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CRITICALITY SAFETY EVALUATION FOR PORTSMOUTH X-345 HIGH-ENRICHED-URANIUM STORAGE AREA

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ABSTRACT

This report evaluates nuclear criticality safety for the High-Enriched Uranium storage area of the X-345 building of the Portsmouth Gaseous Diffusion Plant. The effects of loss of moderation or mass control are examined for storage units in or out of the storage receptacles. Recommendations are made for decreasing criticality hazards under some conditions of storage or handling considered to be hazardous.

UES Technical Report:

Results of Criticality Safety Evaluation for Portsmouth X-345 High Enriched Uranium Storage Area

1. Summary

This report summarizes the results of a criticality safety evaluation of the Portsmouth Gaseous Diffusion Plant High-Enriched Uranium (HEU) storage. There have been occasions in the past when water entered some of the storage receptacles. Since moderation control is important in the safe handling of high-enriched materials this has led to the need for a re-examination of criticality safety in the facility. We were asked to determine whether the double contingency principle applies under water flooding or other conditions encountered by containers in storage or handling. This study shows that loss of moderation control or exceeding uranium oxide mass limits could possibly result in criticality. We see, however, that double-contingency requirements can be met if the high-enriched uranium oxides are stored in 5-inch, rather than 6-inch-diameter canisters.

Results of this study confirm that criticality safety depends upon maintaining the UF_6 in a dry condition. We recommend use of cylinders with diameters equal to or less than that recommended by ANSI/ANS-8.1-1983.¹

Criticality is possible, regardless of container diameter, if a container is open or breached when water enters a receptacle, mixes with the fissile material, and the mixture disperses into the larger volume of the receptacle. This hazard can be minimized by filling the void space surrounding the containers with non-porous filler material.

Adoption of the above recommendations would help assure compliance with DOE orders which require that whenever practicable, reliance be placed on equipment design in which dimensions are limited rather than on administrative controls.

2. Introduction

This Technical Report includes the results of studies done for DOE Task 33-91-15, Job ID X-1, in conformance to Part 1 of *Activity Plan for X-345 Sub task*, outlined in GDPNCS-92-05² which states:

LLNL will establish a firm computational basis for normal and off-normal operations in X-345 using a configuration controlled version of KENO V.a. Calculations will be made for single units and infinite planar arrays. Confirmatory calculations may be made with MCNP if appropriate. LLNL will identify the double contingency controls and investigate the effects of double batching. To support the PRA effort assessing water intrusion, some KENO calculations will be made as a function of depth of water in the storage receptacle.

Appendix A lists Portsmouth letters and reports which support efforts to set the design limits and administrative controls for the X-345 facility.

3. Computer Codes and Data

The Activity Plan referenced above states that a configuration-controlled version of KENO V.a will be used. We used the computer system maintained by the Computing and Telecommunications Division of Martin Marietta Energy Systems, Inc. at Oak Ridge, Tennessee. Connections to Oak Ridge were made via *Internet* from *ncsc*, permitting efficient transfers of input and output files. The ORNL computer has an Internet address of 128.219.128.149 (a.k.a. NX10A.CTD.ORN.LGOV). For this study we used KENO V.a - CSAS4 in SCALE4.1, with the 27-group cross section library, running on the IBM 3090 system. Validation calculations³ supporting this version of SCALE/KENO, which were done by MMES, show that the criterion for subcriticality should be that $k_{eff} + 2\sigma + \text{bias} \leq 0.95$. The KENO default PARAM values were used. A sample Job Control description is included in Appendix B.

We also did confirmatory calculations with the Los Alamos Monte Carlo code, MCNP, using the X6XS.0 cross section set derived from the ENDF/B-V cross section library. MCNP was installed on the LLNL Fission Energy & Systems Safety Program computer, *ncsc*, by LANL staff members who validated the installation with their set of test problems. The MCNP calculations provide additional assurance of the validity of our KENO modeling. Appendix C summarizes the MCNP calculations.

Documentation on the software used for this study is listed in Table 1.

Table 1. Computer Software Documentation.

Author	Report	Date	Title
Parks, C. B., Ed.	NUREG/CR-0200, Rev. 4, ORNL/NUREG/CSD-2/R4, Vols. I, II, and III	April 1992	SCALE: A Modular Code System for Performing Standardized Computer Analyses for Licensing Evaluation
Petrie, L. M. and Landers, N. F.	NUREG/CR-0200, Rev. 4, ORNL/NUREG/CSD-2/R4, Vol. 2, Sec. F11	April 1992	KENO V.a: An Improved Monte Carlo Criticality Program with Supergrouping
Bucholz, J. A., et al.	NUREG/CR-0200, Rev. 4, ORNL/NUREG/CSD-2/R4, Vol. 3, Sec. M8	April 1992	Standard Composition Library
Briesmeister, Judith F.	LA-7396-M, Rev. 2	Sept. 1986	MCNP—A General Monte Carlo Code for Neutron and Photon Transport
Pruvost, Norman L., et al.	LA-12135-MS	June 1991	The X6XS.0 Cross Section Library for MCNP-4
Koponen, B. L.	LLNL Internal Memorandum NCIS/041	Feb. 1992	Installation of MCNP on NCIS Sun

4. Material Forms, Containers, and Storage

High-enriched^a materials that are permitted to be stored in the HEU area include uranium solutions,^b uranium metal, uranyl nitrate hexahydrate (UNH), UF₆, and uranium oxides: UO₂, UO₃ and U₃O₈. UF₆ is stored in monel cylinders. Polybottles are used for UNH and uranium solution storage. The containers for the other materials are steel canisters 5 in., 6 in., 8 in., and 12 in. in diameter. The canisters are described in GAT/GDP-1073.⁴ The X-345 underground storage facility is described in PGDP drawings X-345-S17, X-345-S18, and X-345-A10.

5. Models

5.1. Oxide and UNH Storage

In KENO V.a we modeled the canisters, receptacles, and surrounding concrete using the drawings referenced in Section 4 and other sources as specified. Appendix D includes the Excel spreadsheets used to determine various material densities used in the KENO V.a models. The polybottles and steel-walled canisters are set into steel-lined receptacles which are surrounded by concrete on the sides and bottom. To simulate water flooding we placed water in the void region surrounding the canister. In some problems, we also placed water inside the canister in order to simulate admission of water through damaged or corroded canister walls, or other inadvertent violation of moderation controls. Figure 1 shows a schematic representation of the uranium oxide receptacle region with a canister inserted. For single unit calculations we placed this unit into a 100-cm-edge concrete cube with the lid centered in and flush with a cube face. (100-cm is thick enough to be effectively infinite.) Table 2 includes the dimensions of the components of the model shown in Fig. 1.

Uranium oxides are currently being stored in 6-inch diameter containers, however—when our calculations showed double contingency requirements are not being met for mass and moderation control—we also examined 5-inch containers for uranium oxides.

For array calculations we set up a model which closely represents the actual storage area. In this model we used the KENO V.a “hole geometry” option to model the triangular pitch of the receptacles in the below-ground storage area. A unit cell was modeled such that the use of X and Y reflection boundary conditions in KENO results in a simulation of an infinite planar array. The model is sketched in Fig. 2. Constituents of the “X-345” concrete were determined by an analysis which is summarized in GAT-DM-1444, Rev. 1.⁵ We did some comparison calculations with different concrete models and found differences in k_{eff} of less than 2%, as was found also in earlier Portsmouth calculations reported in POEF-T-3489⁶. Materials stored in the containers are described in Appendix D, Tables D1-D8. We obtained densities for UO₂ and UO₃ from the Atlantic-Richfield Criticality Handbook,⁷ page III.B.2-2. Densities for U₃O₈ are determined using ORNL/CSD/TM-284, Appendix A, Eq. A.1. Densities for UNH are from the Atlantic-Richfield Criticality Handbook⁷ and from the *Handbook of Inorganic Chemistry*.⁸

^a The enrichment assumed in this study was 97.65% ²³⁵U as reported in POEF-T-3447 and in other documents. The detailed weight percents are as follows: ²³⁴U: 1.50%; ²³⁵U: 97.65%; ²³⁸U: 0.85%.

^b Concern for criticality in the event of leakage of a polybottle into a storage receptacle led facility management to move solutions containing more than 350 gm ²³⁵U to another building.

Fig. 1. Schematic of X-345 oxide and UNH receptacle region modeled in KENO V.a. (not to scale)

Fig. 2. Schematic of unit cell used in KENO V.a array calculations (not to scale). Reflection X & Y boundary conditions are used to simulate an infinite planar array.

Table 2. X-345 uranium oxide and UNH storage receptacle materials.^a

Region	Materials in Region	Radius (cm)	Length (cm)
Canister	carbon steel ^b	7.699 or 6.429 ^e	38.258 ^e
Canister contents	UO ₂ , UO ₃ , U ₃ O ₈ , void, water	7.62 or 6.35 ^e	38.1 ^e
Polybottle ^c	Polyethylene	5.97375 ^e	45.829 ^e
Polybottle contents	UNH	5.8738 ^e	45.72 ^e
Receptacle interior	void, water	10.95375 ^f	67.31 ^f
Receptacle ^d	carbon steel	11.24585 ^f	69.215 ^f

^a The materials are described in detail in Appendix D, Tables D1-D8.

^b Steel canisters are used for uranium oxide storage.

^c Polybottles are used for UNH storage.

^d The base is 0.635 cm thick and the lid is 1.27 cm thick.

^e Dimensions obtained from Rich Boelens, department engineer for uranium materials handling, PGDP.

^f Dimensions from drawing X-345-S18, Rev. 1.

5.2 UF₆ Cylinder Storage

We also examined the storage of 8-inch UF₆ cylinders. Our KENO model is described in Fig. 3 and in Table 3.^a The initial loading of the cylinder is 255 pounds of solid UF₆. Various amounts of water are added at the top of the cylinder, producing UO₂F₂ hydrate (at H/U < 4), or UO₂F₂ solution (at H/U ≥ 4). We used the density relationships reported by Jordan and Turner in ORNL/CSD/TM-284, Appendix A.⁹ (Note that the density of ²³⁵U in the UO₂F₂ hydrates (H/U < 4) is greater than that for solid UF₆.) Appendix D, Table D9 shows the material compositions used in the KENO V.a problems.

5.3 Uranium Metal Storage

Current limits⁴ for uranium metal storage in X-345 include the following:

1. A container or several containers with multiple pieces of uranium metal may be stored in a receptacle if the total ²³⁵U mass is less than 3 kg.
2. A container with a single piece of uranium metal may be stored in a receptacle if the ²³⁵U mass is less than 10 kg.
3. The above mass limits do not apply if the uranium metal containers have an inside diameter of 2.7 inches or less; however, the container must have physical supports to center it in the receptacle.
4. As with other non-UF₆ compounds, if more than 8 kg ²³⁵U is in a receptacle, the surrounding storage spaces must be empty.

These limits assure that the mass of uranium metal is well below that permitted by American National Standard ANSI/ANS-8.1-1983.¹ We thus did not consider it necessary to do additional studies for uranium metal in the storage receptacles.

^a Our KENO runs inadvertently used a monel thickness equal to the oxide canister wall thickness rather than the 3/16-inch value shown in the drawing. The KENO problems were later rerun with a PC version of KENO.

Fig. 3. Schematic of X-345 UF_6 receptacle region modeled in KENO V.a (not to scale)

Table 3. X-345 materials for 8 in.-diameter UF_6 cylinder calculations.

Region	Materials in Region	Radius (cm)	Length (cm)
Cylinder	monel	10.6273 ^a	125.41 ^a
Cylinder Contents ^b	UF_6 , UO_2F_2 , H_2O	10.16 ^a	124.4756 ^a
Receptacle ^c	carbon steel	17.78 ^c	151.765 ^c
Receptacle Interior	void, water	17.2244 ^d	149.86 ^d

^a Dimensions from Portsmouth drawing CX-761-M2012

^b The materials are described in detail in Appendix D, Table D-9.

^c The receptacle base is 0.635 cm thick and the lid is 1.27 cm thick.

^d Dimensions from Portsmouth drawing X-345-S18, Rev. 1.

6. Input/Output Notation

Each of the KENO runs prepared for this study is identified by a Problem ID which incorporates a coding which provides an overview of the problem characteristics. The explanation of the coding is included in Appendix E. Appendix E also includes a summary of the KENO results. The KENO problem inputs are included in Appendix F.

7. Contingencies

Appendix A of American National Standard ANSI/ANS-8.1-1983¹ includes examples of variations in process controls that should be considered in criticality safety studies. Discussions with Portsmouth's staff lead us to believe that contingencies which must be considered in the vault areas should include the items listed in Table 4.

Table 4. X-345 vault contingencies.

ANSI/ANS-8.1-1983 ¹	X-345 Vault Application
A change in intended shape or dimensions resulting from bulging, corrosion, or bursting of a container, or failure to meet specifications in fabrication.	Canisters may be dropped, punctured, suffer from corrosion, damaged in fires, etc.
An increase in the mass of fissionable material in a location as the result of operational error, improper labeling, equipment failure, or failure of analytical techniques.	Administrative or analytical error could result in mass limits being exceeded. A canister could receive more material than allowed, up to complete filling.
A change in the ratio of moderator to fissionable material resulting from: (a) Inaccuracies in instruments or chemical analyses, (b) Flooding, spraying, or otherwise supplying units or groups of units with water, oil, snow (i.e., low-density water), cardboard, wood, or other moderating material.	Moderators may be mixed with the fissile material in excess of the allowances. Materials exposed to moist air could absorb water. Water could enter the receptacles from ground or surface sources and mix with the fissile material if canisters are improperly sealed or breached due to breakage, puncture, or corrosion. (The history of water intrusion events for the X-345 vault is included in POEF-T-3447 ¹⁰).

In our computations we model the canisters in their normal state, but also simulate some violations of controls—specifically, mass, moderation, and reflection. In the present study we do not determine the probabilities of these abnormal conditions occurring. (A separate probabilistic analysis, outlined in GDPNCS-92-05,² will be documented separately). The four stages of water moderation that we modeled are included in Table 5.

Table 5. Various stages of water moderation conditions modeled for HEU vault.

Stage	Description
1	Water enters a receptacle, but the canister is intact and there is no contact between the fissile material and water.
2	Water enters a receptacle and subsequently into the canister, but the water remains in the void space in the canister and does not mix with the fissile material.
3	Water enters a receptacle and a canister, and mixes with the fissile material, but the mixture remains confined to the canister volume.
4	Water enters a receptacle and into a canister and the fissile material is dispersed into the volume of the receptacle.

8. Results of Calculations

8.1 Single Units

8.1.1 UO₂

Fig. 4. Schematic of oxide storage receptacle and canister interior.

Although the focus of this study is a storage vault, the subcriticality of any single unit must always be assured—so we began this study with a look at single units, stored as depicted in Fig. 4. In Figs. 5 and 6 we show the results of KENO calculations for single canisters.^a Fig. 5 shows what can happen when the uranium oxide *mass* is not controlled. The material densities for the various cases are given in Appendix D, Table D1. In this series of calculations the H/U is kept at 10 and the mass of UO₂ varies. The void space in the receptacle is filled with water. The results show that criticality is possible for 6-inch diameter canisters, but not for 5-inch diameter canisters.

Figure 6, which represents stage 3 of Table 5, shows what can happen if *moderation* is not controlled. The series begins with a density of 10.96 for crystalline UO₂ at H/U=0. We assume that water first enters and fills the space in the receptacle outside the canister. We assume that some water gets past the steel and plastic barriers^b and then enters the canister and begins to mix with the UO₂. In addition, we assume that the water which enters the canister, measured by the water height above initial UO₂ level, totally mixes with the UO₂, and that the final volume is the sum of the water and UO₂ volumes, i.e., no volume changes due to chemical mixing. The UO₂ density decreases as the UO₂-water volume increases, until the canister is full.^c The material densities for the various cases are given in Appendix D, Table D5 (6-inch) and D6 (5-inch). Again, the KENO results show that 6-inch diameter containers are not safe with water addition, but 5-inch containers are safe. Although there may be other means of assuring that double contingency requirements are met—we recommend a change from 6-inch diameter containers for HEU storage to 5-inch diameter containers. This change would help to insure compliance with current standards and DOE orders¹¹ which require that “wherever practicable, reliance be placed on equipment design in which dimensions are limited rather than on administrative controls.”

^a In section 8.1.3 of this report we look at what happens if a container is breached and the fissile material and water are dispersed into the larger volume of the receptacle.

^b The canisters are sealed in two plastic bags to reduce the probability of water intrusion.

^c In Figs. 5 & 6 the dashed line at 0.95 represents the maximum value of $k_{\text{eff}} + 2\sigma + \text{bias}$ for this version of SCALE/KENO supported by MMES validation calculations.³

Fig. 5. Variation of UO_2 loading for single canisters inside water-flooded storage receptacles. The H/U is 10. The canister loading limit of 8 kg is indicated. The interior of each canister is unflooded. Results are shown for canisters with diameters of 5 and 6 inches. This is stage 1 of Table 5. The dashed line gives $k_{\text{eff}} = 0.95$.

Fig. 6. Loss of moderation control for single UO_2 -loaded canisters in storage receptacles for two canister diameters. The mass loading is fixed at 8 kg ^{235}U . As water is added to the unmoderated, crystal-density UO_2 , the UO_2 density decreases and the H/U and mixture volume increase until the canister is full. The circled numbers show approximate location of several values of H/U for the mixed canister contents. This is stage 3 of Table 5. The dashed line gives $k_{\text{eff}} = 0.95$.

We also looked at moderation variations, stage 3 in Table 5, for ^{235}U masses less than 8 kg in single 6-inch diameter canisters. A canister containing a smaller amount of fissile material has room for additional moderator. Figure 7 shows the results of moderation variation for 2, 5, and 8 kg ^{235}U masses. The 8 kg case exceeds $k_{\text{eff}} + 2\sigma = 0.95$ for $H/U \cong 12$; the 5 kg case exceeds $k_{\text{eff}} + 2\sigma = 0.95$ for $H/U \cong 20$; and the 2 kg case exceeds $k_{\text{eff}} + 2\sigma = 0.95$ for $H/U \cong 60$. The material densities for the various cases are given in Appendix D, Table D5.

Fig. 7. Loss of moderation control for single 6-inch diameter UO_2 -loaded canisters in storage receptacles. Three mass loadings are selected. As water is added to the unmoderated, crystal density, UO_2 the uranium density decreases and the H/U and mixture volume increase until the canister is full. The dashed line gives $k_{\text{eff}} = 0.95$.

Criticality safety is required for units outside of the underground storage area also. Since the canisters are not in the underground storage area 100% of the time, we did some calculations for units outside of the storage area. If a fissile unit is not closely surrounded in concrete (or other effective reflector) standard practice is to assume that thick water reflection will represent surrounding materials (cf. ANS-8.1-1983, Sec. 5)¹. Table 6 shows a comparison of KENO V.a results for units inside and outside of storage receptacles. The cases of Table 6 correspond to UO_2 units containing ^{235}U and water at the maximum vault allowances as summarized in Appendix G. The first row of Table 6 shows KENO V.a results for canisters immersed in thick water. The second row shows results for the same units inside a storage receptacle which has been flooded by water. The differences in the results are not significant so we assume, therefore, that the flooded receptacle results also apply to units outside of the storage receptacles. The material densities are given in Appendix D, Table D1.

Table 6. Results of KENO V.a Calculations for 6-Inch Canisters Containing Maximum Permitted Loadings^a of UO₂

	k_{eff} +2σ		
(H/U; ²³⁵U mass)^a:	65; 2	15; 5	10; 8
Canister outside of receptacle & immersed in thick water reflector	0.935	0.882	0.897
Canister inside water-flooded receptacle	0.947	0.884	0.915

^a The canisters contain UO₂ at the mass limits described in Appendix G. The materials are described in Table 1 and Appendix D, Table D1.

8.1.2 UO₃ and U₃O₈

It was not necessary to do extensive calculations for all forms of uranium oxides. For a given H/U and mass of enriched uranium, UO₂, UO₃, and U₃O₈ are neutronically about the same (oxygen is merely a diluent). Table 7 shows statistically insignificant differences in the KENO results for the various oxides under comparable conditions, representing stage 3 in Table 5. The material densities are given in Appendix D, Tables D1-D3.

Table 7. Results of KENO V.a calculations for uranium oxide single units in 6-inch canisters.

Material^a	Receptacle Flooding	k_{eff} +2σ
UO ₂	Yes	0.884
U ₃ O ₈	Yes	0.878
UO ₃	Yes	0.890
UO ₂	No	0.804
UO ₃	No	0.814

^a The H/U is 15 and the ²³⁵U mass is 5 kg.

8.1.3 Container Breaching

If there should be a water flooding incident involving a receptacle containing high-enriched uranium a criticality incident could occur if the fissile material container is breached and fissile material is dispersed into the water outside of the container. The KENO V.a model for this scenario, stage 4 in Table 5, involves admitting water into the container and permitting increasingly larger amounts of UO₂ or UNH to be dispersed throughout the container and receptacle volume, until all of the fissile material is dispersed. The canister for UO₂ is 6-inches in diameter^a and initially holds 8 kg ²³⁵U with H/U=10. The UO₂ material densities are

^a The maximum loadings are given in MMES Internal Memorandum 504-87-04, in the form of purity (moderator) limits (summarized in Appendix G of this report).

^a Similar results can be expected for 5-inch diameter canisters since the 5- and 6-inch canisters k effectives are close for no dispersal, and for complete dispersal the canister diameter is unimportant.

given in Appendix D, Table D7. The UNH container is assumed to contain $\text{UO}_2(\text{NO}_3)_2 \cdot 6(\text{H}_2\text{O})$ with 5.56 kg ^{235}U . The UNH material densities are given in Appendix D, Table D8. Figure 8 shows results of calculations. The UO_2 case exceeds $k_{\text{eff}} + 2\sigma = 0.95$ for no uranium dispersed. With less than 12% of the UNH dispersed $k_{\text{eff}} + 2\sigma$ exceeds 0.95.

Fig. 8. KENO V.a calculations for receptacle and canister flooding with subsequent dispersal of the uranium from the 6-inch container into the receptacle volume. The ^{235}U mass is 8 kg in the UO_2 cases and 5.56 kg in the UNH cases. The dashed line gives $k_{\text{eff}} = 0.95$.

8.1.4 UF_6

Although UF_6 is stored in pressure-coded vessels and the chance of loss of moderation control is remote, there is a criticality potential if water should enter an 8-inch cylinder containing high-enriched UF_6 . A series of KENO V.a^b calculations shows what could happen for various amounts of water admission to a single cylinder in a storage receptacle (stage 3 in Table 5). When water is admitted to UF_6 a UO_2F_2 hydrate or solution can form. In our model the $\text{UO}_2\text{F}_2\text{-H}_2\text{O}$ mixture sits on top of dry UF_6 (see Fig. 3). We considered it important to use the best data available for $\text{UO}_2\text{F}_2\text{-H}_2\text{O}$ and thus did not use the KENO default densities, which are non-conservative for low H/U values. We used density formulations reported in ORNL/CSD/TM-284, Appendix A.⁹, which show that the density of ^{235}U is higher in the hydrate than in the dry UF_6 for low H/U values. The material densities for the various cases are given in Appendix D, Table D9.

Fig. 9 shows the KENO results for a single UF_6 -loaded 8-inch cylinder in a water-flooded receptacle. The calculations were performed by inserting the volume of water into the cylinder as given by the abscissa and mixing an amount of UF_6 with this water to give the required H/U. Criticality is definitely of concern when water is admitted into a cylinder. This result is not surprising, as the cylinder diameter of 20.4 cm exceeds the single-parameter

^b The results of this section were obtained with a PC version of SCALE/KENO maintained by the LLNL Fission Energy and Systems Safety Program (FESSP). These replace calculations prepared before detailed drawings were obtained and used a cylinder wall thickness which was too thin and a uranium loading which was slightly too high. When this was noticed we no longer had access to the ORNL system. The PC calculations show that a small increase in water volume is needed to produce $k_{\text{eff}} = 0.95$, mostly due to increased neutron absorption in the additional mass of monel in the new model.

UO₂F₂ solution limit of 13.7 cm given in American National Standard ANSI/ANS-8.1-1983¹. We recommend that high-enriched UF₆ be stored in cylinders which do not exceed the limit of ANSI/ANS-8.1-1983¹.

Fig. 9. Loss of moderation control for a single UF₆-loaded cylinder in a water-flooded storage receptacle. The initial mass of UF₆ is 255 lb (115.67 kg). Water is added to the top of the UF₆, producing UO₂F₂·xH₂O. The dashed line gives $k_{\text{eff}} = 0.95$.

Loss of moderation control is a criticality safety concern even for UF₆ cylinders in unflooded receptacles. In Fig. 10 we show the results of KENO V.a calculations for cases that are analogous to cases in Fig. 9, however there is no water in the receptacle space. These calculations show that criticality is possible with a little more water admitted into a cylinder.

Fig. 10. Loss of moderation control for a single UF_6 -loaded cylinders in a dry storage receptacle. The initial mass of UF_6 is 255 lb (115.67 kg). Water is added to the top of the UF_6 , producing $\text{UO}_2\text{F}_2 \cdot x\text{H}_2\text{O}$. The dashed line gives $k_{\text{eff}} = 0.95$.

8.2 Arrays

8.2.1 UO_2

In some vaults neutron interaction between units is important. The calculations of this study show that this is not the case for the HEU storage area. We compared results of calculations for isolated 6-inch diameter canisters with results for arrays of the same canisters inserted in unflooded underground storage receptacles. Table 8 shows the KENO results for various amounts of water mixed with the UO_2 to give the H/U values indicated. The differences between single units and arrays are very small. This is due to the large amount of isolating concrete between the receptacles. Since array interaction is not significant and the results reported in Sec. 8.1 show that unbreached single units (not exceeding mass or moderation limits) are subcritical, the storage array is also subcritical.

Table 8. Results of KENO V.a calculations for UO₂^a -loaded 6-inch canisters for various H/U values.

	$k_{eff} + 2\sigma$		
[H/U; ²³⁵ U mass(kg)] ^a :	65; 2	15; 5	10; 8
Isolated units	0.860	0.804	0.834
Infinite planar array	0.871	0.827	0.845

^a The canisters contain UO₂ at the mass limits described in Appendix G. The materials are described in Table 1 and Appendix D, Table D1.

The density of uranium oxide can vary depending on how it is prepared, packed, or settles in storage and handling. We ran a series of KENO runs for infinite planar arrays containing 8 kg ²³⁵U in which the density of dry UO₂ varied from crystal density to the minimum permitted by the container size, i.e. the oxide distributed uniformly throughout the volume of the canister. Fig. 11 shows the results. The maximum k_{eff} is for crystal density material, with no enhancement of reactivity resulting from density reduction.

Fig. 11. Variation of UO₂ density for an infinite planar array of 6-inch diameter canisters inside unflooded storage receptacles. Each canister is loaded with unmoderated UO₂ containing 8 kg of ²³⁵U. The maximum density and minimum UO₂ volume is for crystal density material. The minimum density is for complete filling of the canister.

8.2.2 UNH

We also looked at uranyl nitrate hexahydrate (UNH) in polybottle containers inside the storage receptacle array. The material densities are given in Appendix D, Table D4. Table 9 shows results of calculations for infinite planar arrays. There is no concern for criticality even when water floods the receptacles unless the polybottle contents are dispersed into the larger receptacle volume, as seen in Section 8.1.3.

Table 9. Results of KENO V.a calculations for UNH^a -loaded polybottles in HEU storage receptacles.^b

Condition	$k_{\text{eff}} + 2\sigma$
No receptacle flooding	0.631
Receptacles flooded	0.742

^a The polybottles are filled with UNH which is described in Table 1 and Appendix D, Table D4.

^b An infinite planar array model is used (see Fig. 2).

8.2.3 Hydrogen Content in Concrete

Array reactivity can be affected by the water content of the concrete. We simulated the effect of changes in the water content through a series of KENO calculations for an infinite array of 6-inch canisters with 8 kg ²³⁵U in UO₂-H₂O with H/U=10. The results are shown in Figure 12. An increase or decrease of the water content by a factor of two does not have a significant effect, however the unlikely scenario of complete removal can cause a noticeable increase in k_{eff} .

Fig. 12. Variation of hydrogen content of vault concrete for 6-inch-diameter canisters loaded with UO₂-H₂O inside dry storage receptacles. The hydrogen density is relative to the density as analyzed for the vault concrete. The mass of ²³⁵U is 8 kg, with H/U=10. An infinite planar array is modeled (see Fig. 2). The dashed line gives $k_{\text{eff}} = 0.95$.

9. Conclusions and Recommendations

There are scenarios that could result in criticality in the HEU storage areas. These include loss of moderation control or exceeding uranium mass allowances. In addition to concern for criticality safety for units in storage receptacles, there is concern for the 6-inch diameter oxide canisters when they are handled outside of the below-ground storage receptacles or at other plant locations. A single over-mass unit or unit with additional moderator could possibly become critical when reflected by the equivalent of close-fitting water. In other words, double contingency safety is not assured for the 6-inch diameter canisters in the event of mass or moderation in excess of the current limits (cf. Figs. 5 and 6).

This criticality potential for oxide storage can be diminished, however, if 5-inch, or smaller, diameter containers are used. This change would help to insure compliance with current standards and DOE orders, e.g. DOE 5480.24¹¹, Section 7a(2), requires:

4.2.3 Geometry Control. As a first priority, reliance shall be placed on equipment design in which dimensions of the contained fissionable material and spacing between equipment are limited via passive engineering controls...

Even with smaller diameter containers, there still is a potential for criticality if a receptacle containing an open or breached container is flooded. The likelihood of flooding and breaching is being investigated by a separate probabilistic analysis. However, the potential can be eliminated by minimizing the possible admission of water into receptacles by filling the receptacle void space with a non-porous, filler material, such as a sleeve with an appropriate diameter hole to receive a canister. In addition, the use of more nearly "leak-proof" container materials is recommended, as has been suggested in earlier analyses.¹⁰

This study has also shown that the UF₆ canisters with high-enriched uranium will be a criticality hazard if there is loss of moderation control. Criticality safety thus depends upon maintaining the UF₆ in a dry condition. In order to ensure subcriticality if moderation control is not maintained, we recommend that high-enriched UF₆ be stored in cylinders with diameters which do not exceed the single-parameter limit (13.7 cm) of Table 1 of ANSI/ANS-8.1-1983.¹

10. References

1. *American National Standard for Nuclear Criticality Safety in Operations with Fissionable Material Outside Reactors*, ANSI/ANS 8.1, American Nuclear Society, LaGrange Park, Illinois, October 7, 1983.
2. Lutz, H. F., *Activity Plan for X-345 Sub Task*, memo to Tom Lemons, GDPNCS-92-05, March 6, 1992.
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4. Portsmouth Gaseous Diffusion Plant Final Safety Analysis Report, Volume 1-3, GAT/GDP-1073, April, 1985.
5. Tayloe, R. W., *Summary of Nuclear Criticality Safety Rules for X-345 Storage Building*, Goodyear Atomic Corporation, GAT-DM-1444, Rev. 1, April 10, 1984.
6. Newvahner, R. L., *Nuclear Criticality Safety Analysis of X-345 Storage Building*, Martin Marietta Energy Systems, Inc., POEF-T-3489, September 30, 1988.
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8. Gmelin, *Handbook of Inorganic Chemistry, 8th Ed., Supplement Volume C7, Nitrogen Compounds*, Springer-Verlag, Berlin, 1981.
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10. Rumble, Bonnie J., *Water Intrusion into X-345 Vaults*, Martin Marietta Energy Systems, Inc., POEF-T-3447, March 3, 1987.
11. *Nuclear Criticality Safety*, DOE Order 5480.24, U.S. Department of Energy, Washington, D.C., August 12, 1992.
12. Oxenham, R. L., Netzer, W. D., and Miller, R. R., *Interim Moderation Control Limits for Oxides in X-345*, Martin Marietta Energy Systems, Portsmouth, POEF-DM-1554, March 10, 1988.
13. D. A. Shisler, Martin Marietta Energy Systems, Portsmouth, Nuclear Materials Control, internal correspondence 504-87-04, January 9, 1987.

APPENDIX A

Documentation on X-345 Criticality Calculations

The following letters and reports document the calculational efforts to set the design limits and administrative controls in X-345:

Author	Date	Report Number	Title
Feuerbacher, J. L.	2/21/69	GAT-DM-1128	A Nuclear Safety Guide for Handling, Storing and Recovering Uranium Metal Slugs, Pellets and Shavings, and High Density Uranium Compounds
Feuerbacher, J. L.	11/1/74	GAT-532-74-187	Containers of Uranium Oxide in Special Vaults
Feuerbacher, J. L.	5/11/76	GAT-532-76-143	Safe Fill of Uranium Oxide in 5" (ID) or 6" (ID) Cans at Limited Moderation, for All Enrichments
Feuerbacher, J. L.	6/8/76	GAT-532-76-184	Nuclear Safety of Storing 5.24" ID and 6-3/16" ID Cans of Uranium Oxide at Limited Moderation in a Proposed Vault Layout
Feuerbacher, J. L. and K. R. Yates	11/17/76	GAT-DM-1345	Storing 5", 8" and 12" UF ₆ Cylinders in Vaults Under the Concrete Floor of a Storage Building
Oxenham, R. L.	10/3/77	GAT-530-77-73	The Approval of Drawings of Proposed In-Floor Storage Arrangements for Future X-345 Facility
Feuerbacher, J. L.	12/14/77	GAT-530-77-97	Studies of Most Recent Design for X-345
Feuerbacher, J. L. and K. R. Yates	1/18/77	GAT-DM-1354, Addendum 1	Storing 5", 8" and 12" UF ₆ Cylinders in Vaults Under the Concrete Floor of a Storage Building - Multiplication Factors of Single 8" and 12" Cylinders Reflected by Concrete,
Feuerbacher, J. L. and K. R. Yates	2/10/77	GAT-DM-1358	Storing 5" ID x 48" Polybottles of Uranium Solution, 5" ID x 911 Plastic Bottles of UNH, and 4" ID x 9-1/2" Polybottles of Uranium Oxide in Vaults Under the Concrete Floor of a Storage Building
Yates, K. R.	3/16/77	GAT-DM-1358, Addendum 1	The Consequence of Spilling the Contents of a 5" ID x 48" Polybottle into Open (or Leaking) Vaults (Receptacles) Containing 5" ID x 48" Polybottles or 5" ID UF ₆ Cylinders
Feuerbacher, J. L. and K. R. Yates	4/5/77	GAT-DM-1354, Addendum 2	Storing 5", 8" and 12" UF ₆ Cylinders in Vaults Under the Concrete Floor of a Storage Building - Between Concrete Slabs for 5" Cylinders
Feuerbacher, J. L. and K. R. Yates	5/9/77	GAT-DM-1358, Addendum 2	6" ID x 15" Cans of Oxide at H/U Between 0.4 and 15.0 in the New SNM Building
Feuerbacher, J. L.	8/11/80	GAT-DM-1358, Addendum 3	Storing 5" ID x 48" Polybottles of Uranium Solution, 5" ID x 9" Plastic Bottles of UNH, and 4" ID x 9-1/2" Polybottles of Uranium Oxide in Vaults Under the Concrete Floor of a Storage Building
Feuerbacher, J. L.	9/19/80	GAT-DM-1358, Addendum 4	Storing 5" ID x 48" Polybottles of Uranium Solution, 5 ID x 9" Plastic Bottles of UNH, and 4" ID x 9-1/2" Polybottles of Uranium Oxide in Vaults Under the Concrete Floor of a Storage Building
Feuerbacher, J. L.	2/20/80	GAT-DM-1444, Appendices I and II	Summary of Nuclear Criticality Safety Rules for X-345 Storage Building
Shively, D. M. and R. W. Tayloe	5/16/83	GAT-T-3234,	Criticality Calculations for Flooded Oxide Containers in X-345

Newvahner, R. L.	9/30/88	POEF-T-3489	Nuclear Criticality Safety Analysis of X-345 Uranium Solution Storage Incident
Tayloe, R. W.	4/10/84	GAT-DM-1444, Rev. 1	Summary of Nuclear Criticality Safety Rules for X-345 Storage Building
Rumble, Bonnie J.	3/9/87	POEF-T-3447	Water Intrusion into X-345 Vaults

APPENDIX B

KENO V.a / SCALE Job Control Description

```

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IEF097I B6PAB - USER B6P ASSIGNED
12:01:51 IAT4401 LOCATE FOR STEP=GO DD=STEPLIB DSN=NCSS.ZAZ39461.NCSS.V1R000.S000.LOAD
12:01:51 IAT4402 UNIT=3380 ,VOL(S)=PSDE03
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12:01:51 IAT4402 UNIT=3380 ,VOL(S)=PSDS02
12:01:51 IAT4401 LOCATE FOR STEP=GO DD=STEPLIB DSN=NCSS.ZAZ39461.KENOV.A.V1R000.S000.LOAD
12:01:51 IAT4402 UNIT=3380 ,VOL(S)=PBDS00
12:01:51 IAT4401 LOCATE FOR STEP=GO DD=STEPLIB DSN=NCSS.ZAZ39461.STARTER.V1R000.S000.LOAD
12:01:51 IAT4402 UNIT=3380 ,VOL(S)=PSDS00
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12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PBDS00

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12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PSDE01
12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PSDS00
12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PSDS02
12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D SGNS11
12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PSDS01
12:01:52 IAT5110 JOB 8671 (B6PAB ) USES D PBDE01
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12:01:52 IAT5210 JOB STEPLIB (8671) X101 USING D PSDE03 ON 155
12:01:52 IAT5210 JOB STEPLIB (8671) X101 USING D PBDS00 ON C06
12:01:52 IAT5210 JOB STEPLIB (8671) X101 USING D PSDE01 ON 140
12:01:52 IAT5210 JOB STEPLIB (8671) X101 USING D PSDS00 ON E00
12:01:52 IAT5210 JOB STEPLIB (8671) X101 USING D PSDS02 ON 247
12:01:52 IAT5210 JOB FORTLIB (8671) X101 USING D SGNS11 ON E07
12:01:52 IAT5210 JOB FT81F001 (8671) X101 USING D PSDS01 ON C17
12:01:52 IAT5210 JOB FT83F001 (8671) X101 USING D PBDE01 ON 141
12:01:52 IAT2000 JOB 8671 B6PAB SELECTED X101 GRP=JS3BATCH
12:01:54 IEF403I B6PAB - STARTED - TIME=12.01.54
12:34:48 IEF404I B6PAB - ENDED - TIME=12.34.48
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// MSGCLASS=T, MSGLEVEL=(0,0) 00000020
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// MSGCLASS=T, MSGLEVEL=(0,0) 00000020
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IEF374I STEP /GO / STOP 93032.1234 CPU 5MIN 33.62SEC SRB OMIN 02.01SEC VIRT 1712K SYS 216K EXT
BK SYS 8756K

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* KXY0002 155 NCSS.ZAZ39461.BONAMI.V1R000.S000.LOAD *
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* KXY0002 E00 NCSS.ZAZ39461.COMPOZ.V1R000.S000.LOAD *
* KXY0002 E00 NCSS.ZAZ39461.WAX.V1R000.S000.LOAD *
* KXY0002 SYS00048 141 CATALOG.ICF.VFBDE01 *
* KXY0002 FORTLIB E07 SYS2.VSFLOAD *
* KXY0002 FT01F001 900 SYS93032.T120148.RA000.B6PAB.R0000001 197 6136 *
* KXY0002 FT02F001 C02 SYS93032.T120148.RA000.B6PAB.R0000002 6136 *
* KXY0002 FT03F001 900 SYS93032.T120148.RA000.B6PAB.R0000003 6136 *
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* KXY0002 FT10F001 C02 SYS93032.T120148.RA000.B6PAB.R0000009 81 1684 *
* KXY0002 FT11F001 900 SYS93032.T120148.RA000.B6PAB.R0000010 75 6136 *
* KXY0002 FT12F001 900 SYS93032.T120148.RA000.B6PAB.R0000011 6136 *
* KXY0002 FT13F001 900 SYS93032.T120148.RA000.B6PAB.R0000012 6136 *
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*KXY0002	FT92F001	C02	SYS93032.T120148.RA000.B6PAB.R0000021	3	6136	*
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*KXY0002	FT94F001	C02	SYS93032.T120148.RA000.B6PAB.R0000023		6136	*
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*KXY0002	QATABLE	140	NCSS.ZAZ39461.QATABLE	8	4000	*
*KXY0002	SYSIN	E00	B6PAB.DATA	2	4240	*
*KXY0003	VIRTUAL STORAGE USED 1712K			TOTAL EXCP COUNT FOR STEP 6,264		*
*KXY0004	01 FEB 93.032 12.34.48.54			CPU TIME FOR STEP 0005 MIN 35.63 SEC		*

IEF375I JOB /B6PAB / START 93032.1201

IEF376I JOB /B6PAB / STOP 93032.1234 CPU 5MIN 33.62SEC SRB 0MIN 02.01SEC

*KXY0003	TOTAL EXCP COUNT FOR JOB			6,264	*
*KXY0006	TOTAL PRINT LINES FOR JOB			2,111	*
*KXY0006	TOTAL PUNCH CARDS FOR JOB				*
*KXY0004	01 FEB 93.032 12.34.48.67	CPU TIME FOR JOB 0005 MIN 35.63 SEC			*
*KXY0005	X10 IBM 3090	**APPROXIMATE JOB COST* \$		92.73	*

1 PRIMARY MODULE ACCESS AND INPUT RECORD (NCSS DRIVER - 07/24/91 - 15.25)

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* Messages of current interest to NCSS users will appear here *

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* NCSS *

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* 2/26/92 *

* This is the QA version of the Martin Marietta Energy Systems criticality safety software. It is now *

* available for validation and production use. *

* *

Appendix C

Confirmatory Calculations with MCNP

A number of MCNP Monte Carlo neutron transport code calculations were done by an analyst who was not involved in setting up the KENO input, providing a degree of independent review. Also, since MCNP has been developed completely independently of KENO and employs very different Monte Carlo algorithms and cross section treatment (pointwise) we have additional assurance in the validity of the KENO results of this study. Table C1 shows close agreement between MCNP and KENO for comparable situations. For these studies, we used a cell depicted in Fig. 4-2 of POEF-3447¹⁰, which considered the receptacle to be off-center in a rectangular box in an effort to provide a conservative model for array calculations.

Table C1. Results of MCNP and KENO V.a calculations for UO₂^a in uranium oxide/UNH storage area.

Array	Receptacle Flooding	k _{eff}	
		MCNP	KENO
1 x 1 x 1	No	0.857 ± .003	0.867 ± .005
1 x 1 x 1	Yes	0.961 ± .003	0.988 ± .005
15 x 15 x 1	Yes	1.030 ± .002	1.021 ± .005

^a Each canister holds 8 kg ²³⁵U with H/U = 15 (8 kg was the H/U = 15 loading limit until the memo referenced in Appendix G lowered the limit to 5 kg).

We also compared MCNP and KENO calculations for UNH, with a level of hydration of 6, which is *doubly batched* inside the receptacle, with no container breaching or water flooding of the receptacle. Input data and results are provided in Table C2.

Table C2. Results of MCNP calculations for UNH in uranium oxide/UNH storage area.

			k _{eff}	
Compound	Density(g/cm ³)	Array	MCNP	KENO
UO ₂ (NO ₃) ₂ •6H ₂ O	2.807 ^a	∞ x ∞ x 1	0.8169 ± .0035	0.787 ± .005

^aThe crystalline density used here is somewhat higher than for loose powders which are actually stored. The density is from Reference 7, pp II.D.2-1.

Appendix D

**Computer Input Spreadsheets
for Uranium Oxides & UNH**

Material:	²³⁴ U	²³⁵ U	²³⁸ U	H	O	F	N	
AWt:	234.0409	235.0439	238.0508	1.0078	15.9994	18.9984	14.0067	
Wfrac:	0.0151	0.9765	0.0084					
Table D1. UO ₂								
H/U	rho(U) ^a	NU	N234	N235	N238	NH	NO	
10	2.10	5.380E-03	8.110E-05	5.254E-03	4.514E-05	5.380E-02	3.766E-02	
15	1.55	3.971E-03	5.986E-05	3.878E-03	3.332E-05	5.957E-02	3.773E-02	
65	0.40	1.025E-03	1.545E-05	1.001E-03	8.599E-06	6.661E-02	3.536E-02	
Table D2. UO ₃								
H/U	rho(U) ^b	NU	N234	N235	N238	NH	NO	
10	2.00	5.124E-03	7.724E-05	5.004E-03	4.299E-05	5.124E-02	4.099E-02	
15	1.50	3.843E-03	5.793E-05	3.753E-03	3.224E-05	5.765E-02	4.035E-02	
65	0.40	1.025E-03	1.545E-05	1.001E-03	8.599E-06	6.661E-02	3.638E-02	
Table D3. U ₃ O ₈								
H/U	rho(U) ^c	NU	N234	N235	N238	NH	NO	
10	1.93	4.945E-03	7.453E-05	4.829E-03	4.149E-05	4.945E-02	3.791E-02	
15	1.42	3.638E-03	5.484E-05	3.553E-03	3.052E-05	5.457E-02	3.699E-02	
65	0.39	9.941E-04	1.498E-05	9.708E-04	8.341E-06	6.462E-02	3.496E-02	
Table D4. UNH								
H/U	rho(U) ^d	NU	N234	N235	N238	NH	NO	NN
12	1.15	2.946E-03	4.441E-05	2.877E-03	2.472E-05	3.536E-02	4.125E-02	5.893E-03

^a Densities are from ARH-600, Page III.B.2-2

^b Densities are from ARH-600, Page III.B.2-2

^c Densities are determined using ORNL/CSD/TM-284, Appendix A, Eq. A.1.

^d Densities are from ARH-600, Page III.B.2-4

Table D5. Computer Input Spreadsheet Data for 6-inch Canisters with Admission of Water

AWt34	234.0409	Wfrac34	0.0151	AWtU	235.05401	RhoUO ₂	10.9600	Can Rad	7.620		
AWt35	235.0439	Wfrac35	0.9765	AWtH	1.00782	RhoU	9.5253	Can Len	38.100		
AWt38	238.0508	Wfrac38	0.0084	AWtO	15.9994						
mU235 8000		Vol UO ₂	860.080	LenUO ₂	4.7150						
WaterDepth ^a	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	4.7150	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-14.3350	0.1238	0.00
2	6.7150	0.7022	0.2978	1.673E-02	2.599E-04	1.421E-04	1.991E-02	4.423E-02	-12.3350	0.1762	1.16
4	8.7150	0.5410	0.4590	1.289E-02	2.002E-04	1.095E-04	3.069E-02	4.175E-02	-10.3350	0.2287	2.32
8	12.7150	0.3708	0.6292	8.837E-03	1.372E-04	7.506E-05	4.207E-02	3.913E-02	-6.3350	0.3337	4.65
10	14.7150	0.3204	0.6796	7.636E-03	1.186E-04	6.486E-05	4.544E-02	3.836E-02	-4.3350	0.3862	5.81
15	19.7150	0.2392	0.7608	5.700E-03	8.851E-05	4.841E-05	5.087E-02	3.711E-02	0.6650	0.5175	8.72
20	24.7150	0.1908	0.8092	4.547E-03	7.061E-05	3.862E-05	5.410E-02	3.636E-02	5.6650	0.6487	11.62
33.385	38.1000	0.1238	0.8762	2.949E-03	4.580E-05	2.505E-05	5.859E-02	3.533E-02	19.0500	1.0000	19.40
mU235 5000		Vol UO ₂	537.550	LenUO ₂	2.9469						
WaterDepth	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	2.9469	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-16.1031	0.0773	0.00
2	4.9469	0.5957	0.4043	1.420E-02	2.205E-04	1.206E-04	2.703E-02	4.259E-02	-14.1031	0.1298	1.86
4	6.9469	0.4242	0.5758	1.011E-02	1.570E-04	8.587E-05	3.850E-02	3.995E-02	-12.1031	0.1823	3.72
8	10.9469	0.2692	0.7308	6.416E-03	9.963E-05	5.449E-05	4.886E-02	3.757E-02	-8.1031	0.2873	7.44
10	12.9469	0.2276	0.7724	5.424E-03	8.424E-05	4.607E-05	5.164E-02	3.693E-02	-6.1031	0.3398	9.30
15	17.9469	0.1642	0.8358	3.913E-03	6.077E-05	3.324E-05	5.588E-02	3.596E-02	-1.1031	0.4710	13.95
20	22.9469	0.1284	0.8716	3.061E-03	4.753E-05	2.599E-05	5.827E-02	3.541E-02	3.8969	0.6023	18.59
35.1531	38.1000	0.0773	0.9227	1.843E-03	2.863E-05	1.566E-05	6.169E-02	3.462E-02	19.0500	1.0000	32.68
mU235 2000		Vol UO ₂	215.020	LenUO ₂	1.1787						
WaterDepth	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	1.1787	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-17.8713	0.0309	0.00
2	3.1787	0.3708	0.6292	8.837E-03	1.372E-04	7.506E-05	4.207E-02	3.913E-02	-15.8713	0.0834	4.65
4	5.1787	0.2276	0.7724	5.424E-03	8.424E-05	4.607E-05	5.164E-02	3.693E-02	-13.8713	0.1359	9.30
8	9.1787	0.1284	0.8716	3.061E-03	4.753E-05	2.599E-05	5.827E-02	3.541E-02	-9.8713	0.2409	18.59
10	11.1787	0.1054	0.8946	2.513E-03	3.903E-05	2.134E-05	5.981E-02	3.505E-02	-7.8713	0.2934	23.24
15	16.1787	0.0729	0.9271	1.736E-03	2.697E-05	1.475E-05	6.199E-02	3.455E-02	-2.8713	0.4246	34.86
20	21.1787	0.0557	0.9443	1.326E-03	2.060E-05	1.127E-05	6.314E-02	3.429E-02	2.1287	0.5559	46.48
36.9213	38.1000	0.0309	0.9691	7.373E-04	1.145E-05	6.262E-06	6.479E-02	3.391E-02	19.0500	1.0000	85.81

^a Water is added to the top of the UO₂ to the indicated depth and then mixed with the UO₂.

Table D6. Computer Input Spreadsheet Data for 5-inch Canisters with Admission of Water

AWt34	234.0409	Wfrac34	0.0151	AWtU	235.05401	RhoUO ₂	10.9600	Can Rad	6.350		
AWt35	235.0439	Wfrac35	0.9765	AWtH	1.00782	RhoU	9.5253	Can Len	38.100		
AWt38	238.0508	Wfrac38	0.0084	AWtO	15.9994						
m U235 8000		Vol UO ₂	860.080	LenUO ₂ 6.7896							
WaterDepth ^a	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	6.7896	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-12.2604	0.1782	0.00
2	8.7896	0.7725	0.2275	1.841E-02	2.859E-04	1.564E-04	1.521E-02	4.531E-02	-10.2604	0.2307	0.81
4	10.7896	0.6293	0.3707	1.500E-02	2.329E-04	1.274E-04	2.479E-02	4.311E-02	-8.2604	0.2832	1.61
8	14.7896	0.4591	0.5409	1.094E-02	1.699E-04	9.293E-05	3.617E-02	4.049E-02	-4.2604	0.3882	3.23
10	16.7896	0.4044	0.5956	9.638E-03	1.497E-04	8.186E-05	3.982E-02	3.965E-02	-2.2604	0.4407	4.04
15	21.7896	0.3116	0.6884	7.426E-03	1.153E-04	6.307E-05	4.603E-02	3.822E-02	2.7396	0.5719	6.05
20	26.7896	0.2534	0.7466	6.040E-03	9.380E-05	5.130E-05	4.991E-02	3.733E-02	7.7396	0.7031	8.07
31.3107	38.1000	0.1782	0.8218	4.247E-03	6.583E-05	3.603E-05	5.495E-02	3.617E-02	19.0500	1.0000	12.63
m U235 5000		Vol UO ₂	537.550	LenUO ₂ 4.2435							
WaterDepth	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	4.2435	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-14.8065	0.1114	0.00
2	6.2435	0.6797	0.3203	1.620E-02	2.515E-04	1.376E-04	2.142E-02	4.388E-02	-12.8065	0.1639	1.29
4	8.2435	0.5148	0.4852	1.227E-02	1.905E-04	1.042E-04	3.244E-02	4.135E-02	-10.8065	0.2164	2.58
8	12.2435	0.3466	0.6534	8.260E-03	1.283E-04	7.016E-05	4.369E-02	3.876E-02	-6.8065	0.3214	5.16
10	14.2435	0.2979	0.7021	7.100E-03	1.103E-04	6.031E-05	4.694E-02	3.801E-02	-4.8065	0.3738	6.46
15	19.2435	0.2205	0.7795	5.255E-03	8.161E-05	4.464E-05	5.212E-02	3.682E-02	0.1935	0.5051	9.68
20	24.2435	0.1750	0.8250	4.171E-03	6.478E-05	3.543E-05	5.516E-02	3.612E-02	5.1935	0.6363	12.91
33.8567	38.1000	0.1114	0.8886	2.654E-03	4.115E-05	2.252E-05	5.941E-02	3.514E-02	19.0500	1.0000	21.86
m U235 2000		Vol UO ₂	215.020	LenUO ₂ 1.6974							
WaterDepth	L+W	VFUO ₂	VFH ₂ O	N235	N234	N238	NH	NO	KENO-Z	Fract. full	H/U mix
0	1.6974	1.0000	0.0000	2.383E-02	3.701E-04	2.024E-04	0.000E+00	4.881E-02	-17.3526	0.0446	0.00
2	3.6974	0.4591	0.5409	1.094E-02	1.699E-04	9.293E-05	3.617E-02	4.049E-02	-15.3526	0.0970	3.23
4	5.6974	0.2979	0.7021	7.100E-03	1.103E-04	6.031E-05	4.694E-02	3.801E-02	-13.3526	0.1495	6.46
8	9.6974	0.1750	0.8250	4.171E-03	6.478E-05	3.543E-05	5.516E-02	3.612E-02	-9.3526	0.2545	12.91
10	11.6974	0.1451	0.8549	3.458E-03	5.371E-05	2.937E-05	5.716E-02	3.566E-02	-7.3526	0.3070	16.14
15	16.6974	0.1017	0.8983	2.423E-03	3.762E-05	2.058E-05	6.006E-02	3.499E-02	-2.3526	0.4383	24.21
20	21.6974	0.0782	0.9218	1.864E-03	2.895E-05	1.584E-05	6.163E-02	3.463E-02	2.6474	0.5695	32.28
36.4027	38.1000	0.0445	0.9555	1.062E-03	1.646E-05	9.007E-06	6.388E-02	3.412E-02	19.0500	1.0000	58.76

^a Water is added to the top of the UO₂ to the indicated depth and then mixed with the UO₂.

Table D7. Computer Input Spreadsheet Data for UO₂ Dispersed into Receptacle

8 kg ²³⁵U, H/U=10 before dispersal

Region	Volume (cc)	Cylinder dimension		Length (cm)	
cylinder:	6949.9983	inside:		38.1	
receptacle:	25372.0187	outside:		38.258	
monel:	327.8700	top & base:		0.158	

Thickness of UO ₂ removed & mixed with water	Volume of UO ₂ undispersed	Volume of UO ₂ dispersed	Volume of UO ₂ + water in canister	VF dispersed UO ₂	VF H ₂ O	Number Densities of Materials in Dispersed Region				
						²³⁴ U	²³⁵ U	²³⁸ U	H ₂ O	O
0	3901.2	0	3048.8	0.000	1.000				3.343E-02	3.343E-02
0.5	3810.0	91.2	3140.0	0.004	0.996	3.459E-07	2.241E-05	1.925E-07	3.329E-02	3.345E-02
1	3718.8	182.4	3231.2	0.008	0.992	6.888E-07	4.462E-05	3.834E-07	3.315E-02	3.347E-02
2	3536.4	364.8	3413.6	0.017	0.983	1.366E-06	8.849E-05	7.603E-07	3.287E-02	3.350E-02
3	3354.0	547.2	3596.0	0.025	0.975	2.032E-06	1.316E-04	1.131E-06	3.259E-02	3.354E-02
4	3171.5	729.7	3778.5	0.033	0.967	2.687E-06	1.741E-04	1.495E-06	3.232E-02	3.357E-02
6	2806.7	1094.5	4143.3	0.049	0.951	3.964E-06	2.568E-04	2.207E-06	3.180E-02	3.364E-02
8	2441.9	1459.3	4508.1	0.064	0.936	5.201E-06	3.370E-04	2.895E-06	3.129E-02	3.370E-02
10	2077.1	1824.1	4872.9	0.079	0.921	6.399E-06	4.145E-04	3.562E-06	3.079E-02	3.376E-02
14	1347.4	2553.8	5602.6	0.107	0.893	8.684E-06	5.626E-04	4.834E-06	2.985E-02	3.388E-02
18	617.7	3283.5	6332.3	0.134	0.866	1.083E-05	7.019E-04	6.030E-06	2.896E-02	3.400E-02
20	252.9	3648.3	6697.1	0.146	0.854	1.186E-05	7.685E-04	6.602E-06	2.854E-02	3.405E-02
21	70.5	3830.7	6879.5	0.152	0.848	1.236E-05	8.010E-04	6.882E-06	2.833E-02	3.408E-02
21.38645	0.0	3901.2	6950.0	0.155	0.845	1.256E-05	8.135E-04	6.989E-06	2.825E-02	3.409E-02

Table D8. Computer Input Spreadsheet Data for UNH Dispersed into Receptacle

5564.9 kg ^{235}U , $\text{UO}_2(\text{NO}_3)_2 \cdot 6(\text{H}_2\text{O})$

Region	Volume (cc)	Bottle dimension		Length (cm)							
bottle:	4955.4936	inside:		45.72							
receptacle:	25372.02	outside:		45.829							
bottle:	182.3899	top & base:		0.109							
Thickness of UNH removed & mixed with water						Number Densities of Materials in Dispersed Region					
						Volume of UNH undispersed	Volume of UNH dispersed	Volume of UNH + water in canister	VF dispersed UNH	VF H ₂ O	²³⁴ U
0	4955.5	0.0		0.0000	1.0000				3.343E-02	3.343E-02	
4	4521.9	433.6	433.6	0.0210	0.9790	9.316E-07	6.036E-05	5.186E-07	3.273E-02	3.359E-02	1.236E-04
6	4305.2	650.3	650.3	0.0311	0.9689	1.383E-06	8.960E-05	7.698E-07	3.239E-02	3.367E-02	1.835E-04
10	3871.6	1083.9	1083.9	0.0508	0.9492	2.258E-06	1.463E-04	1.257E-06	3.173E-02	3.383E-02	2.996E-04
14	3438.1	1517.4	1517.4	0.0698	0.9302	3.098E-06	2.007E-04	1.725E-06	3.110E-02	3.398E-02	4.111E-04
20	2787.7	2167.8	2167.8	0.0968	0.9032	4.298E-06	2.784E-04	2.392E-06	3.020E-02	3.419E-02	5.702E-04
30	1703.9	3251.6	3251.6	0.1385	0.8615	6.149E-06	3.984E-04	3.423E-06	2.880E-02	3.451E-02	8.159E-04
40	620.0	4335.5	4335.5	0.1765	0.8235	7.837E-06	5.077E-04	4.362E-06	2.753E-02	3.481E-02	1.040E-03
45.72	0.0	4955.5	4955.5	0.1967	0.8033	8.737E-06	5.660E-04	4.863E-06	2.685E-02	3.497E-02	1.159E-03

Table D9. Computer Input Spreadsheet Data for 8-inch UF₆ Cylinders with Admission of Water

AWt34 234.0409		Wfrac34 0.0151		AWtU 235.0540		AWtUF6 349.0444		AWtN 14.0067					
AWt35 235.0439		Wfrac35 0.9765		AWtH 1.0078		AWtU(nat) 238.0290		AWtF 18.9984					
AWt38 238.0508		Wfrac38 0.0084		AWtO 15.9994		AWtH2O 18.0160		RhoUF ₆ 5.0321					
SpMV(H2O) 9.0287				SpMV(UO2F2-2H2O) 72.2809				DensFacUF ₆ 1.0375 ^a					
H/U	rho(U)	NU	N234	N235	N238	NH	NO	NF	SPG ^b	rhoH ₂ O			
0.0000	3.3887	8.6823E-03	1.3167E-04	8.4786E-03	7.2013E-05	0.000E+00	0.000E+00	5.2094E-02	5.0315	0.0000			
2.0000	4.2660	1.0930E-02	1.6576E-04	1.0674E-02	9.0655E-05	2.1860E-02	3.2790E-02	2.1860E-02	5.8626	0.3270			
4.0000	3.2520	8.3318E-03	1.2635E-04	8.1364E-03	6.9106E-05	3.3327E-02	3.3327E-02	1.6664E-02	4.7183	0.4985			
8.0000	2.1701	5.5601E-03	8.4321E-05	5.4297E-03	4.6117E-05	4.4481E-02	3.3361E-02	1.1120E-02	3.4813	0.6653			
UF ₆ height ^c	Fraction of UF ₆ unmod-derated	UF ₆ Mass (kg)	Uranium Mass(kg)		H/U=2		H ₂ O Mass (gm)	H/U=4		H ₂ O Mass (gm)	H/U=8		H ₂ O Mass (gm)
					Thickness (cm)			Thickness (cm)			Thickness (cm)		
			dry	mod.	UO ₂ F2	UF ₆	UO ₂ F2	UF ₆	UO ₂ F2	UF ₆			
			0.5694	1.0000	115.6672	77.8928	0.0000	0.0000	70.8798	0	0.0000	70.8798	0
0.5200	0.9132	105.6271	71.1316	6.7612	4.8873	64.7273	518	6.4113	64.7273	1036	9.6073	64.7273	2073
0.5100	0.8956	103.5958	69.7637	8.1291	5.8760	63.4826	623	7.7084	63.4826	1246	11.5510	63.4826	2492
0.4800	0.8430	97.5020	65.6599	12.2329	8.8424	59.7483	938	11.5997	59.7483	1875	17.3822	59.7483	3750
0.4000	0.7025	81.2516	54.7166	23.1762	16.7526	49.7902	1776	21.9766	49.7902	3553	32.9319	49.7902	7105
0.3000	0.5268	60.9387	41.0375	36.8553	26.6405	37.3427	2825	34.9477	37.3427	5649	52.3692	37.3427	11299
0.2000	0.3512	40.6258	27.3583	50.5345	36.5283	24.8951	3873	47.9189	24.8951	7746	71.8064	24.8951	15492
0.1000	0.1756	20.3129	13.6792	64.2136	46.4161	12.4476	4921	60.8900	12.4476	9843	91.2436	12.4476	19686

^aDensity Factor = (5.075)(MU/MU_{nat})/4.85

where 5.075 is the density for unenriched UF₆, from Ref. 9,

4.85 is the KENO default density,

MU is the molecular weight for enriched UF₆,

and MU_{nat} is the molecular weight for unenriched UF₆.

^bSPG=(1/N_a) ∑ N_iA_i

where N_a = Avogadro's number,

N_i = Number density for material i,

and A_i = Atomic weight for material i.

^c(height of UF₆)/(cylinder height)

Appendix E

KENO Results Summary

Problem ID	keff	sigma	UF6_UO2F2_2_2825	0.9494	0.0030
			UF6_UO2F2_2_4921	1.0287	0.0033
UNH			UF₆ (H/U=4), dry recept.		
UNH_12_5.6_M_M_0	0.7365	0.0049	UF6_UO2F2_4_1036	0.7781	0.0027
UNH_12_5.6_M_M_4	0.9104	0.0047	UF6_UO2F2_4_1246	0.7896	0.0029
UNH_12_5.6_M_M_6	0.9592	0.0044	UF6_UO2F2_4_3553	0.9391	0.0032
UNH_12_5.6_M_M_10	1.0352	0.0048	UF6_UO2F2_4_5649	1.0094	0.0032
UNH_12_5.6_M_M_20	1.1268	0.0058	UF6_UO2F2_4_7746	1.0445	0.0032
UNH_12_5.6_M_M_30	1.1781	0.0053	UF6_UO2F2_4_9843	1.0736	0.0031
UNH_12_5.6_M_M_40	1.2024	0.0054	UF₆ (H/U=8), dry recept.		
UNH_12_5.6_M_M_45.72	1.2216	0.006	UF6_UO2F2_8_2073	0.8081	0.0028
UNH_12_5.6_D_D_INF	0.5823	0.0047	UF6_UO2F2_8_2492	0.8342	0.0031
UNH_12_5.6_W_D_INF	0.7239	0.0044	UF6_UO2F2_8_3750	0.9170	0.0034
UNH_12_5.6_M_M_INF	1.1132	0.0048	UF6_UO2F2_8_7105	1.0097	0.0035
UF₆ (H/U=2)			UF6_UO2F2_8_11299	1.0688	0.0039
UF6_UO2F2_2_0	0.8288	0.0029	UF6_UO2F2_8_15492	1.0907	0.0039
UF6_UO2F2_2_518	0.8313	0.0031	UF6_UO2F2_8_19686	1.1171	0.0032
UF6_UO2F2_2_623	0.8297	0.0030	Oxides In 6-Inch Canisters		
UF6_UO2F2_2_938	0.8499	0.0026	U3O8_15_5_W_D	0.8775	0.0057
UF6_UO2F2_2_1776	0.9286	0.0031	UO2_10_5_W_D	0.7966	0.0045
UF6_UO2F2_2_2825	1.0068	0.0033	UO2_10_10.5_W_D	0.9755	0.0051
UF6_UO2F2_2_3873	1.0519	0.0032	UO2_10_8_D_D	0.8341	0.0059
UF6_UO2F2_2_4921	1.0744	0.0032	UO2_10_8_D_D_REG	0.8267	0.0047
UF₆ (H/U=4)			UO2_10_8_D_D_INF	0.8448	0.0049
UF6_UO2F2_4_1036	0.8359	0.0029	UO2_10_8_M_M_0.5	0.9423	0.0044
UF6_UO2F2_4_1246	0.8386	0.0030	UO2_10_8_M_M_1	0.9690	0.0046
UF6_UO2F2_4_1875	0.8849	0.0031	UO2_10_8_M_M_2	1.0104	0.0040
UF6_UO2F2_4_3553	0.9843	0.0035	UO2_10_8_M_M_4	1.0864	0.0049
UF6_UO2F2_4_5649	1.0515	0.0036	UO2_10_8_M_M_6	1.1578	0.0048
UF6_UO2F2_4_7746	1.0841	0.0034	UO2_10_8_M_M_8	1.1826	0.0049
UF6_UO2F2_4_9843	1.1061	0.0037	UO2_10_8_M_M_10	1.2167	0.0057
UF₆ (H/U=8)			UO2_10_8_M_M_14	1.2366	0.0052
UF6_UO2F2_8_2073	0.8592	0.0033	UO2_10_8_M_M_18	1.2653	0.0049
UF6_UO2F2_8_2492	0.8904	0.0030	UO2_10_8_W_D	0.9146	0.0051
UF6_UO2F2_8_3750	0.9535	0.0034	UO2_10_8_W_D_H2O	0.8970	0.0046
UF6_UO2F2_8_7105	1.0455	0.0036	UO2_10_8_W_D_INF	0.9096	0.0051
UF6_UO2F2_8_11299	1.1015	0.0035	UO2_10_8_W_M_8.6	0.9766	0.0055
UF6_UO2F2_8_15492	1.1164	0.0035	UO2_10_8_W_M_16.7	1.0056	0.0049
UF6_UO2F2_8_19686	1.1220	0.0035	UO2_10_8_W_W	0.9303	0.0047
UF₆ (H/U=2), dry recept.			UO2_10_8_W_W_INF	0.9323	0.0054
UF6_UO2F2_2_0	0.7611	0.0028	UO2_10_FULL_D_D	0.9341	0.0053
UF6_UO2F2_2_518	0.7714	0.0028	UO2_10_FULL_D_D_INF	0.9472	0.0050
UF6_UO2F2_2_623	0.7727	0.0028	UO2_10_FULL_W_D	1.0147	0.0051
UF6_UO2F2_2_938	0.7918	0.0029	UO2_15_5_D_D	0.8038	0.0053
UF6_UO2F2_2_1776	0.8830	0.0031	UO2_15_5_D_D_INF	0.8265	0.0051

UO2_15_5_W_D	0.8842	0.0049
UO2_15_5_W_D_H2O	0.8818	0.0045
UO2_15_5_W_D_INF	0.8962	0.0053
UO2_15_5_W_M_5	0.9415	0.0052
UO2_15_5_W_M_15	1.0002	0.0065
UO2_15_5_W_M_20	1.0106	0.0049
UO2_15_5_W_W_INF	0.9121	0.0053
UO2_15_8_W_D	0.9977	0.0051
UO2_15_FULL_D_D	0.9575	0.0056
UO2_15_FULL_D_D_INF	0.9656	0.0060
UO2_15_FULL_W_D	1.0280	0.0050
UO2_65_1.2_W_D	0.8385	0.0055
UO2_65_2_D_D	0.8600	0.0058
UO2_65_2_D_D_H2O	0.9353	0.0052
UO2_65_2_D_D_INF	0.8712	0.0056
UO2_65_2_W_D	0.9471	0.0053
UO2_65_2_W_D_INF	0.9623	0.0057
UO2_65_2_W_M_7	0.9760	0.0053
UO2_65_2_W_M_8	0.9810	0.0050
UO2_65_2_W_M_10	0.9757	0.0048
UO2_65_2_W_W_INF	0.9662	0.0062
UO2_65_FULL_D_D	0.9158	0.0060
UO2_65_FULL_D_D_INF	0.9353	0.0051
UO2_65_FULL_W_D	0.9930	0.0056
UO3_15_5_D_D	0.8138	0.0052
UO3_15_5_W_D	0.8902	0.0055

Oxides In 6-Inch Canisters, 8 kg ²³⁵U

UO2_C_8_W_M_0	0.6497	0.0037
UO2_C_8_W_M_4	0.7501	0.0043
UO2_C_8_W_M_8	0.8345	0.0052
UO2_C_8_W_M_10	0.8463	0.0047
UO2_C_8_W_M_15	0.9150	0.0051
UO2_C_8_W_M_17	0.9183	0.0052
UO2_C_8_W_M_20	0.9520	0.0057
UO2_C_8_W_M_33	1.0016	0.0048

Oxides In 6-Inch Canisters, 5 kg ²³⁵U

UO2_C_5_W_M_0	0.4813	0.0036
UO2_C_5_W_M_2	0.6187	0.0037
UO2_C_5_W_M_10	0.8166	0.0049
UO2_C_5_W_M_18.4	0.9103	0.0050
UO2_C_5_W_M_20	0.9309	0.0055
UO2_C_5_W_M_35.2	0.9941	0.0060

Oxides In 6-Inch Canisters, 2 kg ²³⁵U

UO2_C_2_W_M_0	0.2957	0.0025
UO2_C_2_W_M_2	0.5047	0.0037
UO2_C_2_W_M_8	0.7198	0.0044
UO2_C_2_W_M_10	0.7670	0.0050
UO2_C_2_W_M_20	0.9137	0.0049
UO2_C_2_W_M_36.9	0.9618	0.0053

Oxides In 6-Inch Canisters, 8 kg ²³⁵U, concrete H variation

UO2_10_8_D_D_INF_0H:	0.9204	0.0048
UO2_10_8_D_D_INF_2H	0.8690	0.0049
UO2_10_8_D_D_INF_5H	0.8509	0.0051
UO2_10_8_D_D_INF	0.8448	0.0049
UO2_10_8_D_D_INF_2H:	0.8354	0.0053

Oxides In 6-Inch Canisters, 8 kg ²³⁵U, UO₂ density variation

UO2_C_8_D_D_INF_0	0.5050	0.0039
UO2_C_8_D_D_INF_2	0.4614	0.0036
UO2_C_8_D_D_INF_4	0.4270	0.0033
UO2_C_8_D_D_INF_8	0.4017	0.0029
UO2_C_8_D_D_INF_10	0.3909	0.0038
UO2_C_8_D_D_INF_20	0.3835	0.0035
UO2_C_8_D_D_INF_33	0.3819	0.0033

Oxides In 5-Inch Canisters

U3O8_15_3.47_W_D	0.7873	0.0055
UO2_10_3.47_W_D	0.7258	0.0052
UO2_10_5.56_D_D	0.7058	0.0048
UO2_10_5.56_D_D_INF	0.7063	0.0045
UO2_10_5.56_W_D	0.8345	0.0049
UO2_10_5.56_W_D_H2O	0.8204	0.0051
UO2_10_5.56_W_D_INF	0.8364	0.0056
UO2_10_5.56_W_W	0.8369	0.0044
UO2_10_5.56_W_W_INF	0.8340	0.0046
UO2_10_7.29_W_D	0.8752	0.0057
UO2_10_8_W_D	0.8964	0.0047
UO2_10_8_W_M_5	0.9024	0.0051
UO2_10_8_W_M_7	0.9068	0.0050
UO2_10_FULL_D_D	0.8145	0.0053
UO2_10_FULL_D_D_INF	0.8181	0.0049
UO2_10_FULL_W_D	0.9102	0.0054
UO2_15_3.47_D_D	0.6742	0.0047
UO2_15_3.47_D_D_INF	0.6809	0.0048
UO2_15_3.47_W_D	0.8026	0.0047
UO2_15_3.47_W_D_H2O	0.7959	0.0049
UO2_15_3.47_W_D_INF	0.8071	0.0054
UO2_15_3.47_W_W_INF	0.8277	0.0051
UO2_15_5.56_W_D	0.8872	0.0047
UO2_15_5_W_D	0.8718	0.0060
UO2_15_5_W_M_5	0.8932	0.0053
UO2_15_5_W_M_7	0.9017	0.0052
UO2_15_5_W_M_10	0.9081	0.0051
UO2_15_5_W_M_12	0.9212	0.0052
UO2_15_FULL_D_D	0.8015	0.0052
UO2_15_FULL_D_D_INF	0.8254	0.0046
UO2_15_FULL_W_D	0.9309	0.0053
UO2_65_1.39_D_D	0.7196	0.0056
UO2_65_1.39_D_D_H2O	0.8308	0.0053

UO2_65_1.39_D_D_INF	0.7118	0.0048
UO2_65_1.39_W_D	0.8535	0.0052
UO2_65_1.39_W_D_INF	0.8371	0.0053
UO2_65_1_W_D	0.7856	0.0052
UO2_65_1_W_M_5	0.8730	0.0053
UO2_65_1_W_M_10	0.8294	0.0052
UO2_65_1_W_M_17.8	0.8389	0.0049
UO2_65_FULL_D_D_INF	0.7705	0.0054

**Oxides in 5-inch Canisters,
8 kg U-235**

UO2_C_8_W_M_0	0.6661	0.0042
UO2_C_8_W_M_2	0.6973	0.0038
UO2_C_8_W_M_4	0.7332	0.0044
UO2_C_8_W_M_8	0.7904	0.0047
UO2_C_8_W_M_10	0.7959	0.0049
UO2_C_8_W_M_15	0.8364	0.0048
UO2_C_8_W_M_20	0.8704	0.0052
UO2_C_8_W_M_31.3	0.9035	0.0052

Explanation of Problem ID Coding:

The above summary table includes a *Problem ID*. The coding we use helps provide an immediate overview of the entire problem, and makes it easy to find the corresponding KENO V.a problem input in Appendix F. The *Problem ID* is described in the example below:

KENO Problem ID Coding Example

UO2_10_8_W_D_INF

UO2_10_8_W_M_20

Depth of the water region above the UO_2 prior to the mixing

UO2_C_8_W_M_20

In this series the water is mixed with UO_2 which is initially at crystal density

UNH_12_5.6_M_M_10

Thickness of the UNH region removed and mixed with water in the receptacle

UF6_UO2F2_2_4914

Volume of water (cc) admitted to the cylinder and mixed with some of the UF_6 to form $\text{UO}_2\text{F}_2 \cdot \text{H}_2\text{O}$. (see Fig. 3)

This is the H/U in the $\text{UO}_2\text{F}_2 \cdot \text{H}_2\text{O}$

UO2_10_8_D_D_INF_2H

This is the density of hydrogen in the concrete relative to the normal density

Appendix F KENO Problem Inputs

```

UNH
=CSAS25
UNH_12_5.6_M_M_0
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05      END
U-235 1 0.0 2.8773E-03      END
U-238 1 0.0 2.4721E-05      END
H 1 0.0 3.5357E-02          END
O 1 0.0 4.1250E-02          END
N 1 0.0 5.8928E-03          END
C 2 0.0 .04298              END
H 2 0.0 .08537              END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4              END
H2O 4 1.0                    END
CARBONSTEEL 5 1.0           END
END COMP
UNH_12_5.6_M_M_0
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_0I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_M_M_4
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05      END
U-235 1 0.0 2.8773E-03      END
U-238 1 0.0 2.4721E-05      END
H 1 0.0 3.5357E-02          END
O 1 0.0 4.1250E-02          END
N 1 0.0 5.8928E-03          END
C 2 0.0 .04298              END
H 2 0.0 .08537              END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4              END
U-234 4 0.0 9.3163E-07      END
U-235 4 0.0 6.03573E-05     END
U-238 4 0.0 5.18575E-07     END
H 4 0.0 0.066199151         END
O 4 0.0 0.033594036         END
N 4 0.0 0.000123615         END
CARBONSTEEL 5 1.0           END
END COMP
UNH_12_5.6_M_M_4
READ GEOM
CYLINDER 1 1 5.87375 22.691 -19.029
CYLINDER 4 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_4I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_M_M_6
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05      END
U-235 1 0.0 2.8773E-03      END
U-238 1 0.0 2.4721E-05      END
H 1 0.0 3.5357E-02          END
O 1 0.0 4.1250E-02          END
N 1 0.0 5.8928E-03          END
C 2 0.0 .04298              END
H 2 0.0 .08537              END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4              END
U-234 4 0.0 1.3829E-06      END
U-235 4 0.0 8.9596E-05     END
U-238 4 0.0 7.6979E-07     END
H 4 0.0 6.5879E-02          END
O 4 0.0 3.3673E-02          END
N 4 0.0 1.8350E-04          END
CARBONSTEEL 5 1.0           END
END COMP
UNH_12_5.6_M_M_6
READ GEOM
CYLINDER 1 1 5.87375 20.691 -19.029
CYLINDER 4 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549

```

END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUNH 12 5.6 M_M 6!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=IUFCEIEND PLOT
 END DATA
 END

=CSAS25
 UNH 12 5.6 M_M 10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.4411E-05 END
 U-235 1 0.0 2.8773E-03 END
 U-238 1 0.0 2.4721E-05 END
 H 1 0.0 3.5357E-02 END
 O 1 0.0 4.1250E-02 END
 N 1 0.0 5.8928E-03 END
 C 2 0.0 .04298 END
 H 2 0.0 .08537 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 U-234 4 0.0 2.2580E-06 END
 U-235 4 0.0 1.4629E-04 END
 U-238 4 0.0 1.2569E-06 END
 H 4 0.0 6.5258E-02 END
 O 4 0.0 3.3828E-02 END
 N 4 0.0 2.9961E-04 END
 CARBONSTEEL 5 1.0 END
 END COMP

UNH 12 5.6 M_M 10
 READ GEOM
 CYLINDER 1 1 5.87375 16.691 -19.029
 CYLINDER 4 1 5.87375 26.691 -19.029
 CYLINDER 2 1 5.97375 26.7 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 5 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUNH 12 5.6 M_M 10!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=IUFCEIEND PLOT
 END DATA
 END

=CSAS25
 UNH 12 5.6 M_M 20
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.4411E-05 END
 U-235 1 0.0 2.8773E-03 END
 U-238 1 0.0 2.4721E-05 END
 H 1 0.0 3.5357E-02 END

O 1 0.0 4.1250E-02 END
 N 1 0.0 5.8928E-03 END
 C 2 0.0 .04298 END
 H 2 0.0 .08537 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 U-234 4 0.0 4.2975E-06 END
 U-235 4 0.0 2.7842E-04 END
 U-238 4 0.0 2.3921E-06 END
 H 4 0.0 6.3812E-02 END
 O 4 0.0 3.4187E-02 END
 N 4 0.0 5.7023E-04 END
 CARBONSTEEL 5 1.0 END
 END COMP

UNH 12 5.6 M_M 20
 READ GEOM
 CYLINDER 1 1 5.87375 6.691 -19.029
 CYLINDER 4 1 5.87375 26.691 -19.029
 CYLINDER 2 1 5.97375 26.7 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 5 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUNH 12 5.6 M_M 20!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=IUFCEIEND PLOT
 END DATA
 END

=CSAS25
 UNH 12 5.6 M_M 30
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.4411E-05 END
 U-235 1 0.0 2.8773E-03 END
 U-238 1 0.0 2.4721E-05 END
 H 1 0.0 3.5357E-02 END
 O 1 0.0 4.1250E-02 END
 N 1 0.0 5.8928E-03 END
 C 2 0.0 .04298 END
 H 2 0.0 .08537 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 U-234 4 0.0 6.1488E-06 END
 U-235 4 0.0 3.9836E-04 END
 U-238 4 0.0 3.4226E-06 END

H 4 0.0 6.2498E-02 END
O 4 0.0 3.4513E-02 END
N 4 0.0 8.1587E-04 END
CARBONSTEEL 5 1.0 END
END COMP
UNH_12_5.6_M_M_30
READ GEOM
CYLINDER 1 1 5.87375 -3.309 -19.029
CYLINDER 4 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_30!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=IUFCW!END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_M_M_40
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05 END
U-235 1 0.0 2.8773E-03 END
U-238 1 0.0 2.4721E-05 END
H 1 0.0 3.5357E-02 END
O 1 0.0 4.1250E-02 END
N 1 0.0 5.8928E-03 END
C 2 0.0 .04298 END
H 2 0.0 .08537 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
U-234 4 0.0 7.8367E-06 END
U-235 4 0.0 5.0772E-04 END
U-238 4 0.0 4.3622E-06 END
H 4 0.0 6.1301E-02 END
O 4 0.0 3.4810E-02 END
N 4 0.0 1.0398E-03 END
CARBONSTEEL 5 1.0 END
END COMP
UNH_12_5.6_M_M_40
READ GEOM
CYLINDER 1 1 5.87375 -13.309 -19.029
CYLINDER 4 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_40!

PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=IUFCW!END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_M_M_45.72
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05 END
U-235 1 0.0 2.8773E-03 END
U-238 1 0.0 2.4721E-05 END
H 1 0.0 3.5357E-02 END
O 1 0.0 4.1250E-02 END
N 1 0.0 5.8928E-03 END
C 2 0.0 .04298 END
H 2 0.0 .08537 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
U-234 4 0.0 8.7369E-06 END
U-235 4 0.0 5.6604E-04 END
U-238 4 0.0 4.8633E-06 END
H 4 0.0 6.0662E-02 END
O 4 0.0 3.4968E-02 END
N 4 0.0 1.1593E-03 END
CARBONSTEEL 5 1.0 END
END COMP
UNH_12_5.6_M_M_45.72
READ GEOM
CYLINDER 1 1 5.87375 -19.029 -19.029
CYLINDER 4 1 5.87375 26.691 -19.029
CYLINDER 2 1 5.97375 26.7 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 5 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_45.72!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=IUFCW!END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05 END
U-235 1 0.0 2.8773E-03 END
U-238 1 0.0 2.4721E-05 END
H 1 0.0 3.5357E-02 END
O 1 0.0 4.1250E-02 END
N 1 0.0 5.8928E-03 END
C 2 0.0 .04298 END

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H 2 0.0 .08537          END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
CARBONSTEEL 5 1.0       END
END COMP
UNH_12_5.6_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 5.87375 26.691 -19.029
ZHEMICYL+X 2 1 5.97375 26.7 -19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 5 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 5.87375 26.691 -19.029
ZHEMICYL-X 2 1 5.97375 26.7 -19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 5 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 5.87375 26.691 -19.029
ZHEMICYL-Y 2 1 5.97375 26.7 -19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 5 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 5.87375 26.691 -19.029
ZHEMICYL+Y 2 1 5.97375 26.7 -19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 5 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUNH_12_5.6_D_D_INF!
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UF.W I END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_W_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05    END
U-235 1 0.0 2.8773E-03    END
U-238 1 0.0 2.4721E-05    END
H 1 0.0 3.5357E-02        END
O 1 0.0 4.1250E-02        END
N 1 0.0 5.8928E-03        END
C 2 0.0 .04298            END
H 2 0.0 .08537            END
AL 3 0.0 5.54-4           END
CA 3 0.0 5.30-3           END

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```

C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
CARBONSTEEL 5 1.0       END
END COMP
UNH_12_5.6_W_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 5.87375 26.691 -19.029
ZHEMICYL+X 2 1 5.97375 26.7 -19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 5 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 5.87375 26.691 -19.029
ZHEMICYL-X 2 1 5.97375 26.7 -19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 5 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 5.87375 26.691 -19.029
ZHEMICYL-Y 2 1 5.97375 26.7 -19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 5 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 5.87375 26.691 -19.029
ZHEMICYL+Y 2 1 5.97375 26.7 -19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 5 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUNH_12_5.6_W_D_INF!
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UF.W I END PLOT
END DATA
END

=CSAS25
UNH_12_5.6_M_M_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.4411E-05    END
U-235 1 0.0 2.8773E-03    END
U-238 1 0.0 2.4721E-05    END
H 1 0.0 3.5357E-02        END
O 1 0.0 4.1250E-02        END
N 1 0.0 5.8928E-03        END
C 2 0.0 .04298            END
H 2 0.0 .08537            END
AL 3 0.0 5.54-4           END
CA 3 0.0 5.30-3           END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END

```



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FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4       END
H2O 4 1.0            END
CARBONSTEEL 5 1.0    END
END COMP
UNH_12_5.6_M_M_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 10.95375 48.181 -19.129
ZHEMICYL+X 5 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 10.95375 48.181 -19.129
ZHEMICYL-X 5 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 10.95375 48.181 -19.129
ZHEMICYL-Y 5 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 10.95375 48.181 -19.129
ZHEMICYL+Y 5 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUNH_12_5.6_M_M_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=IUF.WI END PLOT
END DATA
END

UF6 (H/U=2)

=CSAS25
UF6_UO2F2_2_0
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
NI 5 0.0 .0603      END
CU 5 0.0 .02649      END
FE 5 0.0 .00119      END
MN 5 0.0 .0006      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_0
READ PARAM GEN=203 END PARAM

```

```

READ GEOM
CYLINDER 1 1 10.16 -78.5130 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_0
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_518
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
NI 5 0.0 .0603      END
CU 5 0.0 .02649      END
FE 5 0.0 .00119      END
MN 5 0.0 .0006      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_518
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -84.6655 -149.3928
CYLINDER 6 1 10.16 -79.7782 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_518
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_623
27GROUPNDF4 INFHOMMEDIUM

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```

UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000                                END
CARBONSTEEL 2 1.0                    END
AL 3 0.0 5.54-4                      END
CA 3 0.0 5.30-3                      END
C 3 0.0 6.59-3                      END
H 3 0.0 .0133                        END
O 3 0.0 .0457                        END
FE 3 0.0 3.59-4                      END
MG 3 0.0 3.25-3                      END
SI 3 0.0 8.43-3                      END
NA 3 0.0 3.89-4                      END
S 3 0.0 1.09-4                      END
H2O 4 1.0                            END
NI 5 0.0 .0603                      END
CU 5 0.0 .02649                     END
FE 5 0.0 .00119                     END
MN 5 0.0 .0006                      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000    END
END COMP
UF6_UO2F2_2_623
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -85.9102 -149.3928
CYLINDER 6 1 10.16 -80.0342 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_623 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_938
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000                                END
CARBONSTEEL 2 1.0                    END
AL 3 0.0 5.54-4                      END
CA 3 0.0 5.30-3                      END
C 3 0.0 6.59-3                      END
H 3 0.0 .0133                        END
O 3 0.0 .0457                        END
FE 3 0.0 3.59-4                      END
MG 3 0.0 3.25-3                      END
SI 3 0.0 8.43-3                      END
NA 3 0.0 3.89-4                      END
S 3 0.0 1.09-4                      END
H2O 4 1.0                            END
NI 5 0.0 .0603                      END
CU 5 0.0 .02649                     END
FE 5 0.0 .00119                     END
MN 5 0.0 .0006                      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000    END
END COMP

```

```

END COMP
UF6_UO2F2_2_938
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -89.6445 -149.3928
CYLINDER 6 1 10.16 -80.8021 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_938 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_1776
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000                                END
CARBONSTEEL 2 1.0                    END
AL 3 0.0 5.54-4                      END
CA 3 0.0 5.30-3                      END
C 3 0.0 6.59-3                      END
H 3 0.0 .0133                        END
O 3 0.0 .0457                        END
FE 3 0.0 3.59-4                      END
MG 3 0.0 3.25-3                      END
SI 3 0.0 8.43-3                      END
NA 3 0.0 3.89-4                      END
S 3 0.0 1.09-4                      END
H2O 4 1.0                            END
NI 5 0.0 .0603                      END
CU 5 0.0 .02649                     END
FE 5 0.0 .00119                     END
MN 5 0.0 .0006                      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000    END
END COMP
UF6_UO2F2_2_1776
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -99.6026 -149.3928
CYLINDER 6 1 10.16 -82.8499 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_1776 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

=CSAS25
UF6_UO2F2_2_2825
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000 END
END COMP
UF6_UO2F2_2_2825
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -112.0501 -149.3928
CYLINDER 6 1 10.16 -85.4097 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_2825 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCWMS! END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_3873
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END

```

```

FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000 END
END COMP
UF6_UO2F2_2_3873
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -124.4977 -149.3928
CYLINDER 6 1 10.16 -87.9694 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_3873 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCWMS! END PLOT
END DATA
END

```

```

=CSAS25
UF6_UO2F2_2_4921
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000 END
END COMP
UF6_UO2F2_2_4921
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -136.9452 -149.3928
CYLINDER 6 1 10.16 -90.5292 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_4921 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185

```

UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

UF6 (H/U=4)

= CSAS25
UF6_UO2F2_4_1036
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_4_1036
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -84.6655 -149.3928
CYLINDER 6 1 10.16 -78.2542 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_1036 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_4_1246
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_1246
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -85.9102 -149.3928
CYLINDER 6 1 10.16 -78.2019 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_1246 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_4_1875
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_1875
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -89.6445 -149.3928
CYLINDER 6 1 10.16 -78.0448 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6 UO2F2_4_1875 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25

UF6 UO2F2_4_3553
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP

UF6 UO2F2_4_3553

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -99.6026 -149.3928
 CYLINDER 6 1 10.16 -77.6260 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 4 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUF6 UO2F2_4_3553 I

PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5

XLR=50 YLR=00 ZLR=-185

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCWMSI END PLOT

END DATA

END

= CSAS25

UF6 UO2F2_4_5649
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END

SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293

92235 97.65 92238 0.84 92234 1.5100 END

END COMP

UF6 UO2F2_4_5649

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -112.0501 -149.3928

CYLINDER 6 1 10.16 -77.1024 -149.3928

CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86

CYLINDER 4 1 17.2244 0 -149.86

CYLINDER 2 1 17.78 1.27 -150.495

CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUF6 UO2F2_4_5649 I

PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5

XLR=50 YLR=00 ZLR=-185

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCWMSI END PLOT

END DATA

END

= CSAS25

UF6 UO2F2_4_7746

27GROUPNDF4 INFHOMMEDIUM

UF6 1 1.0375 293 92235 97.65 92238 0.84 92234

1.5100 END

CARBONSTEEL 2 1.0 END

AL 3 0.0 5.54-4 END

CA 3 0.0 5.30-3 END

C 3 0.0 6.59-3 END

H 3 0.0 .0133 END

O 3 0.0 .0457 END

FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END

SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END

S 3 0.0 1.09-4 END

H2O 4 1.0 END

NI 5 0.0 .0603 END

CU 5 0.0 .02649 END

FE 5 0.0 .00119 END

MN 5 0.0 .0006 END

SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293

92235 97.65 92238 0.84 92234 1.5100 END

END COMP

UF6 UO2F2_4_7746

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -124.4977 -149.3928

CYLINDER 6 1 10.16 -76.5788 -149.3928

CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 4 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_7746 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_4_9843
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_4_9843
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -136.9452 -149.3928
 CYLINDER 6 1 10.16 -76.0553 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 4 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_9843 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

UF6 (H/U=8)

= CSAS25
 UF6_UO2F2_8_2073
 27GROUPNDF4 INFHOMMEDIUM

UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_2073
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -84.6655 -149.3928
 CYLINDER 6 1 10.16 -75.0582 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 4 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_2073 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_2492
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END

```

END COMP
UF6_UO2F2_8_2492
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -85.9102 -149.3928
CYLINDER 6 1 10.16 -74.3593 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_2492 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_8_3750
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_7105
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -99.6026 -149.3928
CYLINDER 6 1 10.16 -66.6706 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_7105 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_8_11299
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END

```

```

FE 5 0.0 .00119          END
MN 5 0.0 .0006           END
SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_11299
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -112.0501 -149.3928
CYLINDER 6 1 10.16 -59.6810 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_11299 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

= CSAS25
UF6_UO2F2_8_15492
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100          END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
NI 5 0.0 .0603         END
CU 5 0.0 .02649        END
FE 5 0.0 .00119        END
MN 5 0.0 .0006         END
SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_15492
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -124.4977 -149.3928
CYLINDER 6 1 10.16 -52.6913 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_15492 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185

```

```

UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_8_19686
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100          END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
NI 5 0.0 .0603         END
CU 5 0.0 .02649        END
FE 5 0.0 .00119        END
MN 5 0.0 .0006         END
SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_19686
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -136.9452 -149.3928
CYLINDER 6 1 10.16 -45.7016 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_19686 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

UF6 (H/U=2), DRY RECEPT.

```

=CSAS25
UF6_UO2F2_2_0
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000          END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END

```



```

SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
NI 5 0.0 .0603           END
CU 5 0.0 .02649          END
FE 5 0.0 .00119          END
MN 5 0.0 .0006           END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_0
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -78.5130 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_0 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMS! END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_518
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0          END
NI 5 0.0 .0603      END
CU 5 0.0 .02649      END
FE 5 0.0 .00119      END
MN 5 0.0 .0006      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_518
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -84.6655 -149.3928
CYLINDER 6 1 10.16 -79.7782 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180

```

```

END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_518 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMS! END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_623
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0          END
NI 5 0.0 .0603      END
CU 5 0.0 .02649      END
FE 5 0.0 .00119      END
MN 5 0.0 .0006      END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_623
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -85.9102 -149.3928
CYLINDER 6 1 10.16 -80.0342 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_623 !
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMS! END PLOT
END DATA
END

=CSAS25
UF6_UO2F2_2_938
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END

```

```

O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
NI 5 0.0 .0603         END
CU 5 0.0 .02649        END
FE 5 0.0 .00119        END
MN 5 0.0 .0006         END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_938
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -89.6445 -149.3928
CYLINDER 6 1 10.16 -80.8021 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_938 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

=CSAS25
UF6_UO2F2_2_1776
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000          END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
NI 5 0.0 .0603         END
CU 5 0.0 .02649        END
FE 5 0.0 .00119        END
MN 5 0.0 .0006         END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_1776
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -99.6026 -149.3928
CYLINDER 6 1 10.16 -82.8499 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928

```

```

CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_1776 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

=CSAS25
UF6_UO2F2_2_2825
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000          END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
NI 5 0.0 .0603         END
CU 5 0.0 .02649        END
FE 5 0.0 .00119        END
MN 5 0.0 .0006         END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000      END
END COMP
UF6_UO2F2_2_2825
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -112.0501 -149.3928
CYLINDER 6 1 10.16 -85.4097 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_2825 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

=CSAS25
UF6_UO2F2_2_4921
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.85 92234
1.5000          END
CARBONSTEEL 2 1.0      END

```

```

AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3       END
H 3 0.0 .0133        END
O 3 0.0 .0457        END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4       END
H2O 4 1.0            END
NI 5 0.0 .0603       END
CU 5 0.0 .02649      END
FE 5 0.0 .00119      END
MN 5 0.0 .0006       END
SOLNUO2F2 6 4266 0 SPG=5.8633 1.0000 293
92235 97.65 92238 0.85 92234 1.5000 END
END COMP
UF6_UO2F2_2_4921
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -136.9452 -149.3928
CYLINDER 6 1 10.16 -90.5292 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_2_4921 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

UF6 (H/U=4), DRY RECEPT.

```

= CSAS25
UF6_UO2F2_4_1036
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP

```

```

UF6_UO2F2_4_1036
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -84.6655 -149.3928
CYLINDER 6 1 10.16 -78.2542 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_1036 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

= CSAS25
UF6_UO2F2_4_1246
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_8_1246
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -85.9102 -149.3928
CYLINDER 6 1 10.16 -78.2019 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_1246 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

```

```

= CSAS25
UF6_UO2F2_4_3553
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_4_3553
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -99.6026 -149.3928
CYLINDER 6 1 10.16 -77.6260 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 4 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_3553 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_4_5649
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END

```

```

MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_4_5649
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -112.0501 -149.3928
CYLINDER 6 1 10.16 -77.1024 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_5649 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWMSI END PLOT
END DATA
END

= CSAS25
UF6_UO2F2_4_7746
27GROUPNDF4 INFHOMMEDIUM
UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
NI 5 0.0 .0603 END
CU 5 0.0 .02649 END
FE 5 0.0 .00119 END
MN 5 0.0 .0006 END
SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293
92235 97.65 92238 0.84 92234 1.5100 END
END COMP
UF6_UO2F2_4_7746
READ PARAM GEN=203 END PARAM
READ GEOM
CYLINDER 1 1 10.16 -124.4977 -149.3928
CYLINDER 6 1 10.16 -76.5788 -149.3928
CYLINDER 0 1 10.16 -24.9172 -149.3928
CYLINDER 5 1 10.6273 -24.45 -149.86
CYLINDER 0 1 17.2244 0 -149.86
CYLINDER 2 1 17.78 1.27 -150.495
CUBOID 3 2 50 -50 50 -50 1.27 -180
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUF6_UO2F2_4_7746 I
PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
XLR=50 YLR=00 ZLR=-185
UAX=1 WDN=-1 NAX=130 LPI=8

```

NCH=I UFCWMS! END PLOT
END DATA
END

= CSAS25

UF6_UO2F2_4_9843

27GROUPNDF4 INFHOMMEDIUM

UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
1.5100

CARBONSTEEL 2 1.0

AL 3 0.0 5.54-4

CA 3 0.0 5.30-3

C 3 0.0 6.59-3

H 3 0.0 .0133

O 3 0.0 .0457

FE 3 0.0 3.59-4

MG 3 0.0 3.25-3

SI 3 0.0 8.43-3

NA 3 0.0 3.89-4

S 3 0.0 1.09-4

H2O 4 1.0

NI 5 0.0 .0603

CU 5 0.0 .02649

FE 5 0.0 .00119

MN 5 0.0 .0006

SOLNUO2F2 6 3252 0 SPG=4.7183 1.0000 293

92235 97.65 92238 0.84 92234 1.5100 END

END COMP

UF6_UO2F2_4_9843

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -136.9452 -149.3928

CYLINDER 6 1 10.16 -76.0553 -149.3928

CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86

CYLINDER 0 1 17.2244 0 -149.86

CYLINDER 2 1 17.78 1.27 -150.495

CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUF6_9843 !

PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5

XLR=50 YLR=00 ZLR=-185

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCWMS! END PLOT

END DATA

END

UF6 (H/U=8, DRY RECEPT.)

= CSAS25

UF6_UO2F2_8_2073

27GROUPNDF4 INFHOMMEDIUM

UF6 1 1.0375 293 92235 97.65 92238 0.84 92234

1.5100

CARBONSTEEL 2 1.0

AL 3 0.0 5.54-4

CA 3 0.0 5.30-3

C 3 0.0 6.59-3

H 3 0.0 .0133

O 3 0.0 .0457

FE 3 0.0 3.59-4

MG 3 0.0 3.25-3

SI 3 0.0 8.43-3

NA 3 0.0 3.89-4

S 3 0.0 1.09-4

H2O 4 1.0

NI 5 0.0 .0603

CU 5 0.0 .02649

FE 5 0.0 .00119

MN 5 0.0 .0006

SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293

92235 97.65 92238 0.84 92234 1.5100 END

END COMP

UF6_UO2F2_8_2073

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -84.8655 -149.3928

CYLINDER 6 1 10.16 -75.0582 -149.3928

CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86

CYLINDER 0 1 17.2244 0 -149.86

CYLINDER 2 1 17.78 1.27 -150.495

CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUF6_UO2F2_4_2073 !

PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5

XLR=50 YLR=00 ZLR=-185

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCWMS! END PLOT

END DATA

END

= CSAS25

UF6_UO2F2_8_2492

27GROUPNDF4 INFHOMMEDIUM

UF6 1 1.0375 293 92235 97.65 92238 0.84 92234

1.5100

CARBONSTEEL 2 1.0

AL 3 0.0 5.54-4

CA 3 0.0 5.30-3

C 3 0.0 6.59-3

H 3 0.0 .0133

O 3 0.0 .0457

FE 3 0.0 3.59-4

MG 3 0.0 3.25-3

SI 3 0.0 8.43-3

NA 3 0.0 3.89-4

S 3 0.0 1.09-4

H2O 4 1.0

NI 5 0.0 .0603

CU 5 0.0 .02649

FE 5 0.0 .00119

MN 5 0.0 .0006

SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293

92235 97.65 92238 0.84 92234 1.5100 END

END COMP

UF6_UO2F2_8_2492

READ PARAM GEN=203 END PARAM

READ GEOM

CYLINDER 1 1 10.16 -85.9102 -149.3928

CYLINDER 6 1 10.16 -74.3593 -149.3928

CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86

CYLINDER 0 1 17.2244 0 -149.86

CYLINDER 2 1 17.78 1.27 -150.495

CUBOID 3 2 50 -50 50 -50 1.27 -180

END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_2492 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_3750
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_3750
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -89.6445 -149.3928
 CYLINDER 6 1 10.16 -72.2624 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 0 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_3750 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_7105
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_7105
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -99.6026 -149.3928
 CYLINDER 6 1 10.16 -66.6706 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 0 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_7105 I
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMSI END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_11299
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_11299
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -112.0501 -149.3928
 CYLINDER 6 1 10.16 -59.6810 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928

CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 0 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_11299 !
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMS! END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_15492
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_15492
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -124.4977 -149.3928
 CYLINDER 6 1 10.16 -52.6913 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 0 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_UO2F2_4_15492 !
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMS! END PLOT
 END DATA
 END

= CSAS25
 UF6_UO2F2_8_19686
 27GROUPNDF4 INFHOMMEDIUM
 UF6 1 1.0375 293 92235 97.65 92238 0.84 92234
 1.5100 END
 CARBONSTEEL 2 1.0 END

AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 NI 5 0.0 .0603 END
 CU 5 0.0 .02649 END
 FE 5 0.0 .00119 END
 MN 5 0.0 .0006 END
 SOLNUO2F2 6 2170 0 SPG=3.4813 1.0000 293
 92235 97.65 92238 0.84 92234 1.5100 END
 END COMP
 UF6_UO2F2_8_19686
 READ PARAM GEN=203 END PARAM
 READ GEOM
 CYLINDER 1 1 10.16 -136.9452 -149.3928
 CYLINDER 6 1 10.16 -45.7016 -149.3928
 CYLINDER 0 1 10.16 -24.9172 -149.3928
 CYLINDER 5 1 10.6273 -24.45 -149.86
 CYLINDER 0 1 17.2244 0 -149.86
 CYLINDER 2 1 17.78 1.27 -150.495
 CUBOID 3 2 50 -50 50 -50 1.27 -180
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUF6_19686 !
 PLT=NO PIC=MIXTURE XUL=-50 YUL=00 ZUL=5
 XLR=50 YLR=00 ZLR=-185
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWMS! END PLOT
 END DATA
 END

OXIDES IN 6-INCH CANISTERS

=CSAS25
 U3O8_15_5_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.4837E-05 END
 U-235 1 0.0 3.5527E-03 END
 U-238 1 0.0 3.0524E-05 END
 H 1 0.0 5.4571E-02 END
 O 1 0.0 3.6987E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 U3O8_15_5_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM

CYLINDER 1 1 7.62 .718221 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IU3O8_15_5_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_5_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_10_5_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -5.68347 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_5_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_10.5_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END

CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_10_10.5_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 9.01972 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_10.5_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_10_8_D_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 2.3364508 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=UO2_10_8_D_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_REG
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 REG-CONCRETE 3 1 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_REG
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 2.3364508 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_10_8_D_D_REG!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_INF
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -19.05

ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=UO2_10_8_D_D_INFI
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_M_M_0.5
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 U-234 4 0.0 3.4585E-07 END
 U-235 4 0.0 2.2407E-05 END
 U-238 4 0.0 1.9251E-07 END
 H 4 0.0 6.6804E-02 END
 O 4 0.0 3.3448E-02 END
 END COMP
 UO2_10_8_M_M_0.5
 READ PARAM RUN=YES END PARAM

```

READ GEOM
CYLINDER 1 1 7.62 1.83645 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_0.5 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWIEND PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_1
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
U-234 4 0.0 6.8877E-07 END
U-235 4 0.0 4.4623E-05 END
U-238 4 0.0 3.8339E-07 END
H 4 0.0 6.6749E-02 END
O 4 0.0 3.3466E-02 END
END COMP
UO2_10_8_M_M_1
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 1.33645 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_1 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWIEND PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_2
27GROUPNDF4 INFHOMMEDIUM

```

```

U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
U-234 4 0.0 1.3659E-06 END
U-235 4 0.0 8.8495E-05 END
U-238 4 0.0 7.6033E-07 END
H 4 0.0 6.6640E-02 END
O 4 0.0 3.3501E-02 END
END COMP
UO2_10_8_M_M_2
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 0.33645 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_2 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWIEND PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_4
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
U-234 4 0.0 2.6866E-06 END
U-235 4 0.0 1.7406E-04 END
U-238 4 0.0 1.4955E-06 END
H 4 0.0 6.6427E-02 END

```

```

O 4 0.0 3.3570E-02          END
END COMP
UO2_10_8_M_M_4
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -1.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_4!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCWI END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_6
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5          END
U-235 1 0.0 5.254-3          END
U-238 1 0.0 4.51-5           END
H 1 0.0 5.3804-2             END
O 1 0.0 3.7663-2             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3               END
H 3 0.0 .0133                END
O 3 0.0 .0457                END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4               END
U-234 4 0.0 3.9643E-06       END
U-235 4 0.0 2.5683E-04       END
U-238 4 0.0 2.2066E-06       END
H 4 0.0 6.6222E-02           END
O 4 0.0 3.3637E-02           END
END COMP
UO2_10_8_M_M_6
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -3.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_6!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCWI END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_8
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5          END
U-235 1 0.0 5.254-3          END
U-238 1 0.0 4.51-5           END
H 1 0.0 5.3804-2             END
O 1 0.0 3.7663-2             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3               END
H 3 0.0 .0133                END
O 3 0.0 .0457                END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4               END
U-234 4 0.0 5.2009E-06       END
U-235 4 0.0 3.3695E-04       END
U-238 4 0.0 2.8950E-06       END
H 4 0.0 6.6023E-02           END
O 4 0.0 3.3701E-02           END

```

```

END COMP
UO2_10_8_M_M_8
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -5.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_8!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCWI END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_10
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5          END
U-235 1 0.0 5.254-3          END
U-238 1 0.0 4.51-5           END
H 1 0.0 5.3804-2             END
O 1 0.0 3.7663-2             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4              END
CA 3 0.0 5.30-3              END
C 3 0.0 6.59-3               END
H 3 0.0 .0133                END
O 3 0.0 .0457                END
FE 3 0.0 3.59-4              END
MG 3 0.0 3.25-3              END
SI 3 0.0 8.43-3              END
NA 3 0.0 3.89-4              END
S 3 0.0 1.09-4               END

```

```

U-234 4 0.0 6.3986E-06      END
U-235 4 0.0 4.1455E-04      END
U-238 4 0.0 3.5617E-06      END
H   4 0.0 6.5830E-02        END
O   4 0.0 3.3764E-02        END
END COMP
UO2_10_8_M_M_10
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -7.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_10 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW!END PLOT
END DATA

```

```

=CSAS25
UO2_10_8_M_M_14
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H   1 0.0 5.3804-2      END
O   1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL   3 0.0 5.54-4      END
CA   3 0.0 5.30-3      END
C    3 0.0 6.59-3      END
H    3 0.0 .0133      END
O    3 0.0 .0457      END
FE   3 0.0 3.59-4      END
MG   3 0.0 3.25-3      END
SI   3 0.0 8.43-3      END
NA   3 0.0 3.89-4      END
S    3 0.0 1.09-4      END
U-234 4 0.0 8.6840E-06      END
U-235 4 0.0 5.6261E-04      END
U-238 4 0.0 4.8338E-06      END
H   4 0.0 6.5462E-02      END
O   4 0.0 3.3883E-02      END
END COMP
UO2_10_8_M_M_14
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -11.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_14 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8

```

```

NCH=I UFCW!END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_M_M_18
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H   1 0.0 5.3804-2      END
O   1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL   3 0.0 5.54-4      END
CA   3 0.0 5.30-3      END
C    3 0.0 6.59-3      END
H    3 0.0 .0133      END
O    3 0.0 .0457      END
FE   3 0.0 3.59-4      END
MG   3 0.0 3.25-3      END
SI   3 0.0 8.43-3      END
NA   3 0.0 3.89-4      END
S    3 0.0 1.09-4      END
U-234 4 0.0 1.0834E-05      END
U-235 4 0.0 7.0188E-04      END
U-238 4 0.0 6.0304E-06      END
H   4 0.0 6.5116E-02      END
O   4 0.0 3.3995E-02      END
END COMP

```

```

UO2_10_8_M_M_18
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -15.66355 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_M_M_18 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW!END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H   1 0.0 5.3804-2      END
O   1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL   3 0.0 5.54-4      END
CA   3 0.0 5.30-3      END
C    3 0.0 6.59-3      END
H    3 0.0 .0133      END
O    3 0.0 .0457      END
FE   3 0.0 3.59-4      END
MG   3 0.0 3.25-3      END

```

SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 2.3364508 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_8_W_D I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_D_H2O
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 REG-CONCRETE 3 1.0 END
 H2O 4 1.0 END

END COMP
 UO2_10_8_W_D_H2O
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 2.3364508 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CUBOID 4 3 28 -28 28 -28 39 -39
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_8_W_D_H2O I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-50
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_D_INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END

C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_8_W_D_INF
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 4 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0

UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 4 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_W_D_INF I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UF.W I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_M_8.6
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.7812-5 END
 U-235 1 0.0 .00374561 END
 U-238 1 0.0 3.218-5 END
 H 1 0.0 .0575523 END
 O 1 0.0 .03644737 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

```

O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4        END
H2O 4 1.0              END
END COMP
UO2_10_8_W_M_8.6
READ PARAM PUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 10.95 -19.05
CYLINDER 0 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_W_M_8.6I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_W_M_16.7
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.5521-5    END
U-235 1 0.0 .0029493    END
U-238 1 0.0 2.5339-5    END
H 1 0.0 .05953          END
O 1 0.0 .035806         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4        END
H2O 4 1.0              END
END COMP

```

```

UO2_10_8_W_M_16.7
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_W_M_16.7I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA

```

END

```

=CSAS25
UO2_10_8_W_W
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5    END
U-235 1 0.0 5.254-3    END
U-238 1 0.0 4.51-5     END
H 1 0.0 5.3804-2       END
O 1 0.0 3.7663-2       END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3        END
H 3 0.0 .0133         END
O 3 0.0 .0457         END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4        END
H2O 4 1.0              END
END COMP

```

```

UO2_10_8_W_W
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 2.3364508 -19.05
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_8_W_WI
PLT=YES P:C=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_8_W_W_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5    END
U-235 1 0.0 5.254-3    END
U-238 1 0.0 4.51-5     END
H 1 0.0 5.3804-2       END
O 1 0.0 3.7663-2       END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3        END
H 3 0.0 .0133         END
O 3 0.0 .0457         END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4        END
H2O 4 1.0              END
END COMP
UO2_10_8_W_W_INF

```

```

READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 2.3364508 -19.05
ZHEMICYL+X 4 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 2.3364508 -19.05
ZHEMICYL-X 4 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 2.3364508 -19.05
ZHEMICYL-Y 4 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 2.3364508 -19.05
ZHEMICYL+Y 4 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUO2_10_8_W_W_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UFW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_FULL_D_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_FULL_D_D
READ PARAM RUN=YES END PARAM
READ GEOM

```

```

CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 0 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_10_FULL_D_DI
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_FULL_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_FULL_D_D_INF
READ GEOM
UNIT 1

```

```

ZHEMICYL+X 1 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM

```

READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_FULL_D_D_INF
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.W I END PLOT
 END DATA
 END

=CSAS25

UO2_10_FULL_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP

UO2_10_FULL_W_D

READ PARAM RUN=YES END PARAM

READ GEOM

CYLINDER 1 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUO2_10_FULL_W_DI

PLT=YES PIC=MIXTURE XUL=-50 YUL=00

ZUL=50 XLR=50 YLR=00 ZLR=-30

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCW I END PLOT

END DATA

END

=CSAS25

UO2_15_5_D_D

27GROUPNDF4 INFHOMMEDIUM

U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END

SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP

UO2_15_5_D_D

READ PARAM RUN=YES END PARAM

READ GEOM

CYLINDER 1 1 7.62 -.9397338 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUO2_15_5_D_DI

PLT=YES PIC=MIXTURE XUL=-50 YUL=00

ZUL=50 XLR=50 YLR=00 ZLR=-30

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCW I END PLOT

END DATA

END

=CSAS25

UO2_15_5_D_D_INF

27GROUPNDF4 INFHOMMEDIUM

U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP

UO2_15_5_D_D_INF

READ GEOM

UNIT 1

ZHEMICYL+X 1 1 7.62 -.9397338 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004

HOLE 2 105.5675 0 0

HOLE 3 52.78375 30.48 0

HOLE 4 52.78375 -30.48 0

UNIT 2

ZHEMICYL-X 1 1 7.62 -.9397338 -19.05

ZHEMICYL-X 0 1 7.62 2P19.05

ZHEMICYL-X 2 1 7.699 2P19.129

ZHEMICYL-X 0 1 10.95375 48.181 -19.129

ZHEMICYL-X 2 1 11.24585 49.451 -19.764

UNIT 3
 ZHEMICYL-Y 1 1 7.62 -.9397338 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -.9397338 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=UO2_15_5_D_D_INF
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_5_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -.9397338 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_15_5_W_D_I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_D_H2O

27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_5_W_D_H2O
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -.9397338 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CUBOID 4 3 28 -28 28 -28 39 -39
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_15_5_W_D_H2O_I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_D_INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_5_W_D_INF
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -.9397338 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 4 1 10.95375 48.181 -19.129

ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -.9397338 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 4 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -.9397338 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -.9397338 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=UO2_15_5_W_D_INF!
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_5
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.6906-5 END
 U-235 1 0.0 .00303892 END
 U-238 1 0.0 2.6109-5 END
 H 1 0.0 .061144 END
 O 1 0.0 .0367959 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_15_5_W_M_5
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 4.060266 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549

END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_15_5_W_M_5!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_15
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 3.2739-5 END
 U-235 1 0.0 .0021211 END
 U-238 1 0.0 1.8224-5 END
 H 1 0.0 .06287 END
 O 1 0.0 .0357791 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_15_5_W_M_15
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 14.020928 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_15_5_W_M_15!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_20
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 2.8451-5 END
 U-235 1 0.0 .0018433 END
 U-238 1 0.0 1.5837-5 END
 H 1 0.0 .06339238 END
 O 1 0.0 .03547136 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END

```

FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_15_5_W_M_20
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_5_W_M_20!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_15_5_W_W_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878        END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566            END
O 1 0.0 .037725            END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4            END
CA 3 0.0 5.30-3            END
C 3 0.0 6.59-3             END
H 3 0.0 .0133              END
O 3 0.0 .0457              END
FE 3 0.0 3.59-4            END
MG 3 0.0 3.25-3            END
SI 3 0.0 8.43-3            END
NA 3 0.0 3.89-4            END
S 3 0.0 1.09-4             END
H2O 4 1.0                  END
END COMP
UO2_15_5_W_W_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 -.9397338 -19.05
ZHEMICYL+X 4 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 -.9397338 -19.05
ZHEMICYL-X 4 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129

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ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 -.9397338 -19.05
ZHEMICYL-Y 4 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 -.9397338 -19.05
ZHEMICYL+Y 4 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_15_5_W_W_INF!
PLT=YES PIC=MIXTURE XUL=110 YUL=-35
ZUL=0 XLR=0 YLR=35 ZLR=0
VAX=1 UDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_15_8_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878        END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566            END
O 1 0.0 .037725            END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4            END
CA 3 0.0 5.30-3            END
C 3 0.0 6.59-3             END
H 3 0.0 .0133              END
O 3 0.0 .0457              END
FE 3 0.0 3.59-4            END
MG 3 0.0 3.25-3            END
SI 3 0.0 8.43-3            END
NA 3 0.0 3.89-4            END
S 3 0.0 1.09-4             END
H2O 4 1.0                  END
END COMP
UO2_15_8_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 9.926426 -19.05
CYLINDER 0 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_8_W_D!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

=CSAS25

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UO2_15_FULL_D_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_15_FULL_D_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 0 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_FULL_D_D_INF
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

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=CSAS25
UO2_15_FULL_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_15_FULL_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129

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ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_15_FULL_D_D_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=UFW ! END PLOT
END DATA
END

```

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=CSAS25
UO2_15_FULL_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_15_FULL_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_FULL_W_D

```

PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=! UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1.2_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_65_1.2_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -2.207443 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_1.2_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=! UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_D_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_65_2_D_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 9.020928 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_2_D_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=! UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_D_D_H2O
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_65_2_D_D_H2O
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 9.020928 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CUBOID 4 2 28 -28 28 -28 39 -39
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_2_D_D_H2O!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=! UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_D_D_INF
 27GROUPNDF4 INFHOMMEDIUM

```

U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6       END
H 1 0.0 .06661           END
O 1 0.0 .035354          END
CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_65_2_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 9.020928 -19.05
ZHEMICYL+X 0 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 9.020928 -19.05
ZHEMICYL-X 0 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 9.020928 -19.05
ZHEMICYL-Y 0 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 9.020928 -19.05
ZHEMICYL+Y 0 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUO2_65_2_D_D_INF!
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=!UF.W! END PLOT
END DATA
END

=CSAS25
UO2_65_2_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END

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U-238 1 0.0 8.56-6      END
H 1 0.0 .06661          END
O 1 0.0 .035354         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_2_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 9.020928 -19.05
CYLINDER 0 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_65_2_W_D!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=!UFCW! END PLOT
END DATA
END

=CSAS25
UO2_65_2_W_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6       END
H 1 0.0 .06661           END
O 1 0.0 .035354          END
CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_65_2_W_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 9.020928 -19.05
ZHEMICYL+X 0 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764

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CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 9.020928 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 4 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 9.020928 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 9.020928 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=UO2_65_2_W_D_INF1
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=1 UFCW 1 END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_W_M_7
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.2305E-05 END
 U-235 1 0.0 8.0101E-04 END
 U-238 1 0.0 6.8496E-06 END
 H 1 0.0 0.06665521 END
 O 1 0.0 0.03496793 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_65_2_W_M_7
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 16.02092807 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_65_2_W_M_71
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=1 UFCW 1 END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_W_M_8
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.1964E-05 END
 U-235 1 0.0 7.7880E-04 END
 U-238 1 0.0 6.6597E-06 END
 H 1 0.0 0.06666085 END
 O 1 0.0 0.034925271 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_65_2_W_M_8
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 17.02092807 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_65_2_W_M_81
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=1 UFCW 1 END PLOT
 END DATA
 END

=CSAS25
 UO2_65_2_W_M_10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.1330E-05 END
 U-235 1 0.0 7.3750E-04 END
 U-238 1 0.0 6.3065E-06 END
 H 1 0.0 0.06667133 END
 O 1 0.0 0.03484594 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_65_2_W_M_10
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.04092807 -19.05
CYLINDER 0 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_65_2_W_M_10!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_65_2_W_W_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5 END
U-235 1 0.0 .001001 END
U-238 1 0.0 8.56-6 END
H 1 0.0 .06661 END
O 1 0.0 .035354 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_65_2_W_W_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 9.020928 -19.05
ZHEMICYL+X 4 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 9.020928 -19.05
ZHEMICYL-X 4 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129

ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 9.020928 -19.05
ZHEMICYL-Y 4 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 9.020928 -19.05
ZHEMICYL+Y 4 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_65_2_W_W_INF!
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=UFW ! END PLOT
END DATA
END

=CSAS25
UO2_65_FULL_D_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5 END
U-235 1 0.0 .001001 END
U-238 1 0.0 8.56-6 END
H 1 0.0 .06661 END
O 1 0.0 .035354 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_65_FULL_D_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 0 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_65_FULL_D_D!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_65_FULL_D_D_INF


```

27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6       END
H 1 0.0 .06661           END
O 1 0.0 .035354          END
CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_65_FULL_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 7.62 2P19.05
ZHEMICYL-Y 2 1 7.699 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 7.62 2P19.05
ZHEMICYL+Y 2 1 7.699 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_65_FULL_D_D_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UF.W I END PLOT
END DATA
END

```

```

=CSAS25
UO2_65_FULL_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6       END
H 1 0.0 .06661           END
O 1 0.0 .035354          END

```

```

CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_65_FULL_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_65_FULL_W_DI
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UO3_15_5_D_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5      END
U-235 1 0.0 .003878      END
U-238 1 0.0 3.33-5       END
H 1 0.0 .059566          END
O 1 0.0 .037725          END
CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO3_15_5_D_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -.33009 -19.05
CYLINDER 0 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 0 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO3_15_5_D_DI

```

PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO3_15_5_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.7908E-05 END
 U-235 1 0.0 3.7516E-03 END
 U-238 1 0.0 3.2234E-05 END
 H 1 0.0 5.7627E-02 END
 O 1 0.0 4.0339E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO3_15_5_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -0.330093265 -19.05
 CYLINDER 0 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO3_15_5_W_DI
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

OXIDES IN 6-INCH CANISTERS, 8 KG U-235

=CSAS25
 UO2_C_8_W_M_0
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 3.6785E-04 END
 U-235 1 0.0 2.3832E-02 END
 U-238 1 0.0 2.0476E-04 END
 O 1 0.0 4.8809E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_8_W_M_0
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -1.4335E+01 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_8_W_M_0I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_C_8_W_M_4
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.9902E-04 END
 U-235 1 0.0 1.2894E-02 END
 U-238 1 0.0 1.1078E-04 END
 H 1 0.0 3.0687E-02 END
 O 1 0.0 4.1751E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_C_8_W_M_4
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -1.0335E+01 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_8_W_M_4I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

```

=CSAS25
UO2_C_8_W_M_8
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.3641E-04      END
U-235 1 0.0 8.8375E-03      END
U-238 1 0.0 7.5929E-05      END
H 1 0.0 4.2067E-02          END
O 1 0.0 3.9133E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_C_8_W_M_8
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -6.3350E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_8!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_C_8_W_M_10
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.1787E-04      END
U-235 1 0.0 7.6363E-03      END
U-238 1 0.0 6.5609E-05      END
H 1 0.0 4.5437E-02          END
O 1 0.0 3.8358E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_C_8_W_M_10
READ PARAM RUN=YES END PARAM

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```

READ GEOM
CYLINDER 1 1 7.62 -4.3350E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_10!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_15
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.7975E-05      END
U-235 1 0.0 5.6996E-03      END
U-238 1 0.0 4.8970E-05      END
H 1 0.0 5.0870E-02          END
O 1 0.0 3.7108E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP

```

```

UO2_C_8_W_M_15
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 6.6499E-01 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_15!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_17
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1099E-05      END
U-235 1 0.0 5.2542E-03      END
U-238 1 0.0 4.5143E-05      END
H 1 0.0 5.2120E-02          END

```

```

O 1 0.0 3.6821E-02      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_C_8_W_M_17
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 2.3365E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_17I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_20
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 7.0177E-05      END
U-235 1 0.0 4.5466E-03      END
U-238 1 0.0 3.9063E-05      END
H 1 0.0 5.4105E-02      END
O 1 0.0 3.6364E-02      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_C_8_W_M_20
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 5.6650E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM

```

```

READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_20I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_33
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 4.5523E-05      END
U-235 1 0.0 2.9493E-03      END
U-238 1 0.0 2.5340E-05      END
H 1 0.0 5.8586E-02      END
O 1 0.0 3.5333E-02      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_C_8_W_M_33
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 1.9050E+01 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM

```

```

READ BNDS XFC=VAC YFC=VAC END BNDS
READ MIXT EPS=.011 END MIXT
READ MIXT EPS=.011 END MIXT
READ PLOT TTL=IUO2_C_8_W_M_33I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

OXIDES IN 6-INCH CANISTERS, 5 KG U-235

```

=CSAS25
UO2_C_5_W_M_0
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 3.6785E-04      END
U-235 1 0.0 2.3832E-02      END
U-238 1 0.0 2.0476E-04      END
O 1 0.0 4.8809E-02      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END

```

```

C 30.0 6.59-3      END
H 30.0 .0133      END
O 30.0 .0457      END
FE 30.0 3.59-4     END
MG 30.0 3.25-3     END
SI 30.0 8.43-3     END
NA 30.0 3.89-4     END
S 30.0 1.09-4      END
H2O 4 1.0          END
END COMP
UO2_C_5_W_M_0
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -1.6103E+01 -1.9050E+01
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_C_5_W_M_0I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWIEND PLOT
END DATA
END

=CSAS25
UO2_C_5_W_M_2
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 2.1913E-04      END
U-235 1 0.0 1.4197E-02      END
U-238 1 0.0 1.2198E-04      END
H 1 0.0 2.7031E-02          END
O 1 0.0 4.2592E-02          END
CARBONSTEEL 2 1.0          END
AL 30.0 5.54-4              END
CA 30.0 5.30-3              END
C 30.0 6.59-3               END
H 30.0 .0133                END
O 30.0 .0457                END
FE 30.0 3.59-4              END
MG 30.0 3.25-3              END
SI 30.0 8.43-3              END
NA 30.0 3.89-4              END
S 30.0 1.09-4               END
H2O 4 1.0                   END
END COMP
UO2_C_5_W_M_2
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -1.4103E+01 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_C_5_W_M_2I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8

```

```

NCH=I UFCWIEND PLOT
END DATA
END

=CSAS25
UO2_C_5_W_M_10
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.3728E-05      END
U-235 1 0.0 5.4245E-03      END
U-238 1 0.0 4.6606E-05      END
H 1 0.0 5.1642E-02          END
O 1 0.0 3.6931E-02          END
CARBONSTEEL 2 1.0          END
AL 30.0 5.54-4              END
CA 30.0 5.30-3              END
C 30.0 6.59-3               END
H 30.0 .0133                END
O 30.0 .0457                END
FE 30.0 3.59-4              END
MG 30.0 3.25-3              END
SI 30.0 8.43-3              END
NA 30.0 3.89-4              END
S 30.0 1.09-4               END
H2O 4 1.0                   END
END COMP
UO2_C_5_W_M_10
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 -6.1031E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_C_5_W_M_10I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCWIEND PLOT
END DATA
END

=CSAS25
UO2_C_5_W_M_18.4
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.0687E-05      END
U-235 1 0.0 3.2839E-03      END
U-238 1 0.0 2.8214E-05      END
H 1 0.0 5.7647E-02          END
O 1 0.0 3.5549E-02          END
CARBONSTEEL 2 1.0          END
AL 30.0 5.54-4              END
CA 30.0 5.30-3              END
C 30.0 6.59-3               END
H 30.0 .0133                END
O 30.0 .0457                END
FE 30.0 3.59-4              END
MG 30.0 3.25-3              END
SI 30.0 8.43-3              END
NA 30.0 3.89-4              END
S 30.0 1.09-4               END
H2O 4 1.0                   END

```

END COMP
 UO2_C_5_W_M_18.4
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 2.3365E+00 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_C_5_W_M_18.4
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWIEND PLOT
 END DATA
 END

=CSAS25
 UO2_C_5_W_M_20
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.7240E-05 END
 U-235 1 0.0 3.0606E-03 END
 U-238 1 0.0 2.6295E-05 END
 H 1 0.0 5.8274E-02 END
 O 1 0.0 3.5405E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_C_5_W_M_20
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 3.8969E+00 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_C_5_W_M_20
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWIEND PLOT
 END DATA
 END

=CSAS25
 UO2_C_5_W_M_35.2
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 2.8452E-05 END

U-235 1 0.0 1.8433E-03 END
 U-238 1 0.0 1.5837E-05 END
 H 1 0.0 6.1689E-02 END
 O 1 0.0 3.4620E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_C_5_W_M_35.2
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 1.9050E+01 -1.9050E+01
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=UO2_C_5_W_M_35.2
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCWIEND PLOT
 END DATA
 END

OXIDES IN 6-INCH CANISTERS, 2 KG U-235

=CSAS25
 UO2_C_2_W_M_0
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 3.6785E-04 END
 U-235 1 0.0 2.3832E-02 END
 U-238 1 0.0 2.0476E-04 END
 O 1 0.0 4.8809E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_2_W_M_0
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -1.7871E+01 -1.9050E+01
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129

CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_2_W_M_01
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_C_2_W_M_2
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.3641E-04 END
 U-235 1 0.0 8.8375E-03 END
 U-238 1 0.0 7.5929E-05 END
 H 1 0.0 4.2067E-02 END
 O 1 0.0 3.9133E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_2_W_M_2
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -1.5871E+01 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_2_W_M_21
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_C_2_W_M_8
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.7240E-05 END
 U-235 1 0.0 3.0606E-03 END
 U-238 1 0.0 2.6295E-05 END
 H 1 0.0 5.8274E-02 END
 O 1 0.0 3.5405E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END

H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_2_W_M_8
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -9.8713E+00 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_2_W_M_81
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_C_2_W_M_10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 3.8788E-05 END
 U-235 1 0.0 2.5130E-03 END
 U-238 1 0.0 2.1591E-05 END
 H 1 0.0 5.9810E-02 END
 O 1 0.0 3.5052E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_2_W_M_10
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 7.62 -7.8713E+00 -1.9050E+01
 CYLINDER 4 1 7.62 19.05 -19.05
 CYLINDER 2 1 7.699 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_C_2_W_M_101
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UO2_C_2_W_M_20
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 2.0474E-05 END
U-235 1 0.0 1.3264E-03 END
U-238 1 0.0 1.1396E-05 END
H 1 0.0 6.3139E-02 END
O 1 0.0 3.4286E-02 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_C_2_W_M_20
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 2.1287E+00 -1.9050E+01
CYLINDER 4 1 7.62 19.05 -19.05
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_2_W_M_20 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UO2_C_2_W_M_36.9
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.1381E-05 END
U-235 1 0.0 7.3732E-04 END
U-238 1 0.0 6.3349E-06 END
H 1 0.0 6.4791E-02 END
O 1 0.0 3.3906E-02 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END

END COMP
UO2_C_2_W_M_36.9
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 7.62 1.9050E+01 -1.9050E+01
CYLINDER 2 1 7.699 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_2_W_M_36.9 I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

OXIDES IN 6-INCH CANISTERS, 8 KG U-235, CONCRETE H VARIATION

=CSAS25
UO2_10_8_D_D_INF_0H
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
C 1 0.0 7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_8_D_D_INF_0H
READ PARAM RUN=YES END PARAM
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 7.62 2.3364508 -1.9050E+01
ZHEMICYL+X 0 1 7.62 2P19.05
ZHEMICYL+X 2 1 7.699 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 7.62 2.3364508 -1.9050E+01
ZHEMICYL-X 0 1 7.62 2P19.05
ZHEMICYL-X 2 1 7.699 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3

ZHEMICYL-Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_0H!
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=1 UF.W ! END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_INF_.2H
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .00266 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_INF_.2H
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -1.9050E+01

ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_.2H!
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=1 UF.W ! END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_INF_.5H
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0066667 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_INF_.5H
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-Y 0 1 7.62 2P19.05

ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_5HI
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUFWI END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_INF
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129

ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUFWI END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_D_D_INF_2H
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0266 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_10_8_D_D_INF_2H
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129

ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2.3364508 -1.9050E+01
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_2HI
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA

**OXIDES IN 6-INCH CANISTERS,
 8 KG U-235, UO₂ DENSITY
 VARIATION**

=CSAS25
 UO2_C_8_D_D_INF_0
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 3.6785E-04 END
 U-235 1 0.0 2.3832E-02 END
 U-238 1 0.0 2.0476E-04 END
 O 1 0.0 4.8809E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_8_D_D_INF_0
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -1.4335E+01 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -1.4335E+01 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -1.4335E+01 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129

ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -1.4335E+01 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_0I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA
 END

=CSAS25
 UO2_C_8_D_D_INF_2
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 2.5829E-04 END
 U-235 1 0.0 1.6734E-02 END
 U-238 1 0.0 1.4377E-04 END
 O 1 0.0 3.4272E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_C_8_D_D_INF_2
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -1.2335E+01 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -1.2335E+01 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -1.2335E+01 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

UNIT 4
 ZHEMICYL+Y 1 1 7.62 -1.2335E+01 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2 10 8 D D INF 2I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UF.W I END PLOT
 END DATA
 END

=CSAS25
 UO2 C 8 D D INF 4
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.9902E-04 END
 U-235 1 0.0 1.2894E-02 END
 U-238 1 0.0 1.1078E-04 END
 O 1 0.0 2.6407E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2 C 8 D D INF 4
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -1.0335E+01 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -1.0335E+01 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -1.0335E+01 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -1.0335E+01 -19.05

ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2 10 8 D D INF 4I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UF.W I END PLOT
 END DATA
 END

=CSAS25
 UO2 C 8 D D INF 8
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.3641E-04 END
 U-235 1 0.0 8.8375E-03 END
 U-238 1 0.0 7.5929E-05 END
 O 1 0.0 1.8100E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2 C 8 D D INF 8
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -6.3350E+00 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -6.3350E+00 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -6.3350E+00 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -6.3350E+00 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129

ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2 10 8 D D INF 8I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW I END PLOT
 END DATA
 END

=CSAS25
 UO2 C 8 D D INF 10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.1787E-04 END
 U-235 1 0.0 7.6363E-03 END
 U-238 1 0.0 6.5609E-05 END
 O 1 0.0 1.5640E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2 C 8 D D INF 10
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 -4.3350E+00 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 -4.3350E+00 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 -4.3350E+00 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 -4.3350E+00 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764

END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2 10 8 D D INF 10I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW I END PLOT
 END DATA
 END

=CSAS25
 UO2 C 8 D D INF 20
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 7.0177E-05 END
 U-235 1 0.0 4.5466E-03 END
 U-238 1 0.0 3.9063E-05 END
 O 1 0.0 9.3116E-03 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2 C 8 D D INF 20
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 5.6650E+00 -19.05
 ZHEMICYL+X 0 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 7.62 5.6650E+00 -19.05
 ZHEMICYL-X 0 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 5.6650E+00 -19.05
 ZHEMICYL-Y 0 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 5.6650E+00 -19.05
 ZHEMICYL+Y 0 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS

READ PLOT TTL=IUO2_10_8_D_D_INF_20I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA
 END

=CSAS25
 UO2_C_8_D_D_INF_33
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.5523E-05 END
 U-235 1 0.0 2.9493E-03 END
 U-238 1 0.0 2.5340E-05 END
 O 1 0.0 6.0403E-03 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_C_8_D_D_INF_33
 READ PARAM RUN=YES END PARAM
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 7.62 2P19.05
 ZHEMICYL+X 2 1 7.699 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0

UNIT 2
 ZHEMICYL-X 1 1 7.62 2P19.05
 ZHEMICYL-X 2 1 7.699 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 7.62 2P19.05
 ZHEMICYL-Y 2 1 7.699 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 7.62 2P19.05
 ZHEMICYL+Y 2 1 7.699 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM

READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_8_D_D_INF_33I
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA

END

OXIDES IN 5-INCH CANISTERS

=CSAS25
 U3O8_15_3.47_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.4837E-05 END
 U-235 1 0.0 3.5527E-03 END
 U-238 1 0.0 3.0524E-05 END
 H 1 0.0 5.4571E-02 END
 O 1 0.0 3.6987E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 U3O8_15_3.47_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 .718221 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IU3O8_15_3.47_W_DI
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA
 END

=CSAS25
 UO2_10_3.47_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_3.47_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 -5.68347 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_3.47_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_5.56_D_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_5.56_D_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 2.3364508 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_5.56_D_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_5.56_D_D_INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END

U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END
 H 1 0.0 5.3804-2 END
 O 1 0.0 3.7663-2 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_5.56_D_D_INF
 READ GEOM
 UNIT 1
 ZHEMICYL+X 1 1 6.350 2.3364508 -19.05
 ZHEMICYL+X 0 1 6.350 2P19.05
 ZHEMICYL+X 2 1 6.429 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0

UNIT 2
 ZHEMICYL-X 1 1 6.350 2.3364508 -19.05
 ZHEMICYL-X 0 1 6.350 2P19.05
 ZHEMICYL-X 2 1 6.429 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 6.350 2.3364508 -19.05
 ZHEMICYL-Y 0 1 6.350 2P19.05
 ZHEMICYL-Y 2 1 6.429 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

UNIT 4
 ZHEMICYL+Y 1 1 6.350 2.3364508 -19.05
 ZHEMICYL+Y 0 1 6.350 2P19.05
 ZHEMICYL+Y 2 1 6.429 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_10_5.56_D_D_INF!
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UF.W I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_5.56_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1100-5 END
 U-235 1 0.0 5.254-3 END
 U-238 1 0.0 4.51-5 END

```

H 1 0.0 5.3804-2      END
O 1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
END COMP
UO2_10_5.56_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 2.3364508 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_5.56_W_D !
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

=CSAS25

```

UO2_10_5.56_W_D_H2O
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5       END
H 1 0.0 5.3804-2        END
O 1 0.0 3.7663-2        END
CARBONSTEEL 2 1.0       END
REG-CONCRETE 3 1.0      END
H2O 4 1.0               END
END COMP
UO2_10_5.56_W_D_H2O
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 2.3364508 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CUBOID 4 3 28 -28 28 -28 39 -39
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_5.56_W_D_H2O !
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-50
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

=CSAS25

```

UO2_10_5.56_W_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5       END
H 1 0.0 5.3804-2        END
O 1 0.0 3.7663-2        END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4        END
CA 3 0.0 5.30-3        END
C 3 0.0 6.59-3         END
H 3 0.0 .0133          END
O 3 0.0 .0457          END
FE 3 0.0 3.59-4        END
MG 3 0.0 3.25-3        END
SI 3 0.0 8.43-3        END
NA 3 0.0 3.89-4        END
S 3 0.0 1.09-4         END
H2O 4 1.0              END
END COMP

```

```

UO2_10_5.56_W_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 2.3364508 -19.05
ZHEMICYL+X 0 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004

```

```

HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2

```

```

ZHEMICYL-X 1 1 6.350 2.3364508 -19.05
ZHEMICYL-X 0 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3

```

```

ZHEMICYL-Y 1 1 6.350 2.3364508 -19.05
ZHEMICYL-Y 0 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4

```

```

ZHEMICYL+Y 1 1 6.350 2.3364508 -19.05
ZHEMICYL+Y 0 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_10_5.56_W_D_INF !
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=! UF.W ! END PLOT
END DATA
END

```

=CSAS25

```

UO2_10_5.56_W_W
27GROUPNDF4 INFHOMMEDIUM

```



```

U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H 1 0.0 5.3804-2      END
O 1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_10_5.56_W_W
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 2.3364508 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_10_5.56_W_W
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=1 UFCW 1 END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_5.56_W_W_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H 1 0.0 5.3804-2      END
O 1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_10_5.56_W_W_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 2.3364508 -19.05
ZHEMICYL+X 4 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129

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ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 6.350 2.3364508 -19.05
ZHEMICYL-X 4 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 6.350 2.3364508 -19.05
ZHEMICYL-Y 4 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 6.350 2.3364508 -19.05
ZHEMICYL+Y 4 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUO2_10_5.56_W_W_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=1 UF.W 1 END PLOT
END DATA
END

```

```

=CSAS25
UO2_10_7.29_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5      END
U-235 1 0.0 5.254-3      END
U-238 1 0.0 4.51-5      END
H 1 0.0 5.3804-2      END
O 1 0.0 3.7663-2      END
CARBONSTEEL 2 1.0      END
AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3      END
H 3 0.0 .0133      END
O 3 0.0 .0457      END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4      END
H2O 4 1.0      END
END COMP
UO2_10_7.29_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 9.01972 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764

```

CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_7.29_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 8.1099E-05 END
 U-235 1 0.0 5.2542E-03 END
 U-238 1 0.0 4.5142E-05 END
 H 1 0.0 5.3804E-02 END
 O 1 0.0 3.7663E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_10_8_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 11.7467 -19.05
 CYLINDER 4 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_8_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_M_5
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 6.9771E-05 END
 U-235 1 0.0 4.5203E-03 END
 U-238 1 0.0 3.8837E-05 END
 H 1 0.0 5.5628E-02 END
 O 1 0.0 3.7072E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_8_W_M_5
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 16.7467 -19.05
 CYLINDER 4 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_8_W_M_5!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_10_8_W_M_7
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 6.6079E-05 END
 U-235 1 0.0 4.2811E-03 END
 U-238 1 0.0 3.6782E-05 END
 H 1 0.0 5.6222E-02 END
 O 1 0.0 3.6879E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_10_8_W_M_7
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 18.7467 -19.05
 CYLINDER 4 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_10_8_W_M_7!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT

END DATA
END

=CSAS25
UO2_10_FULL_D_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_FULL_D_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 0 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_10_FULL_D_D
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

=CSAS25
UO2_10_FULL_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_FULL_D_D_INF

READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_10_FULL_D_D_INFI
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UF.W I END PLOT
END DATA
END

=CSAS25
UO2_10_FULL_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.1100-5 END
U-235 1 0.0 5.254-3 END
U-238 1 0.0 4.51-5 END
H 1 0.0 5.3804-2 END
O 1 0.0 3.7663-2 END
CARBONSTEEL 2 1.0 END
AL 3 0.0 5.54-4 END
CA 3 0.0 5.30-3 END
C 3 0.0 6.59-3 END
H 3 0.0 .0133 END
O 3 0.0 .0457 END
FE 3 0.0 3.59-4 END
MG 3 0.0 3.25-3 END
SI 3 0.0 8.43-3 END
NA 3 0.0 3.89-4 END
S 3 0.0 1.09-4 END
H2O 4 1.0 END
END COMP
UO2_10_FULL_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764

CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2 10 FULL W DI
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2 15 3.47 D D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2 15 3.47 D D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 -.9397338 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2 15 3.47 D DI
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2 15 3.47 D D INF
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2 15 3.47 D D INF
 READ GEOM

UNIT 1
 ZHEMICYL+X 1 1 6.350 -.9397338 -19.05
 ZHEMICYL+X 0 1 6.350 2P19.05
 ZHEMICYL+X 2 1 6.429 2P19.129
 ZHEMICYL+X 0 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0

UNIT 2
 ZHEMICYL-X 1 1 6.350 -.9397338 -19.05
 ZHEMICYL-X 0 1 6.350 2P19.05
 ZHEMICYL-X 2 1 6.429 2P19.129
 ZHEMICYL-X 0 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764

UNIT 3
 ZHEMICYL-Y 1 1 6.350 -.9397338 -19.05
 ZHEMICYL-Y 0 1 6.350 2P19.05
 ZHEMICYL-Y 2 1 6.429 2P19.129
 ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

UNIT 4
 ZHEMICYL+Y 1 1 6.350 -.9397338 -19.05
 ZHEMICYL+Y 0 1 6.350 2P19.05
 ZHEMICYL+Y 2 1 6.429 2P19.129
 ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764

END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2 15 3.47 D D INF
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UF.W I END PLOT
 END DATA
 END

=CSAS25
 UO2 15 3.47 W D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 F 3 0.0 3.59-4 END

```

MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4       END
H2O 4 1.0             END
END COMP
UO2_15_3.47_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 -.9397338 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_3.47_W_D
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

=CSAS25

```

UO2_15_3.47_W_D_H2O
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5      END
U-235 1 0.0 .003878     END
U-238 1 0.0 3.33-5      END
H 1 0.0 .059566         END
O 1 0.0 .037725         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_15_3.47_W_D_H2O
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 -.9397338 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CUBOID 4 3 28 -28 28 -28 39 -39
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_3.47_W_D_H2O
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

=CSAS25

```

UO2_15_3.47_W_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5      END
U-235 1 0.0 .003878     END
U-238 1 0.0 3.33-5      END
H 1 0.0 .059566         END
O 1 0.0 .037725         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP

```

UO2_15_3.47_W_D_INF

```

READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 -.9397338 -19.05
ZHEMICYL+X 0 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004

```

```

HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0

```

UNIT 2

```

ZHEMICYL-X 1 1 6.350 -.9397338 -19.05
ZHEMICYL-X 0 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764

```

UNIT 3

```

ZHEMICYL-Y 1 1 6.350 -.9397338 -19.05
ZHEMICYL-Y 0 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

```

UNIT 4

```

ZHEMICYL+Y 1 1 6.350 -.9397338 -19.05
ZHEMICYL+Y 0 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764

```

END GEOM

```

READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_15_3.47_W_D_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

=CSAS25

```

UO2_15_3.47_W_W_INF
27GROUPNDF4 INFHOMMEDIUM

```

2 of 2

```

U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3             END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4             END
H2O 4 1.0                   END
END COMP
UO2_15_3.47_W_W_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 -9397338 -19.05
ZHEMICYL+X 4 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 4 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 6.350 -9397338 -19.05
ZHEMICYL-X 4 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 4 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 6.350 -9397338 -19.05
ZHEMICYL-Y 4 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 6.350 -9397338 -19.05
ZHEMICYL+Y 4 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_15_3.47_W_W_INF!
PLT=YES PIC=MIXTURE XUL=110 YUL=-35
ZUL=0 XLR=0 YLR=35 ZLR=0
VAX=1 UDN=-1 NAX=130 LPI=8
NCH=! UF.W ! END PLOT
END DATA
END

```

```

=CSAS25
UO2_15_5.56_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END

```

```

U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3             END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4             END
H2O 4 1.0                   END
END COMP
UO2_15_5.56_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 9.926426 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_15_5.56_W_D!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

```

=CSAS25
UO2_15_5_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 5.99-5          END
U-235 1 0.0 .003878         END
U-238 1 0.0 3.33-5          END
H 1 0.0 .059566             END
O 1 0.0 .037725             END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3             END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4             END
H2O 4 1.0                   END
END COMP
UO2_15_5_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 7.0278 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764

```


CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_15_5_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_5
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.0228E-05 END
 U-235 1 0.0 3.2541E-03 END
 U-238 1 0.0 2.7959E-05 END
 H 1 0.0 6.0742E-02 END
 O 1 0.0 3.7036E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_5_W_M_5
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 12.0278 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_15_5_W_M_5!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_7
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.7191E-05 END
 U-235 1 0.0 3.0574E-03 END
 U-238 1 0.0 2.6268E-05 END
 H 1 0.0 6.1112E-02 END
 O 1 0.0 3.6818E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_15_5_W_M_7
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 14.0278 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_15_5_W_M_7!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT
 END DATA
 END

=CSAS25
 UO2_15_5_W_M_10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 4.3267E-05 END
 U-235 1 0.0 2.8031E-03 END
 U-238 1 0.0 2.4084E-05 END
 H 1 0.0 6.1590E-02 END
 O 1 0.0 3.6536E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_5_W_M_10
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 17.0278 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_15_5_W_M_10!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW I END PLOT

END DATA
END

=CSAS25

UO2_15_5_W_M_12

27GROUPNDF4 INFHOMMEDIUM

U-234 1 0.0 4.0994E-05 END

U-235 1 0.0 2.6559E-03 END

U-238 1 0.0 2.2819E-05 END

H 1 0.0 6.1866E-02 END

O 1 0.0 3.6373E-02 END

CARBONSTEEL 2 1.0 END

AL 3 0.0 5.54-4 END

CA 3 0.0 5.30-3 END

C 3 0.0 6.59-3 END

H 3 0.0 .0133 END

O 3 0.0 .0457 END

FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END

SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END

S 3 0.0 1.09-4 END

H2O 4 1.0 END

END COMP

UO2_15_5_W_M_12

READ PARAM RUN=YES END PARAM

READ GEOM

CYLINDER 1 1 6.350 19.0278 -19.05

CYLINDER 0 1 6.350 19.05 -19.05

CYLINDER 2 1 6.429 19.129 -19.129

CYLINDER 4 1 10.95375 48.181 -19.129

CYLINDER 2 1 11.24585 49.451 -19.764

CUBOID 3 3 50 -50 50 -50 49.451 -50.549

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUO2_15_5_W_M_12I

PLT=YES PIC=MIXTURE XUL=-50 YUL=00

ZUL=50 XLR=50 YLR=00 ZLR=-30

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCW I END PLOT

END DATA

END

=CSAS25

UO2_15_FULL_D_D

27GROUPNDF4 INFHOMMEDIUM

U-234 1 0.0 5.99-5 END

U-235 1 0.0 .003878 END

U-238 1 0.0 3.33-5 END

H 1 0.0 .059566 END

O 1 0.0 .037725 END

CARBONSTEEL 2 1.0 END

AL 3 0.0 5.54-4 END

CA 3 0.0 5.30-3 END

C 3 0.0 6.59-3 END

H 3 0.0 .0133 END

O 3 0.0 .0457 END

FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END

SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END

S 3 0.0 1.09-4 END

H2O 4 1.0 END

END COMP

UO2_15_FULL_D_D

READ PARAM RUN=YES END PARAM

READ GEOM

CYLINDER 1 1 6.350 19.05 -19.05

CYLINDER 2 1 6.429 19.129 -19.129

CYLINDER 0 1 10.95375 48.181 -19.129

CYLINDER 2 1 11.24585 49.451 -19.764

CUBOID 3 3 50 -50 50 -50 49.451 -50.549

END GEOM

READ BNDS XFC=VAC YFC=VAC END BNDS

READ PLOT TTL=IUO2_15_FULL_D_DI

PLT=YES PIC=MIXTURE XUL=-50 YUL=00

ZUL=50 XLR=50 YLR=00 ZLR=-30

UAX=1 WDN=-1 NAX=130 LPI=8

NCH=I UFCW I END PLOT

END DATA

END

=CSAS25

UO2_15_FULL_D_D_INF

27GROUPNDF4 INFHOMMEDIUM

U-234 1 0.0 5.99-5 END

U-235 1 0.0 .003878 END

U-238 1 0.0 3.33-5 END

H 1 0.0 .059566 END

O 1 0.0 .037725 END

CARBONSTEEL 2 1.0 END

AL 3 0.0 5.54-4 END

CA 3 0.0 5.30-3 END

C 3 0.0 6.59-3 END

H 3 0.0 .0133 END

O 3 0.0 .0457 END

FE 3 0.0 3.59-4 END

MG 3 0.0 3.25-3 END

SI 3 0.0 8.43-3 END

NA 3 0.0 3.89-4 END

S 3 0.0 1.09-4 END

H2O 4 1.0 END

END COMP

UO2_15_FULL_D_D_INF

READ GEOM

UNIT 1

ZHEMICYL+X 1 1 6.350 2P19.05

ZHEMICYL+X 2 1 6.429 2P19.129

ZHEMICYL+X 0 1 10.95375 48.181 -19.129

ZHEMICYL+X 2 1 11.24585 49.451 -19.764

CUBOID 3 1 105.5675 0 30.48 -30.48 49.451

-35.004

HOLE 2 105.5675 0 0

HOLE 3 52.78375 30.48 0

HOLE 4 52.78375 -30.48 0

UNIT 2

ZHEMICYL-X 1 1 6.350 2P19.05

ZHEMICYL-X 2 1 6.429 2P19.129

ZHEMICYL-X 0 1 10.95375 48.181 -19.129

ZHEMICYL-X 2 1 11.24585 49.451 -19.764

UNIT 3

ZHEMICYL-Y 1 1 6.350 2P19.05

ZHEMICYL-Y 2 1 6.429 2P19.129

ZHEMICYL-Y 0 1 10.95375 48.181 -19.129

ZHEMICYL-Y 2 1 11.24585 49.451 -19.764

UNIT 4

ZHEMICYL+Y 1 1 6.350 2P19.05

ZHEMICYL+Y 2 1 6.429 2P19.129

ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_15_FULL_D_D_INFI
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=I UFW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_15_FULL_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 5.99-5 END
 U-235 1 0.0 .003878 END
 U-238 1 0.0 3.33-5 END
 H 1 0.0 .059566 END
 O 1 0.0 .037725 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_15_FULL_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_15_FULL_W_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1.39_D_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END

O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_65_1.39_D_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 9.020928 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 0 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_1.39_D_D!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1.39_D_D_H2O
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END

END COMP
 UO2_65_1.39_D_D_H2O
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 9.020928 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CUBOID 4 2 28 -28 28 -28 39 -39
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_1.39_D_D_H2O!
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

```

=CSAS25
UO2_65_1.39_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6      END
H 1 0.0 .06661          END
O 1 0.0 .035354         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_1.39_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 9.020928 -19.05
ZHEMICYL+X 0 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 6.350 9.020928 -19.05
ZHEMICYL-X 0 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 6.350 9.020928 -19.05
ZHEMICYL-Y 0 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 6.350 9.020928 -19.05
ZHEMICYL+Y 0 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=UO2_65_1.39_D_D_INF
PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=I UFW I END PLOT
END DATA
END
=CSAS25

```

```

UO2_65_1.39_W_D
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6      END
H 1 0.0 .06661          END
O 1 0.0 .035354         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_1.39_W_D
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 9.020928 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_65_1.39_W_D
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END
=CSAS25
UO2_65_1.39_W_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001      END
U-238 1 0.0 8.56-6      END
H 1 0.0 .06661          END
O 1 0.0 .035354         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_1.39_W_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 9.020928 -19.05

```

ZHEMICYL+X 0 1 6.350 2P19.05
 ZHEMICYL+X 2 1 6.429 2P19.129
 ZHEMICYL+X 4 1 10.95375 48.181 -19.129
 ZHEMICYL+X 2 1 11.24585 49.451 -19.764
 CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
 -35.004
 HOLE 2 105.5675 0 0
 HOLE 3 52.78375 30.48 0
 HOLE 4 52.78375 -30.48 0
 UNIT 2
 ZHEMICYL-X 1 1 6.350 9.020928 -19.05
 ZHEMICYL-X 0 1 6.350 2P19.05
 ZHEMICYL-X 2 1 6.429 2P19.129
 ZHEMICYL-X 4 1 10.95375 48.181 -19.129
 ZHEMICYL-X 2 1 11.24585 49.451 -19.764
 UNIT 3
 ZHEMICYL-Y 1 1 6.350 9.020928 -19.05
 ZHEMICYL-Y 0 1 6.350 2P19.05
 ZHEMICYL-Y 2 1 6.429 2P19.129
 ZHEMICYL-Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
 UNIT 4
 ZHEMICYL+Y 1 1 6.350 9.020928 -19.05
 ZHEMICYL+Y 0 1 6.350 2P19.05
 ZHEMICYL+Y 2 1 6.429 2P19.129
 ZHEMICYL+Y 4 1 10.95375 48.181 -19.129
 ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
 END GEOM
 READ BNDS XFC=SPEC YFC=SPEC END BNDS
 READ PLOT TTL=IUO2_65_1.39_W_D_INFI
 PLT=YES PIC=MIXTURE XUL=0 YUL=35 ZUL=0
 XLR=110 YLR=-35 ZLR=0
 UAX=1 VDN=-1 NAX=130 LPI=8
 NCH=IUF.WI END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1_W_D
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.540-5 END
 U-235 1 0.0 .001001 END
 U-238 1 0.0 8.56-6 END
 H 1 0.0 .06661 END
 O 1 0.0 .035354 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP
 UO2_65_1_W_D
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 1.1603 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129

CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_1_W_DI
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1_W_M_5
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.3112E-05 END
 U-235 1 0.0 8.4948E-04 END
 U-238 1 0.0 7.2985E-06 END
 H 1 0.0 6.6652E-02 END
 O 1 0.0 3.5066E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END
 C 3 0.0 6.59-3 END
 H 3 0.0 .0133 END
 O 3 0.0 .0457 END
 FE 3 0.0 3.59-4 END
 MG 3 0.0 3.25-3 END
 SI 3 0.0 8.43-3 END
 NA 3 0.0 3.89-4 END
 S 3 0.0 1.09-4 END
 H2O 4 1.0 END
 END COMP

UO2_65_1_W_M_5
 READ PARAM RUN=YES END PARAM
 READ GEOM
 CYLINDER 1 1 6.350 14.0199 -19.05
 CYLINDER 0 1 6.350 19.05 -19.05
 CYLINDER 2 1 6.429 19.129 -19.129
 CYLINDER 4 1 10.95375 48.181 -19.129
 CYLINDER 2 1 11.24585 49.451 -19.764
 CUBOID 3 3 50 -50 50 -50 49.451 -50.549
 END GEOM
 READ BNDS XFC=VAC YFC=VAC END BNDS
 READ PLOT TTL=IUO2_65_1_W_M_5I
 PLT=YES PIC=MIXTURE XUL=-50 YUL=00
 ZUL=50 XLR=50 YLR=00 ZLR=-30
 UAX=1 WDN=-1 NAX=130 LPI=8
 NCH=I UFCW ! END PLOT
 END DATA
 END

=CSAS25
 UO2_65_1_W_M_10
 27GROUPNDF4 INFHOMMEDIUM
 U-234 1 0.0 1.0334E-05 END
 U-235 1 0.0 6.6952E-04 END
 U-238 1 0.0 5.7523E-06 END
 H 1 0.0 6.6696E-02 END
 O 1 0.0 3.4719E-02 END
 CARBONSTEEL 2 1.0 END
 AL 3 0.0 5.54-4 END
 CA 3 0.0 5.30-3 END

```

C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_1_W_M_10
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 11.1603 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_65_1_W_M_10!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_65_1_W_M_17.8
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 8.2135E-06   END
U-235 1 0.0 5.3213E-04   END
U-238 1 0.0 4.5719E-06   END
H 1 0.0 6.6729E-02       END
O 1 0.0 3.4455E-02       END
CARBONSTEEL 2 1.0        END
AL 3 0.0 5.54-4          END
CA 3 0.0 5.30-3          END
C 3 0.0 6.59-3           END
H 3 0.0 .0133            END
O 3 0.0 .0457            END
FE 3 0.0 3.59-4          END
MG 3 0.0 3.25-3          END
SI 3 0.0 8.43-3          END
NA 3 0.0 3.89-4          END
S 3 0.0 1.09-4           END
H2O 4 1.0                END
END COMP
UO2_65_1_W_M_17.8
READ PARAM RUN=YES END PARAM
READ GEOM
CYLINDER 1 1 6.350 18.9603 -19.05
CYLINDER 0 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_65_1_W_M_17.8!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30

```

```

UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

=CSAS25
UO2_65_FULL_D_D_INF
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.540-5      END
U-235 1 0.0 .001001     END
U-238 1 0.0 8.56-6      END
H 1 0.0 .06661          END
O 1 0.0 .035354         END
CARBONSTEEL 2 1.0       END
AL 3 0.0 5.54-4         END
CA 3 0.0 5.30-3         END
C 3 0.0 6.59-3          END
H 3 0.0 .0133           END
O 3 0.0 .0457           END
FE 3 0.0 3.59-4         END
MG 3 0.0 3.25-3         END
SI 3 0.0 8.43-3         END
NA 3 0.0 3.89-4         END
S 3 0.0 1.09-4          END
H2O 4 1.0               END
END COMP
UO2_65_FULL_D_D_INF
READ GEOM
UNIT 1
ZHEMICYL+X 1 1 6.350 2P19.05
ZHEMICYL+X 2 1 6.429 2P19.129
ZHEMICYL+X 0 1 10.95375 48.181 -19.129
ZHEMICYL+X 2 1 11.24585 49.451 -19.764
CUBOID 3 1 105.5675 0 30.48 -30.48 49.451
-35.004
HOLE 2 105.5675 0 0
HOLE 3 52.78375 30.48 0
HOLE 4 52.78375 -30.48 0
UNIT 2
ZHEMICYL-X 1 1 6.350 2P19.05
ZHEMICYL-X 2 1 6.429 2P19.129
ZHEMICYL-X 0 1 10.95375 48.181 -19.129
ZHEMICYL-X 2 1 11.24585 49.451 -19.764
UNIT 3
ZHEMICYL-Y 1 1 6.350 2P19.05
ZHEMICYL-Y 2 1 6.429 2P19.129
ZHEMICYL-Y 0 1 10.95375 48.181 -19.129
ZHEMICYL-Y 2 1 11.24585 49.451 -19.764
UNIT 4
ZHEMICYL+Y 1 1 6.350 2P19.05
ZHEMICYL+Y 2 1 6.429 2P19.129
ZHEMICYL+Y 0 1 10.95375 48.181 -19.129
ZHEMICYL+Y 2 1 11.24585 49.451 -19.764
END GEOM
READ BNDS XFC=SPEC YFC=SPEC END BNDS
READ PLOT TTL=IUO2_65_FULL_D_D_INF!
PLT=YES PIC=MIXTURE XUL=0 YUL=-35 ZUL=0
XLR=110 YLR=-35 ZLR=0
UAX=1 VDN=-1 NAX=130 LPI=8
NCH=! UF.W ! END PLOT
END DATA
END

```

**Oxides in 5-inch Canisters,
8 kg U-235**

```
=CSAS25
UO2_C_8_W_M_0
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 3.6785E-04      END
U-235 1 0.0 2.3832E-02      END
U-238 1 0.0 2.0476E-04      END
O 1 0.0 4.8809E-02          END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_C_8_W_M_0
READ GEOM
CYLINDER 1 1 6.350 -1.2260E+01 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_0!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END
```

```
=CSAS25
UO2_C_8_W_M_2
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 2.8415E-04      END
U-235 1 0.0 1.8409E-02      END
U-238 1 0.0 1.5817E-04      END
H 1 0.0 1.5213E-02          END
O 1 0.0 4.5310E-02          END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_C_8_W_M_2
READ GEOM
```

```
CYLINDER 1 1 6.350 -1.0260E+01 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_2!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END
```

```
=CSAS25
UO2_C_8_W_M_4
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 2.3148E-04      END
U-235 1 0.0 1.4997E-02      END
U-238 1 0.0 1.2885E-04      END
H 1 0.0 2.4787E-02          END
O 1 0.0 4.3108E-02          END
CARBONSTEEL 2 1.0           END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
```

```
UO2_C_8_W_M_4
READ GEOM
CYLINDER 1 1 6.350 -8.2604E+00 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_4!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END
```

```
=CSAS25
UO2_C_8_W_M_8
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.6887E-04      END
U-235 1 0.0 1.0941E-02      END
U-238 1 0.0 9.4001E-05      END
H 1 0.0 3.6166E-02          END
O 1 0.0 4.0490E-02          END
CARBONSTEEL 2 1.0           END
```

```

AL 3 0.0 5.54-4      END
CA 3 0.0 5.30-3      END
C 3 0.0 6.59-3       END
H 3 0.0 .0133        END
O 3 0.0 .0457        END
FE 3 0.0 3.59-4      END
MG 3 0.0 3.25-3      END
SI 3 0.0 8.43-3      END
NA 3 0.0 3.89-4      END
S 3 0.0 1.09-4       END
H2O 4 1.0            END
END COMP
UO2_C_8_W_M_8
READ GEOM
CYLINDER 1 1 6.350 -4.2604E+00 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_8I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_10
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.4876E-04      END
U-235 1 0.0 9.6375E-03      END
U-238 1 0.0 8.2803E-05      END
H 1 0.0 3.9822E-02          END
O 1 0.0 3.9649E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP
UO2_C_8_W_M_10
READ GEOM
CYLINDER 1 1 6.350 -2.2604E+00 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_10I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30

```

```

UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_15
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 1.1462E-04      END
U-235 1 0.0 7.4260E-03      END
U-238 1 0.0 6.3803E-05      END
H 1 0.0 4.6027E-02          END
O 1 0.0 3.8222E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END
END COMP

```

```

UO2_C_8_W_M_15
READ GEOM
CYLINDER 1 1 6.350 2.7396E+00 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=IUO2_C_8_W_M_15I
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=I UFCW I END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_20
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 9.3229E-05      END
U-235 1 0.0 6.0400E-03      END
U-238 1 0.0 5.1894E-05      END
H 1 0.0 4.9915E-02          END
O 1 0.0 3.7328E-02          END
CARBONSTEEL 2 1.0          END
AL 3 0.0 5.54-4             END
CA 3 0.0 5.30-3             END
C 3 0.0 6.59-3              END
H 3 0.0 .0133               END
O 3 0.0 .0457               END
FE 3 0.0 3.59-4             END
MG 3 0.0 3.25-3             END
SI 3 0.0 8.43-3             END
NA 3 0.0 3.89-4             END
S 3 0.0 1.09-4              END
H2O 4 1.0                   END

```



```

END COMP
UO2_C_8_W_M_20
READ GEOM
CYLINDER 1 1 6.350 7.7396E+00 -19.05
CYLINDER 4 1 6.350 19.05 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_C_8_W_M_20!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

```

=CSAS25
UO2_C_8_W_M_31
27GROUPNDF4 INFHOMMEDIUM
U-234 1 0.0 6.5553E-05      END
U-235 1 0.0 4.2470E-03      END
U-238 1 0.0 3.6489E-05      END
H   1 0.0 5.4945E-02      END
O   1 0.0 3.6171E-02      END
CARBONSTEEL 2 1.0          END
AL   3 0.0 5.54-4          END
CA   3 0.0 5.30-3          END
C    3 0.0 6.59-3          END
H    3 0.0 .0133           END
O    3 0.0 .0457           END
FE   3 0.0 3.59-4          END
MG   3 0.0 3.25-3          END
SI   3 0.0 8.43-3          END
NA   3 0.0 3.89-4          END
S    3 0.0 1.09-4          END
H2O  4 1.0                 END

```

```

END COMP
UO2_C_8_W_M_31
READ GEOM
CYLINDER 1 1 6.350 19.0500 -19.05
CYLINDER 2 1 6.429 19.129 -19.129
CYLINDER 4 1 10.95375 48.181 -19.129
CYLINDER 2 1 11.24585 49.451 -19.764
CUBOID 3 3 50 -50 50 -50 49.451 -50.549
END GEOM
READ BNDS XFC=VAC YFC=VAC END BNDS
READ PLOT TTL=UO2_C_8_W_M_31!
PLT=YES PIC=MIXTURE XUL=-50 YUL=00
ZUL=50 XLR=50 YLR=00 ZLR=-30
UAX=1 WDN=-1 NAX=130 LPI=8
NCH=! UFCW ! END PLOT
END DATA
END

```

Appendix G

X-345 Moderation Control Limits

The moderation control limits for oxides in X-345 are given in a memo from the Portsmouth criticality safety staff in 1988¹. These rules are summarized below:

1. Until notified otherwise in writing by the NCS staff, Nuclear Material Control personnel will neither assign below-floor-level storage positions in the oxide vault of X-345 for containers of uranium oxides, nor cause such containers to be placed in such positions, unless purities meet the requirements contained in correspondence 504-87-04 (table reproduced below).
2. Until notified otherwise in writing by the NCS staff, Nuclear Materials Control will send an inventory sheet - listing the ²³⁵U assay, ²³⁵U mass, and uranium purity of the uranium oxide in each container stored in the X-345 oxide vault - to the NCS staff on a quarterly basis.

Minimum Uranium Purity Required for Moderation Control for Uranium Oxides²

Material	H/ ²³⁵ U = 65	H/ ²³⁵ U = 15	H/ ²³⁵ U = 10
	²³⁵ U Mass Limit(kg)		
	2	5	8
	Minimum Uranium Purity Limit (g _U /g _{Total})		
UO ₂	0.276	0.585	0.660
UO ₃	0.271	0.560	0.630
U ₃ O ₈	0.275	0.567	0.635

References

1. Oxenham, R.L., Netzer, W. D., and Miller, R. R., *Interim Moderation Control Limits for Oxides in X-345*, Martin Marietta Energy Systems, Portsmouth, POEF-DM-1554, March 10, 1988.
2. D. A. Shisler, Martin Marietta Energy Systems, Portsmouth, Nuclear Materials Control, internal correspondence 504-87-04, January 9, 1987.

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