.	746.	0.478415E+02	0.134638E+02	635.	678.	707.	750.	655.	725.	614.	685.	646.					
10.	0.001583	0.000990	-0.000808	1.447524	610.	752.	0.483074E+02	0.138356E+02	640.	685.	713.	757.	658.	729.	617.	688.	648.					
11.	0.001515	0.001000	-0.000885	1.413229	616.	757.	0.487435E+02	0.141073E+02	645.	690.	718.	763.	661.	733.	620.	691.	650.					
12.	0.001487	0.001000	-0.000913	1.372211	620.	760.	0.490210E+02	0.141214E+02	648.	693.	720.	765.	664.	736.	623.	694.	652.					
13.	0.001477	0.001000	-0.000923	1.353501	622.	762.	0.492338E+02	0.140550E+02	651.	695.	723.	767.	667.	739.	626.	697.	655.					
14.	0.001471	0.001000	-0.000929	1.342156	624.	764.	0.494328E+02	0.139856E+02	653.	697.	725.	769.	669.	742.	629.	700.	657.					
15.	0.001466	0.001000	-0.000934	1.333598	626.	765.	0.496388E+02	0.139299E+02	655.	698.	726.	770.	671.	745.	631.	703.	659.					
16.	0.001461	0.001000	-0.000939	1.326267	628.	767.	0.498632E+02	0.138894E+02	657.	700.	728.	772.	673.	747.	634.	705.	662.					
17.	0.001455	0.001000	-0.000945	1.319592	630.	769.	0.501092E+02	0.138601E+02	659.	702.	730.	774.	675.	750.	637.	708.	664.					
18.	0.001449	0.001000	-0.000951	1.312767	632.	771.	0.503502E+02	0.138270E+02	661.	704.	732.	775.	677.	752.	639.	710.	666.					
19.	0.001444	0.001000	-0.000956	1.305342	633.	773.	0.505611E+02	0.137799E+02	663.	705.	734.	777.	679.	754.	642.	713.	668.					
20.	0.001439	0.001000	-0.000961	1.297667	635.	774.	0.507409E+02	0.137207E+02	664.	707.	736.	779.	681.	756.	644.	715.	671.					
21.	0.001435	0.001000	-0.000965	1.290210	637.	776.	0.508971E+02	0.136546E+02	666.	709.	738.	780.	683.	758.	646.	718.	673.					
22.	0.001432	0.001000	-0.000968	1.283034	638.	778.	0.510389E+02	0.135860E+02	668.	710.	740.	782.	685.	760.	649.	720.	675.					
23.	0.001429	0.001000	-0.000971	1.275944	640.	779.	0.511748E+02	0.135175E+02	670.	712.	741.	783.	687.	762.	651.	722.	677.					
24.	0.001426	0.001000	-0.000974	1.269203	641.	781.	0.513094E+02	0.134499E+02	671.	713.	743.	785.	689.	763.	653.	725.	679.					
25.	0.001423	0.001000	-0.000977	1.262781	643.	782.	0.514404E+02	0.133836E+02	673.	714.	745.	786.	691.	765.	655.	727.	681.					
26.	0.001420	0.001000	-0.000980	1.256512	644.	784.	0.515626E+02	0.133182E+02	675.	716.	746.	787.	693.	767.	657.	729.	683.					
27.	0.001418	0.001000	-0.000982	1.250309	646.	785.	0.516726E+02	0.132531E+02	676.	717.	748.	789.	694.	768.	659.	731.	685.					
28.	0.001415	0.001000	-0.000985	1.244252	647.	786.	0.517699E+02	0.131882E+02	678.	719.	749.	790.	696.	770.	661.	733.	687.					
29.	0.001413	0.001000	-0.000987	1.238300	648.	788.	0.518560E+02	0.131240E+02	679.	720.	751.	791.	698.	771.	663.	735.	689.					
30.	0.001411	0.001000	-0.000989	1.232486	650.	789.	0.519333E+02	0.130605E+02	680.	721.	752.	793.	699.	773.	665.	737.	690.					
31.	0.001409	0.001000	-0.000991	1.226795	651.	790.	0.520041E+02	0.129980E+02	682.	722.	753.	794.	701.	774.	667.	739.	692.					
32.	0.001407	0.001000	-0.000993	1.221232	652.	791.	0.520691E+02	0.129366E+02	683.	723.	755.	795.	702.	776.	669.	740.	694.					
33.	0.001405	0.001000	-0.000995	1.215795	653.	792.	0.521280E+02	0.128764E+02	685.	725.	756.	796.	704.	777.	671.	742.	696.					
34.	0.001403	0.001000	-0.000997	1.210446	655.	794.	0.521801E+02	0.128173E+02	686.	726.	757.	797.	705.	778.	672.	744.	697.					
35.	0.001401	0.001000	-0.000999	1.205188	656.	795.	0.522248E+02	0.127592E+02	687.	727.	758.	798.	707.	780.	674.	746.	699.					
36.	0.001399	0.001000	-0.001001	1.199783	657.	796.	0.522619E+02	0.127016E+02	688.	728.	760.	799.	708.	781.	676.	747.	701.					
37.	0.001398	0.001000	-0.001002	1.194553	658.	797.	0.522917E+02	0.126444E+02	689.	729.	761.	800.	710.	782.	677.	749.	702.					
38.	0.001396	0.001000	-0.001004	1.189505	659.	798.	0.523154E+02	0.125882E+02	691.	730.	762.	801.	711.	783.	679.	750.	704.					
39.	0.001394	0.001000	-0.001006	1.184592	660.	799.	0.523337E+02	0.125333E+02	692.	731.	763.	802.	712.	785.	680.	752.	705.					
40.	0.001393	0.001000	-0.001007	1.179781	661.	800.	0.523470E+02	0.124795E+02	693.	732.	764.	803.	714.	786.	682.	753.	707.					
41.	0.001392	0.001000	-0.001008	1.175068	662.	801.	0.523555E+02	0.124268E+02	694.	733.	765.	804.	715.	787.	683.	754.	708.					
42.	0.001390	0.001000	-0.001010	1.170453	663.	802.	0.523589E+02	0.123753E+02	695.	733.	766.	805.	716.	788.	685.	756.	710.					
43.	0.001389	0.001000	-0.001011	1.165878	663.	802.	0.523577E+02	0.123246E+02	696.	734.	767.	805.	717.	789.	686.	757.	711.					
44.	0.001388	0.001000	-0.001012	1.161391	664.	803.	0.523509E+02	0.122748E+02	697.	735.	768.	806.	719.	790.	687.	758.	712.					
45.	0.001386	0.001000	-0.001014	1.157022	665.	804.	0.523396E+02	0.122259E+02	698.	736.	769.	807.	720.	791.	688.	760.	714.					
46.	0.001385	0.001000	-0.001015	1.152762	666.	805.	0.523242E+02	0.121780E+02	698.	737.	769.	808.	721.	792.	690.	761.	715.					
47.	0.001384	0.001000	-0.001016	1.148583	667.	806.	0.523049E+02	0.121312E+02	699.	737.	770.	808.	722.	793.	691.	762.	716.					
48.	0.001383	0.001000	-0.001017	1.144518	667.	806.	0.522820E+02	0.120854E+02	700.	738.	771.	809.	723.	794.	692.	763.	717.					
49.	0.001382	0.001000	-0.001018	1.140527	668.	807.	0.522556E+02	0.120405E+02	701.	739.	772.	810.	724.	795.	693.	764.	719.					
50.	0.001381	0.001000	-0.001019	1.136592	669.	808.	0.522255E+02	0.119966E+02	702.	739.	773.	810.	725.	796.	694.	765.	720.					
51.	0.001380	0.001000	-0.001020	1.132745	669.	808.	0.521920E+02	0.119535E+02	702.	740.	773.	811.	726.	797.	695.	766.	721.					
52.	0.001379	0.001000	-0.001021	1.128951	670.	809.	0.521553E+02	0.119113E+02	703.	741.	774.	812.	727.	798.	696.	767.	722.					
53.	0.001378	0.001000	-0.001022	1.125029	671.	810.	0.521152E+02	0.118693E+02	704.	741.	775.	812.	728.	798.	697.	768.	723.					
54.	0.001377	0.001000	-0.001023	1.121294	671.	810.	0.520719E+02	0.118278E+02	705.	742.	775.	813.	729.	799.	698.	769.	724.					
55.	0.001377	0.001000	-0.001023	1.117698	672.	811.	0.520260E+02	0.117873E+02	705.	742.	776.	813.	730.	800.	699.	770.	725.					
56.	0.001376	0.001000	-0.001024	1.114223	672.	811.	0.519777E+02	0.117478E+02	706.	743.	777.	814.	731.	801.	700.	771.	726.					
57.	0.001375	0.001000	-0.001025	1.110846	673.	812.	0.519270E+02	0.117093E+02	706.	743.	777.	814.	731.	802.	701.	772.	727.					
58.	0.001375	0.001000	-0.001025	1.107505	673.	812.	0.518743E+02	0.116718E+02	707.	744.	778.	815.	732.	802.	702.	773.	728.					
59.	0.001374	0.001000	-0.001026	1.104289	674.	813.	0.518194E+02	0.116352E+02	708.	744.	778.	815.	733.	803.	703.	774.	729.					
60.	0.001374	0.001000	-0.001026	1.101105	674.	813.	0.517624E+02	0.115993E+02	708.	745.	779.	815.	734.	804.	703.	774.	730.					
61.	0.001373	0.001000	-0.001027	1.097996	675.	814.	0.517035E+02	0.115643E+02	709.	745.	779.	816.	735.	804.	704.	775.	731.					

62.	0.001373	0.001000	-0.001027	1.094984	675.	814.	0.516427E+02	0.115299E+02	709.	746.	780.	816.	735.	805.	705.	776.	732.
63.	0.001372	0.001000	-0.001028	1.091978	676.	815.	0.515803E+02	0.114964E+02	710.	746.	780.	817.	736.	806.	706.	777.	733.
64.	0.001372	0.001000	-0.001028	1.089095	676.	815.	0.515163E+02	0.114635E+02	710.	746.	781.	817.	737.	806.	706.	777.	734.
65.	0.001372	0.001000	-0.001028	1.086235	677.	815.	0.514510E+02	0.114315E+02	711.	747.	781.	817.	737.	807.	707.	778.	734.
66.	0.001371	0.001000	-0.001029	1.083485	677.	816.	0.513844E+02	0.114002E+02	711.	747.	781.	818.	738.	807.	708.	778.	735.
67.	0.001371	0.001000	-0.001029	1.080750	677.	816.	0.513165E+02	0.113696E+02	711.	748.	782.	818.	739.	808.	708.	779.	736.
68.	0.001370	0.001000	-0.001030	1.078127	678.	816.	0.512475E+02	0.113397E+02	712.	748.	782.	818.	739.	808.	709.	780.	737.
69.	0.001370	0.001000	-0.001030	1.075498	678.	817.	0.511773E+02	0.113103E+02	712.	748.	783.	819.	740.	809.	710.	780.	737.
70.	0.001370	0.001000	-0.001030	1.073027	678.	817.	0.511062E+02	0.112816E+02	713.	749.	783.	819.	740.	809.	710.	781.	738.
71.	0.001370	0.001000	-0.001030	1.070560	679.	817.	0.510343E+02	0.112538E+02	713.	749.	783.	819.	741.	810.	711.	781.	739.
72.	0.001370	0.001000	-0.001030	1.068190	679.	818.	0.509616E+02	0.112267E+02	713.	749.	784.	819.	742.	810.	711.	782.	739.
73.	0.001370	0.001000	-0.001030	1.065936	679.	818.	0.508884E+02	0.112004E+02	714.	749.	784.	820.	742.	811.	712.	782.	740.
74.	0.001370	0.001000	-0.001030	1.063685	680.	818.	0.508145E+02	0.111747E+02	714.	750.	784.	820.	743.	811.	712.	783.	741.
75.	0.001370	0.001000	-0.001030	1.061505	680.	819.	0.507402E+02	0.111497E+02	714.	750.	785.	820.	743.	812.	713.	783.	741.
76.	0.001369	0.001000	-0.001031	1.059366	680.	819.	0.506655E+02	0.111255E+02	715.	750.	785.	820.	744.	812.	713.	784.	742.
77.	0.001369	0.001000	-0.001031	1.057313	680.	819.	0.505903E+02	0.111017E+02	715.	750.	785.	820.	744.	813.	714.	784.	742.
78.	0.001369	0.001000	-0.001031	1.055299	681.	819.	0.505148E+02	0.110786E+02	715.	751.	785.	821.	744.	813.	714.	785.	743.
79.	0.001369	0.001000	-0.001031	1.053171	681.	819.	0.504391E+02	0.110561E+02	715.	751.	786.	821.	745.	813.	715.	785.	743.
80.	0.001369	0.001000	-0.001031	1.051086	681.	820.	0.503626E+02	0.110332E+02	716.	751.	786.	821.	745.	814.	715.	785.	744.
81.	0.001369	0.001000	-0.001031	1.049153	681.	820.	0.502860E+02	0.110110E+02	716.	751.	786.	821.	746.	814.	715.	786.	744.
82.	0.001369	0.001000	-0.001031	1.047324	681.	820.	0.502093E+02	0.109895E+02	716.	751.	786.	821.	746.	814.	716.	786.	745.
83.	0.001369	0.001000	-0.001031	1.045504	681.	820.	0.501326E+02	0.109686E+02	716.	751.	786.	821.	746.	815.	716.	786.	745.
84.	0.001369	0.001000	-0.001031	1.043830	682.	820.	0.500561E+02	0.109486E+02	717.	752.	787.	822.	747.	815.	716.	787.	746.
85.	0.001370	0.001000	-0.001030	1.042137	682.	820.	0.499799E+02	0.109293E+02	717.	752.	787.	822.	747.	815.	717.	787.	746.
86.	0.001370	0.001000	-0.001030	1.040530	682.	821.	0.499039E+02	0.109105E+02	717.	752.	787.	822.	747.	816.	717.	787.	747.
87.	0.001370	0.001000	-0.001030	1.038925	682.	821.	0.498278E+02	0.108921E+02	717.	752.	787.	822.	748.	816.	717.	787.	747.
88.	0.001370	0.001000	-0.001030	1.037451	682.	821.	0.497520E+02	0.108744E+02	717.	752.	787.	822.	748.	816.	718.	788.	747.
89.	0.001370	0.001000	-0.001030	1.035927	682.	821.	0.496765E+02	0.108572E+02	717.	752.	787.	822.	748.	816.	718.	788.	748.
90.	0.001370	0.001000	-0.001030	1.034515	682.	821.	0.496012E+02	0.108404E+02	717.	752.	787.	822.	749.	817.	718.	788.	748.
91.	0.001371	0.001000	-0.001029	1.033009	683.	821.	0.495262E+02	0.108240E+02	718.	752.	788.	822.	749.	817.	718.	788.	748.
92.	0.001371	0.001000	-0.001029	1.031786	683.	821.	0.494517E+02	0.108082E+02	718.	752.	788.	822.	749.	817.	719.	789.	749.
93.	0.001371	0.001000	-0.001029	1.030387	683.	821.	0.493778E+02	0.107930E+02	718.	752.	788.	822.	749.	817.	719.	789.	749.
94.	0.001371	0.001000	-0.001029	1.029088	683.	821.	0.493041E+02	0.107780E+02	718.	753.	788.	822.	750.	818.	719.	789.	749.
95.	0.001372	0.001000	-0.001028	1.027851	683.	822.	0.492309E+02	0.107634E+02	718.	753.	788.	822.	750.	818.	719.	789.	750.
96.	0.001372	0.001000	-0.001028	1.026606	683.	822.	0.491581E+02	0.107493E+02	718.	753.	788.	822.	750.	818.	719.	789.	750.
97.	0.001372	0.001000	-0.001028	1.025558	683.	822.	0.490859E+02	0.107357E+02	718.	753.	788.	823.	750.	818.	720.	790.	750.
98.	0.001372	0.001000	-0.001028	1.024344	683.	822.	0.490146E+02	0.107227E+02	718.	753.	788.	823.	751.	818.	720.	790.	750.
99.	0.001372	0.001000	-0.001028	1.023193	683.	822.	0.489435E+02	0.107097E+02	718.	753.	788.	823.	751.	818.	720.	790.	751.
100.	0.001373	0.001000	-0.001027	1.022144	683.	822.	0.488730E+02	0.106971E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
101.	0.001373	0.001000	-0.001027	1.021126	683.	822.	0.488031E+02	0.106850E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
102.	0.001373	0.001000	-0.001027	1.020121	683.	822.	0.487339E+02	0.106734E+02	719.	753.	788.	823.	751.	819.	720.	790.	751.
103.	0.001374	0.001000	-0.001026	1.019219	683.	822.	0.486654E+02	0.106621E+02	719.	753.	788.	823.	751.	819.	720.	790.	752.
104.	0.001374	0.001000	-0.001026	1.018328	683.	822.	0.485979E+02	0.106515E+02	719.	753.	788.	823.	752.	819.	721.	790.	752.
105.	0.001374	0.001000	-0.001026	1.017211	683.	822.	0.485307E+02	0.106407E+02	719.	753.	789.	823.	752.	819.	721.	791.	752.
106.	0.001375	0.001000	-0.001025	1.016409	683.	822.	0.484640E+02	0.106301E+02	719.	753.	789.	823.	752.	819.	721.	791.	752.
107.	0.001375	0.001000	-0.001025	1.015596	684.	822.	0.483983E+02	0.106202E+02	719.	753.	789.	823.	752.	820.	721.	791.	752.
108.	0.001375	0.001000	-0.001025	1.014748	684.	822.	0.483332E+02	0.106105E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
109.	0.001376	0.001000	-0.001024	1.013988	684.	822.	0.482690E+02	0.106012E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
110.	0.001376	0.001000	-0.001024	1.013258	684.	822.	0.482055E+02	0.105924E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
111.	0.001376	0.001000	-0.001024	1.012511	684.	822.	0.481430E+02	0.105838E+02	719.	753.	789.	823.	752.	820.	721.	791.	753.
112.	0.001377	0.001000	-0.001023	1.011827	684.	822.	0.480811E+02	0.105755E+02	719.	753.	789.	823.	753.	820.	721.	791.	753.
113.	0.001377	0.001000	-0.001023	1.011084	684.	822.	0.480199E+02	0.105674E+02	719.	753.	789.	823.	753.	820.	721.	791.	753.
114.	0.001377	0.001000	-0.001023	1.010311	684.	822.	0.479593E+02	0.105591E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
115.	0.001378	0.001000	-0.001022	1.009772	684.	822.	0.478996E+02	0.105514E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
116.	0.001378	0.001000	-0.001022	1.009135	684.	822.	0.478407E+02	0.105441E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
117.	0.001378	0.001000	-0.001022	1.008455	684.	822.	0.477824E+02	0.105369E+02	719.	753.	789.	823.	753.	820.	722.	791.	754.
118.	0.001379	0.001000	-0.001021	1.007984	684.	822.	0.477251E+02	0.105300E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
119.	0.001379	0.001000	-0.001021	1.007400	684.	822.	0.476688E+02	0.105235E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
120.	0.001379	0.001000	-0.001021	1.006937	684.	822.	0.476134E+02	0.105173E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
121.	0.001380	0.001000	-0.001020	1.006433	684.	822.	0.475587E+02	0.105114E+02	719.	753.	789.	823.	753.	821.	722.	791.	754.
122.	0.001380	0.001000	-0.001020	1.005937	684.	822.	0.475048E+02	0.105056E+02	719.	753.	789.	823.	753.	821.	722.	792.	754.
123.	0.001380	0.001000	-0.001020	1.005475	684.	822.	0.474517E+02	0.105000E+02	719.	753.	789.	822.	753.	821.	722.	792.	754.
124.	0.001381	0.001000	-0.001019	1.005051	684.	822.	0.473993E+02	0.104947E+02	719.	753.	789.	822.	753.	821.	722.	792.	755.
125.	0.001381	0.001000	-0.001019	1.004593	684.	822.	0.473477E+02	0.104895E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
126.	0.001381	0.001000	-0.001019	1.004039	684.	822.	0.472968E+02	0.104842E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
127.	0.001382	0.001000	-0.001018	1.003616	683.	822.	0.472465E+02	0.104789E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.

128.	0.001382	0.001000	-0.001018	1.003280	683.	822.	0.471975E+02	0.104741E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
129.	0.001382	0.001000	-0.001018	1.002811	683.	822.	0.471489E+02	0.104695E+02	719.	753.	789.	822.	754.	821.	722.	792.	755.
130.	0.001382	0.001000	-0.001018	1.002467	683.	822.	0.471010E+02	0.104649E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
131.	0.001383	0.001000	-0.001017	1.002109	683.	822.	0.470542E+02	0.104606E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
132.	0.001383	0.001000	-0.001017	1.001746	683.	822.	0.470082E+02	0.104564E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
133.	0.001383	0.001000	-0.001017	1.001456	683.	822.	0.469627E+02	0.104525E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
134.	0.001384	0.001000	-0.001016	1.001348	683.	822.	0.469184E+02	0.104491E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
135.	0.001384	0.001000	-0.001016	1.001079	683.	822.	0.468752E+02	0.104461E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
136.	0.001385	0.001000	-0.001015	1.000859	683.	822.	0.468323E+02	0.104431E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
137.	0.001385	0.001000	-0.001015	1.000537	683.	822.	0.467906E+02	0.104402E+02	719.	753.	788.	822.	754.	821.	722.	792.	755.
138.	0.001385	0.001000	-0.001015	1.000245	683.	822.	0.467491E+02	0.104370E+02	719.	753.	788.	822.	754.	821.	722.	791.	755.
139.	0.001385	0.001000	-0.001015	1.000023	683.	822.	0.467087E+02	0.104341E+02	719.	753.	788.	822.	754.	821.	722.	791.	755.
140.	0.001386	0.001000	-0.001014	0.999774	683.	822.	0.466684E+02	0.104311E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
141.	0.001386	0.001000	-0.001014	0.999517	683.	822.	0.466295E+02	0.104284E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
142.	0.001386	0.001000	-0.001014	0.999334	683.	822.	0.465906E+02	0.104257E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
143.	0.001387	0.001000	-0.001013	0.999221	683.	822.	0.465531E+02	0.104234E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
144.	0.001387	0.001000	-0.001013	0.999108	683.	822.	0.465167E+02	0.104215E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
145.	0.001387	0.001000	-0.001013	0.998923	683.	822.	0.464806E+02	0.104196E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
146.	0.001388	0.001000	-0.001012	0.998860	683.	821.	0.464450E+02	0.104179E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
147.	0.001388	0.001000	-0.001012	0.999013	683.	821.	0.464106E+02	0.104168E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
148.	0.001389	0.001000	-0.001011	0.999057	683.	821.	0.463783E+02	0.104164E+02	719.	752.	788.	822.	754.	821.	722.	791.	755.
149.	0.001389	0.001000	-0.001011	0.998889	683.	821.	0.463458E+02	0.104158E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
150.	0.001389	0.001000	-0.001011	0.998597	683.	821.	0.463136E+02	0.104145E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
151.	0.001389	0.001000	-0.001011	0.998316	683.	821.	0.462814E+02	0.104125E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
152.	0.001389	0.001000	-0.001011	0.998122	683.	821.	0.462496E+02	0.104104E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
153.	0.001389	0.001000	-0.001011	0.998002	683.	821.	0.462190E+02	0.104084E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
154.	0.001390	0.001000	-0.001010	0.998015	683.	821.	0.461894E+02	0.104071E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
155.	0.001390	0.001000	-0.001010	0.997987	683.	821.	0.461608E+02	0.104063E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
156.	0.001390	0.001000	-0.001010	0.997919	683.	821.	0.461327E+02	0.104055E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
157.	0.001390	0.001000	-0.001010	0.997846	683.	821.	0.461042E+02	0.104047E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
158.	0.001390	0.001000	-0.001010	0.997581	683.	821.	0.460766E+02	0.104036E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
159.	0.001390	0.001000	-0.001010	0.997337	682.	821.	0.460493E+02	0.104017E+02	718.	752.	788.	821.	754.	821.	722.	791.	755.
160.	0.001391	0.001000	-0.001009	0.997271	682.	821.	0.460220E+02	0.104000E+02	718.	752.	787.	821.	754.	821.	722.	791.	755.
161.	0.001391	0.001000	-0.001009	0.997246	682.	821.	0.459957E+02	0.103988E+02	718.	752.	787.	821.	754.	821.	722.	791.	755.
162.	0.001391	0.001000	-0.001009	0.997237	682.	821.	0.459704E+02	0.103980E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
163.	0.001392	0.001000	-0.001008	0.997190	682.	821.	0.459458E+02	0.103973E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
164.	0.001392	0.001000	-0.001008	0.997148	682.	821.	0.459218E+02	0.103967E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
165.	0.001392	0.001000	-0.001008	0.997111	682.	821.	0.458985E+02	0.103961E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
166.	0.001392	0.001000	-0.001008	0.997078	682.	821.	0.458755E+02	0.103955E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
167.	0.001392	0.001000	-0.001008	0.997050	682.	821.	0.458529E+02	0.103950E+02	718.	752.	787.	821.	754.	821.	721.	791.	755.
168.	0.001393	0.001000	-0.001007	0.997029	682.	821.	0.458309E+02	0.103945E+02	718.	751.	787.	821.	754.	821.	721.	791.	755.
169.	0.001393	0.001000	-0.001007	0.997018	682.	821.	0.458095E+02	0.103941E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
170.	0.001393	0.001000	-0.001007	0.997018	682.	821.	0.457887E+02	0.103939E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
171.	0.001393	0.001000	-0.001007	0.997029	682.	821.	0.457684E+02	0.103937E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
172.	0.001393	0.001000	-0.001007	0.997046	682.	821.	0.457485E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
173.	0.001394	0.001000	-0.001006	0.997074	682.	821.	0.457292E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
174.	0.001394	0.001000	-0.001006	0.997108	682.	821.	0.457102E+02	0.103936E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
175.	0.001394	0.001000	-0.001006	0.997154	682.	821.	0.456917E+02	0.103938E+02	718.	751.	787.	821.	753.	821.	721.	791.	755.
176.	0.001394	0.001000	-0.001006	0.997211	682.	821.	0.456737E+02	0.103940E+02	718.	751.	787.	821.	753.	820.	721.	791.	755.
177.	0.001395	0.001000	-0.001005	0.997277	682.	821.	0.456560E+02	0.103944E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
178.	0.001395	0.001000	-0.001005	0.997349	682.	821.	0.456389E+02	0.103949E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
179.	0.001395	0.001000	-0.001005	0.997433	682.	821.	0.456228E+02	0.103954E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.
180.	0.001395	0.001000	-0.001005	0.997529	682.	821.	0.456076E+02	0.103960E+02	718.	751.	787.	821.	753.	820.	721.	790.	755.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00099714		0.00171959			0.00324059		0.00271544		0.01475992			0.00159996			
	0.00945175		0.00422059			0.49659890		0.10774821		0.02219312			3.07586956			
1.	0.001482	0.000099	-0.000018	1.054839	566.	705.	0.451160E+02	0.105088E+02	602.	636.	672.	705.	637.	705.	605.	674. 639.
2.	0.001524	0.000198	-0.000075	1.120278	568.	708.	0.453196E+02	0.107946E+02	604.	639.	674.	709.	638.	706.	605.	674. 639.
3.	0.001544	0.000297	-0.000153	1.174695	572.	713.	0.456151E+02	0.111770E+02	608.	644.	678.	714.	639.	707.	605.	675. 639.
4.	0.001555	0.000396	-0.000242	1.220991	577.	718.	0.459548E+02	0.115838E+02	611.	649.	682.	720.	641.	709.	606.	676. 639.
5.	0.001561	0.000495	-0.000335	1.262576	582.	723.	0.463121E+02	0.119838E+02	616.	654.	687.	725.	643.	712.	607.	677. 640.
6.	0.001567	0.000594	-0.000428	1.301488	587.	728.	0.466738E+02	0.123671E+02	620.	660.	692.	731.	646.	714.	608.	678. 641.
7.	0.001572	0.000693	-0.000522	1.338774	593.	734.	0.470361E+02	0.127344E+02	625.	666.	697.	738.	649.	718.	610.	680. 642.
8.	0.001576	0.000792	-0.000616	1.375329	598.	740.	0.474186E+02	0.130967E+02	630.	672.	702.	744.	652.	721.	612.	682. 644.
9.	0.001580	0.000891	-0.000712	1.411717	604.	746.	0.478415E+02	0.134638E+02	635.	678.	707.	750.	655.	725.	614.	685. 646.
10.	0.001583	0.000990	-0.000808	1.447524	610.	752.	0.483074E+02	0.138356E+02	640.	685.	713.	757.	658.	729.	617.	688. 648.
11.	0.001584	0.001089	-0.000906	1.482650	617.	758.	0.488105E+02	0.142087E+02	646.	691.	719.	764.	662.	733.	620.	691. 650.
12.	0.001585	0.001188	-0.001004	1.516490	623.	765.	0.493404E+02	0.145781E+02	652.	698.	725.	771.	666.	738.	623.	694. 652.
13.	0.001585	0.001287	-0.001103	1.549458	630.	772.	0.498881E+02	0.149406E+02	658.	705.	731.	778.	670.	743.	627.	698. 655.
14.	0.001584	0.001386	-0.001202	1.581175	637.	779.	0.504480E+02	0.152945E+02	664.	712.	738.	786.	674.	748.	630.	702. 658.
15.	0.001584	0.001485	-0.001302	1.612134	644.	786.	0.510204E+02	0.156395E+02	671.	720.	745.	793.	678.	753.	634.	706. 661.
16.	0.001584	0.001584	-0.001401	1.642222	651.	793.	0.516092E+02	0.159768E+02	677.	727.	751.	801.	683.	758.	638.	710. 665.
17.	0.001583	0.001683	-0.001501	1.671438	659.	801.	0.522162E+02	0.163048E+02	684.	735.	758.	809.	688.	764.	643.	715. 668.
18.	0.001582	0.001782	-0.001601	1.700048	666.	808.	0.528418E+02	0.166263E+02	691.	743.	766.	817.	693.	770.	648.	720. 672.
19.	0.001581	0.001881	-0.001701	1.727769	674.	816.	0.534841E+02	0.169407E+02	698.	751.	773.	825.	698.	776.	652.	725. 676.
20.	0.001580	0.001980	-0.001801	1.754927	682.	824.	0.541400E+02	0.172479E+02	705.	759.	781.	834.	704.	782.	658.	730. 681.
21.	0.001578	0.002079	-0.001901	1.781218	690.	832.	0.548069E+02	0.175483E+02	713.	767.	788.	842.	709.	789.	663.	736. 685.
22.	0.001577	0.002178	-0.002002	1.806586	698.	840.	0.554822E+02	0.178399E+02	720.	775.	796.	851.	715.	795.	668.	742. 690.
23.	0.001575	0.002277	-0.002102	1.831632	706.	849.	0.561662E+02	0.181240E+02	728.	784.	804.	860.	721.	802.	674.	748. 695.
24.	0.001573	0.002376	-0.002203	1.855737	715.	857.	0.568589E+02	0.184010E+02	736.	793.	812.	868.	727.	809.	680.	754. 700.
25.	0.001572	0.002474	-0.002304	1.879055	723.	866.	0.575593E+02	0.186701E+02	744.	801.	820.	877.	734.	816.	686.	760. 705.
26.	0.001570	0.002573	-0.002404	1.902043	732.	875.	0.582674E+02	0.189319E+02	752.	810.	829.	887.	740.	823.	693.	767. 711.
27.	0.001568	0.002672	-0.002505	1.924315	741.	883.	0.589828E+02	0.191875E+02	761.	819.	837.	896.	747.	830.	699.	774. 716.
28.	0.001566	0.002771	-0.002606	1.945723	750.	892.	0.597035E+02	0.194359E+02	769.	828.	846.	905.	754.	837.	706.	781. 722.
29.	0.001565	0.002870	-0.002707	1.966578	759.	901.	0.604276E+02	0.196767E+02	778.	837.	855.	914.	761.	845.	713.	788. 728.
30.	0.001563	0.002969	-0.002807	1.987144	768.	911.	0.611558E+02	0.199116E+02	786.	847.	864.	924.	768.	853.	720.	795. 734.
31.	0.001507	0.003000	-0.002894	1.942382	777.	919.	0.618398E+02	0.200677E+02	794.	855.	872.	933.	775.	860.	727.	803. 740.
32.	0.001481	0.003000	-0.002919	1.874251	783.	924.	0.623066E+02	0.199089E+02	800.	860.	877.	938.	781.	867.	734.	810. 747.
33.	0.001473	0.003000	-0.002927	1.843091	788.	929.	0.626888E+02	0.196702E+02	806.	865.	882.	941.	787.	873.	741.	817. 753.
34.	0.001467	0.003000	-0.002933	1.820468	792.	933.	0.630575E+02	0.194497E+02	810.	869.	887.	945.	792.	879.	748.	824. 759.
35.	0.001461	0.003000	-0.002939	1.799643	797.	937.	0.634270E+02	0.192544E+02	815.	873.	891.	949.	798.	884.	755.	831. 765.
36.	0.001454	0.003000	-0.002946	1.779294	801.	941.	0.638002E+02	0.190768E+02	820.	877.	896.	953.	803.	890.	761.	837. 771.
37.	0.001447	0.003000	-0.002953	1.759933	805.	945.	0.641774E+02	0.189118E+02	825.	881.	901.	957.	808.	895.	768.	843. 777.
38.	0.001439	0.003000	-0.002961	1.740948	809.	950.	0.645517E+02	0.187453E+02	829.	885.	905.	961.	813.	900.	774.	849. 783.
39.	0.001433	0.003000	-0.002967	1.721425	813.	953.	0.648339E+02	0.185648E+02	833.	889.	909.	965.	818.	905.	780.	855. 788.
40.	0.001427	0.003000	-0.002973	1.702013	817.	957.	0.650871E+02	0.183734E+02	838.	893.	913.	968.	823.	909.	785.	861. 794.
41.	0.001422	0.003000	-0.002978	1.683330	821.	961.	0.653043E+02	0.181787E+02	842.	896.	917.	972.	828.	914.	791.	867. 799.
42.	0.001417	0.003000	-0.002983	1.665414	824.	964.	0.654972E+02	0.179859E+02	846.	900.	921.	975.	833.	918.	796.	872. 805.
43.	0.001412	0.003000	-0.002988	1.647972	828.	968.	0.656745E+02	0.177974E+02	850.	903.	925.	978.	837.	922.	802.	877. 810.
44.	0.001408	0.003000	-0.002992	1.630942	831.	971.	0.658403E+02	0.176131E+02	854.	906.	929.	982.	842.	926.	807.	883. 815.
45.	0.001404	0.003000	-0.002996	1.614486	834.	975.	0.659909E+02	0.174330E+02	857.	909.	933.	985.	846.	930.	812.	888. 820.
46.	0.001400	0.003000	-0.003000	1.598349	838.	978.	0.661207E+02	0.172560E+02	861.	913.	936.	988.	850.	934.	817.	892. 825.
47.	0.001396	0.003000	-0.003004	1.582579	841.	981.	0.662268E+02	0.170817E+02	864.	916.	939.	991.	855.	938.	822.	897. 829.
48.	0.001392	0.003000	-0.003008	1.566872	844.	984.	0.663096E+02	0.169099E+02	868.	918.	943.	994.	859.	941.	826.	902. 834.
49.	0.001388	0.003000	-0.003012	1.551617	847.	987.	0.663716E+02	0.167404E+02	871.	921.	946.	996.	863.	945.	831.	906. 839.
50.	0.001384	0.003000	-0.003016	1.536819	850.	989.	0.664166E+02	0.165744E+02	874.	924.	949.	999.	867.	948.	835.	911. 843.
51.	0.001381	0.003000	-0.003019	1.522355	852.	992.	0.664473E+02	0.164122E+02	877.	927.	952.	1001.	870.	952.	839.	915. 847.
52.	0.001378	0.003000	-0.003022	1.508197	855.	995.	0.664645E+02	0.162534E+02	880.	929.	955.	1004.	874.	955.	844.	919. 852.
53.	0.001374	0.003000	-0.003026	1.494164	858.	997.	0.664677E+02	0.160978E+02	883.	932.	958.	1006.	878.	958.	848.	923. 856.
54.	0.001371	0.003000	-0.003029	1.480534	860.	1000.	0.664564E+02	0.159454E+02	886.	934.	960.	1009.	881.	961.	851.	927. 860.
55.	0.001368	0.003000	-0.003032	1.467328	863.	1002.	0.664306E+02	0.157974E+02	889.	936.	963.	1011.	885.	964.	855.	930. 864.
56.	0.001365	0.003000	-0.003035	1.454401	865.	1005.	0.663911E+02	0.156524E+02	891.	939.	966.	1013.	888.	967.	859.	934. 868.
57.	0.001362	0.003000	-0.003038	1.441731	867.	1007.	0.663388E+02	0.155102E+02	894.	941.	968.	1015.	891.	970.	863.	938. 871.
58.	0.001359	0.003000	-0.003041	1.429267	869.	1009.	0.662748E+02	0.153709E+02	896.	943.	971.	1017.	894.	973.	866.	941. 875.
59.	0.001357	0.003000	-0.003043	1.416843	872.	1011.	0.661992E+02	0.152336E+02	899.	945.	973.	1019.	898.	976.	869.	944. 879.
60.	0.001354	0.003000	-0.003046	1.404878	874.	1013.	0.661132E+02	0.150989E+02	901.	947.	975.	1021.	901.	978.	873.	947. 882.
61.	0.001352	0.003000	-0.003048	1.393269	876.	1015.	0.660175E+02	0.149674E+02	903.	949.	977.	1023.	904.	981.	876.	951. 886.

62.	0.001349	0.003000	-0.003051	1.381934	878.1017.	0.659123E+02	0.148391E+02	906.	951.	979.	1025.	906.	984.	879.	954.	889.
63.	0.001347	0.003000	-0.003053	1.370865	879.1019.	0.657979E+02	0.147139E+02	908.	953.	981.	1026.	909.	986.	882.	956.	892.
64.	0.001345	0.003000	-0.003055	1.360042	881.1021.	0.656750E+02	0.145916E+02	910.	954.	983.	1028.	912.	988.	885.	959.	896.
65.	0.001343	0.003000	-0.003057	1.349307	883.1022.	0.655436E+02	0.144718E+02	912.	956.	985.	1030.	915.	991.	888.	962.	899.
66.	0.001340	0.003000	-0.003060	1.338686	885.1024.	0.654040E+02	0.143539E+02	914.	958.	987.	1031.	917.	993.	890.	965.	902.
67.	0.001339	0.003000	-0.003061	1.328468	886.1026.	0.652567E+02	0.142382E+02	915.	959.	989.	1032.	920.	995.	893.	967.	905.
68.	0.001337	0.003000	-0.003063	1.318568	888.1027.	0.651028E+02	0.141255E+02	917.	961.	990.	1034.	922.	997.	896.	970.	907.
69.	0.001335	0.003000	-0.003065	1.308919	889.1029.	0.649426E+02	0.140157E+02	919.	962.	992.	1035.	925.	1000.	898.	972.	910.
70.	0.001333	0.003000	-0.003067	1.299508	891.1030.	0.647767E+02	0.139087E+02	921.	963.	994.	1037.	927.	1002.	901.	974.	913.
71.	0.001332	0.003000	-0.003068	1.290318	892.1031.	0.646053E+02	0.138043E+02	922.	965.	995.	1038.	929.	1004.	903.	977.	916.
72.	0.001330	0.003000	-0.003070	1.281345	894.1033.	0.644285E+02	0.137024E+02	924.	966.	997.	1039.	931.	1006.	905.	979.	918.
73.	0.001329	0.003000	-0.003071	1.272345	895.1034.	0.642465E+02	0.136024E+02	925.	967.	998.	1040.	934.	1007.	907.	981.	921.
74.	0.001327	0.003000	-0.003073	1.263611	896.1035.	0.640592E+02	0.135042E+02	927.	968.	999.	1041.	936.	1009.	909.	983.	923.
75.	0.001326	0.003000	-0.003074	1.255157	897.1036.	0.638675E+02	0.134082E+02	928.	969.	1001.	1042.	938.	1011.	911.	985.	926.
76.	0.001325	0.003000	-0.003075	1.246922	898.1038.	0.636719E+02	0.133145E+02	929.	971.	1002.	1043.	940.	1013.	913.	987.	928.
77.	0.001324	0.003000	-0.003076	1.238950	900.1039.	0.634727E+02	0.132233E+02	931.	972.	1003.	1044.	941.	1014.	915.	989.	930.
78.	0.001323	0.003000	-0.003077	1.231199	901.1040.	0.632705E+02	0.131346E+02	932.	973.	1004.	1045.	943.	1016.	917.	990.	932.
79.	0.001322	0.003000	-0.003078	1.223639	902.1041.	0.630654E+02	0.130482E+02	933.	974.	1005.	1046.	945.	1018.	919.	992.	934.
80.	0.001321	0.003000	-0.003079	1.216273	903.1042.	0.628575E+02	0.129641E+02	934.	974.	1007.	1047.	947.	1019.	921.	994.	937.
81.	0.001321	0.003000	-0.003079	1.209088	904.1043.	0.626469E+02	0.128820E+02	935.	975.	1008.	1048.	948.	1021.	922.	995.	939.
82.	0.001320	0.003000	-0.003080	1.201982	905.1044.	0.624340E+02	0.128019E+02	936.	976.	1009.	1048.	950.	1022.	924.	997.	941.
83.	0.001319	0.003000	-0.003081	1.194927	905.1044.	0.622185E+02	0.127230E+02	937.	977.	1009.	1049.	952.	1023.	926.	998.	942.
84.	0.001318	0.003000	-0.003082	1.188168	906.1045.	0.620009E+02	0.126459E+02	938.	978.	1010.	1050.	953.	1025.	927.	1000.	944.
85.	0.001318	0.003000	-0.003082	1.181635	907.1046.	0.617819E+02	0.125709E+02	939.	978.	1011.	1051.	955.	1026.	928.	1001.	946.
86.	0.001317	0.003000	-0.003083	1.175288	908.1047.	0.615616E+02	0.124980E+02	940.	979.	1012.	1051.	956.	1027.	930.	1003.	948.
87.	0.001317.	0.003000	-0.003083	1.169114	908.1047.	0.613402E+02	0.124271E+02	941.	980.	1013.	1052.	957.	1028.	931.	1004.	949.
88.	0.001317	0.003000	-0.003083	1.163046	909.1048.	0.611180E+02	0.123581E+02	942.	980.	1014.	1052.	959.	1030.	932.	1005.	951.
89.	0.001316	0.003000	-0.003084	1.157173	910.1049.	0.608950E+02	0.122908E+02	943.	981.	1014.	1053.	960.	1031.	934.	1006.	953.
90.	0.001316	0.003000	-0.003084	1.151493	910.1049.	0.606713E+02	0.122253E+02	943.	982.	1015.	1053.	961.	1032.	935.	1007.	954.
91.	0.001316	0.003000	-0.003084	1.145987	911.1050.	0.604473E+02	0.121616E+02	944.	982.	1016.	1054.	962.	1033.	936.	1008.	956.
92.	0.001316	0.003000	-0.003084	1.140615	912.1051.	0.602229E+02	0.120997E+02	945.	983.	1016.	1054.	964.	1034.	937.	1009.	957.
93.	0.001316	0.003000	-0.003084	1.135392	912.1051.	0.599985E+02	0.120395E+02	945.	983.	1017.	1055.	965.	1035.	938.	1010.	958.
94.	0.001316	0.003000	-0.003084	1.130315	913.1052.	0.597743E+02	0.119810E+02	946.	984.	1017.	1055.	966.	1036.	939.	1011.	960.
95.	0.001316	0.003000	-0.003084	1.125158	913.1052.	0.595501E+02	0.119237E+02	947.	984.	1018.	1056.	967.	1037.	940.	1012.	961.
96.	0.001316	0.003000	-0.003084	1.120193	914.1053.	0.593258E+02	0.118674E+02	947.	985.	1019.	1056.	968.	1038.	941.	1013.	962.
97.	0.001316	0.003000	-0.003084	1.115451	914.1053.	0.591019E+02	0.118126E+02	948.	985.	1019.	1056.	969.	1039.	942.	1014.	964.
98.	0.001316	0.003000	-0.003084	1.110888	915.1053.	0.588788E+02	0.117595E+02	948.	985.	1019.	1057.	970.	1039.	943.	1015.	965.
99.	0.001317	0.003000	-0.003083	1.106442	915.1054.	0.586564E+02	0.117080E+02	949.	986.	1020.	1057.	971.	1040.	944.	1016.	966.
100.	0.001317	0.003000	-0.003083	1.102133	915.1054.	0.584349E+02	0.116581E+02	949.	986.	1020.	1057.	972.	1041.	945.	1016.	967.
101.	0.001317	0.003000	-0.003083	1.097965	916.1055.	0.582146E+02	0.116097E+02	950.	986.	1021.	1057.	972.	1042.	945.	1017.	968.
102.	0.001318	0.003000	-0.003082	1.093914	916.1055.	0.579953E+02	0.115627E+02	950.	987.	1021.	1058.	973.	1042.	946.	1018.	969.
103.	0.001318	0.003000	-0.003082	1.089959	916.1055.	0.577772E+02	0.115170E+02	950.	987.	1021.	1058.	974.	1043.	947.	1018.	970.
104.	0.001318	0.003000	-0.003082	1.086141	917.1055.	0.575602E+02	0.114726E+02	951.	987.	1022.	1058.	975.	1044.	947.	1019.	971.
105.	0.001319	0.003000	-0.003081	1.082410	917.1056.	0.573446E+02	0.114295E+02	951.	987.	1022.	1058.	976.	1044.	948.	1020.	972.
106.	0.001319	0.003000	-0.003081	1.078792	917.1056.	0.571303E+02	0.113876E+02	952.	988.	1022.	1058.	976.	1045.	949.	1020.	973.
107.	0.001320	0.003000	-0.003080	1.075266	918.1056.	0.569175E+02	0.113469E+02	952.	988.	1023.	1059.	977.	1046.	949.	1021.	974.
108.	0.001320	0.003000	-0.003080	1.071841	918.1056.	0.567063E+02	0.113073E+02	952.	988.	1023.	1059.	978.	1046.	950.	1021.	974.
109.	0.001321	0.003000	-0.003079	1.068592	918.1057.	0.564967E+02	0.112689E+02	952.	988.	1023.	1059.	978.	1047.	950.	1022.	975.
110.	0.001322	0.003000	-0.003078	1.065416	918.1057.	0.562890E+02	0.112318E+02	953.	988.	1023.	1059.	979.	1047.	951.	1022.	976.
111.	0.001322	0.003000	-0.003078	1.062348	918.1057.	0.560831E+02	0.111959E+02	953.	989.	1024.	1059.	979.	1048.	951.	1023.	977.
112.	0.001323	0.003000	-0.003077	1.059385	919.1057.	0.558791E+02	0.111612E+02	953.	989.	1024.	1059.	980.	1048.	952.	1023.	977.
113.	0.001324	0.003000	-0.003076	1.056504	919.1057.	0.556770E+02	0.111275E+02	953.	989.	1024.	1059.	980.	1049.	952.	1023.	978.
114.	0.001324	0.003000	-0.003076	1.053693	919.1057.	0.554769E+02	0.110950E+02	954.	989.	1024.	1059.	981.	1049.	953.	1024.	979.
115.	0.001325	0.003000	-0.003075	1.050768	919.1058.	0.552785E+02	0.110628E+02	954.	989.	1024.	1059.	981.	1049.	953.	1024.	979.
116.	0.001326	0.003000	-0.003074	1.048100	919.1058.	0.550817E+02	0.110313E+02	954.	989.	1024.	1060.	982.	1050.	953.	1024.	980.
117.	0.001327	0.003000	-0.003073	1.045517	919.1058.	0.548870E+02	0.110010E+02	954.	989.	1024.	1060.	982.	1050.	954.	1025.	980.
118.	0.001327	0.003000	-0.003073	1.043030	919.1058.	0.546946E+02	0.109717E+02	954.	989.	1024.	1060.	983.	1051.	954.	1025.	981.
119.	0.001328	0.003000	-0.003072	1.040725	919.1058.	0.545044E+02	0.109436E+02	954.	989.	1025.	1060.	983.	1051.	954.	1025.	981.
120.	0.001329	0.003000	-0.003071	1.038417	919.1058.	0.543166E+02	0.109166E+02	954.	989.	1025.	1060.	983.	1051.	955.	1025.	982.
121.	0.001330	0.003000	-0.003070	1.036201	919.1058.	0.541311E+02	0.108905E+02	955.	989.	1025.	1060.	984.	1051.	955.	1026.	982.
122.	0.001331	0.003000	-0.003069	1.034129	919.1058.	0.539477E+02	0.108653E+02	955.	989.	1025.	1060.	984.	1052.	955.	1026.	983.
123.	0.001332	0.003000	-0.003068	1.032038	920.1058.	0.537666E+02	0.108409E+02	955.	989.	1025.	1060.	984.	1052.	955.	1026.	983.
124.	0.001332	0.003000	-0.003068	1.030012	920.1058.	0.535877E+02	0.108173E+02	955.	989.	1025.	1060.	985.	1052.	956.	1026.	984.
125.	0.001333	0.003000	-0.003067	1.028126	920.1058.	0.534111E+02	0.107945E+02	955.	989.	1025.	1059.	985.	1052.	956.	1026.	984.
126.	0.001334	0.003000	-0.003066	1.026268	920.1058.	0.532369E+02	0.107726E+02	955.	989.	1025.	1059.	985.	1053.	956.	1026.	984.
127.	0.001335	0.003000	-0.003065	1.024474	920.1058.	0.530650E+02	0.107514E+02	955.	989.	1025.	1059.	985.	1053.	956.	1027.	985.

128.	0.001336	0.003000	-0.003064	1.022779	920.1058.	0.528955E+02	0.107309E+02	955.	989.1025.1059.	986.1053.	956.1027.	985.
129.	0.001337	0.003000	-0.003063	1.021129	920.1058.	0.527285E+02	0.107112E+02	955.	989.1025.1059.	986.1053.	957.1027.	985.
130.	0.001338	0.003000	-0.003062	1.019540	920.1058.	0.525638E+02	0.106923E+02	955.	989.1025.1059.	986.1053.	957.1027.	986.
131.	0.001339	0.003000	-0.003061	1.017973	920.1058.	0.524013E+02	0.106739E+02	955.	989.1025.1059.	986.1054.	957.1027.	986.
132.	0.001340	0.003000	-0.003060	1.016487	920.1058.	0.522412E+02	0.106561E+02	955.	989.1025.1059.	986.1054.	957.1027.	986.
133.	0.001341	0.003000	-0.003059	1.015038	919.1058.	0.520835E+02	0.106390E+02	955.	989.1025.1059.	987.1054.	957.1027.	987.
134.	0.001342	0.003000	-0.003058	1.013760	919.1058.	0.519282E+02	0.106227E+02	955.	989.1025.1059.	987.1054.	957.1027.	987.
135.	0.001342	0.003000	-0.003058	1.012418	919.1058.	0.517755E+02	0.106071E+02	955.	989.1025.1059.	987.1054.	957.1027.	987.
136.	0.001343	0.003000	-0.003057	1.011146	919.1058.	0.516249E+02	0.105919E+02	955.	989.1025.1059.	987.1054.	957.1027.	987.
137.	0.001344	0.003000	-0.003056	1.009909	919.1058.	0.514768E+02	0.105772E+02	955.	989.1025.1059.	987.1054.	957.1027.	988.
138.	0.001345	0.003000	-0.003055	1.008694	919.1058.	0.513310E+02	0.105630E+02	955.	989.1025.1059.	987.1055.	957.1027.	988.
139.	0.001346	0.003000	-0.003054	1.007644	919.1058.	0.511874E+02	0.105494E+02	955.	989.1025.1058.	987.1055.	957.1027.	988.
140.	0.001347	0.003000	-0.003053	1.006618	919.1058.	0.510464E+02	0.105367E+02	955.	989.1024.1058.	988.1055.	957.1027.	988.
141.	0.001348	0.003000	-0.003052	1.005550	919.1058.	0.509077E+02	0.105243E+02	955.	989.1024.1058.	988.1055.	957.1027.	988.
142.	0.001349	0.003000	-0.003051	1.004574	919.1058.	0.507712E+02	0.105124E+02	955.	988.1024.1058.	988.1055.	958.1027.	988.
143.	0.001350	0.003000	-0.003050	1.003617	919.1057.	0.506371E+02	0.105009E+02	955.	988.1024.1058.	988.1055.	958.1027.	988.
144.	0.001351	0.003000	-0.003049	1.002627	919.1057.	0.505052E+02	0.104897E+02	955.	988.1024.1058.	988.1055.	958.1027.	989.
145.	0.001351	0.003000	-0.003049	1.001716	919.1057.	0.503755E+02	0.104788E+02	954.	988.1024.1058.	988.1055.	958.1027.	989.
146.	0.001352	0.003000	-0.003048	1.000969	919.1057.	0.502479E+02	0.104685E+02	954.	988.1024.1058.	988.1055.	958.1027.	989.
147.	0.001353	0.003000	-0.003047	1.000310	919.1057.	0.501232E+02	0.104592E+02	954.	988.1024.1058.	988.1055.	958.1027.	989.
148.	0.001354	0.003000	-0.003046	0.999467	918.1057.	0.500006E+02	0.104501E+02	954.	988.1024.1058.	988.1055.	958.1027.	989.
149.	0.001355	0.003000	-0.003045	0.998767	918.1057.	0.498798E+02	0.104411E+02	954.	988.1024.1057.	988.1055.	957.1027.	989.
150.	0.001356	0.003000	-0.003044	0.998232	918.1057.	0.497617E+02	0.104330E+02	954.	988.1024.1057.	988.1055.	957.1027.	989.
151.	0.001357	0.003000	-0.003043	0.997652	918.1057.	0.496459E+02	0.104256E+02	954.	988.1024.1057.	988.1055.	957.1027.	989.
152.	0.001358	0.003000	-0.003042	0.996857	918.1057.	0.495321E+02	0.104180E+02	954.	988.1023.1057.	988.1055.	957.1027.	989.
153.	0.001358	0.003000	-0.003042	0.996276	918.1057.	0.494201E+02	0.104104E+02	954.	987.1023.1057.	988.1055.	957.1027.	989.
154.	0.001359	0.003000	-0.003041	0.995631	918.1056.	0.493102E+02	0.104032E+02	954.	987.1023.1057.	988.1055.	957.1027.	989.
155.	0.001360	0.003000	-0.003040	0.995018	918.1056.	0.492022E+02	0.103961E+02	954.	987.1023.1057.	988.1055.	957.1027.	989.
156.	0.001361	0.003000	-0.003039	0.994488	918.1056.	0.490962E+02	0.103892E+02	954.	987.1023.1057.	988.1055.	957.1027.	989.
157.	0.001362	0.003000	-0.003038	0.994244	918.1056.	0.489929E+02	0.103834E+02	953.	987.1023.1056.	988.1055.	957.1027.	989.
158.	0.001363	0.003000	-0.003037	0.993803	918.1056.	0.488918E+02	0.103782E+02	953.	987.1023.1056.	988.1055.	957.1027.	989.
159.	0.001363	0.003000	-0.003037	0.993338	917.1056.	0.487924E+02	0.103730E+02	953.	987.1023.1056.	988.1055.	957.1027.	989.
160.	0.001364	0.003000	-0.003036	0.992863	917.1056.	0.486949E+02	0.103677E+02	953.	987.1023.1056.	988.1055.	957.1027.	989.
161.	0.001365	0.003000	-0.003035	0.992367	917.1056.	0.485991E+02	0.103625E+02	953.	987.1023.1056.	988.1055.	957.1026.	989.
162.	0.001366	0.003000	-0.003034	0.992065	917.1056.	0.485053E+02	0.103575E+02	953.	986.1022.1056.	988.1055.	957.1026.	989.
163.	0.001367	0.003000	-0.003033	0.991949	917.1056.	0.484137E+02	0.103534E+02	953.	986.1022.1056.	988.1055.	957.1026.	989.
164.	0.001367	0.003000	-0.003033	0.991578	917.1055.	0.483241E+02	0.103498E+02	953.	986.1022.1056.	988.1055.	957.1026.	989.
165.	0.001368	0.003000	-0.003032	0.991398	917.1055.	0.482365E+02	0.103462E+02	953.	986.1022.1055.	988.1055.	957.1026.	989.
166.	0.001369	0.003000	-0.003031	0.991143	917.1055.	0.481507E+02	0.103431E+02	953.	986.1022.1055.	988.1055.	957.1026.	989.
167.	0.001369	0.003000	-0.003031	0.990922	917.1055.	0.480672E+02	0.103400E+02	952.	986.1022.1055.	988.1055.	956.1026.	989.
168.	0.001370	0.003000	-0.003030	0.990567	916.1055.	0.479845E+02	0.103369E+02	952.	986.1022.1055.	988.1055.	956.1026.	989.
169.	0.001371	0.003000	-0.003029	0.990319	916.1055.	0.479038E+02	0.103336E+02	952.	986.1022.1055.	988.1055.	956.1026.	989.
170.	0.001371	0.003000	-0.003029	0.990121	916.1055.	0.478244E+02	0.103306E+02	952.	986.1022.1055.	988.1055.	956.1026.	989.
171.	0.001372	0.003000	-0.003028	0.990130	916.1055.	0.477474E+02	0.103284E+02	952.	985.1021.1055.	988.1054.	956.1026.	989.
172.	0.001373	0.003000	-0.003027	0.990108	916.1055.	0.476725E+02	0.103268E+02	952.	985.1021.1055.	987.1054.	956.1026.	989.
173.	0.001374	0.003000	-0.003026	0.990074	916.1055.	0.475996E+02	0.103256E+02	952.	985.1021.1055.	987.1054.	956.1026.	989.
174.	0.001374	0.003000	-0.003026	0.990041	916.1054.	0.475285E+02	0.103245E+02	952.	985.1021.1054.	987.1054.	956.1026.	989.
175.	0.001375	0.003000	-0.003025	0.989959	916.1054.	0.474590E+02	0.103235E+02	952.	985.1021.1054.	987.1054.	956.1026.	989.
176.	0.001375	0.003000	-0.003025	0.989792	916.1054.	0.473906E+02	0.103223E+02	952.	985.1021.1054.	987.1054.	956.1026.	989.
177.	0.001376	0.003000	-0.003024	0.989638	916.1054.	0.473230E+02	0.103207E+02	951.	985.1021.1054.	987.1054.	955.1026.	989.
178.	0.001377	0.003000	-0.003023	0.989664	915.1054.	0.472573E+02	0.103195E+02	951.	985.1021.1054.	987.1054.	955.1026.	989.
179.	0.001377	0.003000	-0.003023	0.989682	915.1054.	0.471934E+02	0.103188E+02	951.	985.1021.1054.	987.1054.	955.1026.	989.
180.	0.001378	0.003000	-0.003022	0.989564	915.1054.	0.471311E+02	0.103181E+02	951.	985.1021.1054.	987.1054.	955.1026.	989.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

ME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE								GRAPHITE TEMP.							
	0.00099714		0.00171959			0.00324059		0.00271544	0.01475992								0.00159996							
	0.00945175		0.00422059			0.49659890		0.10774821	0.02219312								3.07586956							
1.	0.001482	0.000099	-0.000018	1.054839	566.	705.	0.451160E+02	0.105088E+02	602.	636.	672.	705.	637.	705.	605.	674.	639.							
2.	0.001524	0.000198	-0.000075	1.120278	568.	708.	0.453196E+02	0.107946E+02	604.	639.	674.	709.	638.	706.	605.	674.	639.							
3.	0.001544	0.000297	-0.000153	1.174695	572.	713.	0.456151E+02	0.111770E+02	608.	644.	678.	714.	639.	707.	605.	675.	639.							
4.	0.001555	0.000396	-0.000242	1.220991	577.	718.	0.459548E+02	0.115838E+02	611.	649.	682.	720.	641.	709.	606.	676.	639.							
5.	0.001561	0.000495	-0.000335	1.262576	582.	723.	0.463121E+02	0.119838E+02	616.	654.	687.	725.	643.	712.	607.	677.	640.							
6.	0.001567	0.000594	-0.000428	1.301488	587.	728.	0.466738E+02	0.123671E+02	620.	660.	692.	731.	646.	714.	608.	678.	641.							
7.	0.001572	0.000693	-0.000522	1.338774	593.	734.	0.470361E+02	0.127344E+02	625.	666.	697.	738.	649.	718.	610.	680.	642.							
8.	0.001576	0.000792	-0.000616	1.375329	598.	740.	0.474186E+02	0.130967E+02	630.	672.	702.	744.	652.	721.	612.	682.	644.							
9.	0.001580	0.000891	-0.000712	1.411717	604.	746.	0.478415E+02	0.134638E+02	635.	678.	707.	750.	655.	725.	614.	685.	646.							
10.	0.001583	0.000990	-0.000808	1.447524	610.	752.	0.483074E+02	0.138356E+02	640.	685.	713.	757.	658.	729.	617.	688.	648.							
11.	0.001584	0.001089	-0.000906	1.482650	617.	758.	0.488105E+02	0.142087E+02	646.	691.	719.	764.	662.	733.	620.	691.	650.							
12.	0.001585	0.001188	-0.001004	1.516490	623.	765.	0.493404E+02	0.145781E+02	652.	698.	725.	771.	666.	738.	623.	694.	652.							
13.	0.001585	0.001287	-0.001103	1.549458	630.	772.	0.498881E+02	0.149406E+02	658.	705.	731.	778.	670.	743.	627.	698.	655.							
14.	0.001584	0.001386	-0.001202	1.581175	637.	779.	0.504480E+02	0.152945E+02	664.	712.	738.	786.	674.	748.	630.	702.	658.							
15.	0.001584	0.001485	-0.001302	1.612134	644.	786.	0.510204E+02	0.156395E+02	671.	720.	745.	793.	678.	753.	634.	706.	661.							
16.	0.001584	0.001584	-0.001401	1.642222	651.	793.	0.516092E+02	0.159768E+02	677.	727.	751.	801.	683.	758.	638.	710.	665.							
17.	0.001583	0.001683	-0.001501	1.671438	659.	801.	0.522162E+02	0.163048E+02	684.	735.	758.	809.	688.	764.	643.	715.	668.							
18.	0.001582	0.001782	-0.001601	1.700048	666.	808.	0.528418E+02	0.166263E+02	691.	743.	766.	817.	693.	770.	648.	720.	672.							
19.	0.001581	0.001881	-0.001701	1.727769	674.	816.	0.534841E+02	0.169407E+02	698.	751.	773.	825.	698.	776.	652.	725.	676.							
20.	0.001580	0.001980	-0.001801	1.754927	682.	824.	0.541400E+02	0.172479E+02	705.	759.	781.	834.	704.	782.	658.	730.	681.							
21.	0.001578	0.002079	-0.001901	1.781218	690.	832.	0.548069E+02	0.175483E+02	713.	767.	788.	842.	709.	789.	663.	736.	685.							
22.	0.001577	0.002178	-0.002002	1.806586	698.	840.	0.554822E+02	0.178399E+02	720.	775.	796.	851.	715.	795.	668.	742.	690.							
23.	0.001575	0.002277	-0.002102	1.831632	706.	849.	0.561662E+02	0.181240E+02	728.	784.	804.	860.	721.	802.	674.	748.	695.							
24.	0.001573	0.002376	-0.002203	1.855737	715.	857.	0.568589E+02	0.184010E+02	736.	793.	812.	868.	727.	809.	680.	754.	700.							
25.	0.001572	0.002474	-0.002304	1.879055	723.	866.	0.575593E+02	0.186701E+02	744.	801.	820.	877.	734.	816.	686.	760.	705.							
26.	0.001570	0.002573	-0.002404	1.902043	732.	875.	0.582674E+02	0.189319E+02	752.	810.	829.	887.	740.	823.	693.	767.	711.							
27.	0.001568	0.002672	-0.002505	1.924315	741.	883.	0.589828E+02	0.191875E+02	761.	819.	837.	896.	747.	830.	699.	774.	716.							
28.	0.001566	0.002771	-0.002606	1.945723	750.	892.	0.597033E+02	0.194359E+02	769.	828.	846.	905.	754.	837.	706.	781.	722.							
29.	0.001565	0.002870	-0.002707	1.966578	759.	901.	0.604276E+02	0.196767E+02	778.	837.	855.	914.	761.	845.	713.	788.	728.							
30.	0.001563	0.002969	-0.002807	1.987144	768.	911.	0.611558E+02	0.199116E+02	786.	847.	864.	924.	768.	853.	720.	795.	734.							
31.	0.001561	0.003068	-0.002908	2.006897	777.	920.	0.618871E+02	0.201401E+02	795.	856.	873.	934.	775.	860.	727.	803.	740.							
32.	0.001559	0.003167	-0.003009	2.025907	786.	929.	0.626203E+02	0.203617E+02	804.	866.	882.	943.	782.	868.	735.	810.	747.							
33.	0.001557	0.003266	-0.003110	2.044542	796.	939.	0.633551E+02	0.205765E+02	813.	875.	891.	953.	790.	876.	742.	818.	753.							
34.	0.001555	0.003365	-0.003211	2.062753	805.	948.	0.640917E+02	0.207861E+02	822.	885.	900.	963.	797.	884.	750.	826.	760.							
35.	0.001553	0.003464	-0.003312	2.080232	815.	958.	0.648289E+02	0.209895E+02	831.	895.	910.	973.	805.	893.	758.	834.	767.							
36.	0.001551	0.003563	-0.003413	2.097128	825.	968.	0.655659E+02	0.211865E+02	841.	904.	919.	983.	813.	901.	766.	842.	774.							
37.	0.001549	0.003662	-0.003514	2.113525	834.	977.	0.663019E+02	0.213775E+02	850.	914.	929.	993.	821.	910.	774.	850.	781.							
38.	0.001547	0.003761	-0.003615	2.129742	844.	987.	0.670373E+02	0.215634E+02	860.	924.	938.	1003.	829.	918.	782.	859.	799.							
39.	0.001545	0.003860	-0.003716	2.145175	854.	997.	0.677711E+02	0.217440E+02	869.	934.	948.	1013.	837.	927.	790.	867.	796.							
40.	0.001543	0.003959	-0.003817	2.160003	864.	1007.	0.685025E+02	0.219185E+02	879.	945.	958.	1024.	846.	936.	799.	876.	804.							
41.	0.001541	0.004058	-0.003918	2.174376	874.	1017.	0.692311E+02	0.220873E+02	889.	955.	968.	1034.	854.	944.	808.	885.	812.							
42.	0.001539	0.004157	-0.004019	2.188344	884.	1027.	0.699565E+02	0.222505E+02	898.	965.	978.	1044.	863.	953.	816.	894.	820.							
43.	0.001537	0.004256	-0.004119	2.202188	894.	1038.	0.706791E+02	0.224096E+02	908.	975.	988.	1055.	872.	962.	825.	903.	828.							
44.	0.001535	0.004354	-0.004220	2.215289	905.	1048.	0.713981E+02	0.225639E+02	918.	986.	998.	1065.	880.	971.	834.	912.	836.							
45.	0.001533	0.004453	-0.004321	2.227904	915.	1058.	0.721128E+02	0.227128E+02	928.	996.	1008.	1076.	889.	981.	843.	921.	844.							
46.	0.001531	0.004552	-0.004422	2.240111	925.	1069.	0.728229E+02	0.228567E+02	939.	1007.	1019.	1087.	898.	990.	852.	931.	852.							
47.	0.001529	0.004651	-0.004523	2.251979	936.	1079.	0.735281E+02	0.229959E+02	949.	1017.	1029.	1097.	907.	999.	862.	940.	861.							
48.	0.001527	0.004750	-0.004624	2.263577	946.	1090.	0.742284E+02	0.231309E+02	959.	1028.	1039.	1108.	916.	1009.	871.	950.	869.							
49.	0.001525	0.004849	-0.004724	2.274996	957.	1100.	0.749240E+02	0.232623E+02	969.	1039.	1050.	1119.	926.	1018.	880.	959.	878.							
50.	0.001523	0.004947	-0.004825	2.285714	967.	1111.	0.756142E+02	0.233897E+02	980.	1049.	1060.	1130.	935.	1028.	890.	969.	887.							
51.	0.001481	0.005000	-0.004920	2.253723	978.	1121.	0.762781E+02	0.234811E+02	990.	1060.	1071.	1140.	944.	1037.	900.	979.	895.							
52.	0.001449	0.005000	-0.004951	2.161935	986.	1128.	0.767149E+02	0.232491E+02	998.	1066.	1078.	1147.	953.	1046.	909.	988.	904.							
53.	0.001442	0.005000	-0.004958	2.120774	992.	1134.	0.770360E+02	0.229047E+02	1004.	1072.	1084.	1152.	961.	1054.	918.	998.	913.							
54.	0.001435	0.005000	-0.004965	2.089548	998.	1139.	0.773351E+02	0.225830E+02	1011.	1077.	1090.	1157.	968.	1062.	927.	1007.	922.							
55.	0.001429	0.005000	-0.004971	2.060250	1004.	1145.	0.776272E+02	0.222896E+02	1017.	1083.	1096.	1162.	976.	1069.	936.	1015.	930.							
56.	0.001422	0.005000	-0.004978	2.032044	1009.	1150.	0.779166E+02	0.220179E+02	1023.	1088.	1102.	1167.	983.	1076.	945.	1024.	938.							
57.	0.001414	0.005000	-0.004986	2.004477	1014.	1155.	0.782047E+02	0.217621E+02	1029.	1093.	1108.	1172.	990.	1083.	953.	1032.	946.							
58.	0.001407	0.005000	-0.004993	1.977695	1020.	1160.	0.784708E+02	0.215094E+02	1035.	1098.	1114.	1177.	997.	1089.	961.	1040.	954.							
59.	0.001400	0.005000	-0.005000	1.950771	1025.	1165.	0.786796E+02	0.212446E+02	1040.	1103.	1119.	1182.	1004.	1096.	969.	1048.	962.							
60.	0.001393	0.005000	-0.005007	1.924068	1030.	1170.	0.788327E+02	0.209705E+02	1046.	1107.	1124.	1186.	1010.	1102.	976.	1055.	969.							
61.	0.001388	0.005000	-0.005012	1.898432	1034.	1175.	0.789433E+02	0.206950E+02	1051.	1112.	1130.	1190.	1017.	1108.	984.	1063.	977.							

62.	0.001383	0.005000	-0.005017	1.8735251039.1180.	0.790239E+02	0.204234E+021056.1116.1135.1195.1023.1113. 991.1070. 934.
63.	0.001378	0.005000	-0.005022	1.8492041043.1184.	0.790833E+02	0.201572E+021061.1121.1139.1199.1029.1119. 998.1077. 991.
64.	0.001373	0.005000	-0.005027	1.8258731048.1188.	0.791277E+02	0.198930E+021066.1125.1144.1203.1035.1124.1004.1083. 998.
65.	0.001368	0.005000	-0.005032	1.8031631052.1192.	0.791548E+02	0.196455E+021071.1129.1149.1207.1041.1130.1011.1090.1005.
66.	0.001364	0.005000	-0.005036	1.7805891056.1196.	0.791579E+02	0.193976E+021076.1133.1153.1211.1047.1135.1017.1096.1011.
67.	0.001359	0.005000	-0.005041	1.7587511060.1200.	0.791337E+02	0.191537E+021080.1137.1157.1214.1052.1140.1024.1102.1017.
68.	0.001355	0.005000	-0.005045	1.7374971064.1204.	0.790836E+02	0.189148E+021084.1140.1162.1218.1058.1144.1030.1108.1024.
69.	0.001351	0.005000	-0.005049	1.7165431067.1208.	0.790100E+02	0.186808E+021088.1144.1166.1221.1063.1149.1035.1114.1030.
70.	0.001347	0.005000	-0.005053	1.6960751071.1211.	0.789162E+02	0.184511E+021092.1147.1169.1224.1068.1154.1041.1119.1036.
71.	0.001343	0.005000	-0.005057	1.6762291074.1215.	0.788055E+02	0.182266E+021096.1151.1173.1228.1073.1158.1047.1125.1042.
72.	0.001339	0.005000	-0.005061	1.6569361078.1218.	0.786793E+02	0.180077E+021100.1154.1177.1231.1078.1162.1052.1130.1047.
73.	0.001336	0.005000	-0.005064	1.6378331081.1221.	0.785380E+02	0.177937E+021104.1157.1180.1234.1083.1167.1057.1135.1053.
74.	0.001332	0.005000	-0.005068	1.6192931084.1224.	0.783803E+02	0.175841E+021107.1160.1184.1236.1087.1171.1062.1140.1058.
75.	0.001329	0.005000	-0.005071	1.6012301087.1227.	0.782068E+02	0.173793E+021111.1163.1187.1239.1092.1175.1067.1145.1064.
76.	0.001326	0.005000	-0.005075	1.5836491090.1230.	0.780182E+02	0.171797E+021114.1165.1190.1242.1096.1179.1072.1149.1069.
77.	0.001322	0.005000	-0.005078	1.5662441093.1233.	0.778154E+02	0.169843E+021117.1168.1193.1244.1101.1182.1076.1154.1074.
78.	0.001319	0.005000	-0.005081	1.5493311096.1235.	0.775994E+02	0.167930E+021120.1171.1196.1247.1105.1186.1081.1158.1079.
79.	0.001316	0.005000	-0.005084	1.5329481098.1238.	0.773719E+02	0.166064E+021123.1173.1199.1249.1109.1190.1085.1162.1084.
80.	0.001313	0.005000	-0.005087	1.5169211101.1241.	0.771336E+02	0.164244E+021126.1176.1202.1251.1113.1193.1089.1166.1088.
81.	0.001311	0.005000	-0.005089	1.5012371103.1243.	0.768848E+02	0.162467E+021129.1178.1205.1254.1117.1197.1093.1170.1093.
82.	0.001308	0.005000	-0.005092	1.4857651106.1245.	0.766258E+02	0.160726E+021132.1180.1207.1256.1120.1200.1097.1174.1097.
83.	0.001305	0.005000	-0.005095	1.4708641108.1248.	0.763572E+02	0.159035E+021134.1182.1210.1258.1124.1203.1101.1178.1101.
84.	0.001303	0.005000	-0.005097	1.4564041110.1250.	0.760798E+02	0.157393E+021137.1184.1212.1260.1128.1206.1105.1181.1105.
85.	0.001301	0.005000	-0.005099	1.4422751112.1252.	0.757942E+02	0.155799E+021139.1187.1214.1262.1131.1209.1108.1185.1110.
86.	0.001298	0.005000	-0.005102	1.4284051114.1254.	0.755011E+02	0.154221E+021142.1188.1217.1263.1135.1212.1112.1188.1113.
87.	0.001296	0.005000	-0.005104	1.4146351116.1256.	0.752006E+02	0.152681E+021144.1190.1219.1265.1138.1215.1115.1191.1117.
88.	0.001294	0.005000	-0.005106	1.4013951118.1258.	0.748932E+02	0.151175E+021146.1192.1221.1267.1141.1218.1119.1194.1121.
89.	0.001292	0.005000	-0.005108	1.3885581120.1260.	0.745799E+02	0.149707E+021148.1194.1223.1268.1144.1221.1121.1197.1123.
90.	0.001291	0.005000	-0.005109	1.3760781122.1261.	0.742612E+02	0.144278E+021150.1195.1225.1270.1147.1223.1124.1200.1126.
91.	0.001289	0.005000	-0.005111	1.3639211124.1263.	0.739375E+02	0.146888E+021152.1197.1227.1271.1150.1226.1127.1203.1129.
92.	0.001287	0.005000	-0.005113	1.3519941125.1265.	0.736093E+02	0.145533E+021154.1199.1228.1273.1153.1228.1130.1206.1132.
93.	0.001286	0.005000	-0.005114	1.3401341127.1266.	0.732763E+02	0.144205E+021156.1200.1230.1274.1155.1231.1133.1208.1134.
94.	0.001284	0.005000	-0.005116	1.3287131128.1268.	0.729392E+02	0.142905E+021158.1201.1232.1275.1158.1233.1136.1211.1136.
95.	0.001283	0.005000	-0.005117	1.3176991130.1269.	0.725984E+02	0.141639E+021159.1203.1233.1277.1161.1235.1138.1213.1139.
96.	0.001282	0.005000	-0.005118	1.3069951131.1270.	0.722549E+02	0.140404E+021161.1204.1235.1278.1163.1237.1141.1216.1141.
97.	0.001281	0.005000	-0.005119	1.2965841132.1272.	0.719090E+02	0.139212E+021162.1205.1236.1279.1165.1239.1143.1218.1143.
98.	0.001280	0.005000	-0.005120	1.2864281134.1273.	0.715609E+02	0.138046E+021164.1206.1238.1280.1168.1242.1145.1221.1145.
99.	0.001279	0.005000	-0.005121	1.2764691135.1274.	0.712109E+02	0.136914E+021165.1208.1239.1281.1170.1244.1147.1223.1148.
100.	0.001278	0.005000	-0.005122	1.2666171136.1275.	0.708584E+02	0.135805E+021167.1209.1240.1282.1172.1246.1150.1226.1150.
101.	0.001277	0.005000	-0.005123	1.2571271137.1276.	0.705049E+02	0.134718E+021168.1210.1241.1283.1174.1247.1152.1228.1151.
102.	0.001277	0.005000	-0.005123	1.2478961138.1277.	0.701498E+02	0.133660E+021169.1211.1242.1284.1176.1249.1154.1229.1153.
103.	0.001276	0.005000	-0.005124	1.2389921139.1278.	0.697940E+02	0.132632E+021171.1212.1244.1285.1178.1251.1155.1231.1154.
104.	0.001276	0.005000	-0.005124	1.2303501140.1279.	0.694379E+02	0.131633E+021172.1212.1245.1285.1180.1253.1157.1231.1156.
105.	0.001276	0.005000	-0.005124	1.2219511141.1280.	0.690818E+02	0.130666E+021173.1213.1246.1286.1182.1254.1159.1233.1157.
106.	0.001275	0.005000	-0.005125	1.2137871142.1281.	0.687259E+02	0.129724E+021174.1214.1247.1287.1184.1256.1161.1235.1159.
107.	0.001275	0.005000	-0.005125	1.2058371143.1282.	0.683702E+02	0.128803E+021175.1215.1248.1288.1186.1257.1162.1236.1159.
108.	0.001275	0.005000	-0.005125	1.1978971144.1283.	0.680146E+02	0.127918E+021176.1216.1248.1288.1187.1259.1164.1238.1177.
109.	0.001275	0.005000	-0.005125	1.1902231145.1283.	0.676592E+02	0.127037E+021177.1216.1249.1289.1189.1260.1165.1239.1179.
110.	0.001275	0.005000	-0.005125	1.1828411145.1284.	0.673045E+02	0.126183E+021178.1217.1250.1289.1190.1262.1167.1240.1181.
111.	0.001275	0.005000	-0.005125	1.1756961146.1285.	0.669510E+02	0.125357E+021178.1218.1251.1290.1192.1263.1168.1242.1183.
112.	0.001275	0.005000	-0.005125	1.1687621147.1286.	0.665990E+02	0.124555E+021179.1218.1251.1290.1193.1264.1170.1243.1185.
113.	0.001275	0.005000	-0.005125	1.1619871147.1286.	0.662485E+02	0.123775E+021180.1219.1252.1291.1195.1265.1171.1244.1186.
114.	0.001275	0.005000	-0.005125	1.1554441148.1287.	0.658997E+02	0.123017E+021181.1219.1253.1291.1196.1266.1172.1245.1188.
115.	0.001276	0.005000	-0.005124	1.1491231148.1287.	0.655526E+02	0.122282E+021181.1220.1253.1292.1197.1268.1173.1246.1190.
116.	0.001276	0.005000	-0.005124	1.1429781149.1288.	0.652074E+02	0.121568E+021182.1220.1254.1292.1199.1269.1174.1247.1191.
117.	0.001277	0.005000	-0.005123	1.1370121149.1288.	0.648643E+02	0.120876E+021183.1221.1254.1292.1200.1270.1175.1248.1193.
118.	0.001277	0.005000	-0.005123	1.1312311150.1289.	0.645234E+02	0.120203E+021183.1221.1255.1293.1201.1271.1176.1249.1194.
119.	0.001277	0.005000	-0.005122	1.1254531150.1289.	0.641847E+02	0.119549E+021184.1221.1255.1293.1202.1272.1177.1250.1196.
120.	0.001278	0.005000	-0.005122	1.1198431151.1290.	0.638480E+02	0.118907E+021184.1222.1256.1293.1203.1273.1178.1251.1197.
121.	0.001279	0.005000	-0.005121	1.1144811151.1290.	0.635139E+02	0.118284E+021185.1222.1256.1294.1204.1274.1179.1252.1198.
122.	0.001279	0.005000	-0.005121	1.1093161151.1290.	0.631823E+02	0.117680E+021185.1222.1257.1294.1205.1274.1180.1252.1200.
123.	0.001280	0.005000	-0.005120	1.1043231152.1291.	0.628537E+02	0.117096E+021186.1223.1257.1294.1206.1275.1181.1253.1201.
124.	0.001281	0.005000	-0.005119	1.0994891152.1291.	0.625281E+02	0.116531E+021186.1223.1257.1294.1207.1276.1182.1254.1202.
125.	0.001282	0.005000	-0.005118	1.0948141152.1291.	0.622055E+02	0.115984E+021186.1223.1258.1294.1208.1277.1182.1255.1203.
126.	0.001283	0.005000	-0.005117	1.0902811153.1291.	0.618859E+02	0.115454E+021187.1223.1258.1295.1209.1278.1183.1255.1204.
127.	0.001284	0.005000	-0.005116	1.0858581153.1292.	0.615694E+02	0.114940E+021187.1223.1258.1295.1209.1278.1184.1256.1205.

128.	0.001285	0.005000	-0.005115	1.0816091153.1292.	0.612560E+02	0.114441E+021187.1224.1258.1295.1210.1279.1184.1256.1206.
129.	0.001286	0.005000	-0.005114	1.0774711153.1292.	0.609458E+02	0.113958E+021188.1224.1259.1295.1211.1279.1185.1257.1207.
130.	0.001287	0.005000	-0.005113	1.0734051153.1292.	0.606389E+02	0.113488E+021188.1224.1259.1295.1212.1280.1186.1257.1208.
131.	0.001288	0.005000	-0.005112	1.0695551154.1292.	0.603353E+02	0.113034E+021188.1224.1259.1295.1212.1281.1186.1258.1209.
132.	0.001289	0.005000	-0.005111	1.0658191154.1292.	0.600352E+02	0.112594E+021188.1224.1259.1295.1213.1281.1187.1258.1210.
133.	0.001290	0.005000	-0.005110	1.0622511154.1293.	0.597386E+02	0.112170E+021189.1224.1259.1295.1214.1282.1187.1259.1210.
134.	0.001291	0.005000	-0.005109	1.0587641154.1293.	0.594458E+02	0.111760E+021189.1224.1260.1295.1214.1282.1188.1259.1211.
135.	0.001293	0.005000	-0.005107	1.0554281154.1293.	0.591563E+02	0.111364E+021189.1224.1260.1295.1215.1283.1188.1259.1212.
136.	0.001293	0.005000	-0.005106	1.0520181154.1293.	0.588702E+02	0.110980E+021189.1224.1260.1295.1215.1283.1188.1260.1213.
137.	0.001295	0.005000	-0.005105	1.0487351154.1293.	0.585873E+02	0.110602E+021189.1224.1260.1295.1216.1284.1189.1260.1213.
138.	0.001296	0.005000	-0.005104	1.0456241154.1293.	0.583080E+02	0.110235E+021189.1224.1260.1295.1216.1284.1189.1260.1214.
139.	0.001297	0.005000	-0.005103	1.0426771154.1293.	0.580323E+02	0.109882E+021189.1224.1260.1295.1217.1284.1189.1261.1215.
140.	0.001299	0.005000	-0.005101	1.0398681154.1293.	0.577606E+02	0.109544E+021189.1224.1260.1295.1217.1285.1190.1261.1215.
141.	0.001300	0.005000	-0.005100	1.0371181154.1293.	0.574927E+02	0.109219E+021190.1224.1260.1295.1217.1285.1190.1261.1216.
142.	0.001301	0.005000	-0.005099	1.0345201154.1293.	0.572285E+02	0.108906E+021190.1224.1260.1295.1218.1285.1190.1261.1216.
143.	0.001302	0.005000	-0.005098	1.0319711154.1293.	0.569682E+02	0.108604E+021190.1224.1260.1295.1218.1286.1190.1261.1217.
144.	0.001304	0.005000	-0.005096	1.0295351154.1293.	0.567114E+02	0.108312E+021190.1224.1260.1295.1218.1286.1191.1261.1217.
145.	0.001305	0.005000	-0.005095	1.0272081154.1293.	0.564583E+02	0.108031E+021190.1224.1260.1295.1219.1286.1191.1262.1218.
146.	0.001307	0.005000	-0.005093	1.0249081154.1293.	0.562091E+02	0.107761E+021190.1224.1260.1294.1219.1286.1191.1262.1218.
147.	0.001308	0.005000	-0.005092	1.0227491154.1293.	0.559635E+02	0.107499E+021190.1224.1260.1294.1219.1287.1191.1262.1218.
148.	0.001309	0.005000	-0.005091	1.0206591154.1293.	0.557216E+02	0.107248E+021190.1224.1260.1294.1219.1287.1191.1262.1219.
149.	0.001311	0.005000	-0.005089	1.0186531154.1293.	0.554836E+02	0.107007E+021190.1224.1260.1294.1220.1287.1191.1262.1219.
150.	0.001312	0.005000	-0.005088	1.0167031154.1293.	0.552492E+02	0.106774E+021190.1224.1260.1294.1220.1287.1192.1262.1220.
151.	0.001313	0.005000	-0.005087	1.0147841154.1293.	0.550186E+02	0.106549E+021190.1224.1260.1294.1220.1287.1192.1262.1220.
152.	0.001315	0.005000	-0.005085	1.0130731154.1293.	0.547917E+02	0.106334E+021190.1224.1260.1294.1220.1288.1192.1262.1220.
153.	0.001316	0.005000	-0.005084	1.0113721154.1292.	0.545685E+02	0.106128E+021189.1224.1259.1294.1220.1288.1192.1262.1220.
154.	0.001318	0.005000	-0.005082	1.0097061154.1292.	0.543489E+02	0.105929E+021189.1223.1259.1293.1221.1288.1192.1262.1221.
155.	0.001319	0.005000	-0.005081	1.0080691154.1292.	0.541329E+02	0.105738E+021189.1223.1259.1293.1221.1288.1192.1262.1221.
156.	0.001320	0.005000	-0.005080	1.0066091154.1292.	0.539206E+02	0.105554E+021189.1223.1259.1293.1221.1288.1192.1262.1221.
157.	0.001322	0.005000	-0.005078	1.0051831153.1292.	0.537119E+02	0.105378E+021189.1223.1259.1293.1221.1288.1192.1262.1221.
158.	0.001323	0.005000	-0.005077	1.0038261153.1292.	0.535070E+02	0.105211E+021189.1223.1259.1293.1221.1288.1192.1262.1222.
159.	0.001324	0.005000	-0.005076	1.0024941153.1292.	0.533055E+02	0.105050E+021189.1223.1259.1293.1221.1288.1192.1262.1222.
160.	0.001326	0.005000	-0.005074	1.0011551153.1292.	0.531075E+02	0.104894E+021189.1223.1259.1292.1221.1288.1192.1262.1222.
161.	0.001327	0.005000	-0.005073	0.9999461153.1292.	0.529130E+02	0.104744E+021189.1222.1259.1292.1221.1288.1192.1262.1222.
162.	0.001328	0.005000	-0.005072	0.9988121153.1291.	0.527219E+02	0.104601E+021189.1222.1258.1292.1221.1288.1192.1262.1222.
163.	0.001330	0.005000	-0.005070	0.9977531153.1291.	0.525344E+02	0.104466E+021189.1222.1258.1292.1221.1288.1192.1262.1222.
164.	0.001331	0.005000	-0.005069	0.9966851153.1291.	0.523504E+02	0.104337E+021188.1222.1258.1292.1222.1288.1192.1262.1222.
165.	0.001332	0.005000	-0.005067	0.9957931152.1291.	0.521701E+02	0.104215E+021188.1222.1258.1292.1222.1288.1192.1262.1223.
166.	0.001334	0.005000	-0.005066	0.9948121152.1291.	0.519930E+02	0.104100E+021188.1222.1258.1291.1222.1288.1192.1262.1223.
167.	0.001335	0.005000	-0.005065	0.9938231152.1291.	0.518190E+02	0.103986E+021188.1222.1258.1291.1222.1288.1192.1262.1223.
168.	0.001336	0.005000	-0.005064	0.9928871152.1291.	0.516482E+02	0.103876E+021188.1221.1258.1291.1222.1288.1192.1262.1223.
169.	0.001337	0.005000	-0.005063	0.9920571152.1290.	0.514807E+02	0.103769E+021188.1221.1257.1291.1222.1288.1192.1261.1223.
170.	0.001339	0.005000	-0.005061	0.9914121152.1290.	0.513165E+02	0.103672E+021188.1221.1257.1291.1222.1288.1192.1261.1223.
171.	0.001340	0.005000	-0.005060	0.9906151152.1290.	0.511556E+02	0.103582E+021187.1221.1257.1290.1222.1288.1191.1261.1223.
172.	0.001341	0.005000	-0.005059	0.9898541151.1290.	0.509978E+02	0.103490E+021187.1221.1257.1290.1222.1288.1191.1261.1223.
173.	0.001343	0.005000	-0.005057	0.9893231151.1290.	0.508432E+02	0.103407E+021187.1221.1257.1290.1222.1288.1191.1261.1223.
174.	0.001344	0.005000	-0.005056	0.9888041151.1290.	0.506920E+02	0.103332E+021187.1220.1257.1290.1221.1288.1191.1261.1223.
175.	0.001345	0.005000	-0.005055	0.9881621151.1289.	0.505436E+02	0.103260E+021187.1220.1256.1290.1221.1288.1191.1261.1223.
176.	0.001346	0.005000	-0.005054	0.9876281151.1289.	0.503982E+02	0.103195E+021187.1220.1256.1290.1221.1288.1191.1261.1223.
177.	0.001347	0.005000	-0.005053	0.9872231151.1289.	0.502560E+02	0.103126E+021187.1220.1256.1289.1221.1288.1191.1261.1223.
178.	0.001348	0.005000	-0.005052	0.9867651150.1289.	0.501166E+02	0.103067E+021186.1220.1256.1289.1221.1288.1191.1260.1223.
179.	0.001350	0.005000	-0.005050	0.9862991150.1289.	0.499801E+02	0.103009E+021186.1220.1256.1289.1221.1288.1191.1260.1223.
180.	0.001351	0.005000	-0.005049	0.9859421150.1289.	0.498465E+02	0.102955E+021186.1219.1256.1289.1221.1288.1190.1260.1223.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00072292		0.00124669				0.00324059	0.00271544	0.01106993				0.00119957			
	0.00685246		0.00305990				0.49659854	0.10774815	0.02219161				3.07589531			
1.	0.001304	0.0	-0.000098	0.965643	568.	709.	0.452440E 02	0.106367E 02	605.	640.	676.	710.	638.	706.	605.	674. 639.
1.	0.001241	0.0	-0.000160	0.923126	571.	713.	0.453524E 02	0.107228E 02	608.	644.	679.	714.	639.	707.	605.	674. 639.
2.	0.001203	0.0	-0.000198	0.892962	574.	715.	0.454003E 02	0.107188E 02	609.	646.	680.	717.	640.	708.	605.	675. 639.
2.	0.001178	0.0	-0.000222	0.871830	576.	716.	0.454091E 02	0.106644E 02	610.	648.	681.	718.	641.	708.	605.	675. 639.
3.	0.001164	0.0	-0.000237	0.856426	578.	717.	0.453926E 02	0.105841E 02	611.	648.	682.	719.	641.	709.	606.	675. 639.
3.	0.001155	0.0	-0.000245	0.844900	579.	718.	0.453602E 02	0.104925E 02	612.	649.	682.	720.	642.	709.	606.	676. 640.
4.	0.001151	0.0	-0.000249	0.836183	579.	718.	0.453178E 02	0.103985E 02	612.	649.	683.	720.	642.	710.	606.	676. 640.
4.	0.001150	0.0	-0.000250	0.829555	579.	718.	0.452699E 02	0.103074E 02	613.	650.	683.	720.	642.	710.	607.	676. 640.
5.	0.001151	0.0	-0.000249	0.824497	579.	718.	0.452196E 02	0.102224E 02	613.	650.	683.	720.	643.	711.	607.	677. 640.
5.	0.001153	0.0	-0.000247	0.820602	579.	718.	0.451688E 02	0.101450E 02	613.	650.	683.	720.	643.	711.	607.	677. 641.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00041779		0.00072049				0.00324059	0.00271544	0.00737996				0.00079998			
	0.00396020		0.00176839				0.49659854	0.10774815	0.02219270				3.07594872			
1.	0.001198	0.0	-0.000205	0.931077	570.	714.	0.454367E 02	0.108594E 02	611.	646.	681.	716.	639.	707.	605.	674. 639.
1.	0.001054	0.0	-0.000348	0.847048	577.	722.	0.456691E 02	0.110473E 02	616.	655.	689.	725.	641.	709.	605.	674. 639.
2.	0.000954	0.0	-0.000448	0.788909	583.	727.	0.457868E 02	0.110584E 02	620.	660.	693.	731.	643.	711.	605.	675. 639.
2.	0.000883	0.0	-0.000518	0.747907	589.	732.	0.458286E 02	0.109672E 02	623.	664.	696.	736.	644.	712.	606.	675. 639.
3.	0.000831	0.0	-0.000570	0.716955	593.	734.	0.458188E 02	0.108180E 02	625.	667.	698.	739.	646.	713.	606.	676. 640.
3.	0.000795	0.0	-0.000606	0.692614	596.	737.	0.457723E 02	0.106373E 02	627.	669.	700.	742.	647.	714.	607.	677. 640.
4.	0.000770	0.0	-0.000630	0.673062	598.	738.	0.456998E 02	0.104417E 02	628.	670.	701.	743.	648.	715.	607.	677. 640.
4.	0.000754	0.0	-0.000647	0.657111	599.	739.	0.456088E 02	0.102423E 02	629.	671.	702.	744.	649.	716.	608.	678. 641.
5.	0.000744	0.0	-0.000656	0.644061	600.	739.	0.455054E 02	0.100464E 02	630.	672.	702.	744.	650.	717.	608.	678. 641.
5.	0.000740	0.0	-0.000660	0.633371	601.	740.	0.453939E 02	0.985884E 01	631.	673.	702.	745.	650.	718.	609.	679. 641.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00011966		0.00020635				0.00324059	0.00271544	0.00368998				0.00040006			
	0.00113423		0.00050648				0.49659854	0.10774815	0.02219262				3.07556057			
1.	0.001082	0.0	-0.000324	0.895565	572.	719.	0.456357E 02	0.110893E 02	617.	652.	688.	722.	641.	708.	605.	674. 639.
1.	0.000830	0.0	-0.000575	0.771078	583.	731.	0.460085E 02	0.113949E 02	628.	666.	701.	736.	644.	711.	605.	674. 639.
2.	0.000634	0.0	-0.000770	0.687315	594.	741.	0.462208E 02	0.114425E 02	637.	677.	711.	747.	646.	714.	605.	675. 639.
2.	0.000475	0.0	-0.000928	0.627948	603.	749.	0.463258E 02	0.113365E 02	643.	686.	719.	757.	649.	716.	605.	675. 639.
3.	0.000345	0.0	-0.001058	0.582134	611.	756.	0.463539E 02	0.111361E 02	649.	693.	725.	765.	651.	718.	606.	675. 639.
3.	0.000236	0.0	-0.001166	0.544942	618.	761.	0.463235E 02	0.108768E 02	653.	698.	730.	771.	653.	720.	606.	676. 640.
4.	0.000145	0.0	-0.001257	0.513877	623.	766.	0.462474E 02	0.105818E 02	657.	703.	734.	777.	655.	721.	607.	676. 640.
4.	0.000069	0.0	-0.001332	0.487399	628.	770.	0.461351E 02	0.102673E 02	661.	707.	738.	781.	656.	723.	607.	677. 640.
5.	0.000007	0.0	-0.001395	0.464574	632.	773.	0.459940E 02	0.994430E 01	663.	710.	740.	785.	658.	724.	607.	677. 640.
5.	-0.000045	0.0	-0.001446	0.444696	635.	776.	0.458298E 02	0.962097E 01	666.	713.	742.	788.	659.	725.	608.	677. 640.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00005733		0.00009887				0.00324059	0.00271544	0.0				0.0			
	0.00054343		0.00024266				0.49659854	0.10774815	0.0				0.0			
1.	0.000970	0.0	-0.000438	0.863819	566.	704.	0.458396E 02	0.113257E 02	641.	641.	711.	711.	676.	676.	605.	674. 639.
1.	0.000614	0.0	-0.000793	0.711550	566.	720.	0.463810E 02	0.117843E 02	660.	660.	729.	729.	680.	680.	605.	674. 639.
2.	0.000321	0.0	-0.001084	0.615922	566.	733.	0.467433E 02	0.119341E 02	676.	676.	745.	745.	683.	683.	605.	675. 640.
2.	0.000071	0.0	-0.001334	0.550186	566.	745.	0.469895E 02	0.118999E 02	689.	689.	758.	758.	686.	686.	606.	675. 640.
3.	-0.000149	0.0	-0.001553	0.500087	566.	755.	0.471519E 02	0.117475E 02	701.	701.	770.	770.	688.	688.	606.	675. 640.
3.	-0.000344	0.0	-0.001747	0.459648	566.	764.	0.472487E 02	0.115156E 02	711.	711.	781.	781.	691.	691.	606.	676. 640.
4.	-0.000518	0.0	-0.001922	0.425858	566.	772.	0.472924E 02	0.112298E 02	721.	721.	790.	790.	693.	693.	607.	676. 641.
4.	-0.000675	0.0	-0.002078	0.396963	566.	779.	0.472912E 02	0.109079E 02	729.	729.	799.	799.	695.	695.	607.	676. 641.
5.	-0.000818	0.0	-0.002220	0.371850	566.	786.	0.472525E 02	0.105631E 02	737.	737.	807.	807.	696.	696.	607.	677. 641.
5.	-0.000946	0.0	-0.002349	0.349735	566.	792.	0.471809E 02	0.102049E 02	744.	744.	814.	814.	698.	698.	608.	677. 642.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00072292		0.00124669			0.00324059		0.00271544	0.01106993	0.00119957
	0.00685246		0.00305990			0.49659854		0.10774815	0.02219161	3.07589531
5.	0.001153	0.0	-0.000247	0.820602	579.	718.	0.451688E 02	0.101450E 02	613. 650. 683. 720. 643. 711. 607. 677. 641.	
10.	0.001173	0.0	-0.000227	0.808381	580.	718.	0.449268E 02	0.976866E 01	614. 650. 683. 720. 645. 714. 610. 680. 643.	
15.	0.001181	0.0	-0.000219	0.800497	581.	719.	0.446428E 02	0.958518E 01	615. 651. 685. 720. 646. 715. 612. 682. 645.	
20.	0.001184	0.0	-0.000216	0.795155	582.	720.	0.443841E 02	0.948185E 01	616. 652. 686. 721. 648. 717. 614. 684. 647.	
25.	0.001186	0.0	-0.000214	0.790586	583.	721.	0.441173E 02	0.941067E 01	617. 653. 687. 722. 649. 718. 616. 686. 648.	
30.	0.001188	0.0	-0.000212	0.786618	584.	722.	0.438577E 02	0.935456E 01	618. 653. 688. 723. 650. 719. 617. 687. 650.	
35.	0.001189	0.0	-0.000211	0.783081	584.	723.	0.436054E 02	0.930656E 01	619. 654. 689. 724. 651. 720. 619. 689. 651.	
40.	0.001189	0.0	-0.000211	0.779582	585.	724.	0.433612E 02	0.926376E 01	620. 655. 690. 725. 652. 721. 620. 690. 652.	
45.	0.001191	0.0	-0.000209	0.776561	586.	725.	0.431262E 02	0.922476E 01	621. 655. 690. 725. 653. 722. 621. 691. 653.	
50.	0.001192	0.0	-0.000208	0.773755	586.	725.	0.429002E 02	0.918889E 01	621. 656. 691. 726. 654. 722. 622. 692. 654.	
55.	0.001193	0.0	-0.000207	0.771050	587.	726.	0.426835E 02	0.915530E 01	622. 656. 692. 726. 655. 723. 623. 693. 655.	
60.	0.001194	0.0	-0.000206	0.768698	587.	726.	0.424775E 02	0.912538E 01	622. 657. 692. 726. 656. 724. 624. 693. 656.	
65.	0.001195	0.0	-0.000205	0.766308	588.	726.	0.422803E 02	0.909627E 01	623. 657. 692. 727. 656. 724. 624. 694. 657.	
70.	0.001196	0.0	-0.000204	0.764352	588.	726.	0.420942E 02	0.907154E 01	623. 657. 693. 727. 657. 724. 625. 695. 657.	
75.	0.001197	0.0	-0.000203	0.762620	588.	727.	0.419175E 02	0.904784E 01	623. 658. 693. 727. 657. 725. 625. 695. 658.	
80.	0.001198	0.0	-0.000202	0.760901	588.	727.	0.417505E 02	0.902577E 01	624. 658. 693. 727. 658. 725. 626. 695. 658.	
85.	0.001199	0.0	-0.000201	0.759514	588.	727.	0.415957E 02	0.900926E 01	624. 658. 693. 727. 658. 725. 626. 696. 659.	
90.	0.001200	0.0	-0.000200	0.757887	589.	727.	0.414474E 02	0.898987E 01	624. 658. 693. 727. 658. 726. 626. 696. 659.	
95.	0.001201	0.0	-0.000199	0.756717	589.	727.	0.413097E 02	0.897376E 01	624. 658. 694. 727. 658. 726. 627. 696. 659.	
100.	0.001202	0.0	-0.000198	0.755791	589.	727.	0.411819E 02	0.896187E 01	624. 658. 694. 728. 659. 726. 627. 696. 660.	
105.	0.001203	0.0	-0.000197	0.754905	589.	727.	0.410622E 02	0.894906E 01	624. 658. 694. 728. 659. 726. 627. 697. 660.	
110.	0.001204	0.0	-0.000196	0.754371	589.	727.	0.409518E 02	0.893989E 01	624. 658. 694. 728. 659. 726. 627. 697. 660.	
115.	0.001204	0.0	-0.000196	0.753427	589.	727.	0.408514E 02	0.893100E 01	624. 658. 694. 728. 659. 726. 627. 697. 660.	
120.	0.001205	0.0	-0.000195	0.752269	589.	727.	0.407527E 02	0.891789E 01	624. 658. 694. 727. 659. 726. 627. 697. 660.	
125.	0.001205	0.0	-0.000195	0.751627	589.	727.	0.406641E 02	0.890995E 01	624. 658. 694. 727. 659. 726. 627. 697. 660.	
130.	0.001206	0.0	-0.000194	0.751126	588.	727.	0.405808E 02	0.890211E 01	624. 658. 693. 727. 659. 726. 627. 696. 661.	
135.	0.001207	0.0	-0.000193	0.750689	588.	727.	0.405059E 02	0.889657E 01	624. 658. 693. 727. 659. 726. 627. 696. 661.	
140.	0.001207	0.0	-0.000193	0.750233	588.	727.	0.404356E 02	0.889132E 01	624. 657. 693. 727. 659. 726. 627. 696. 661.	
145.	0.001209	0.0	-0.000191	0.750321	588.	727.	0.403748E 02	0.888919E 01	624. 657. 693. 727. 659. 726. 627. 696. 661.	
150.	0.001209	0.0	-0.000191	0.749999	588.	726.	0.403174E 02	0.888640E 01	623. 657. 693. 726. 659. 726. 627. 696. 661.	
155.	0.001210	0.0	-0.000190	0.750225	588.	726.	0.402675E 02	0.888555E 01	623. 657. 693. 726. 659. 726. 626. 696. 660.	
160.	0.001211	0.0	-0.000189	0.750719	588.	726.	0.402265E 02	0.888911E 01	623. 657. 692. 726. 659. 726. 626. 696. 660.	
165.	0.001211	0.0	-0.000189	0.750709	587.	726.	0.401897E 02	0.889125E 01	623. 657. 692. 726. 659. 726. 626. 696. 660.	
170.	0.001212	0.0	-0.000188	0.750707	587.	726.	0.401569E 02	0.889180E 01	623. 657. 692. 726. 659. 726. 626. 696. 660.	
175.	0.001212	0.0	-0.000188	0.750730	587.	726.	0.401280E 02	0.889209E 01	623. 657. 692. 726. 658. 726. 626. 695. 660.	
180.	0.001213	0.0	-0.000187	0.751202	587.	726.	0.401071E 02	0.889561E 01	623. 656. 692. 726. 658. 726. 626. 695. 660.	

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE					GRAPHITE TEMP.				
	0.00041779		0.00072049			0.00324059		0.00271544			0.00737996			0.00079998				
	0.00396020		0.00176839			0.49659854		0.10774815			0.02219270			3.07594872				
5.	0.000740	0.0	-0.000660	0.633371	601.	740.	0.453939E 02	0.985884E 01	631.	673.	702.	745.	650.	718.	609.	679.	641.	
10.	0.000791	0.0	-0.000609	0.593806	600.	739.	0.445565E 02	0.871685E 01	631.	671.	702.	742.	654.	723.	614.	684.	645.	
15.	0.000835	0.0	-0.000565	0.583702	600.	739.	0.437932E 02	0.825606E 01	632.	671.	702.	741.	656.	727.	618.	688.	649.	
20.	0.000856	0.0	-0.000543	0.577294	601.	740.	0.430736E 02	0.804155E 01	633.	672.	704.	742.	659.	730.	621.	692.	652.	
25.	0.000867	0.0	-0.000533	0.571793	602.	741.	0.423897E 02	0.791934E 01	635.	673.	705.	743.	661.	732.	624.	695.	655.	
30.	0.000874	0.0	-0.000526	0.566743	604.	743.	0.417480E 02	0.783235E 01	637.	674.	707.	745.	663.	734.	627.	698.	658.	
35.	0.000879	0.0	-0.000521	0.561941	605.	744.	0.411434E 02	0.775879E 01	638.	676.	709.	746.	665.	736.	630.	700.	660.	
40.	0.000883	0.0	-0.000517	0.557619	607.	745.	0.405760E 02	0.769431E 01	640.	677.	710.	747.	667.	738.	632.	703.	662.	
45.	0.000888	0.0	-0.000512	0.553589	608.	747.	0.400428E 02	0.763490E 01	641.	678.	711.	748.	669.	739.	635.	705.	665.	
50.	0.000892	0.0	-0.000508	0.549805	609.	748.	0.395420E 02	0.757962E 01	643.	679.	713.	749.	670.	741.	637.	707.	667.	
55.	0.000895	0.0	-0.000504	0.546140	610.	749.	0.390719E 02	0.752796E 01	644.	680.	714.	750.	672.	742.	639.	709.	669.	
60.	0.000899	0.0	-0.000501	0.542804	611.	750.	0.386306E 02	0.747961E 01	645.	681.	715.	751.	673.	743.	640.	711.	670.	
65.	0.000903	0.0	-0.000497	0.539654	612.	751.	0.382160E 02	0.743428E 01	646.	682.	716.	752.	675.	744.	642.	712.	672.	
70.	0.000906	0.0	-0.000494	0.536605	613.	751.	0.378259E 02	0.739066E 01	647.	683.	717.	753.	676.	746.	644.	714.	674.	
75.	0.000909	0.0	-0.000491	0.533863	613.	752.	0.374606E 02	0.735116E 01	648.	683.	718.	753.	677.	747.	645.	715.	675.	
80.	0.000912	0.0	-0.000488	0.531364	614.	753.	0.371177E 02	0.731410E 01	648.	684.	718.	754.	678.	747.	646.	716.	676.	
85.	0.000915	0.0	-0.000485	0.529112	615.	753.	0.367969E 02	0.728064E 01	649.	685.	719.	755.	679.	748.	648.	718.	678.	
90.	0.000918	0.0	-0.000482	0.526772	615.	754.	0.364959E 02	0.724819E 01	650.	685.	720.	755.	680.	749.	649.	719.	679.	
95.	0.000920	0.0	-0.000480	0.524405	616.	754.	0.362113E 02	0.721548E 01	650.	686.	720.	755.	681.	750.	649.	720.	680.	
100.	0.000922	0.0	-0.000478	0.522392	616.	755.	0.359445E 02	0.718562E 01	651.	686.	721.	756.	682.	750.	650.	720.	681.	
105.	0.000925	0.0	-0.000475	0.520656	616.	755.	0.356943E 02	0.715868E 01	651.	686.	721.	756.	682.	751.	651.	721.	682.	
110.	0.000927	0.0	-0.000473	0.518981	617.	755.	0.354618E 02	0.713584E 01	652.	686.	721.	756.	683.	752.	652.	722.	682.	
115.	0.000929	0.0	-0.000471	0.517468	617.	756.	0.352434E 02	0.711295E 01	652.	687.	722.	756.	684.	752.	652.	722.	683.	
120.	0.000931	0.0	-0.000469	0.515986	617.	756.	0.350392E 02	0.709168E 01	652.	687.	722.	757.	684.	752.	653.	723.	684.	
125.	0.000933	0.0	-0.000467	0.514778	617.	756.	0.348491E 02	0.707308E 01	652.	687.	722.	757.	685.	753.	653.	723.	685.	
130.	0.000935	0.0	-0.000465	0.513567	617.	756.	0.346718E 02	0.705605E 01	653.	687.	722.	757.	685.	753.	654.	724.	685.	
135.	0.000936	0.0	-0.000464	0.512171	618.	756.	0.345048E 02	0.703752E 01	653.	687.	722.	757.	686.	754.	654.	724.	686.	
140.	0.000939	0.0	-0.000461	0.511524	618.	756.	0.343510E 02	0.702383E 01	653.	687.	723.	757.	686.	754.	655.	724.	686.	
145.	0.000939	0.0	-0.000461	0.510343	618.	756.	0.342072E 02	0.701043E 01	653.	687.	723.	757.	686.	754.	655.	725.	687.	
150.	0.000942	0.0	-0.000458	0.509608	618.	756.	0.340732E 02	0.699694E 01	653.	687.	723.	757.	686.	754.	655.	725.	687.	
155.	0.000943	0.0	-0.000457	0.508965	618.	757.	0.339505E 02	0.698742E 01	653.	687.	723.	757.	687.	754.	655.	725.	687.	
160.	0.000944	0.0	-0.000456	0.508065	618.	757.	0.338351E 02	0.697681E 01	653.	687.	723.	757.	687.	755.	656.	725.	688.	
165.	0.000945	0.0	-0.000455	0.507222	618.	757.	0.337262E 02	0.696435E 01	653.	687.	723.	757.	687.	755.	656.	725.	688.	
170.	0.000946	0.0	-0.000454	0.506604	618.	757.	0.336251E 02	0.695476E 01	653.	687.	723.	757.	687.	755.	656.	726.	688.	
175.	0.000948	0.0	-0.000452	0.506270	618.	757.	0.335339E 02	0.694756E 01	653.	687.	723.	757.	687.	755.	656.	726.	688.	
180.	0.000948	0.0	-0.000452	0.505646	618.	757.	0.334477E 02	0.694020E 01	653.	687.	723.	757.	688.	755.	656.	726.	689.	

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE							GRAPHITE TEMP.					
	0.00011966		0.00020635			0.00324059		0.00271544				0.00368998				0.00040006					
	0.00113423		0.00050648			0.49659854		0.10774815				0.02219262				3.07556057					
5.	-0.000045	0.0	-0.001446	0.444696	635.	776.	0.458298E 02	0.962097E 01	666.	713.	742.	788.	659.	725.	608.	677.	640.				
10.	-0.000200	0.0	-0.001600	0.338834	645.	783.	0.438886E 02	0.707346E 01	673.	720.	747.	795.	669.	732.	612.	682.	643.				
15.	-0.000088	0.0	-0.001488	0.305325	640.	778.	0.418199E 02	0.573286E 01	668.	713.	741.	787.	674.	737.	616.	686.	646.				
20.	0.000058	0.0	-0.001342	0.296849	633.	772.	0.398492E 02	0.514054E 01	662.	706.	735.	779.	675.	740.	619.	689.	649.				
25.	0.000170	0.0	-0.001230	0.297144	629.	767.	0.380934E 02	0.493180E 01	659.	701.	731.	773.	676.	743.	622.	692.	652.				
30.	0.000242	0.0	-0.001158	0.298693	627.	765.	0.365565E 02	0.488125E 01	657.	698.	728.	770.	676.	745.	624.	695.	655.				
35.	0.000286	0.0	-0.001114	0.299040	626.	764.	0.352056E 02	0.487414E 01	657.	697.	728.	768.	677.	747.	626.	697.	657.				
40.	0.000316	0.0	-0.001084	0.298030	626.	765.	0.340034E 02	0.486494E 01	657.	697.	728.	768.	678.	749.	628.	699.	660.				
45.	0.000339	0.0	-0.001061	0.296176	626.	765.	0.329244E 02	0.484366E 01	657.	697.	728.	768.	679.	751.	630.	701.	662.				
50.	0.000360	0.0	-0.001040	0.294175	626.	765.	0.319503E 02	0.481508E 01	658.	697.	729.	768.	680.	752.	632.	703.	664.				
55.	0.000381	0.0	-0.001019	0.292304	627.	765.	0.310698E 02	0.478465E 01	658.	697.	729.	768.	681.	753.	634.	705.	666.				
60.	0.000399	0.0	-0.001000	0.290552	627.	766.	0.302734E 02	0.475478E 01	659.	698.	729.	768.	682.	754.	636.	706.	667.				
65.	0.000417	0.0	-0.000983	0.289041	627.	766.	0.295537E 02	0.472766E 01	659.	698.	730.	769.	683.	755.	637.	708.	669.				
70.	0.000433	0.0	-0.000967	0.287629	628.	766.	0.289032E 02	0.470299E 01	660.	698.	730.	769.	684.	756.	639.	710.	671.				
75.	0.000448	0.0	-0.000952	0.286429	628.	767.	0.283154E 02	0.468129E 01	660.	699.	731.	769.	684.	757.	640.	711.	672.				
80.	0.000462	0.0	-0.000938	0.285280	629.	767.	0.277837E 02	0.466101E 01	661.	699.	731.	769.	685.	758.	642.	713.	674.				
85.	0.000474	0.0	-0.000926	0.284342	629.	768.	0.273050E 02	0.464405E 01	661.	699.	732.	770.	686.	759.	643.	714.	675.				
90.	0.000485	0.0	-0.000915	0.283328	629.	768.	0.268711E 02	0.462732E 01	662.	700.	732.	770.	687.	759.	645.	715.	677.				
95.	0.000495	0.0	-0.000905	0.282556	630.	769.	0.264784E 02	0.461239E 01	662.	700.	733.	771.	688.	760.	646.	717.	678.				
100.	0.000503	0.0	-0.000897	0.281598	630.	769.	0.261236E 02	0.459814E 01	663.	701.	733.	771.	689.	761.	647.	718.	679.				
105.	0.000511	0.0	-0.000889	0.280756	631.	770.	0.257999E 02	0.458315E 01	664.	701.	734.	771.	690.	762.	648.	719.	681.				
110.	0.000520	0.0	-0.000880	0.280203	631.	770.	0.255080E 02	0.457146E 01	664.	702.	734.	772.	691.	762.	650.	720.	682.				
115.	0.000525	0.0	-0.000875	0.279396	632.	771.	0.252434E 02	0.456018E 01	665.	702.	735.	772.	692.	763.	651.	721.	683.				
120.	0.000530	0.0	-0.000870	0.278553	632.	771.	0.250006E 02	0.454657E 01	665.	703.	736.	773.	692.	764.	652.	722.	684.				
125.	0.000537	0.0	-0.000863	0.278089	633.	772.	0.247798E 02	0.453586E 01	666.	703.	736.	773.	693.	764.	653.	724.	685.				
130.	0.000542	0.0	-0.000858	0.277576	633.	772.	0.245802E 02	0.452713E 01	667.	704.	737.	774.	694.	765.	654.	725.	686.				
135.	0.000545	0.0	-0.000855	0.276817	634.	773.	0.243981E 02	0.451732E 01	667.	704.	737.	774.	695.	766.	655.	726.	688.				
140.	0.000548	0.0	-0.000852	0.276082	634.	773.	0.242276E 02	0.450499E 01	668.	705.	738.	775.	696.	766.	656.	727.	689.				
145.	0.000553	0.0	-0.000847	0.275653	635.	774.	0.240731E 02	0.449555E 01	668.	705.	738.	775.	696.	767.	657.	728.	690.				
150.	0.000556	0.0	-0.000844	0.275226	635.	774.	0.239327E 02	0.448790E 01	669.	706.	739.	776.	697.	767.	658.	728.	691.				
155.	0.000559	0.0	-0.000841	0.274737	636.	775.	0.238032E 02	0.448066E 01	669.	706.	740.	776.	698.	768.	659.	729.	692.				
160.	0.000561	0.0	-0.000839	0.274130	637.	775.	0.236838E 02	0.447195E 01	670.	707.	740.	777.	698.	769.	660.	730.	693.				
165.	0.000563	0.0	-0.000837	0.273557	637.	776.	0.235722E 02	0.446240E 01	670.	707.	741.	777.	699.	769.	661.	731.	693.				
170.	0.000565	0.0	-0.000835	0.273061	637.	776.	0.234687E 02	0.445321E 01	671.	707.	741.	777.	700.	770.	662.	732.	694.				
175.	0.000568	0.0	-0.000832	0.272717	638.	777.	0.233719E 02	0.444602E 01	671.	708.	742.	778.	700.	770.	663.	733.	695.				
180.	0.000569	0.0	-0.000831	0.272258	638.	777.	0.232834E 02	0.443922E 01	672.	708.	742.	778.	701.	771.	663.	734.	696.				

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00005733		0.00009887			0.00324059		0.00271544		0.0				0.0		
	0.00054343		0.00024266			0.49659854		0.10774815		0.0				0.0		
5.	-0.000946	0.0	-0.002349	0.349735	566.	792.	0.471809E 02	0.102049E 02	744.	744.	814.	814.	698.	698.	608.	677.
10.	-0.001745	0.0	-0.003146	0.218691	566.	832.	0.453485E 02	0.685474E 01	791.	791.	860.	860.	709.	709.	613.	682.
15.	-0.002051	0.0	-0.003451	0.161011	566.	850.	0.425791E 02	0.467104E 01	811.	811.	881.	881.	715.	715.	618.	688.
20.	-0.002133	0.0	-0.003533	0.131486	566.	858.	0.395806E 02	0.343350E 01	821.	821.	890.	890.	718.	718.	624.	693.
25.	-0.002110	0.0	-0.003509	0.114847	566.	862.	0.366343E 02	0.274630E 01	824.	824.	894.	894.	721.	721.	630.	699.
30.	-0.002034	0.0	-0.003434	0.104622	566.	863.	0.338551E 02	0.235433E 01	825.	825.	895.	895.	723.	723.	635.	705.
35.	-0.001935	0.0	-0.003335	0.097725	566.	863.	0.312844E 02	0.211787E 01	825.	825.	894.	894.	724.	724.	641.	710.
40.	-0.001826	0.0	-0.003226	0.092657	566.	862.	0.289330E 02	0.196383E 01	824.	824.	893.	893.	725.	725.	646.	715.
45.	-0.001715	0.0	-0.003115	0.088640	566.	861.	0.267916E 02	0.185440E 01	822.	822.	892.	892.	726.	726.	651.	720.
50.	-0.001607	0.0	-0.003006	0.085271	566.	860.	0.248488E 02	0.177025E 01	821.	821.	890.	890.	728.	728.	656.	725.
55.	-0.001502	0.0	-0.002901	0.082333	566.	859.	0.230884E 02	0.170093E 01	820.	820.	889.	889.	729.	729.	661.	730.
60.	-0.001401	0.0	-0.002801	0.079716	566.	858.	0.214938E 02	0.164146E 01	818.	818.	888.	888.	729.	729.	665.	735.
65.	-0.001305	0.0	-0.002705	0.077341	566.	858.	0.200493E 02	0.158886E 01	817.	817.	887.	887.	730.	730.	670.	739.
70.	-0.001215	0.0	-0.002615	0.075163	566.	857.	0.187412E 02	0.154142E 01	816.	816.	886.	886.	731.	731.	674.	743.
75.	-0.001132	0.0	-0.002532	0.073112	566.	857.	0.175562E 02	0.149772E 01	816.	816.	885.	885.	732.	732.	678.	747.
80.	-0.001054	0.0	-0.002454	0.071210	566.	856.	0.164820E 02	0.145707E 01	815.	815.	884.	884.	733.	733.	682.	751.
85.	-0.000980	0.0	-0.002380	0.069456	566.	856.	0.155108E 02	0.141924E 01	815.	815.	884.	884.	734.	734.	685.	755.
90.	-0.000911	0.0	-0.002311	0.067833	566.	856.	0.146343E 02	0.138428E 01	814.	814.	884.	884.	735.	735.	689.	758.
95.	-0.000846	0.0	-0.002246	0.066337	566.	856.	0.138382E 02	0.135219E 01	814.	814.	883.	883.	735.	735.	692.	762.
100.	-0.000785	0.0	-0.002185	0.064958	566.	856.	0.131146E 02	0.132244E 01	814.	814.	883.	883.	736.	736.	696.	765.
105.	-0.000728	0.0	-0.002128	0.063659	566.	856.	0.124565E 02	0.129484E 01	814.	814.	883.	883.	737.	737.	699.	768.
110.	-0.000676	0.0	-0.002075	0.062457	566.	856.	0.118577E 02	0.126916E 01	814.	814.	883.	883.	738.	738.	702.	772.
115.	-0.000627	0.0	-0.002027	0.061323	566.	857.	0.113124E 02	0.124525E 01	814.	814.	884.	884.	739.	739.	705.	775.
120.	-0.000580	0.0	-0.001980	0.060290	566.	857.	0.108155E 02	0.122296E 01	815.	815.	884.	884.	740.	740.	708.	778.
125.	-0.000538	0.0	-0.001938	0.059298	566.	858.	0.103624E 02	0.120212E 01	815.	815.	884.	884.	740.	740.	711.	781.
130.	-0.000499	0.0	-0.001899	0.058388	566.	858.	0.994882E 01	0.118268E 01	816.	816.	885.	885.	741.	741.	714.	783.
135.	-0.000462	0.0	-0.001862	0.057521	566.	859.	0.957112E 01	0.116443E 01	816.	816.	886.	886.	742.	742.	717.	786.
140.	-0.000428	0.0	-0.001828	0.056724	566.	860.	0.922594E 01	0.114745E 01	817.	817.	886.	886.	743.	743.	720.	789.
145.	-0.000397	0.0	-0.001797	0.055959	566.	860.	0.891008E 01	0.113137E 01	818.	818.	887.	887.	744.	744.	722.	792.
150.	-0.000367	0.0	-0.001767	0.055265	566.	861.	0.862093E 01	0.111642E 01	819.	819.	888.	888.	745.	745.	725.	794.
155.	-0.000341	0.0	-0.001741	0.054588	566.	862.	0.835601E 01	0.110240E 01	819.	819.	889.	889.	745.	745.	728.	797.
160.	-0.000316	0.0	-0.001716	0.053946	566.	863.	0.811284E 01	0.108878E 01	820.	820.	890.	890.	746.	746.	730.	800.
165.	-0.000293	0.0	-0.001693	0.053359	566.	864.	0.788957E 01	0.107610E 01	821.	821.	891.	891.	747.	747.	733.	802.
170.	-0.000271	0.0	-0.001671	0.052796	566.	865.	0.768432E 01	0.106421E 01	823.	823.	892.	892.	748.	748.	735.	805.
175.	-0.000252	0.0	-0.001652	0.052256	566.	866.	0.749546E 01	0.105300E 01	824.	824.	893.	893.	749.	749.	738.	807.
180.	-0.000234	0.0	-0.001634	0.051759	566.	867.	0.732143E 01	0.104239E 01	825.	825.	894.	894.	750.	750.	740.	809.
185.	-0.000217	0.0	-0.001617	0.051280	566.	869.	0.716095E 01	0.103239E 01	826.	826.	895.	895.	751.	751.	742.	812.
190.	-0.000201	0.0	-0.001601	0.050843	566.	870.	0.701291E 01	0.102301E 01	827.	827.	897.	897.	752.	752.	745.	814.
195.	-0.000188	0.0	-0.001587	0.050415	566.	871.	0.687617E 01	0.101419E 01	829.	829.	898.	898.	753.	753.	747.	816.
200.	-0.000175	0.0	-0.001575	0.049992	566.	872.	0.674956E 01	0.100562E 01	830.	830.	899.	899.	754.	754.	749.	819.
205.	-0.000164	0.0	-0.001564	0.049589	566.	873.	0.663197E 01	0.997373E 00	831.	831.	901.	901.	754.	754.	751.	821.
210.	-0.000152	0.0	-0.001552	0.049234	566.	875.	0.652299E 01	0.990003E 00	833.	833.	902.	902.	755.	755.	754.	823.
215.	-0.000141	0.0	-0.001541	0.048906	566.	876.	0.642197E 01	0.982966E 00	834.	834.	903.	903.	756.	756.	756.	825.
220.	-0.000132	0.0	-0.001532	0.048578	566.	877.	0.632829E 01	0.976332E 00	835.	835.	905.	905.	757.	757.	758.	827.
225.	-0.000124	0.0	-0.001524	0.048248	566.	879.	0.624105E 01	0.969761E 00	837.	837.	906.	906.	758.	758.	760.	830.
230.	-0.000118	0.0	-0.001518	0.047891	566.	880.	0.615932E 01	0.962970E 00	838.	838.	908.	908.	759.	759.	762.	832.
235.	-0.000112	0.0	-0.001512	0.047543	566.	881.	0.608226E 01	0.955921E 00	840.	840.	909.	909.	760.	760.	764.	834.
240.	-0.000105	0.0	-0.001505	0.047244	566.	883.	0.600980E 01	0.949357E 00	841.	841.	911.	911.	761.	761.	766.	836.
245.	-0.000097	0.0	-0.001497	0.046981	566.	884.	0.594192E 01	0.943511E 00	843.	843.	912.	912.	762.	762.	769.	838.
250.	-0.000091	0.0	-0.001491	0.046727	566.	885.	0.587856E 01	0.938156E 00	844.	844.	914.	914.	763.	763.	771.	840.
255.	-0.000085	0.0	-0.001485	0.046491	566.	887.	0.581914E 01	0.933107E 00	846.	846.	915.	915.	763.	763.	773.	842.
260.	-0.000081	0.0	-0.001481	0.046220	566.	888.	0.576329E 01	0.928072E 00	847.	847.	917.	917.	764.	764.	775.	844.
265.	-0.000079	0.0	-0.001479	0.045931	566.	890.	0.571014E 01	0.922613E 00	849.	849.	918.	918.	765.	765.	777.	846.
270.	-0.000077	0.0	-0.001477	0.045614	566.	891.	0.565903E 01	0.916676E 00	850.	850.	920.	920.	766.	766.	779.	848.
275.	-0.000075	0.0	-0.001475	0.045315	566.	892.	0.560973E 01	0.910616E 00	852.	852.	921.	921.	767.	767.	781.	850.
280.	-0.000071	0.0	-0.001471	0.045058	566.	894.	0.556240E 01	0.904912E 00	853.	853.	923.	923.	768.	768.	783.	852.
285.	-0.000066	0.0	-0.001466	0.044836	566.	895.	0.551733E 01	0.899905E 00	855.	855.	924.	924.	769.	769.	785.	854.
290.	-0.000062	0.0	-0.001462	0.044620	566.	897.	0.547465E 01	0.895285E 00	856.	856.	926.	926.	770.	770.	786.	856.
295.	-0.000058	0.0	-0.001458	0.044437	566.	898.	0.543406E 01	0.891181E 00	858.	858.	927.	927.	771.	771.	788.	858.
300.	-0.000055	0.0	-0.001455	0.044238	566.	899.	0.539578E 01	0.887261E 00	859.	859.	929.	929.	772.	772.	790.	860.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE						GRAPHITE TEMP.		
	0.00099714		0.00171959			0.00324059		0.00271544		0.01106993					0.00119957		
	0.00945174		0.00422059			0.49659854		0.10774815		0.02219161					3.07589531		
1.	0.001303	0.0	-0.000099	0.964882	568.	709.	0.452435E 02	0.106358E 02	605.	641.	676.	710.	638.	706.	605.	674.	639.
1.	0.001243	0.0	-0.000157	0.923429	571.	713.	0.453515E 02	0.107214E 02	607.	644.	678.	714.	639.	707.	605.	674.	639.
2.	0.001208	0.0	-0.000192	0.895387	574.	715.	0.454012E 02	0.107204E 02	609.	646.	680.	717.	640.	708.	605.	675.	639.
2.	0.001187	0.0	-0.000214	0.876385	576.	716.	0.454145E 02	0.106728E 02	610.	647.	681.	718.	641.	708.	605.	675.	639.
3.	0.001174	0.0	-0.000226	0.862815	577.	717.	0.454048E 02	0.106021E 02	611.	648.	681.	719.	641.	709.	606.	676.	639.
3.	0.001167	0.0	-0.000233	0.852785	578.	717.	0.453806E 02	0.105215E 02	611.	649.	682.	719.	641.	709.	606.	676.	640.
4.	0.001164	0.0	-0.000236	0.845183	579.	718.	0.453473E 02	0.104390E 02	612.	649.	682.	720.	642.	710.	607.	676.	640.
4.	0.001163	0.0	-0.000237	0.839333	579.	718.	0.453087E 02	0.103591E 02	612.	649.	682.	720.	642.	710.	607.	677.	640.
5.	0.001163	0.0	-0.000237	0.834826	579.	718.	0.452675E 02	0.102844E 02	612.	649.	682.	720.	642.	711.	607.	677.	640.
5.	0.001165	0.0	-0.000235	0.831257	579.	718.	0.452256E 02	0.102162E 02	612.	650.	682.	720.	643.	711.	608.	677.	641.

	0.00099714		0.00171959			0.00324059		0.00271544		0.00737996					0.00079998		
	0.00945174		0.00422059			0.49659854		0.10774815		0.02219270					3.07594872		
1.	0.001202	0.0	-0.000201	0.931624	570.	714.	0.454364E 02	0.108589E 02	610.	646.	681.	716.	640.	707.	605.	674.	639.
1.	0.001078	0.0	-0.000324	0.855922	577.	722.	0.456745E 02	0.110558E 02	614.	654.	686.	725.	641.	709.	605.	675.	639.
2.	0.000999	0.0	-0.000402	0.808173	583.	727.	0.458109E 02	0.110945E 02	617.	660.	689.	730.	643.	711.	606.	676.	639.
2.	0.000946	0.0	-0.000455	0.776537	588.	730.	0.458836E 02	0.110470E 02	619.	663.	692.	735.	644.	712.	607.	676.	640.
3.	0.000911	0.0	-0.000490	0.753630	592.	733.	0.459140E 02	0.109522E 02	621.	666.	693.	737.	645.	714.	607.	677.	640.
3.	0.000887	0.0	-0.000514	0.736064	594.	735.	0.459149E 02	0.108319E 02	622.	668.	694.	739.	646.	715.	608.	678.	641.
4.	0.000871	0.0	-0.000529	0.722166	596.	736.	0.458942E 02	0.106995E 02	623.	669.	695.	741.	647.	716.	609.	679.	641.
4.	0.000861	0.0	-0.000539	0.710914	597.	737.	0.458581E 02	0.105634E 02	624.	670.	696.	742.	647.	717.	610.	680.	642.
5.	0.000855	0.0	-0.000545	0.701654	598.	738.	0.458109E 02	0.104289E 02	625.	671.	696.	742.	648.	718.	611.	681.	642.
5.	0.000852	0.0	-0.000548	0.693912	599.	738.	0.457560E 02	0.102995E 02	626.	671.	697.	743.	648.	719.	611.	682.	643.

	0.00099714		0.00171959			0.00324059		0.00271544		0.00368998					0.00040006		
	0.00945174		0.00422059			0.49659854		0.10774815		0.02219262					3.07556057		
1.	0.001099	0.0	-0.000305	0.899600	572.	719.	0.456364E 02	0.110904E 02	615.	652.	686.	722.	641.	708.	605.	674.	639.
1.	0.000903	0.0	-0.000500	0.795976	583.	731.	0.460280E 02	0.114247E 02	622.	666.	694.	736.	643.	711.	606.	675.	639.
2.	0.000771	0.0	-0.000631	0.734915	593.	740.	0.462898E 02	0.115448E 02	626.	676.	698.	746.	645.	714.	607.	676.	640.
2.	0.000675	0.0	-0.000726	0.694941	602.	747.	0.464712E 02	0.115455E 02	629.	684.	702.	755.	647.	717.	608.	678.	640.
3.	0.000603	0.0	-0.000799	0.665345	609.	753.	0.465968E 02	0.114744E 02	631.	690.	704.	761.	648.	719.	609.	679.	641.
3.	0.000547	0.0	-0.000854	0.641863	615.	758.	0.466801E 02	0.113579E 02	633.	695.	706.	767.	649.	721.	610.	680.	642.
4.	0.000504	0.0	-0.000897	0.622546	620.	762.	0.467300E 02	0.112128E 02	635.	699.	708.	771.	650.	723.	611.	682.	642.
4.	0.000471	0.0	-0.000930	0.606262	623.	765.	0.467532E 02	0.110504E 02	636.	702.	709.	774.	651.	725.	613.	683.	643.
5.	0.000445	0.0	-0.000955	0.592278	626.	768.	0.467541E 02	0.108787E 02	638.	705.	711.	777.	652.	726.	614.	684.	644.
5.	0.000426	0.0	-0.000975	0.580131	629.	770.	0.467371E 02	0.107032E 02	639.	707.	712.	779.	653.	728.	615.	686.	645.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE						GRAPHITE TEMP.		
	0.00099714		0.00171959			0.00324059		0.00271544		0.0					0.0		
	0.00945174		0.00422059			0.49659854		0.10774815		0.0					0.0		
1.	0.001118	0.0	-0.000287	0.915535	566.	700.	0.458659E 02	0.113665E 02	637.	637.	706.	706.	673.	673.	606.	675.	641.
1.	0.000940	0.0	-0.000463	0.834395	556.	711.	0.465310E 02	0.120094E 02	650.	650.	719.	719.	674.	674.	608.	677.	644.
2.	0.000828	0.0	-0.000573	0.794499	555.	718.	0.471042E 02	0.124584E 02	659.	659.	728.	728.	675.	675.	610.	680.	647.
2.	0.000754	0.0	-0.000647	0.775480	565.	725.	0.476304E 02	0.127995E 02	666.	666.	736.	736.	677.	677.	613.	682.	649.
3.	0.000703	0.0	-0.000698	0.766189	566.	730.	0.481306E 02	0.130752E 02	672.	672.	742.	742.	678.	678.	616.	685.	652.
3.	0.000664	0.0	-0.000736	0.761825	556.	734.	0.486152E 02	0.133076E 02	678.	678.	747.	747.	679.	679.	619.	688.	654.
4.	0.000535	0.0	-0.000766	0.760099	566.	739.	0.490895E 02	0.135089E 02	682.	682.	752.	752.	681.	681.	622.	691.	656.
4.	0.000510	0.0	-0.000790	0.759779	566.	742.	0.495564E 02	0.135867E 02	687.	687.	756.	756.	682.	682.	625.	694.	658.
5.	0.000590	0.0	-0.000811	0.760180	566.	746.	0.500176E 02	0.138458E 02	691.	691.	760.	760.	684.	684.	628.	698.	661.
5.	0.000571	0.0	-0.000829	0.760915	566.	750.	0.504738E 02	0.139891E 02	695.	695.	764.	764.	686.	686.	631.	701.	663.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE						GRAPHITE TEMP.					
	0.00099714		0.00171959			0.00324059		0.00271544	0.01106993						0.00119957					
	0.00945174		0.00422059			0.49659854		0.10774815	0.02219161						3.07589531					
5.	0.001165	0.0	-0.000235	0.831257	579.	718.	0.452256E 02	0.102162E 02	612.	650.	682.	720.	643.	711.	608.	677.	641.			
10.	0.001177	0.0	-0.000223	0.816182	580.	719.	0.450277E 02	0.986129E 01	614.	650.	684.	720.	645.	714.	611.	681.	643.			
15.	0.001181	0.0	-0.000219	0.805756	582.	720.	0.447687E 02	0.966164E 01	616.	651.	685.	721.	647.	716.	613.	683.	645.			
20.	0.001183	0.0	-0.000217	0.798517	583.	721.	0.445166E 02	0.953586E 01	617.	653.	687.	722.	648.	717.	615.	685.	647.			
25.	0.001185	0.0	-0.000215	0.792463	584.	723.	0.442469E 02	0.944482E 01	618.	654.	688.	723.	650.	719.	617.	687.	649.			
30.	0.001186	0.0	-0.000214	0.787268	585.	723.	0.439774E 02	0.937235E 01	619.	654.	689.	724.	651.	720.	619.	689.	650.			
35.	0.001186	0.0	-0.000214	0.782555	586.	724.	0.437095E 02	0.931029E 01	620.	655.	690.	725.	652.	721.	620.	690.	652.			
40.	0.001187	0.0	-0.000213	0.778246	586.	725.	0.434453E 02	0.925487E 01	621.	656.	691.	726.	653.	722.	621.	691.	653.			
45.	0.001188	0.0	-0.000212	0.774310	587.	725.	0.431871E 02	0.920478E 01	622.	656.	691.	726.	654.	722.	622.	692.	654.			
50.	0.001188	0.0	-0.000212	0.770563	587.	726.	0.429362E 02	0.915913E 01	622.	657.	692.	726.	655.	723.	623.	693.	655.			
55.	0.001189	0.0	-0.000211	0.767347	588.	726.	0.426940E 02	0.911764E 01	623.	657.	692.	727.	656.	724.	624.	693.	656.			
60.	0.001191	0.0	-0.000209	0.764476	588.	726.	0.424613E 02	0.908047E 01	623.	657.	693.	727.	656.	724.	624.	694.	657.			
65.	0.001192	0.0	-0.000208	0.761797	588.	727.	0.422386E 02	0.904634E 01	623.	657.	693.	727.	657.	724.	625.	694.	657.			
70.	0.001193	0.0	-0.000207	0.759511	588.	727.	0.420277E 02	0.901668E 01	624.	658.	693.	727.	657.	725.	625.	695.	658.			
75.	0.001194	0.0	-0.000206	0.757262	588.	727.	0.418268E 02	0.898852E 01	624.	658.	693.	727.	658.	725.	625.	695.	658.			
80.	0.001196	0.0	-0.000204	0.755651	588.	727.	0.416392E 02	0.896602E 01	624.	658.	693.	727.	658.	725.	626.	695.	658.			
85.	0.001197	0.0	-0.000203	0.754139	588.	727.	0.414622E 02	0.894539E 01	624.	658.	693.	727.	658.	725.	626.	695.	659.			
90.	0.001198	0.0	-0.000202	0.752392	588.	727.	0.412982E 02	0.892698E 01	624.	657.	693.	727.	658.	725.	626.	695.	659.			
95.	0.001199	0.0	-0.000201	0.751144	588.	726.	0.411423E 02	0.890840E 01	623.	657.	693.	727.	658.	725.	626.	695.	659.			
100.	0.001200	0.0	-0.000200	0.750162	588.	726.	0.409993E 02	0.889530E 01	623.	657.	693.	726.	658.	725.	626.	695.	659.			
105.	0.001202	0.0	-0.000198	0.749702	587.	726.	0.408691E 02	0.888615E 01	623.	657.	692.	726.	658.	725.	625.	695.	659.			
110.	0.001203	0.0	-0.000197	0.749155	587.	726.	0.407505E 02	0.887831E 01	623.	657.	692.	726.	658.	725.	625.	695.	659.			
115.	0.001204	0.0	-0.000196	0.748334	587.	726.	0.406393E 02	0.886921E 01	623.	656.	692.	726.	658.	725.	625.	694.	659.			
120.	0.001205	0.0	-0.000195	0.748264	587.	725.	0.405420E 02	0.886504E 01	622.	656.	692.	725.	658.	725.	625.	694.	659.			
125.	0.001206	0.0	-0.000194	0.747932	586.	725.	0.404535E 02	0.886186E 01	622.	656.	691.	725.	658.	725.	625.	694.	659.			
130.	0.001207	0.0	-0.000193	0.747812	586.	725.	0.403737E 02	0.885871E 01	622.	655.	691.	725.	658.	725.	624.	694.	659.			
135.	0.001208	0.0	-0.000192	0.747868	586.	725.	0.403032E 02	0.885917E 01	622.	655.	691.	725.	658.	725.	624.	694.	659.			
140.	0.001209	0.0	-0.000191	0.747759	586.	724.	0.402409E 02	0.885781E 01	621.	655.	691.	724.	657.	725.	624.	693.	659.			
145.	0.001210	0.0	-0.000190	0.747969	586.	724.	0.401859E 02	0.885818E 01	621.	655.	690.	724.	657.	725.	624.	693.	658.			
150.	0.001210	0.0	-0.000190	0.748108	585.	724.	0.401399E 02	0.886017E 01	621.	655.	690.	724.	657.	724.	623.	693.	658.			
155.	0.001211	0.0	-0.000189	0.748258	585.	724.	0.400997E 02	0.886206E 01	621.	654.	690.	724.	657.	724.	623.	693.	658.			
160.	0.001212	0.0	-0.000188	0.748682	585.	724.	0.400655E 02	0.886498E 01	621.	654.	690.	724.	657.	724.	623.	692.	658.			
165.	0.001212	0.0	-0.000188	0.748871	585.	724.	0.400375E 02	0.886814E 01	621.	654.	690.	723.	657.	724.	623.	692.	658.			
170.	0.001213	0.0	-0.000187	0.749243	585.	723.	0.400161E 02	0.887271E 01	621.	654.	690.	723.	657.	724.	623.	692.	658.			
175.	0.001213	0.0	-0.000187	0.749736	585.	723.	0.399984E 02	0.887768E 01	620.	654.	690.	723.	656.	724.	623.	692.	658.			
180.	0.001214	0.0	-0.000186	0.750044	585.	723.	0.399849E 02	0.888096E 01	620.	654.	690.	723.	656.	724.	623.	692.	658.			

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE							GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544					0.00737996			0.00079998
	0.00945174		0.00422059			0.49659854		0.10774815					0.02219270			3.07594872
5.	0.000852	0.0	-0.000548	0.693912	599.	738.	0.457560E 02	0.102995E 02	626.	671.	697.	743.	648.	719.	611.	682. 643.
10.	0.000863	0.0	-0.000537	0.656324	602.	741.	0.453718E 02	0.946666E 01	630.	674.	701.	745.	653.	726.	619.	689. 648.
15.	0.000870	0.0	-0.000530	0.635282	606.	745.	0.449194E 02	0.900319E 01	635.	677.	706.	748.	657.	731.	625.	696. 653.
20.	0.000873	0.0	-0.000527	0.619425	609.	748.	0.443992E 02	0.869498E 01	639.	680.	710.	750.	661.	736.	630.	701. 657.
25.	0.000874	0.0	-0.000526	0.606620	612.	750.	0.438346E 02	0.847025E 01	642.	682.	713.	753.	665.	739.	635.	706. 661.
30.	0.000873	0.0	-0.000527	0.595262	614.	753.	0.432504E 02	0.828998E 01	646.	685.	716.	756.	668.	742.	639.	710. 665.
35.	0.000873	0.0	-0.000527	0.585116	616.	755.	0.426550E 02	0.813455E 01	648.	687.	719.	758.	671.	744.	643.	714. 668.
40.	0.000873	0.0	-0.000527	0.575799	618.	757.	0.420574E 02	0.799606E 01	651.	689.	721.	760.	674.	746.	646.	717. 672.
45.	0.000874	0.0	-0.000526	0.567121	620.	759.	0.414626E 02	0.786916E 01	653.	691.	723.	761.	677.	748.	649.	720. 674.
50.	0.000874	0.0	-0.000526	0.558968	621.	760.	0.408745E 02	0.775121E 01	655.	692.	725.	762.	679.	750.	652.	722. 677.
55.	0.000875	0.0	-0.000525	0.551342	623.	761.	0.402962E 02	0.764104E 01	656.	693.	727.	763.	681.	752.	654.	724. 679.
60.	0.000877	0.0	-0.000523	0.544191	623.	762.	0.397303E 02	0.753800E 01	657.	694.	728.	764.	683.	753.	656.	726. 682.
65.	0.000878	0.0	-0.000522	0.537538	624.	763.	0.391789E 02	0.744168E 01	658.	694.	729.	765.	685.	754.	657.	728. 684.
70.	0.000881	0.0	-0.000519	0.531404	625.	763.	0.386441E 02	0.735217E 01	659.	695.	730.	765.	686.	755.	658.	729. 685.
75.	0.000883	0.0	-0.000517	0.525675	625.	764.	0.381284E 02	0.727001E 01	660.	695.	730.	765.	688.	756.	659.	730. 687.
80.	0.000885	0.0	-0.000514	0.520418	625.	764.	0.376308E 02	0.719255E 01	660.	695.	730.	765.	689.	757.	660.	731. 688.
85.	0.000889	0.0	-0.000511	0.515718	625.	764.	0.371549E 02	0.712286E 01	660.	695.	730.	765.	690.	757.	661.	731. 689.
90.	0.000892	0.0	-0.000508	0.511493	625.	764.	0.367013E 02	0.705988E 01	660.	695.	730.	765.	690.	758.	661.	731. 690.
95.	0.000896	0.0	-0.000504	0.507716	625.	763.	0.362710E 02	0.700342E 01	660.	694.	730.	764.	691.	758.	661.	731. 691.
100.	0.000899	0.0	-0.000501	0.504337	624.	763.	0.358639E 02	0.695247E 01	660.	694.	730.	764.	691.	758.	661.	731. 691.
105.	0.000903	0.0	-0.000497	0.501309	624.	763.	0.354813E 02	0.690763E 01	660.	694.	730.	763.	692.	759.	661.	731. 692.
110.	0.000905	0.0	-0.000494	0.498687	624.	762.	0.351221E 02	0.686756E 01	659.	693.	729.	763.	692.	759.	661.	731. 692.
115.	0.000910	0.0	-0.000490	0.496416	623.	762.	0.347870E 02	0.683309E 01	659.	693.	729.	762.	692.	759.	661.	731. 692.
120.	0.000914	0.0	-0.000486	0.494477	622.	761.	0.344752E 02	0.680285E 01	658.	692.	728.	762.	692.	758.	661.	730. 692.
125.	0.000918	0.0	-0.000482	0.492954	622.	760.	0.341867E 02	0.677749E 01	658.	691.	728.	761.	692.	758.	660.	730. 692.
130.	0.000921	0.0	-0.000479	0.491560	621.	760.	0.339210E 02	0.675609E 01	657.	691.	727.	760.	691.	758.	660.	729. 692.
135.	0.000925	0.0	-0.000475	0.490454	621.	759.	0.336774E 02	0.673855E 01	657.	690.	726.	759.	691.	758.	659.	729. 692.
140.	0.000928	0.0	-0.000472	0.489361	620.	759.	0.334539E 02	0.672291E 01	656.	689.	726.	759.	691.	758.	659.	728. 692.
145.	0.000932	0.0	-0.000468	0.488965	619.	758.	0.332529E 02	0.671221E 01	656.	689.	725.	758.	691.	757.	658.	728. 692.
150.	0.000935	0.0	-0.000465	0.488579	619.	757.	0.330708E 02	0.670479E 01	655.	688.	724.	757.	690.	757.	657.	727. 691.
155.	0.000938	0.0	-0.000462	0.488311	618.	757.	0.329069E 02	0.670002E 01	654.	687.	724.	757.	690.	756.	657.	726. 691.
160.	0.000940	0.0	-0.000460	0.488184	618.	756.	0.327618E 02	0.669683E 01	654.	687.	723.	756.	690.	756.	656.	726. 691.
165.	0.000944	0.0	-0.000456	0.488518	617.	756.	0.326348E 02	0.669811E 01	653.	686.	722.	755.	689.	756.	656.	725. 690.
170.	0.000946	0.0	-0.000454	0.488721	616.	755.	0.325254E 02	0.670082E 01	653.	686.	722.	755.	689.	755.	655.	725. 690.
175.	0.000949	0.0	-0.000451	0.489454	616.	754.	0.324318E 02	0.670696E 01	652.	685.	721.	754.	688.	755.	655.	724. 689.
180.	0.000951	0.0	-0.000449	0.489842	615.	754.	0.323538E 02	0.671366E 01	652.	685.	721.	754.	688.	754.	654.	723. 689.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

IME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE				GRAPHITE TEMP.			
	0.00099714		0.00171959			0.00324059		0.00271544		0.00368998			0.00040006			
	0.00945174		0.00422059			0.49659854		0.10774815		0.02219262			3.07556057			
						①	②									③
5.	0.000426	0.0	-0.000975	0.580131	629.	770.	0.467371E 02	0.107032E 02	639.	707.	712.	779.	653.	728.	615.	686.	645.
10.	0.000380	0.0	-0.001020	0.513107	640.	779.	0.463177E 02	0.926783E 01	649.	716.	722.	788.	660.	741.	627.	699.	653.
15.	0.000388	0.0	-0.001012	0.480835	646.	785.	0.456744E 02	0.839628E 01	657.	720.	730.	792.	667.	751.	638.	710.	660.
20.	0.000393	0.0	-0.001007	0.458414	651.	790.	0.448616E 02	0.784027E 01	665.	724.	737.	796.	673.	759.	648.	720.	666.
25.	0.000391	0.0	-0.001009	0.440460	655.	794.	0.439607E 02	0.744990E 01	672.	729.	744.	801.	679.	766.	656.	729.	672.
30.	0.000389	0.0	-0.001011	0.425229	660.	799.	0.430101E 02	0.714713E 01	678.	733.	751.	805.	684.	772.	664.	737.	678.
35.	0.000386	0.0	-0.001014	0.411800	665.	804.	0.420355E 02	0.689541E 01	684.	737.	757.	810.	689.	777.	671.	744.	683.
40.	0.000383	0.0	-0.001017	0.399654	669.	808.	0.410533E 02	0.667606E 01	690.	741.	762.	814.	694.	781.	678.	750.	689.
45.	0.000381	0.0	-0.001019	0.388392	673.	811.	0.400737E 02	0.647808E 01	695.	745.	767.	818.	699.	785.	684.	757.	694.
50.	0.000380	0.0	-0.001020	0.377864	676.	815.	0.391039E 02	0.629557E 01	700.	749.	772.	821.	703.	788.	690.	762.	698.
55.	0.000379	0.0	-0.001021	0.367745	679.	818.	0.381477E 02	0.612366E 01	704.	752.	776.	824.	708.	791.	695.	767.	703.
60.	0.000378	0.0	-0.001022	0.358206	682.	821.	0.372084E 02	0.596092E 01	707.	754.	780.	827.	712.	794.	699.	772.	707.
65.	0.000379	0.0	-0.001021	0.349174	684.	823.	0.362891E 02	0.580691E 01	711.	757.	783.	829.	715.	797.	704.	776.	711.
70.	0.000380	0.0	-0.001020	0.340619	686.	825.	0.353925E 02	0.566130E 01	714.	759.	786.	831.	719.	799.	708.	780.	715.
75.	0.000381	0.0	-0.001019	0.332469	688.	827.	0.345197E 02	0.552301E 01	717.	761.	789.	833.	722.	801.	711.	783.	719.
80.	0.000383	0.0	-0.001017	0.324687	690.	829.	0.336718E 02	0.539120E 01	719.	762.	792.	834.	725.	803.	714.	787.	722.
85.	0.000385	0.0	-0.001015	0.317250	691.	830.	0.328493E 02	0.526540E 01	721.	763.	794.	836.	728.	805.	717.	789.	725.
90.	0.000388	0.0	-0.001012	0.310136	692.	831.	0.320524E 02	0.514526E 01	723.	764.	796.	837.	731.	806.	719.	792.	728.
95.	0.000390	0.0	-0.001010	0.303365	693.	832.	0.312811E 02	0.503050E 01	725.	765.	797.	837.	733.	808.	722.	794.	731.
100.	0.000392	0.0	-0.001008	0.296752	694.	833.	0.305352E 02	0.492015E 01	726.	766.	798.	838.	736.	809.	723.	796.	733.
105.	0.000395	0.0	-0.001005	0.290483	694.	833.	0.298137E 02	0.481392E 01	727.	766.	799.	838.	738.	810.	725.	797.	736.
110.	0.000399	0.0	-0.001001	0.284545	695.	833.	0.291174E 02	0.471291E 01	728.	766.	800.	838.	740.	811.	726.	798.	738.
115.	0.000402	0.0	-0.000998	0.278894	695.	833.	0.284463E 02	0.461707E 01	729.	766.	801.	838.	742.	812.	727.	799.	740.
120.	0.000407	0.0	-0.000993	0.273556	695.	833.	0.278005E 02	0.452612E 01	729.	766.	801.	838.	743.	813.	728.	800.	741.
125.	0.000411	0.0	-0.000989	0.268502	694.	833.	0.271796E 02	0.443995E 01	729.	766.	801.	837.	744.	813.	729.	801.	743.
130.	0.000416	0.0	-0.000984	0.263727	694.	832.	0.265835E 02	0.435836E 01	729.	765.	801.	837.	746.	814.	729.	801.	744.
135.	0.000421	0.0	-0.000979	0.259283	693.	832.	0.260125E 02	0.428191E 01	729.	764.	801.	836.	747.	814.	729.	801.	746.
140.	0.000426	0.0	-0.000974	0.255109	693.	831.	0.254665E 02	0.421016E 01	729.	764.	800.	835.	747.	815.	729.	801.	747.
145.	0.000432	0.0	-0.000968	0.251204	692.	830.	0.249450E 02	0.414297E 01	728.	763.	800.	834.	748.	815.	729.	801.	747.
150.	0.000437	0.0	-0.000963	0.247564	691.	830.	0.244479E 02	0.408021E 01	728.	762.	799.	833.	749.	815.	729.	801.	748.
155.	0.000443	0.0	-0.000957	0.244157	690.	829.	0.239748E 02	0.402166E 01	727.	761.	798.	832.	749.	815.	729.	800.	749.
160.	0.000449	0.0	-0.000951	0.241023	689.	828.	0.235254E 02	0.396727E 01	726.	759.	797.	831.	749.	815.	728.	799.	749.
165.	0.000455	0.0	-0.000945	0.238115	688.	826.	0.230992E 02	0.391678E 01	726.	758.	796.	829.	750.	814.	728.	799.	749.
170.	0.000462	0.0	-0.000938	0.235430	687.	825.	0.226957E 02	0.387016E 01	725.	757.	795.	828.	750.	814.	727.	798.	750.
175.	0.000469	0.0	-0.000931	0.233018	686.	824.	0.223145E 02	0.382736E 01	724.	756.	794.	826.	750.	814.	726.	797.	750.
180.	0.000475	0.0	-0.000925	0.230765	684.	823.	0.219553E 02	0.378829E 01	722.	754.	793.	825.	749.	813.	725.	796.	750.

REACTIVITY ACCIDENT ANALYSIS IN A MSBR

TIME	RHO	RHOP	RHOFB	PR	TI	TRO	C1	C2	SALT TEMP. IN CORE	GRAPHITE TEMP.
	0.00099714		0.00171959			0.00324059		0.00271544	0.0	0.0
	0.00945174		0.00422059			0.49659854		0.10774815	0.0	0.0
5.	0.000571	0.0	-0.000829	0.760915	566.	750.	0.504738E 02	0.139891E 02	695. 695. 764. 764. 686. 686. 631. 701. 663.	
10.	0.000433	0.0	-0.000967	0.762043	566.	782.	0.547706E 02	0.148359E 02	731. 731. 800. 800. 704. 704. 665. 734. 682.	
15.	0.000329	0.0	-0.001072	0.747616	566.	812.	0.584763E 02	0.149955E 02	764. 764. 833. 833. 722. 722. 699. 768. 701.	
20.	0.000244	0.0	-0.001156	0.725257	566.	841.	0.615021E 02	0.147821E 02	795. 795. 864. 864. 740. 740. 732. 801. 720.	
25.	0.000172	0.0	-0.001229	0.699315	566.	869.	0.638554E 02	0.143794E 02	825. 825. 894. 894. 757. 757. 764. 833. 738.	
30.	0.000107	0.0	-0.001293	0.671909	566.	895.	0.655823E 02	0.138860E 02	853. 853. 923. 923. 774. 774. 795. 864. 755.	
35.	0.000049	0.0	-0.001351	0.644029	566.	920.	0.667422E 02	0.133507E 02	881. 881. 950. 950. 790. 790. 824. 894. 772.	
40.	-0.000005	0.0	-0.001405	0.616380	566.	944.	0.674011E 02	0.128024E 02	907. 907. 976. 976. 805. 805. 853. 922. 788.	
45.	-0.000055	0.0	-0.001455	0.589203	566.	967.	0.676183E 02	0.122551E 02	931. 931.1001.1001. 819. 819. 880. 949. 803.	
50.	-0.000101	0.0	-0.001501	0.562778	566.	989.	0.674586E 02	0.117162E 02	955. 955.1025.1025. 833. 833. 906. 975. 817.	
55.	-0.000145	0.0	-0.001545	0.537156	566.1010.		0.669722E 02	0.111912E 02	978. 978.1047.1047. 846. 846. 931.1000. 831.	
60.	-0.000186	0.0	-0.001587	0.512282	566.1030.		0.662063E 02	0.106810E 02	999. 999.1069.1069. 859. 859. 954.1024. 845.	
65.	-0.000225	0.0	-0.001625	0.488390	566.1048.		0.652022E 02	0.101874E 02	1020.1020.1089.1089. 871. 871. 977.1046. 857.	
70.	-0.000261	0.0	-0.001661	0.465410	566.1066.		0.640063E 02	0.971211E 01	1039.1039.1109.1109. 882. 882. 998.1068. 869.	
75.	-0.000296	0.0	-0.001696	0.443210	566.1084.		0.626465E 02	0.925436E 01	1058.1058.1127.1127. 893. 893.1019.1088. 881.	
80.	-0.000328	0.0	-0.001728	0.421946	566.1100.		0.611556E 02	0.881318E 01	1075.1075.1145.1145. 904. 904.1038.1108. 892.	
85.	-0.000358	0.0	-0.001758	0.401627	566.1115.		0.595612E 02	0.839074E 01	1092.1092.1161.1161. 913. 913.1057.1126. 902.	
90.	-0.000386	0.0	-0.001786	0.382171	566.1130.		0.578869E 02	0.798632E 01	1108.1108.1177.1177. 923. 923.1075.1144. 912.	
95.	-0.000414	0.0	-0.001814	0.363433	566.1144.		0.561523E 02	0.759838E 01	1123.1123.1193.1193. 932. 932.1091.1161. 921.	
100.	-0.000439	0.0	-0.001839	0.345552	566.1157.		0.543744E 02	0.722630E 01	1138.1138.1207.1207. 940. 940.1107.1177. 930.	
105.	-0.000463	0.0	-0.001863	0.328534	566.1170.		0.525700E 02	0.687125E 01	1151.1151.1221.1221. 948. 948.1122.1192. 939.	
110.	-0.000485	0.0	-0.001885	0.312304	566.1182.		0.507531E 02	0.653271E 01	1164.1164.1234.1234. 956. 956.1137.1206. 947.	
115.	-0.000507	0.0	-0.001907	0.296761	566.1193.		0.489350E 02	0.620956E 01	1177.1177.1246.1246. 963. 963.1151.1220. 955.	
120.	-0.000527	0.0	-0.001927	0.281912	566.1204.		0.471245E 02	0.590025E 01	1188.1188.1258.1258. 970. 970.1164.1233. 962.	
125.	-0.000546	0.0	-0.001946	0.267767	566.1214.		0.453304E 02	0.560518E 01	1199.1199.1269.1269. 976. 976.1176.1245. 969.	
130.	-0.000564	0.0	-0.001964	0.254302	566.1224.		0.435599E 02	0.532385E 01	1210.1210.1279.1279. 983. 983.1188.1257. 975.	
135.	-0.000580	0.0	-0.001980	0.241517	566.1233.		0.418193E 02	0.505637E 01	1220.1220.1289.1289. 988. 988.1199.1268. 982.	
140.	-0.000596	0.0	-0.001996	0.229353	566.1242.		0.401140E 02	0.480204E 01	1229.1229.1299.1299. 994. 994.1209.1279. 987.	
145.	-0.000611	0.0	-0.002011	0.217709	566.1250.		0.384473E 02	0.455960E 01	1238.1238.1308.1308. 999. 999.1219.1289. 993.	
150.	-0.000626	0.0	-0.002026	0.206648	566.1258.		0.368221E 02	0.432836E 01	1247.1247.1316.1316.1004.1004.1229.1298. 998.	
155.	-0.000639	0.0	-0.002039	0.196127	566.1266.		0.352412E 02	0.410847E 01	1255.1255.1324.1324.1009.1009.1238.1307.1003.	
160.	-0.000652	0.0	-0.002052	0.186121	566.1273.		0.337057E 02	0.389923E 01	1263.1263.1332.1332.1013.1013.1246.1316.1008.	
165.	-0.000664	0.0	-0.002064	0.176595	566.1280.		0.322175E 02	0.370012E 01	1270.1270.1339.1339.1018.1018.1255.1324.1013.	
170.	-0.000674	0.0	-0.002075	0.167566	566.1286.		0.307778E 02	0.351096E 01	1277.1277.1346.1346.1022.1022.1262.1332.1017.	
175.	-0.000684	0.0	-0.002085	0.159007	566.1292.		0.293874E 02	0.333145E 01	1283.1283.1353.1353.1026.1026.1270.1339.1021.	
180.	-0.000694	0.0	-0.002094	0.150876	566.1298.		0.280469E 02	0.316118E 01	1290.1290.1359.1359.1029.1029.1277.1346.1025.	
185.	-0.000704	0.0	-0.002104	0.143104	566.1303.		0.267559E 02	0.299893E 01	1296.1296.1365.1365.1033.1033.1283.1352.1028.	
190.	-0.000713	0.0	-0.002113	0.135740	566.1308.		0.255116E 02	0.284485E 01	1301.1301.1371.1371.1036.1036.1289.1359.1032.	
195.	-0.000721	0.0	-0.002121	0.128743	566.1313.		0.243161E 02	0.269841E 01	1306.1306.1376.1376.1039.1039.1295.1364.1035.	
200.	-0.000729	0.0	-0.002129	0.122111	566.1318.		0.231690E 02	0.255942E 01	1311.1311.1381.1381.1042.1042.1301.1370.1038.	
205.	-0.000736	0.0	-0.002136	0.115808	566.1322.		0.220671E 02	0.242749E 01	1316.1316.1385.1385.1045.1045.1306.1375.1041.	
210.	-0.000743	0.0	-0.002143	0.109812	566.1326.		0.210105E 02	0.230198E 01	1321.1321.1390.1390.1047.1047.1311.1380.1044.	
215.	-0.000749	0.0	-0.002149	0.104130	566.1330.		0.200001E 02	0.218293E 01	1325.1325.1394.1394.1050.1050.1316.1385.1047.	
220.	-0.000755	0.0	-0.002155	0.098735	566.1334.		0.190297E 02	0.206996E 01	1329.1329.1398.1398.1052.1052.1320.1389.1049.	
225.	-0.000761	0.0	-0.002161	0.093608	566.1337.		0.181035E 02	0.196252E 01	1333.1333.1402.1402.1054.1054.1324.1394.1052.	
230.	-0.000767	0.0	-0.002167	0.088735	566.1341.		0.172163E 02	0.186060E 01	1336.1336.1406.1406.1056.1056.1328.1398.1054.	
235.	-0.000772	0.0	-0.002172	0.084136	566.1344.		0.163696E 02	0.176400E 01	1340.1340.1409.1409.1058.1058.1332.1402.1056.	
240.	-0.000776	0.0	-0.002176	0.079786	566.1347.		0.155653E 02	0.167238E 01	1343.1343.1412.1412.1060.1060.1336.1405.1058.	
245.	-0.000779	0.0	-0.002179	0.075689	566.1350.		0.148026E 02	0.158603E 01	1346.1346.1415.1415.1062.1062.1339.1409.1060.	
250.	-0.000784	0.0	-0.002184	0.071778	566.1352.		0.140747E 02	0.150431E 01	1349.1349.1418.1418.1063.1063.1343.1412.1061.	
255.	-0.000788	0.0	-0.002188	0.068081	566.1355.		0.133802E 02	0.142684E 01	1352.1352.1421.1421.1065.1065.1346.1415.1063.	
260.	-0.000791	0.0	-0.002191	0.064582	566.1357.		0.127180E 02	0.135323E 01	1354.1354.1423.1423.1066.1066.1348.1418.1065.	
265.	-0.000795	0.0	-0.002195	0.061256	566.1359.		0.120867E 02	0.128342E 01	1356.1356.1426.1426.1068.1068.1351.1420.1066.	
270.	-0.000798	0.0	-0.002198	0.058105	566.1361.		0.114852E 02	0.121738E 01	1359.1359.1428.1428.1069.1069.1354.1423.1067.	
275.	-0.000800	0.0	-0.002200	0.055123	566.1363.		0.109124E 02	0.115484E 01	1361.1361.1430.1430.1070.1070.1356.1425.1069.	
280.	-0.000803	0.0	-0.002203	0.052284	566.1365.		0.103669E 02	0.109552E 01	1363.1363.1432.1432.1072.1072.1358.1428.1070.	
285.	-0.000806	0.0	-0.002206	0.049598	566.1367.		0.984770E 01	0.103922E 01	1365.1365.1434.1434.1073.1073.1361.1430.1071.	
290.	-0.000808	0.0	-0.002208	0.047042	566.1369.		0.935350E 01	0.985674E 00	1367.1367.1436.1436.1074.1074.1363.1432.1072.	
295.	-0.000810	0.0	-0.002210	0.044635	566.1370.		0.888332E 01	0.935336E 00	1368.1368.1438.1438.1075.1075.1365.1434.1073.	
300.	-0.000812	0.0	-0.002212	0.042337	566.1372.		0.843606E 01	0.887348E 00	1370.1370.1439.1439.1076.1076.1366.1436.1074.	