**REDIQ — A Computer Program
for Estimating Health Effects
from Inhalation and Ingestion
of Radionuclides**

December 1976

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Nuclear Regulatory Commission**

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ERRATA
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The following corrections should be made.

- 1) Page A.9: The last line for equation (12) should be

$$+ \frac{C_h}{(\lambda_i - \lambda_n)} \left\{ \frac{e^{-\lambda_n T_2} - e^{-\lambda_i T_2}}{\lambda_i - \lambda_n} - T_2 e^{-\lambda_i T_2} \right\} \quad (12)$$

- 2) Pages D.38 and D.39: The organ data library presented in Appendix D contains outdated f_w values for uranium. The values should be:⁽²⁾
for total body, 1×10^{-2} ; for kidneys, 1.1×10^{-3} ; and for bone, 1.1×10^{-3} .

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REDIQ - A COMPUTER PROGRAM FOR ESTIMATING
HEALTH EFFECTS FROM INHALATION AND
INGESTION OF RADIONUCLIDES

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SUMMARY

The computer program REDIQ calculates the risk equivalence of dosage from internally deposited radionuclides to dosage from external whole-body irradiation. The calculation gives an estimate of the microcurie intake per nuclide that would result in a risk equivalent to receiving 1 rem of external whole-body irradiation. The program allows for internal deposition resulting from either inhalation of radioactive aerosols or ingestion of contaminated food. The inhalation portion of REDIQ was taken from the computer program DACRIN,⁽¹⁾ which uses the models of the respiratory tract adopted by the Task Group on Lung Dynamics.⁽²⁾ REDIQ also uses a simple exponential model for retention by an organ of interest, and the gastrointestinal tract model of the International Commission on Radiological Protection (ICRP).⁽³⁾

For each nuclide specified, the program first calculates the radiation dose per microcurie intake by inhalation or ingestion to any of 23 organs and tissues. A maximum of 10 organs may be specified for any one case. The values for dose per microcurie intake are then coupled with relative risk values for each organ being considered, to arrive at the estimated intake equivalent to 1 rem of external whole-body irradiation.

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REDIQ - A COMPUTER PROGRAM FOR ESTIMATING HEALTH EFFECTS FROM INHALATION AND INGESTION OF RADIONUCLIDES

INTRODUCTION

People are continually exposed to radiation from many sources (e.g., cosmic radiation, x-ray machines, television sets and radionuclides in the environment) that results in receipt of an external dose. Internal exposure, resulting in dose receipt by individual organs within the body, occurs when radionuclides are assimilated through respiration of air and ingestion of food and water. The purpose of this report is to describe a computer program for estimating the radionuclide intake that produces an internal exposure equivalent to 1 rem of whole-body external exposure.

The "intake equivalent" is expressed as the microcuries total intake of a given nuclide, via inhalation or ingestion (not both), that produce a risk equivalent to that from 1 rem of external whole-body irradiation. "Risk" means the danger that a particular effect, such as death from cancer, may occur. The intake equivalent is established using risk factors to weight the dose for each organ, and equating the total risk to the external whole-body exposure risk. The computer program REDIQ was developed to calculate the values for organ dose per microcuries of intake, and to use these values to estimate the equivalent intake amounts.

The program makes no assumptions about the values to be used for risk factors; these must be supplied by the user. The Advisory Committee on Biological Effects of Ionizing Radiation^(a) (the BEIR Committee) has reported its best estimates of the cancer death risk for the U.S. population from exposure to ionizing radiation.⁽⁴⁾ Use of this information is discussed in Appendix G as part of the sample problem.

(a) Of the National Academy of Sciences--National Research Council.

MATHEMATICAL MODELS AND METHODS

The mathematical models used by REDIQ are those of the computer program DACRIN⁽¹⁾ plus the ingestion pathway model presented in ICRP Publication 2.⁽³⁾ These models are used to determine the dose to specific organs per microcurie intake via inhalation or ingestion. A detailed discussion of each model is given in Appendix A. The normalized organ dose values are used to determine the equivalent intake values for each nuclide of interest, using the method that is described below following a general discussion of the inhalation and ingestion models.

INHALATION PATHWAY

The model of the respiratory tract adopted by the Task Group on Lung Dynamics forms the general basis for the mathematical models developed to calculate the dose from the inhalation of radionuclides.⁽¹⁾ In the Task Group's model, the respiratory tract is divided into three regions, the nasopharyngeal (NP), the tracheobronchial (TB), and the pulmonary (P), as shown in Figure 1. Deposition is assumed to vary with the aerodynamic properties of the aerosol distribution for each inhaled radionuclide, and is described by the three parameters D_3 , D_4 , and D_5 . These parameters represent the fraction of the inhaled material, Q_I , initially deposited in each of the three regions.

The NP, TB and P regions of deposition are further subdivided into two or more subcompartments. Each subcompartment represents the fraction of a compartment's initial radionuclide content that is subject to a particular clearance process. This fraction is represented by f_j , where j indicates the clearance pathway. For example, the quantity of material in the TB region that is cleared by process (c) is represented by the product $f_c D_4 Q_I$. For each clearance process in the three translocation or aerosol solubility groups, the values of f_j and T_j (the clearance half-time) are those suggested by the ICRP⁽⁵⁾ (see Appendix A, Table A-1). Values of the deposition fractions D_3 , D_4 , and D_5 have been published in graphic form⁽²⁾ as a function of activity median aerodynamic diameter (AMAD).

FIGURE 1. Schematic Diagram of the Task Group Lung Model

Routines to generate these values directly from the AMAD have been included in the code and yield essentially the same values as those presented by the Task Group.

REDIQ expands the Task Group lung model to include calculation of organ doses, using the lung model to describe entry of radioactive materials into the body. Radionuclides are assumed to be transported via the blood, moving from the respiratory tract, the lymphatic system, and the gastrointestinal (GI) tract to other organs and tissues where significant accumulations of inhaled radionuclides occur. This translocation from the respiratory tract and lymphatic system to the blood has been described in some detail by the Task Group. Of the material clearing from the respiratory tract through the GI tract, a constant fraction, f_1 , is assumed to be taken up by the blood. The portion moving to the n^{th} organ or tissue is assumed to be a constant fraction, f'_2 , of the amount that enters the blood stream at any time t . Once in the n^{th} organ, the radioactive material is assumed to clear the organ (and the body) at a constant rate, λ_n . This expanded model can thus be used to determine organ doses at any time following acute or chronic exposures. A schematic representation of the REDIQ metabolic model described above is shown in Figure 2.

FIGURE 2. Schematic Diagram of the REDIQ Metabolic Model

Material entering the GI tract from the respiratory system can cause portions of the GI tract to be exposed to radiation. The ICRP GI tract model⁽³⁾ is used to describe movement of material within the tract's compartments. A diagram of this model is given in Figure 3. Material from the respiratory tract enters the G.I. tract through the stomach (S), which is assumed to be uniformly irradiated for a mean residence time of 1 hour. Absorption of material into the blood is assumed to occur from the small intestine (SI) only. Using an exponential absorption model, the rate constant is defined so that a fraction f_1 is absorbed during passage through the SI. Values of f_1 are those recommended by the ICRP.⁽³⁾

The dose contribution to the pulmonary portion of the lung includes radiations from daughter nuclides formed there. The daughter contributions are computed indirectly using weighted values of the effective energy emitted by the daughter nuclides in the chain. Weighted values were calculated for each of the decay chains tabulated by the ICRP^(3,6) for residence half-times of 1 day, 50 days and 500 days. These values are included in the organ data library discussed in Appendix D.

FIGURE 3. Schematic Diagram of the GI System Model

INGESTION PATHWAY

The ICRP GI tract model described above is also the basis for the ingestion pathway model used by REDIQ. Material is assumed to enter the body via ingestion to the stomach (arrow D_I in Figure 2). Transfer to other organs is assumed to occur through absorption of material from the small intestine.

EQUIVALENT INTAKE

The calculation of equivalent intake values depends on a careful determination of relative risk values. All risk values must be related to the same biological effect, for example, death from cancer. Values are determined for the risk from 1 rem of whole-body irradiation, plus the risk per rem for each organ to which a nuclide contributes a significant dose. Risk values are expressed as events per rem. The equivalent intake is then calculated as the ratio of the whole-body exposure risk to the sum of the products of organ dose times the organ risk factor. The equivalent intake is expressed as microcuries per rem of whole-body exposure. Details of the calculation are given in Appendix A.

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APPENDIX A

DESCRIPTION OF MATHEMATICAL MODELS

DESCRIPTION OF MATHEMATICAL MODELS

This appendix describes mathematical models used to calculate inhalation and ingestion doses and the risk equivalence values. Equations are presented for both acute and chronic uptake modes.

INHALATION DOSE MODEL

The mathematical model for calculating the dose to an organ of interest via inhalation, using the ICRP Task Group Lung Model (TGLM),^(1,2) is described here. In the TGLM, the respiratory tract is divided into three regions, the nasopharyngeal (NP), the tracheobronchial (TB), and the pulmonary (P). The schematic representation of this model is shown in Figure 1 of the main text. Deposition of inhaled nuclides is assumed to vary with the aerodynamic properties of the aerosol distribution for each nuclide, and is described by the three parameters D_3 , D_4 , and D_5 . These parameters represent the fraction of the inhaled material Q_I initially deposited in the NP, TB, and P regions, respectively. Each of the three regions of deposition is further subdivided into two or more subcompartments, each representing the fraction of material initially in a compartment that is subject to a certain clearance process. This fraction is represented by f_j , where j indicates the clearance pathway. For example, the quantity of material in the TB region cleared by process (c) is represented by the product $f_c D_4 Q_I$. Material from pulmonary compartment (h) clears through the lymphatic system (LM).

Table A-1⁽²⁾ shows the values of f_j and the clearance half-times T_j for each clearance process in the three translocation classes of aerosols. The three translocation classes indicate the extent to which material is retained in the respiratory compartments: for days (D), weeks (W), or years (Y). Values of the deposition fractions D_3 , D_4 , and D_5 as a function of activity median aerodynamic diameter (AMAD) have been published in the form of a graph.⁽¹⁾

Radionuclides are assumed to be transported via the blood, moving from the respiratory tract, lymphatic systems, and GI tract to other organs and

TABLE A-1. Values of the Clearance Parameters
for the Task Group Lung Model

COMPARTMENT	j(a)	TRANSLOCATION CLASS					
		D		W		Y	
		$T_j^{(b)}$	$f_j^{(c)}$	T_j	f_j	T_j	f_j
NP	a	0.01	0.5	0.01	0.1	0.01	0.01
	b	0.01	0.5	0.40	0.9	0.4	0.99
TB	c	0.01	0.95	0.01	0.5	0.01	0.01
	d	0.2	0.05	0.2	0.5	0.2	0.99
P	e	0.5	0.8	50	0.15	500	0.05
	f	n.a.	n.a.	1	0.4	1	0.4
	g	n.a.	n.a.	50	0.4	500	0.4
	h	0.5	0.2	50	0.05	500	0.15
LM	i	0.5	1	50	1	1000	0.9

(a) Metabolic pathways from lung.

(b) Half-time (in days) for removal from compartment via pathway j.

(c) Fraction removed from compartment via pathway j.

tissues where significant accumulations of inhaled radionuclides occur. This translocation from the respiratory tract and lymphatic system to the blood has been described in considerable detail.⁽¹⁾ Of the material clearing from the respiratory tract through the GI tract, a constant fraction is assumed to be taken up by the blood. Uptake by the n^{th} organ or tissue is assumed to be a constant fraction of the amount entering the blood stream at any time. Once in the n^{th} organ, the activity is assumed to clear the organ and the body at a constant rate.

Notation for the equations found in this section is as follows:

- $D_{1n}(T_1)$ • is the dose in rem received by the nth organ or tissue by time T_1 during continuous uptake of radioactive material.
- $D_{2n}(T_2)$ • is the dose in rem received by the nth organ or tissue by time T_2 following the termination of continuous uptake of radioactive material.
- $Q_{1n}(T_1)$ • is the quantity of radioactive material in μCi present in the nth organ or tissue as a function of time during continuous uptake of radioactive material.
- $Q_{2n}(T_2)$ • is the quantity of radioactive material in μCi present in the nth organ or tissue following the termination of continuous uptake of radioactive material.
- E_n • is the effective absorbed energy per disintegration in $\frac{\text{MeV} \cdot \text{rem}}{\text{dis} \cdot \text{rad}}$ for the nth organ or tissue.
- M_n • is the mass in grams of the nth organ or tissue over which the dose is to be averaged.
- λ_j^b • is the biological removal rate constant per sec for the jth subcompartment of the respiratory tract.
- λ • is the radiological decay constant of the nuclide of interest, per sec.
- λ_j • is the total removal rate constant per sec for the jth subcompartment of the respiratory tract. Note: $\lambda_j = \lambda_j^b + \lambda$.
- λ_n^b • is the biological removal rate constant per sec for the nth organ or tissue.
- λ_n • is the total effective removal rate constant per sec for the nth organ or tissue. Note: $\lambda_n = \lambda_n^b + \lambda$.
- f_2^i • is the fraction of material in the blood that reaches the organ of interest.

- f_1 • is the fraction of material in the GI tract that reaches the blood.
- f_w • is the fraction of material ingested that reaches the organ of interest.
- P_0 • is the rate at which the radioactive material is inhaled, in $\mu\text{Ci/sec}$.
- f_j • is the fraction of the material in a deposition region (NP, TB, P), that clears by the j th pathway.
- D_k • is the fraction of the inhaled material deposited in the k th compartment of the respiratory tract.
 $k = 3$ for the nasopharyngeal (NP) compartment.
 $k = 4$ for the tracheobronchial (TB) compartment.
 $k = 5$ for the pulmonary (P) and lymph (LM) compartments.
- T_1 • is the total uptake time, in sec.
- T_2 • is the time interval following termination of uptake, in sec.

The development of equations to describe the lung clearance model is divided into two parts: the first deals with organ burdens and doses in the time interval during which the inhalation of radionuclides takes place; and the second considers the contiguous time interval following the cessation of radionuclide intake.

Intake Period

For the intake stage, the quantity of radionuclide in the eight sub-compartments (j) of the three compartments (k) of the respiratory tract is computed by the equation

$$Q_{j,k}(t) = f_j D_k Q_I \frac{1 - e^{-\lambda_j t}}{\lambda_j} \quad (1)$$

The equations for the removable quantity in the pulmonary lymph nodes are complicated: the rate of radionuclide transfer into the lymph system

(λ_h) may be either equal or unequal to the rate of transfer out of the system (λ_i) , depending on the solubility class of the radionuclide. Thus, two equations are needed to compute the quantity of radionuclide in the lymph compartment. For the case $\lambda_h \neq \lambda_i$, i.e., Class Y solubility in the current version of the model,

$$Q_{LMi}(t) = \frac{\lambda_h^b f_i f_h P_o D_5}{\lambda_h} \left[\frac{(1 - e^{-\lambda_i t})}{\lambda_i} - \frac{(e^{-\lambda_i t} - e^{-\lambda_h t})}{\lambda_h - \lambda_i} \right] \quad (2)$$

and for the case $\lambda_h = \lambda_i$, i.e., Class D and W in the current version of the model,

$$Q_{LMi}(t) = \frac{\lambda_h^b f_i f_h P_o D_5}{\lambda_h} \left[\frac{(1 - e^{-\lambda_i t})}{\lambda_i} - t e^{-\lambda_i t} \right] \quad (3)$$

Using the preceding equations, the equations describing the quantity of radionuclide in the nth organ as a function of time during uptake can be derived by

$$Q_{Ln}(t) = P_o \left\{ \sum_{j=a}^g f_2' C_j \left[\frac{(1 - e^{-\lambda_n t})}{\lambda_n} - \frac{(e^{-\lambda_n t} - e^{-\lambda_j t})}{(\lambda_j - \lambda_n)} \right] + L \right\} \quad (4)$$

where

L • is the contribution to the organ burden from material passing through the lymphatic system,

and

$$C_a = \lambda_a^b f_a D_3 / \lambda_a$$

$$C_b = \lambda_b^b f_b D_3 f_1 / \lambda_b$$

$$C_c = \lambda_c^b f_c D_4 / \lambda_c$$

$$C_d = \lambda_d^b f_d D_4 f_1 / \lambda_d$$

$$C_e = \lambda_e^b f_e D_5 / \lambda_e$$

$$C_f = \lambda_f^b f_f D_5 f_1 / \lambda_f$$

$$C_g = \lambda_g^b f_g D_5 f_1 / \lambda_g$$

The lymph pathway contributions to the n^{th} organ burden for the two situations are calculated as follows:

$$L = f_2' C_h \left\{ \frac{1}{\lambda_i} \left[\frac{(1 - e^{-\lambda_n t})}{\lambda_n} - \frac{(e^{-\lambda_n t} - e^{-\lambda_i t})}{(\lambda_i - \lambda_n)} \right] - \frac{1}{(\lambda_h - \lambda_i)} \left[\frac{(e^{-\lambda_n t} - e^{-\lambda_i t})}{(\lambda_i - \lambda_n)} - \frac{(e^{-\lambda_n t} - e^{-\lambda_h t})}{(\lambda_h - \lambda_n)} \right] \right\} \text{ for } \lambda_h \neq \lambda_i \quad (5a)$$

$$L = f_2' C_h \left\{ \frac{1}{\lambda_i} \left[\frac{(1 - e^{-\lambda_n t})}{\lambda_i} - \frac{(e^{-\lambda_n t} - e^{-\lambda_i t})}{(\lambda_i - \lambda_n)} \right] - \frac{e^{-\lambda_n t} - [(\lambda_i - \lambda_n) t + 1] e^{-\lambda_i t}}{(\lambda_i - \lambda_n)^2} \right\} \text{ for } \lambda_h = \lambda_i \quad (5b)$$

where

$$C_h = \frac{\lambda_i^b \lambda_h^b f_i f_h D_5}{\lambda_h}$$

The calculation of the dose to organs burdened by the radionuclide is based on the following:

$$D_{ln}(t) = \frac{5.92 \times 10^{-4} E_n}{M_n} \int_0^t Q_{ln}(\tau) d\tau \quad (6)$$

where the constant is a combination of the conversion factors

$$3.7 \times 10^4 \left(\frac{\text{dis/sec}}{\mu\text{Ci}} \right) 1.6 \times 10^{-6} \left(\frac{\text{ergs}}{\text{MeV}} \right) 10^{-2} \left(\frac{\text{rads}}{\text{erg/g}} \right) = 5.92 \times 10^{-4}$$

The dose to the pulmonary lung at the end of inhalation intake of a radionuclide is determined by

$$D_{lp}(T_1) = \frac{5.92 \times 10^{-4} E_p}{M_p} P_0 D_5 \sum_{j=e}^h \frac{f_j}{\lambda_j} (T_1 - A_j) \quad (7)$$

where

M_p • is the mass of the lung in grams

and

$$A_j = \frac{1 - e^{-\lambda_j T_1}}{\lambda_j}$$

For the n^{th} organ or tissue, the dose is computed for $\lambda_h \neq \lambda_i$ by

$$D_{ln}(T_1) = 5.92 \times 10^{-4} \frac{E_n P_0 f_2'}{M_n} \left\{ \sum_{j=a}^g C_j \left[\frac{T_1 - A_n}{\lambda_n} - \left(\frac{A_n - A_j}{\lambda_j - \lambda_n} \right) \right] \right. \\ \left. + \frac{C_h}{\lambda_i} \left[\frac{T_1 - A_n}{\lambda_n} - \frac{A_n - A_i}{(\lambda_i - \lambda_n)} \right] - \frac{C_h}{(\lambda_h - \lambda_i)} \left[\frac{A_n - A_i}{(\lambda_i - \lambda_n)} \right. \right. \\ \left. \left. - \frac{A_n - A_h}{\lambda_h - \lambda_n} \right] \right\} \quad (8)$$

or for $\lambda_h = \lambda_i$ by

$$D_{ln}(T_1) = 5.92 \times 10^{-4} \frac{E_n P_0 f_2'}{M_n} \left(\sum_{j=a}^g C_j \left(\frac{T_1 - A_n}{\lambda_n} - \frac{A_n - A_j}{\lambda_j - \lambda_n} \right) \right. \\ \left. + \frac{C_h}{\lambda_i} \left(\frac{T_1 - A_n}{\lambda_n} - \frac{A_n - A_i}{\lambda_i - \lambda_n} \right) + \frac{C_h}{(\lambda_i - \lambda_n)^2} \left\{ A_i - A_n \right. \right. \\ \left. \left. + \frac{(\lambda_i - \lambda_n)}{\lambda_i^2} \left[1 - (\lambda_i T_1 + 1) e^{-\lambda_i T_1} \right] \right\} \right) \quad (9)$$

where

$$A_n = \frac{1 - e^{-\lambda_n T_1}}{\lambda_n}$$

$$A_i = \frac{1 - e^{-\lambda_i T_1}}{\lambda_i}$$

$$A_h = \frac{1 - e^{-\lambda_h T_1}}{\lambda_h}$$

and C_j and C_h are as previously defined.

Post-Intake Period

For the time following cessation of radionuclide inhalation, the equations used to calculate the respiratory tract burden become

$$Q_{2j}(T_2) = Q_{1j}(T_1)e^{-\lambda_j T_2} \quad (10)$$

where $Q_{2j}(T_2)$ • is the burden in the respiratory tract subcompartment at a time T_2 following the termination of inhalation uptake
 $Q_{1j}(T_1)$ • is the burden in the respiratory tract subcompartment at the end of inhalation uptake for a time T_1 .

The burden in the n^{th} organ at time T_2 can be described for $\lambda_h \neq \lambda_i$ by

$$\begin{aligned} Q_{2n}(T_2) = & Q_{1n}(T_1)e^{-\lambda_n T_2} + f_2' \lambda_i^b Q_{1LMi}(T_1) \frac{(e^{-\lambda_i T_2} - e^{-\lambda_n T_2})}{(\lambda_n - \lambda_i)} \\ & + f_2' \left\{ \sum_{j=a}^g \frac{C_j'}{(\lambda_j - \lambda_n)} (e^{-\lambda_n T_2} - e^{-\lambda_j T_2}) \right. \\ & \left. + \frac{C_h'}{(\lambda_h - \lambda_i)} \left[\frac{(e^{-\lambda_n T_2} - e^{-\lambda_i T_2})}{(\lambda_i - \lambda_n)} - \frac{(e^{-\lambda_n T_2} - e^{-\lambda_h T_2})}{(\lambda_h - \lambda_n)} \right] \right\} \quad (11) \end{aligned}$$

or for $\lambda_h = \lambda_i$ by

$$\begin{aligned}
 Q_{2n}(T_2) = & Q_{1n}(T_1)e^{-\lambda_n T_2} + f_2' \lambda_i^b Q_{1LMi}(T_1) \frac{(e^{-\lambda_i T_2} - e^{-\lambda_n T_2})}{(\lambda_n - \lambda_i)} \\
 & + f_2' \left(\sum_{j=a}^g \frac{c_j'}{(\lambda_j - \lambda_n)} (e^{-\lambda_n T_2} - e^{-\lambda_j T_2}) \right. \\
 & \left. + \frac{c_h'}{(\lambda_i - \lambda_n)} \left\{ e^{-\lambda_n T_2} - [(\lambda_i - \lambda_n)T_2 - 1] e^{-\lambda_i T_2} \right\} \right) \quad (12)
 \end{aligned}$$

where

$$c_a' = \lambda_a^b Q_{1a}(T_1)$$

$$c_b' = \lambda_b^b Q_{1b}(T_1) f_1$$

$$c_c' = \lambda_c^b Q_{1c}(T_1)$$

$$c_d' = \lambda_d^b Q_{1d}(T_1) f_1$$

$$c_e' = \lambda_e^b Q_{1e}(T_1)$$

$$c_f' = \lambda_f^b Q_{1f}(T_1) f_1$$

$$c_g' = \lambda_g^b Q_{1g}(T_1) f_1$$

$$c_h' = f_i \lambda_h^b \lambda_i^b Q_{1h}(T_1)$$

The pulmonary lung dose from inhalation of a radionuclide for a time T_1 followed by no additional radioactive intake for a time T_2 is determined by

$$D_p = D_{1p}(T_1) + 5.92 \times 10^{-4} \frac{E_p^P D_5}{M_p} \sum_{j=e}^h f_j A_j B_j \quad (13)$$

where

$$B_j = \frac{1 - e^{-\lambda_j T_2}}{\lambda_j}$$

and $D_{1p}(T_1)$ and A_j are as defined by Equation (7).

The effective dose to the n^{th} organ as a result of inhalation uptake for a time T_1 followed by no additional radioactive intake for a time T_2 is determined by

$$D_n = D_{1n}(T_1) + 5.92 \times 10^{-4} \left\{ \frac{E_n}{M_n} \left[Q_{1n}(T_1) B_n + f_2' \left[\frac{\lambda_i^b Q_{1LMi}(T_1)}{(\lambda_n - \lambda_i)} (B_i - B_n) \right. \right. \right. \\ \left. \left. \left. + G \left[\frac{(B_n - B_i)}{(\lambda_i - \lambda_n)} - Z \right] + \sum_{j=a}^g \frac{C_j'}{(\lambda_j - \lambda_n)} (B_n - B_j) \right] \right] \right\} \quad (14)$$

where

$$B_n = \frac{1 - e^{-\lambda_n T_2}}{\lambda_n}$$

$$B_h = \frac{1 - e^{-\lambda_h T_2}}{\lambda_h}$$

$$B_i = \frac{1 - e^{-\lambda_i T_2}}{\lambda_i}$$

$$B_j = \frac{1 - e^{-\lambda_j T_2}}{\lambda_j}$$

Also, for $\lambda_h \neq \lambda_i$

$D_{1n}(T_1)$ is determined by Equation (8)

$Q_{1n}(T_1)$ is determined by Equations (4, 5a)

$$G = \frac{C_h'}{(\lambda_h - \lambda_i)}$$

$$Z = \frac{B_n - B_h}{(\lambda_h - \lambda_n)}$$

and for $\lambda_h = \lambda_i$

$D_{ln}(T_l)$ is determined by Equation (9)

$Q_{ln}(T_l)$ is determined by Equations (4, 5b)

$$G = \frac{C_h}{(\lambda_i - \lambda_n)}$$

$$Z = \lambda_i^{-2} \left[1 - (\lambda_i T_2 + 1) e^{-\lambda_i T_2} \right]$$

The code provides for calculation of the dose to the pulmonary lung as a result of both primary deposition (that occurring directly on the lung surfaces during inhalation) and secondary deposition (that occurring as a result of solubilization and redeposition in the lung tissue itself). For the second case, the pulmonary lung is treated like any other organ.

Weighted values of the effective energy, ϵ_i , of daughter radionuclides are calculated using the ICRP equations⁽³⁾ for three biological clearance half-times of 1 day, 50 days and 500 days. The effective energy of the i^{th} daughter is determined by

$$\epsilon_i = \sum_j F_j [E(RBE)_n]_i$$

where

$$F_i = \frac{\prod_{j=1}^i T_j / T_j^r}{1 - e^{-\lambda_o t}} \sum_{n=1}^i \frac{T_n^i (1 - e^{-\lambda_n t})}{\prod_{\substack{p=0 \\ p \neq n}}^i (T_n - T_p)}$$

and

- F_i • is the ratio of the number of disintegrations of daughter atoms to the number of disintegrations of parent atoms in the lung over a time t
- λ_o • is the effective decay constant of the parent (the subscript zero refers to the parent)
- λ_i • is the effective decay constant of the i^{th} daughter in the lung
- T_i • is the effective half life of the i^{th} daughter in the lung
- T_i^r • is the radioactive half life of the i^{th} daughter
- t • is the time over which the dose is to be calculated
- E • is the total energy absorbed in the organ per disintegration of the radionuclide
- RBE • is the relative biological effectiveness of the radiation
- n • is the relative damage factor for radionuclides deposited in the bone.

G.I. TRACT MODEL

The ICRP GI tract model⁽³⁾ is used to describe movement of material within the GI tract compartments, with input to the GI model described by the lung model (see Figure 1 of main text). A diagram of the GI tract model is given in Figure 3 of the main text. Material from the respiratory tract enters the GI tract through the stomach, which is assumed to be uniformly irradiated for a mean residence time of 1 hour. Absorption into the blood is assumed to occur from the small intestine (SI) only. An exponential absorption model is used, with the rate constant defined so that a fraction f_1 is absorbed during passage through the SI. Values of f_1 are those recommended by the ICRP.⁽³⁾

To determine the amount of a radionuclide reaching the GI tract, it is necessary to know the radionuclide concentration in each compartment of the lung (b, d, f and g in text Figure 1) as a function of time. For the uptake period, this concentration is given by Equation (1).

The rate of material entering the GI tract from the respiratory system (in $\mu\text{Ci/sec}$) is calculated from Equation (15) as

$$q_{1G}(t) = \sum_{j = b,d,f,g} \lambda_j^b Q_{1j}(t) \quad (15)$$

The total amount of radionuclide entering the GI tract during the uptake period is

$$Q_{1G} = \int_0^{T_1} q_{1G}(t) dt = P_0 \sum_{j = b,d,f,g} \frac{\lambda_j^b f_j D_i}{\lambda_j} \left[T_1 - \frac{1 - e^{-\lambda_j T_1}}{\lambda_j} \right] \quad (16)$$

Where T_1 is the uptake period in sec.

Equation (16) can be reduced to

$$Q_{1G} = P_0 \sum_{j = b,d,f,g} C_j \left[T_1 - \frac{1 - e^{-\lambda_j T_1}}{\lambda_j} \right]$$

where

$$C_b = \frac{\lambda_b^b f_b D_3}{\lambda_b}$$

$$C_d = \frac{\lambda_d^b f_d D_4}{\lambda_d}$$

$$C_f = \frac{\lambda_f^b f_f D_5}{\lambda_f}$$

$$C_g = \frac{\lambda_g^b f_g D_5}{\lambda_g}$$

The amount of a radionuclide (in μCi) in each lung compartment during the second period (i.e., from the time uptake stops to the dose time) is given by Equation (10)

$$Q_{2j}(t) = Q_{1j}(T_1)e^{-\lambda_j t}$$

The rate at which a nuclide enters the GI tract during the second period (in $\mu\text{Ci/sec}$) is then

$$q_{2G}(t) = \sum_{j = b,d,f,g} \lambda_j^b Q_{1j}(T_1)e^{-\lambda_j t}$$

and the total amount (in μCi) for the second period is

$$Q_{2G} = \int_0^{T_2} q_{2G}(t)dt = P_o \sum_{j = b,d,f,g} \frac{C_j}{\lambda_j} \left(1 - e^{-\lambda_j T_1}\right) \left(1 - e^{-\lambda_j T_2}\right) \quad (17)$$

The total amount of radionuclide entering the GI tract from the start of uptake to the dose time is

$$Q_G = Q_{1G} + Q_{2G}$$

This amount can give a radiation dose to each of the four GI tract compartments: stomach (S), small intestine (SI), upper large intestine (ULI) and lower large intestine (LLI). The dose is a function of residence time and absorption into the blood stream. According to the ICRP GI tract model (text Figure 3), absorption occurs only in the small intestine. Data for this model are given in Table A.2.

TABLE A.2. GI Tract Data

GI Tract Compartment	Residence Time, Hours	Time for Material to Reach Compartment, Hours	Mass of Contents, Grams
S	1	--	250
SI	4	1	1100
ULI	8	5	135
LLI	18	13	150

Stomach Dose

Material leaving the lung goes first to the stomach, where it is assumed to remain for a mean time of 1 hr before passing to the small intestine. The dose to the stomach is

$$D_S = 2.96 \times 10^{-4} \frac{E_S Q_G}{m_S} \frac{(1 - e^{-\lambda_r \tau_S})}{\lambda_r} \quad (18)$$

where

- E_S • is the effective energy per disintegration for the radionuclide in the stomach, in MeV/dis
- m_S • is the mass of the contents of the stomach, in grams
- τ_S • is the mean residence time in the stomach, in sec
- Q_G • is the total input to the GI system, in μCi

and

$$2.96 \times 10^{-4} = (1/2) \times 3.7 \times 10^4 \left(\frac{\text{dis/sec}}{\mu\text{Ci}} \right) 1.6 \times 10^{-6} \left(\frac{\text{ergs}}{\text{MeV}} \right) 10^{-2} \frac{\text{rads}}{\text{erg/g}}$$

The factor (1/2) is included because the dose to the walls of the GI system is about one-half the dose to its contents.

Small Intestine

Of the material entering the SI, a fraction f_1 is absorbed into the blood. The amount of material leaving the SI is then $1 - f_1$. If the material entering the blood is assumed to be absorbed at constant rate (λ_a), the following expression holds:

$$1 - f_1 = e^{-\lambda_a \tau_{SI}}$$

This can be solved for λ_a using the equation

$$\lambda_a = \frac{1}{\tau_{SI}} \ln \frac{1}{1 - f_1} \quad (19)$$

where

- λ_a • is the absorption rate constant per sec for a given element
- τ_{SI} • is the residence time in the SI, in sec.

Equation (19) requires f_1 to be less than unity. Where f_1 for an element has been listed as unity in ICRP Publication 2, it is set to 0.95. This is consistent with the ICRP assumption in calculating the dose to the ULI and LLI that at least 5% of all elements passing through the G.I. system reach the large intestines.

The dose to the SI is calculated as

$$D_{SI} = 2.96 \times 10^{-4} \left(\frac{E_{SI}}{m_{SI}} \right) \left(e^{-\lambda_r \tau_S} \right) \left(\frac{1 - e^{-\lambda_{SI} \tau_{SI}}}{\lambda_{SI}} \right) Q_G \quad (20)$$

where

$$\lambda_{SI} = \lambda_a + \lambda_r$$

and

- λ_{SI} • is the effective removal constant per sec for the nuclide in the small intestine
- E_{SI} • is the effective energy per disintegration for the radio-nuclide in the SI, in MeV/dis
- m_{SI} • is the mass of the contents of the SI, in grams
- $e^{-\lambda_r \tau_S}$ • is the decay of Q_G in passing through the stomach

Upper Large Intestine

The material leaving the SI enters the upper large intestine. The amount of material is Q_G reduced by decay in passing through the S and SI and by absorption in the SI. The material is assumed to flow linearly through the ULI so that the dose is given by

$$D_{ULI} = 2.96 \times 10^{-4} \tau_{ULI} e^{-\lambda_r (\tau_S + \tau_{SI})} \left(\frac{E_{ULI}}{m_{ULI}} \right) Q_G (1 - f_1) \quad (21)$$

where

- τ_{ULI} • is the mean residence time in the ULI, in sec
- m_{ULI} • is the mass of contents of the ULI, in grams
- E_{ULI} • is the effective energy per disintegration for the radionuclide in the ULI, in MeV/dis.

Lower Large Intestine

The equation for dose to the LLI is similar to the ULI dose equation except that decay during passage through the ULI is included.

$$D_{LLI} = 2.96 \times 10^{-4} \tau_{LLI} e^{-\lambda(\tau_S + \tau_{SI} + \tau_{ULI})} \left(\frac{E_{LLI}}{m_{LLI}} \right) Q_G (1 - f_1) \quad (22)$$

where

- τ_{LLI} • is the mean residence time in the LLI, in sec
- m_{LLI} • is the mass of contents of the LLI, in grams
- E_{LLI} • is the effective energy for the radionuclide in the LLI, in MeV/dis.

The above equations for ULI and LLI calculate the dose at the entrance to the compartment as recommended by the ICRP.⁽³⁾

REDIQ INGESTION MODEL

Ingestion doses are calculated in two steps: first, the dose to the GI tract is calculated using the four compartment model shown in text Figure 3; and second, the organ dose is calculated from the fraction of the ingested radioactivity reaching the organs through the blood.

GI Tract Dose

Since the time for transfer of material through the GI tract is short compared to the dose times for most radionuclides, all of the ingested activity (Q_G) is assumed to enter the stomach at time zero. The equations for dose to the GI tract compartments are those defined in Equations 18-22.

Organ Dose

Equations are given below for both acute and chronic ingestion.

Acute Ingestion

For a single ingestion of radionuclides, the radionuclide quantity reaching an organ at any time t is given by the equation

$$Q = Q_0 f_w e^{-\lambda_j t} \quad (23)$$

where

$$\lambda_j = \lambda_r + \lambda_b$$

and

f_w • is the fraction of the ingested material reaching the organ of interest

Q_0 • is the total radioactivity ingested during the uptake period, in μCi .

The total dose to an organ at any time T_2 after a single ingestion is the time integral of this quantity as follows:

$$D = \frac{5.92 \times 10^{-4} E_n}{M_n} \int_0^{T_2} Q dt = \frac{5.92 \times 10^{-4} E_n}{M_n} Q_0 f_w \int_0^{T_2} e^{-\lambda_j t} dt \quad (24)$$

so that

$$D = \frac{5.92 \times 10^{-4} E_n Q_0 f_w}{M_n} \left[\frac{1 - e^{-\lambda_j T_2}}{\lambda_j} \right] \quad (25)$$

Chronic Ingestion

For chronic ingestion of radionuclides, the ingestion rate is defined as

$$P_0 = \frac{Q_0}{T_1} \quad (26)$$

Computation of the quantity of radionuclides present in the organ of interest during continuous ingestion is given by the following equation:

$$Q_1(t) = \frac{f_w P_o (1 - e^{-\lambda_j t})}{\lambda_j} \quad (27)$$

The dose to any organ during the ingestion period is calculated from the integral of Equation (27).

$$D_{1n} = \frac{5.92 \times 10^{-4} E_n}{M_n} \int_0^{T_1} Q_1(t) dt = \frac{5.92 \times 10^{-4} E_n}{M_n} f_w P_o \int_0^{T_1} \frac{(1 - e^{-\lambda_j t})}{\lambda_j} dt \quad (28)$$

or

$$D_{1n} = \frac{5.92 \times 10^{-4} E_n f_w P_o}{M_n \lambda_j} \left[T_1 - \frac{1 - e^{-\lambda_j T_1}}{\lambda_j} \right] \quad (29)$$

The quantity of radionuclide found in any organ at a time after the ingestion period is found by correcting the expression in Equation (10) for physical and biological decay. This quantity is expressed as

$$Q_2(t_2) = Q_1(t_1) e^{-\lambda_j t_2} \quad (30)$$

or

$$Q_2(t_2) = \frac{f_w P_o (1 - e^{-\lambda_j T_1})}{\lambda_j} e^{-\lambda_j t_2} \quad (31)$$

The expression is based on the assumption that at time $t_2 = 0$, $Q_2(0) = Q_1(T_1)$. The dose then is the time integral of this activity given by the following equation:

$$D_{2n} = \frac{5.92 \times 10^{-4} E_n}{M_n} \int_0^{T_2} Q_2(t_2) dt \quad (32)$$

or

$$D_{2n} = \frac{5.92 \times 10^{-4} E_n}{M_n} \frac{f_w P_o}{\lambda_j} \left(1 - e^{-\lambda_j T_1}\right) \int_0^{T_2} e^{-\lambda_j t} dt \quad (33)$$

The solution of this integral is

$$D_{2n} = \frac{5.92 \times 10^{-4} E_n}{M_n} \frac{f_w P_o}{\lambda_j} \left(1 - e^{-\lambda_j T_1}\right) \left(\frac{1 - e^{-\lambda_j T_2}}{\lambda_j}\right) \quad (34)$$

The total dose to any organ is given by the sum of D_{1n} [Equation (29)] and D_{2n} [Equation (34)]. The total dose D_{Tn} is found by the equation

$$D_{Tn} = D_{1n} + D_{2n} = \frac{5.92 \times 10^{-4} E_n}{M_n} \frac{f_w P_o}{\lambda_j} \left[\left(T_1 - \frac{1 - e^{-\lambda_j T_1}}{\lambda_j} \right) + \left(1 - e^{-\lambda_j T_1}\right) \left(\frac{1 - e^{-\lambda_j T_2}}{\lambda_j}\right) \right] \quad (35)$$

RISK EQUIVALENCE CALCULATION

The organ dose commitments described above are used by REDIQ to estimate the intake in microcuries, via inhalation or ingestion, that yields the same health risk as 1 rem of whole-body external exposure. The resulting values are referred to as "intake equivalents" (I_e). The intake equivalent is calculated as

$$I_e = \frac{R_{WB}}{\sum_n R_n D_n}$$

where

- I_e • is the intake equivalent that yields the same health risk as 1 rem of whole-body dose, in $\mu\text{Ci/rem}$

R_{WB} • is the whole-body health risk factor, in events/rem

R_n • is the health risk factor for organ n, in events/rem

D_n • is the dose to organ n per μCi intake, in rem/ μCi .

All risk factors must be based on the same health effect, for example, death from cancer.

REFERENCES FOR APPENDIX A

1. Task Group on Lung Dynamics for Committee II of the International Commission on Radiological Protection, "Deposition and Retention Models for Internal Dosimetry of the Human Respiratory Tract." Health Phys. 12:173, 1966.
2. The International Commission on Radiological Protection, The Metabolism of Compounds of Plutonium and Other Actinides. ICRP Publication 19, Pergamon Press, Oxford, 1972.
3. The International Commission on Radiological Protection, Report of Committee II on Permissible Dose for Internal Radiation. ICRP Publication 2, Pergamon Press, Oxford, 1972.

APPENDIX B

COMPUTER CODE

COMPUTER CODE

The models described in Appendix A have been incorporated into a computer code programmed for a CDC CYBER Computer. The modules of this program are described below. A listing of the program is given in Appendix E.

MAIN

MAIN is the main program and calls the other routines as needed to perform the calculations requested by the user. The data library reading subroutines are called by the main program, and all other input data are read in this program. Required input data is explained in detail in Appendix F. As an example, if the aerosol AMAD is supplied, the routine to generate the deposition fractions is called. The ORDOSE subroutine is then called to calculate the doses per μCi uptake for each nuclide and organ chosen, and the equivalent intake values.

ORDOSE

Subroutine ORDOSE controls the routines that generate the necessary values for organ dose calculation (in $\text{rem}/\mu\text{Ci}$ uptake). The individual nuclide contributions to the organ dose values are printed in this routine. ORDOSE also determines output page format according to the number of organs chosen at execution time (up to a maximum of 10). Where no data exist for a nuclide-organ combination, the output page shows a blank rather than a zero. ORDOSE uses the $\text{rem per } \mu\text{Ci}$ values to calculate the equivalent risk values.

DEP

Subroutine DEP is used to calculate the deposition fraction for each compartment (D_3 , D_4 and D_5) when the AMAD is supplied as input. The error function is integrated numerically over appropriate limits to produce the necessary fractions.

SIMPS

Function SIMPS performs the numerical integration of the error function using Simpson's rule.

ERFXP

Function ERFXP is the error function e^{-x^2} that is integrated by SIMPS.

UNIT

Subroutine UNIT converts input time in seconds to more convenient units, depending on the magnitude of the value supplied. The appropriate units, i.e., minutes, hours, days, etc., are also returned for use in the printed output.

ORDOT1

Function ORDOT1 calculates the dose to an organ for the time T_1 during which inhalation of radioactivity occurs at a continuous rate.

ORDOT2

Function ORDOT2 calculates the dose to an organ during a time T_2 following the termination of inhalation of radioactivity at a continuous rate. The equations used take into account any continuing movement of material from the respiratory compartments and the lymph to the organ during this period.

QLUNT1

Function QLUNT1 calculates the radioactivity in each lung subcompartment following continuous inhalation for a time T_1 .

QLMIT1

Function QLMIT1 calculates the removable quantity of a nuclide present in the pulmonary lymph following continuous uptake for a time T_1 .

QNT1

Function QNT1 calculates the quantity of a nuclide present in an organ following continuous uptake for a time T_1 .

The results from the preceding three routines are used in calculating the dose that follows cessation of inhalation uptake.

LIBB

Subroutine LIBK reads the radiological data library (see Appendix D) and converts some values to other units.

LIBK

Subroutine LIBK reads the radiological data library and converts some values to other units.

GIDOT

Function GIDOT controls calculation of doses to the GI tract compartments over the time periods for uptake and dose (periods T_1 and T_2 in Appendix A). GIDOT uses functions QUINT1 and QUINT2 (described below); the use of GIDOT is similar to that of ORDOT1 and ORDOT2.

QUINT1

Function QUINT1 calculates the time integral of material entering the GI system over the uptake period T_1 .

QUINT2

Function QUINT2 calculates the time integral of material entering the GI system over the second time period, T_2 , following cessation of uptake.

IGOR1

Function IGOR1 calculates the dose to an organ for the time T_1 during which ingestion of radioactivity occurs at a continuous rate.

IGOR2

Function IGOR2 calculates the dose to an organ during time T_2 following ingestion of radioactivity at a continuous rate. The equations used account for physical decay and biological removal from the organ.

APPENDIX C

CODE FLOW DIAGRAM

CODE FLOW DIAGRAM

A general outline of the code operation is given in this appendix. The relationship between the main program and the subroutines used by the code is shown in Figure C-1. The code flow diagrams (Figures C-2 and C-3) cover in some detail the logic in both the main program and subroutine ORDOSE. Code flow diagrams for the auxiliary routines are not shown; however, their functions are included in blocks at the appropriate places within the flow diagrams given.

FIGURE C-1. Program Module Linkage

FIGURE C-2(a). Main Program Flow Diagram

FIGURE C-2(b). Main Program Flow Diagram

FIGURE C-2(c). Main Program Flow Diagram

FIGURE C-3(a). Subroutine ORDOSE Flow Diagram

FIGURE C-3(b). Subroutine ORDOSE Flow Diagram

FIGURE C-3(c). Subroutine ORDOSE Flow Diagram

FIGURE C-3(d). Subroutine ORDOSE Flow Diagram

APPENDIX D

DATA LIBRARIES

DATA LIBRARIES

Two data libraries are used by the code:

1. Radionuclide data library
2. Organ data library

The organization and purpose of the data libraries are described below. Each library's data structure has been arranged so that additions or changes can be made with a minimum of effort.

Radionuclide Data Library

This library contains a master list of nuclide identification symbols and physical half lives. Nuclides supplied on input cards are compared to the master identification list.

The first card of the isotope library contains the number of fission products in the library, with I3 format used in the first three columns. The library has one card for each fission product, arranged in ascending atomic number order within an ascending atomic mass sequence. Currently, the library contains data on 331 fission products.

The card following that for the last fission product contains the number of activation products, using I3 format in the first three columns. A card follows for each of the 162 activation product nuclides currently in the library.

Each card for nuclide data has the following structure:

<u>Column</u>	<u>Format</u>	<u>Variable</u>
1-3	I3	Atomic mass number
4-5	I2	Atomic number
6-8	A3	Nuclide symbol, with isomeric states indicated by an asterisk (i.e., KR*), left justified.
9	I1	Integer to indicate isomeric state: 1 - isomeric state 2 - ground state
10-18	E9.2	Physical half life in days

A listing of the radionuclide data library is given in Figure D-1, page D.4.

ORGAN DATA LIBRARY

This library contains most of the data required by ORDOSE to calculate the effective dose to an organ. Data in the library are based on recommendations of the ICRP.^(1,2,3)

The first card contains the total number of data cards in the library, using I4 format in the first four columns. The present limit on the data base is 2400 cards, and 2176 entries are currently in the library. One card is given for each radionuclide-organ combination. Entries are arranged in ascending organ number, within an ascending atomic mass sequence, within an ascending atomic number order.

The structure of each data card is indicated below. A listing of the organ data library is given in Figure D-2, page D.7.

<u>COLUMN</u>	<u>FORMAT</u>	<u>VARIABLE</u>
1-3	I3	Atomic number
4-6	I3	Atomic mass number
7	I1	Isotope type: blank - ground state 1 - isomeric state
8-9	A2	Element name
10-11	I2	Organ code number
12-19	E8.3	Physical half life, in days
20-27	E8.3	Biological half life in the organ or tissue, in days
28-35	E8.3	*Fraction of material taken into the body by ingestion that is retained in the organ (f_w in the initial ICRP lung model)
36-43	E8.3	**Fraction of material taken into the body by inhalation that arrives in the organ (f_a in the initial ICRP lung model)
44-51	E8.3	Fraction of the nuclide in the blood that reaches the organ (f_2')
52-59	E8.3	Effective absorbed energy per disintegra- tion of the radionuclide and daughters in the organ (E, in MeV). For the lung, this is for a 1-day half-residence time
60-65	E6.2	Weighted value of the effective absorbed energy per disintegration of the radio- nuclide and its daughters in the lung for a 50-day half-residence time
66-71	E6.2	Same as previous field except for a 500- day half-residence time

* Used for extracting f_1 , the fraction of the ingested nuclide that
reaches the blood.

** Not used by code.

FIGURE D-1. Radionuclide Data Library

331		903AS2	2	1.05E+04	10443TC	2	1.25E-02	1194ACD	2	6.60E-03
7230ZV	2	9039Y+	1	1.33E-01	10445KH+	1	3.06E-03	11949IN+	1	1.25E-02
7231GA	2	9039Y	2	2.58E+00	10445RH	2	4.86E-04	11949IN	2	1.39E-03
7330ZV	2	9136KR	2	1.16E-04	10542MO	2	4.63E-04	11950SN+	1	2.50E+02
7331GA	2	9137RA+	1	9.72E-03	10543TC	2	5.56E-03	12049IN	2	5.09E-04
7431GA	2	9137RA	2	8.34E-04	10544RU	2	1.85E-01	1214ACD	2	2.43E-03
7531GA	2	913AS2	2	4.04E-01	10545RH+	1	3.47E-04	12149IN+	1	2.15E-03
7532GE+	1	9139Y+	1	3.47E-02	10545RH	2	1.50E+00	12149IN	2	3.47E-04
7532GE	2	9139Y	2	5.90E+01	10644RU	2	3.65E+02	12150SN+	1	9.13E+03
7631GA	2	9236KR	2	3.47E-05	10645RH+	1	9.17E-02	12150SN	2	1.11E+00
7633AS	2	9237RA	2	5.79E-05	10645RH	2	3.47E-04	12249IN	2	8.68E-05
7732GE+	1	9238SA	2	1.13E-01	10743TC	2	3.36E-04	12251SA+	1	2.85E-03
7732GE	2	9239Y	2	1.47E-01	10744RU	2	2.92E-03	12251SA	2	2.80E+00
7733AS	2	9336KR	2	2.32E-05	10745RH	2	1.51E-02	12340IN	2	1.10E-04
7734SE+	1	9337RA	2	6.94E-05	10746PD	2	2.56E+00	12350SN+	1	2.78E-02
7832GF	2	9338SA	2	5.76E-03	10844RU	2	3.13E-03	12350SN	2	1.29E+02
7833AS	2	9339Y	2	4.21E-01	10845RH	2	1.97E-04	12352TE+	1	1.17E+02
7933AS	2	9440ZR	2	3.47E+02	10847AG+	1	3.65E+04	12451SA	2	1.46E-02
7934SE+	1	9441NA+	1	1.35E+03	10847AG	2	1.67E-03	12451SA	2	6.02E+01
7934SE	2	9436KR	2	1.15E-05	10945RH	2	3.47E-04	12550SN+	1	6.74E-03
8033AS	2	9437RA	2	3.47E-05	10946PD+	1	3.33E-03	12550SN	2	9.42E+00
8035BR+	1	9438SA	2	8.33E-04	10946PD	2	5.63E-01	12551SA	2	9.46E+02
8035BR	2	9439Y	2	1.39E-02	10947AG+	1	4.63E-04	12552TE+	1	5.40E+01
8133AS	2	9441NA+	1	4.38E-03	11047AG+	1	2.60E+02	12650SN	2	3.65E+07
8134SE+	1	9441NA	2	7.30E+06	11047AG	2	2.78E-04	12651SA+	1	1.32E-02
8134SE	2	9536KR	2	1.16E-05	11146PD+	1	2.29E-01	12651SA	2	1.25E+01
8136KR	2	9537RA	2	2.31E-05	11146PD	2	1.53E-02	12750SN	2	8.75E-02
8235BR	2	9538SA	2	5.56E-04	11147AG+	1	8.57E-04	12751SA	2	3.90E+00
8334SE+	1	9539Y	2	7.64E-03	11147AG	2	7.50E+00	12752TE+	1	1.05E+02
8334SE	2	9540ZR	2	6.50E+01	11148CD+	1	3.40E-02	12752TE	2	3.88E-01
8335BR	2	9541NA+	1	3.75E+00	11246PD	2	8.75E-01	12850SN	2	4.31E-02
8336KR+	1	9541NA	2	3.50E+01	11247AG	2	1.33E-01	12851SA+	1	4.00E-01
8434SE	2	9639Y	2	1.60E-03	11346PD	2	1.04E-03	12851SA	2	6.94E-03
8435BR+	1	9641NA	2	9.58E-01	11347AG+	1	8.33E-04	12853I	2	1.24E-02
8435BR	2	9736KR	2	1.16E-05	11347AG	2	2.21E-01	12951SA	2	1.86E-01
8533AS	2	9737RA	2	2.32E-05	11348CD+	1	5.11E+03	12952TE+	1	3.40E+01
8534SE	2	9738SA	2	3.47E-05	11446PD	2	1.67E-03	12952TE	2	4.65E-02
8535BR	2	9739Y	2	6.94E-05	11447AG	2	5.79E-05	12953I	2	5.84E+00
8536KR+	1	9740ZR	2	7.08E-01	11449IN+	1	5.00E+01	13050SN	2	1.81E-03
8536KR	2	9741NA+	1	6.94E-04	11449IN	2	8.33E-04	13051SA	2	2.71E-02
8634SE	2	9741NA	2	5.00E-02	11546PD	2	5.21E-04	13053I	2	5.21E-01
8635BR	2	9840ZR	2	6.94E-04	11547AG+	1	2.32E-04	13151SA	2	1.72E-02
8637RA+	1	9841NA+	1	1.81E-02	11547AG	2	1.46E-02	13152TE+	1	1.20E+00
8637RA	2	9841NA	2	3.58E-02	11548CD+	1	4.30E+01	13152TE	2	1.81E-02
8734SF	2	9940ZR	2	1.85E-05	11548CD	2	2.30E+00	13153I	2	8.05E+00
8735BR	2	9941NA	2	1.74E-03	11549IN+	1	1.83E-01	13154XE+	1	1.20E+01
8736KR	2	9942MO	2	2.79E+00	11549IN	2	2.20E+17	13251SA	2	1.45E-03
8737RA	2	9943TC+	1	2.50E-01	11646PD	2	3.47E-04	13252TE	2	3.25E+00
8738SA+	1	10043TC	2	7.67E+07	11647AG	2	1.74E-03	13253I	2	9.58E-02
8835BR	2	10041NA	2	2.08E-03	11649IN+	1	3.75E-02	13351SA	2	2.85E-03
8836KR	2	10043TC	2	1.97E-04	11649IN	2	1.62E-04	13352TE+	1	3.47E-02
8837RA	2	10141NA	2	6.94E-04	11747AG	2	7.64E-04	13352TE	2	1.39E-03
8935BR	2	10142MO	2	1.01E-02	11748CD+	1	1.33E-01	13353I	2	8.75E-01
8936KR	2	10143TC	2	9.72E-03	11748CD	2	1.04E-01	13354XE+	1	2.30E+00
8937RA	2	10242MO	2	7.64E-03	11749IN+	1	7.92E-02	13354XE	2	5.27E+00
8938SA	2	10243TC	2	5.79E-05	11749IN	2	3.13E-02	13451SA	2	1.74E-05
8939Y+	1	10343TC	2	5.79E-04	11750SN+	1	1.40E+01	13452TE	2	2.92E-02
9035BR	2	10344RU	2	4.00E+01	11848CD	2	3.47E-02	13453I	2	3.68E-02
9036KR	2	10345RH+	1	3.96E-02	11849IN	2	5.90E-05	13455CS+	1	1.21E-01
9037RA	2	10442MO	2	1.11E-03	11948CD+	1	1.88E-03	13455CS	2	7.67E+02

13551SA	2	2.20E-05	14960ND	2	7.21E-02	5727CN	2	2.70E+02	19778PT	2	7.50E-01
13552TE	2	3.36E-04	14961PM	2	2.21E+00	5A27CN+1	3.80E-01	19A79AU	2	5.60E+00	
13553I	2	2.79E-01	15160ND	2	4.33E-03	5A27CN	2	7.20E+01	19A79AU	2	2.70E+00
13554XF+1	1.11E-02	15161PM	2	1.17E+00	6027CN	2	1.90E+03	19079AU	2	3.15E+00	
13554XE	2	3.83E-01	15162SM	2	3.29E+04	5028AT	2	2.90E+07	19780HG+1	1.00E+00	
13555CS	2	7.30E+04	15261PM	2	4.17E-03	6328AT	2	2.90E+04	19780HG	2	2.70E+00
13556AA+1	1.21E+00	15263EU+1	3.88E-01	6528AT	2	1.10E-01	20380HG	2	4.58E+01		
13A53I	2	9.61E-04	15263EU	2	4.53E+03	6429CU	2	5.30E-01	20881TL	2	1.13E+00
13655CS	2	1.30E+01	15361PM	2	3.82E-03	6530ZN	2	2.45E+02	20181TL	2	3.00E+00
13753I	2	2.78E-04	15362SM	2	1.96E+00	6930ZN+1	5.80E-01	20281TL	2	1.20E+01	
13754XE	2	2.92E-03	15461PM	2	1.74E-03	6930ZN	2	3.60E-02	20481TL	2	1.10E+03
13755CS	2	1.10E+04	15463EU	2	5.84E+03	7132GE	2	1.20E+01	20382PR	2	2.17E+00
13756BA+1	1.81E-03	15562SM	2	1.53E-02	7333AS	2	7.60E+01	21082PR	2	7.10E+02	
13A53I	2	7.29E-05	15563EU	2	6.57E+02	7433AS	2	1.75E+01	21282PR	2	4.40E-01
13A54XF	2	1.18E-02	15662SM	2	3.92E-01	7534SE	2	1.27E+02	20683AT	2	6.40E+00
13A55CS	2	2.24E-02	15663EU	2	1.52E+01	8538SR+1	4.90E-02	20783BT	2	2.90E+03	
13953I	2	2.32E-05	15763EU	2	6.33E-01	8538SR	2	6.50E-01	21083BT	2	5.00E+02
13954XE	2	4.75E-04	15A63EU	2	3.19E-02	9342MO	2	1.10E+04	21283BT	2	4.20E-02
13955CS	2	6.60E-03	15963EU	2	1.32E-02	9643TC+1	3.60E-02	21084PD	2	1.38E+02	
13956BA	2	5.76E-02	15964GD	2	7.50E-01	9643TC	2	4.30E+00	21185AT	2	3.00E-01
14054XE	2	1.85E-04	16063EU	2	1.74E-02	9743TC+1	2.50E-01	22388RA	2	1.17E+01	
14055CS	2	7.64E-04	16065TR	2	7.20E+01	9743TC	2	3.70E+04	22488RA	2	3.64E+00
14056BA	2	1.28E+01	16164GD	2	2.57E-03	9744RU	2	2.80E+00	22588QA	2	1.48E+01
14057LA	2	1.68E+00	16165TR	2	6.90E+00	10346PD	2	1.70E+01	22688RA	2	5.90E+05
14154XE	2	2.32E-05	16264GD	2	3.65E+02	10547AG	2	4.00E+01	22888RA	2	2.40E+03
14155CS	2	2.78E-04	16265TR	2	8.33E-02	10948CN	2	4.75E+02	22889AC	2	1.00E+01
14156BA	2	1.25E-02	16365TR	2	2.71E-01	11349IN+1	7.30E-02	22789AC	2	8.00E+03	
14157LA	2	1.63E-01	16566DY+1	8.73E-04	11350SN	2	1.12E+02	22989AC	2	2.60E-01	
14158CE	2	3.25E+01	16566DY	2	9.79E-02	12553I	2	6.00E+01	22790TH	2	1.84E+01
14254XE	2	1.74E-05	16666DY	2	3.42E+00	12653I	2	1.33E+01	22990TH	2	7.00E+02
14255CS	2	2.66E-05	16667HO	2	1.13E+00	13155CS	2	1.00E+01	22990TH	2	2.86E+06
14256BA	2	7.64E-03	16768ER+1	2.89E-05	13156BA	2	1.16E+01	23090TH	2	2.90E+07	
14257LA	2	5.83E-02	162		15364GD	2	2.36E+02	23190TH	2	1.07E+00	
14258PR	2	8.00E-01	3 1H	2	4.50E+03	16667HO+1	4.38E+05	23290TH	2	5.10E+12	
14354XE	2	1.16E-05	7 48E	2	5.36E+01	16968ER	2	9.40E+00	23490TH	2	2.41E+01
14355CS	2	2.32E-05	10 48E	2	9.18E+04	17168ER	2	3.10E-01	23091PA	2	1.77E+01
14356BA	2	1.93E-04	14 6C	2	2.00E+04	17669TM	2	1.27E+02	23191PA	2	1.30E+07
14357LA	2	9.72E-03	1A 9F	2	7.80E-02	17169TM	2	6.94E+02	23391PA	2	2.74E+01
14358CE	2	1.38E+00	2211NA	2	9.50E+02	17570YA	2	4.10E+00	23092U	2	2.08E+01
14359PD	2	1.37E+01	2411NA	2	6.30E-01	17771LU	2	6.80E+00	23292U	2	2.70E+04
14454XE	2	1.16E-05	3114ST	2	1.10E-01	18172HF	2	4.60E+01	23392U	2	5.90E+07
14455CS	2	2.32E-05	3215P	2	1.43E+01	18273TA	2	1.12E+02	23492U	2	9.10E+07
14456BA	2	3.47E-05	3516S	2	8.71E+01	18174W	2	1.40E+02	23592U	2	2.60E+11
14457LA	2	4.63E-05	3617CL	2	1.20E+02	18574W	2	7.40E+01	23692U	2	8.70E+00
14458CE	2	2.85E+02	3817CL	2	2.60E-02	18774W	2	1.00E+00	23792U	2	6.75E+00
14459PD	2	1.20E-02	4118AR	2	7.63E-02	18375RE	2	7.30E+01	23892U	2	1.70E+12
14460ND	2	7.30E+07	4219K	2	5.20E-01	18675RE	2	3.79E+00	24092U	2	5.88E-01
1455ACF	2	2.08E-03	4120CA	2	2.97E+07	18775RE	2	1.80E+13	23793NP	2	8.00E+08
14559PD	2	2.46E-01	4520CA	2	1.64E+02	18A75RE	2	7.10E-01	23993NP	2	2.33E+00
1465ACE	2	9.72E-03	4720CA	2	4.90E+00	18576DS	2	9.50E+01	23694PU	2	2.85E+00
14659PR	2	1.67E-02	4621SC	2	8.50E+01	19176DS+1	5.80E-01	23794PU	2	4.50E+01	
1475ACE	2	7.64E-04	4721SC	2	3.43E+00	19176DS	2	1.60E+01	23894PU	2	3.30E+04
14759PR	2	8.33E-03	4821SC	2	1.83E+00	19376DS	2	1.30E+00	23994PU	2	8.90E+06
14760ND	2	1.11E+01	4A23V	2	1.61E+01	19077IR	2	1.20E+01	24094PU	2	2.40E+06
14761PM	2	9.49E+02	5124CR	2	2.78E+01	19277IR	2	7.45E+01	24194PU	2	4.80E+03
14762SM	2	4.80E+13	5225MN	2	5.55E+00	19477IR	2	7.90E-01	24294PU	2	1.40E+08
14A58CE	2	4.86E-04	5425MN	2	3.00E+02	19178PT	2	3.00E+00	24394PU	2	2.08E-01
14A59PR	2	1.39E-03	5625MN	2	1.10E-01	19378PT+1	3.40E+00	24494PU	2	2.92E+10	
14A61PM+1	4.10E+01	5526FE	2	1.10E+03	19378PT	2	1.80E+05	24195AM	2	1.70E+05	
14A61PM	2	5.40E+00	5926FE	2	4.51E+01	19778PT+1	5.80E-02	24295AM+1	5.60E+04		

24295AM	2	6.77E-01
24395AM	2	2.90E+06
24495AM	2	4.21E-01
24296CM	2	1.63E+02
24396CM	2	1.30E+04
24496CM	2	4.70E+03
24596CM	2	7.30E+06
24696CM	2	2.40E+06
24796CM	2	5.84E+09
24896CM	2	1.72E+08
24997BK	2	2.90E+02
25097BK	2	1.34E-01
24998CF	2	1.31E+05
25098CF	2	3.70E+03
25298CF	2	8.03E+02

FIGURE D-2. Organ Data Library

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1	3	H 1	.450+04	.120+02	.100+01	.100+01	.100+01	.100+01	.100-01
1	3	H 2	.450+04	.120+02	.100+01	.100+01	.100+01	.100+01	.100-01
1	3	H 8							.100-01
4	7	BE 1	.536+02	.180+03	.200-02	.250-00	.100+01	.350-01	.100-01
4	7	BE 3	.536+02	.120+03	.600-04	.750-02	.300+01	.120-01	.100-01
4	7	BE 4	.536+02	.270+03	.200-03	.250-01	.100+00	.160-01	.100-01
4	7	BE 5	.536+02	.540+03	.400-05	.500-03	.200-02	.120-01	.100-01
4	7	BE 6	.536+02	.450+03	.640-03	.800-01	.320-00	.850-01	.100-01
4	7	BE 8						.160-01	.100-01
4	7	BE20	.536+02					.016	.100-01
4	7	BE21	.536+02					.035	.100-01
4	7	BE22	.536+02					.0085	.100-01
4	7	BE23	.536+02					.0085	.100-01
4	10	BE 1	5.84E8	180.	.002	.25	1.	.209	.100-01
4	10	BE 3	5.84E8	120.	6.E-5	.0075	.03	.209	.100-01
4	10	BE 4	5.84E8	270.	2.E-4	.025	.1	.209	.100-01
4	10	BE 6	5.84E8	450.	6.4E-4	.08	.32	1.045	.100-01
4	10	BE 8	.584+09					.209	.100-01
4	10	BE20	.584+09					.209	.100-01
4	10	BE21	.584+09					.209	.100-01
4	10	BE22	.584+09					.209	.100-01
4	10	BE23	5.84E8	0.				.209	.100-01
6	14	C 1	.200+07	.100+02	.100+01	.750-00	.100+01	.540-01	.100-01
6	14	C 6	.200+07	.400+02	.250-01	.200-01	.250-01	.270-00	.100-01
6	14	C 7	.200+07	.120+02	.500-00	.380-00	.500-00	.540-01	.100-01
6	14	C20	.200+07					.054	.100-01
6	14	C21	.200+07					.054	.100-01
6	14	C22	.200+07					.054	.100-01
6	14	C23	.200+07					.054	.100-01
9	18	F 1	.780-01	.808+03	.100+01	.750-00	.100+01	.890-00	.100-01
9	18	F 6	.780-01	.145+04	.530-00	.400-00	.530-00	.140+01	.100-01
9	18	F 8						.540+00	.100-01
9	18	F20	.708-01					.54	.100-01
9	18	F21	.708-01					.89	.100-01
9	18	F22	.708-01					.41	.100-01
9	18	F23	.708-01					.41	.100-01
11	22	NA 1	.950+03	.110+02	.100+01	.750-00	.100+01	.160+01	.100-01
11	22	NA 8						.800+00	.100-01
11	22	NA20	.950+03					.80	.100-01
11	22	NA21	.950+03					1.6	.100-01
11	22	NA22	.950+03					.53	.100-01
11	22	NA23	.950+03					.53	.100-01
11	24	NA 1	.630-00	.110+02	.100+01	.750-00	.100+01	.270+01	.100-01
11	24	NA 8						.150+01	.100-01
11	24	NA20	.630-00					1.5	.100-01
11	24	NA21	.630-00					2.7	.100-01
11	24	NA22	.630-00					1.0	.100-01
11	24	NA23	.630-00					1.0	.100-01
14	31	SI 1	.110+00	.600+02	.850-00	.680-00	.100+01	.590-00	.100-01
14	31	SI 8	.110+00	.600+02	.900-01	.700-01	.100+00	.590-00	.100-01
14	31	SI 9	.110+00	.600+02	.850-03	.700-03	.100-02	.590-00	.100-01
14	31	SI10	.110+00	.600+02	.430-03	.340-03	.500-03	.590-00	.100-01
14	31	SI11	.110+00	.600+02	.500-04	.400-04	.600-03	.590-00	.100-01
14	31	SI12	.110+00	.600+02	.300-01	.300-01	.400-01	.590-00	.100-01
14	31	SI20	.110+00					.59	.100-01
14	31	SI21	.110+00					.59	.100-01
14	31	SI22	.110+00					.59	.100-01
14	31	SI23	.110+00					.59	.100-01
15	32	P 1	.143+02	.257+03	.750-00	.630-00	.100+01	.690-00	.100-01

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15 32	P 4	.143+02	.150+02	.500-01	.400-01	.700-01	.690-00	ORCLIB	35
15 32	P 6	.143+02	.115+04	.375-00	.320-00	.200-00	.350+01	ORCLIB	36
15 32	P 8						.690+00	ORCLIB	37
15 32	P13	.143+02	.257+03	.530-02	.440-02	.700-02	.690-00	ORCLIB	38
15 32	P20	.143+02					.69	ORCLIB	24
15 32	P21	.143+02					.69	ORCLIB	25
15 32	P22	.143+02					.69	ORCLIB	26
15 32	P23	.143+02					.69	ORCLIB	27
16 35	S 1	.871+02	.000+02	.100+01	.750-00	.100+01	.560-01	ORCLIB	39
16 35	S 6	.871+02	.600+03	.300-01	.200-01	.300-01	.240-00	ORCLIB	40
16 35	S 8						.560-01	ORCLIB	41
16 35	S10	.871+02	.623+03	.130-02	.980-03	.130-02	.560-01	ORCLIB	42
16 35	S12	.871+02	.153+04	.100-01	.750-02	.100-01	.560-01	ORCLIB	43
16 35	S20	.871+02					.056	ORCLIB	28
16 35	S21	.871+02					.056	ORCLIB	29
16 35	S22	.871+02					.056	ORCLIB	30
16 35	S23	.871+02					.056	ORCLIB	31
17 36	CL 1	.120+02	.290+02	1.0	.75	1.0	.26	ORCLIB	32
17 36	CL 8						.260+00	ORCLIB	45
17 36	CL20	.120+09					.26	ORCLIB	33
17 36	CL21	.120+09					.26	ORCLIB	34
17 36	CL22	.120+09					.26	ORCLIB	35
17 36	CL23	.120+09					.26	ORCLIB	36
17 38	CL 1	.260-01	.200+02	1.0	.75	1.0	2.3	CL28	1
17 38	CL 8						.160+01	ORCLIB	47
17 38	CL20	.260-01					1.9	ORCLIB	38
17 38	CL21	.260-01					2.3	ORCLIB	39
17 38	CL22	.260-01					1.7	ORCLIB	40
17 38	CL23	.260-01					1.7	ORCLIB	41
19 42	K 1	.520-00	.580+02	.100+01	.750-00	.100+01	.160+01	ORCLIB	48
19 42	K 4	.520-00	.580+02	.200-01	.150-01	.200-01	.150+01	ORCLIB	49
19 42	K 5	.520-00	.580+02	.400-02	.300-02	.400-02	.150+01	ORCLIB	50
19 42	K 8						.150+01	ORCLIB	51
19 42	K13	.520-00	.580+02	.400-01	.300-01	.400-01	.150+01	ORCLIB	52
19 42	K14	.520-00	.580+02	.650-00	.490-00	.650-00	.160+01	ORCLIB	53
19 42	K20	.520-00					1.5	ORCLIB	42
19 42	K21	.520-00					1.6	ORCLIB	43
19 42	K22	.520-00					1.5	ORCLIB	44
19 42	K23	.520-00					1.5	ORCLIB	45
20 41	CA 1	4.75E7	1.64E4	.60	.55	1.	.0036	ORCLIB	54
20 41	CA 6	4.75E7	18000.	.54	.5	0.9	.0036	ORCLIB	55
20 41	CA 8	4.75E7					.0036	ORCLIB	56
20 41	CA20	.475+08					.0036	ORCLIB	46
20 41	CA21	.475+08					.0036	ORCLIB	47
20 41	CA22	.475+08					.0036	ORCLIB	48
20 41	CA23	4.75E7					.0036	ORCLIB	57
20 45	CA 1	.164+03	.164+05	.600-00	.550-00	.100+01	.860-01	ORCLIB	58
20 45	CA 6	.164+03	.164+05	.540-00	.500-00	.900-00	.430-00	ORCLIB	59
20 45	CA 8						.860-01	ORCLIB	60
20 45	CA20	.164+03					.086	ORCLIB	49
20 45	CA21	.164+03					.086	ORCLIB	50
20 45	CA22	.164+03					.086	ORCLIB	51
20 45	CA23	.164+03					.086	ORCLIB	52
20 47	CA 1	.490+01	.164+05	.600-00	.550-00	.100+01	.140+01	ORCLIB	61
20 47	CA 6	.490+01	.180+05	.540-00	.500-00	.900-00	.260+01	ORCLIB	62
20 47	CA 8						.657-00, .81-00, .82-00	ORCLIB	63
20 47	CA20	.490+01					.61	ORCLIB	53
20 47	CA21	.490+01					1.2	ORCLIB	54
20 47	CA22	.490+01					.48	ORCLIB	55
20 47	CA23	.490+01					.48	ORCLIB	56

21	46	SC 1	.850+02	.300+02	.100-03	.250-00	.100+01	.130+01	ORCLIA	64
21	46	SC 3	.850+02	.750+02	.200-05	.500-02	.200-01	.500-00	ORCLIA	65
21	46	SC 4	.850+02	.300+02	.150-04	.400-01	.150-00	.640-00	ORCLIA	66
21	46	SC 6	.850+02	.330+02	.200-04	.500-01	.200-00	.900-00	ORCLIA	67
21	46	SC 8						.640+00	ORCLIA	68
21	46	SC20	.850+02					.64	ORC001	57
21	46	SC21	.850+02					1.3	ORC001	58
21	46	SC22	.850+02					.4	ORC001	59
21	46	SC23	.850+02					.4	ORC001	60
21	47	SC 1	.343+01	.300+02	.100-03	.250-00	.100+01	.260-00	ORCLIA	69
21	47	SC 3	.343+01	.750+02	.200-05	.500-02	.200-01	.200-00	ORCLIA	70
21	47	SC 4	.343+01	.360+02	.150-04	.400-01	.150-00	.210-00	ORCLIA	71
21	47	SC 6	.343+01	.330+02	.200-04	.500-01	.200-00	.890-00	ORCLIA	72
21	47	SC 8						.210+00	ORCLIA	73
21	47	SC20	.343+01					.21	ORC001	61
21	47	SC21	.343+01					.26	ORC001	62
21	47	SC22	.343+01					.19	ORC001	63
21	47	SC23	.343+01					.19	ORC001	64
21	48	SC 1	.183+01	.300+02	.100-03	.250-00	.100+01	.220+01	ORCLIA	74
21	48	SC 3	.183+01	.750+02	.200-05	.500-02	.200-01	.850-00	ORCLIA	75
21	48	SC 4	.183+01	.360+02	.150-04	.400-01	.150-00	.110+01	ORCLIA	76
21	48	SC 6	.183+01	.330+02	.200-04	.500-01	.200-00	.160+01	ORCLIA	77
21	48	SC 8						.110+01	ORCLIA	78
21	48	SC20	.183+01					1.1	ORC001	65
21	48	SC21	.183+01					2.2	ORC001	66
21	48	SC22	.183+01					0.69	ORC001	67
21	48	SC23	.183+01					0.69	ORC001	68
23	48	V 1	.161+02	.420+02	.200-01	.260-00	.100+01	.190+01	ORCLIA	79
23	48	V 3	.161+02	.740+02	.800-03	.100-01	.400-01	.700-00	ORCLIA	80
23	48	V 4	.161+02	.700+02	.120-02	.200-01	.600-01	.900-00	ORCLIA	81
23	48	V 5	.161+02	.900+02	.200-03	.260-02	.100-01	.700-00	ORCLIA	82
23	48	V 6	.161+02	.135+03	.280-02	.400-01	.140-00	.120+01	ORCLIA	83
23	48	V 8						.900+00	ORCLIA	84
23	48	V20	.161+02					.9	ORC001	69
23	48	V21	.161+02					1.9	ORC001	70
23	48	V22	.161+02					.56	ORC001	71
23	48	V23	.161+02					.56	ORC001	72
24	51	CR 1	.278+02	.616+03	.500-02	.250-00	.100+01	.250-01	ORCLIA	85
24	51	CR 3	.278+02	.616+03	.130-04	.680-03	.270-02	.120-01	ORCLIA	86
24	51	CR 8	.278+02	.616+03	.200-03	.100-01	.400-01	.140-01	ORCLIA	87
24	51	CR15	.278+02	.616+03	.450-05	.230-03	.900-03	.840-02	ORCLIA	88
24	51	CR16	.278+02	.616+03	.450-05	.230-03	.900-03	.840-02	ORCLIA	89
24	51	CR20	.278+02					.014	ORC001	73
24	51	CR21	.278+02					.025	ORC001	74
24	51	CR22	.278+02					.010	ORC001	75
24	51	CR23	.278+02					.010	ORC001	76
25	52	MN 1	.555+01	.170+02	.100+00	.300-00	.100+01	.210+01	ORCLIA	90
25	52	MN 4	.555+01	.250+02	.200-01	.700-01	.240-00	.960-00	ORCLIA	91
25	52	MN 8						.960+00	ORCLIA	92
25	52	MN17	.555+01	.570+01	.300-02	.900-02	.300-01	.560-00	ORCLIA	93
25	52	MN20	.555+01					.96	ORC001	77
25	52	MN21	.555+01					2.1	ORC001	78
25	52	MN22	.555+01					.56	ORC001	79
25	52	MN23	.555+01					.56	ORC001	80
25	54	MN 1	.300+03	.170+02	.100+00	.300-00	.100+01	.510-00	ORCLIA	94
25	54	MN 4	.300+03	.250+02	.200-01	.700-01	.240-00	.230-00	ORCLIA	95
25	54	MN 8						.230+00	ORCLIA	96
25	54	MN17	.300+03	.570+01	.300-02	.900-02	.300-01	.130-00	ORCLIA	97
25	54	MN20	.300+03					.23	ORC001	81
25	54	MN21	.300+03					.51	ORC001	82

25 54 MN22	.300+03					.13	ORC001	83
25 54 MN23	.300+03					.13	ORC001	84
25 56 MN 1	.110+00	.170+02	.100+00	.300-00	.100+01	.100+01	ORCLIA	98
25 56 MN 4	.110+00	.250+02	.200-01	.700-01	.240-00	.130+01	ORCLIA	99
25 56 MN 2						.130+01	ORCLIA	100
25 56 MN17	.110+00	.570+01	.300-02	.900-02	.300-01	.110+01	ORCLIA	101
25 56 MN20	.110+00					.13	ORC001	85
25 56 MN21	.110+00					.13	ORC001	86
25 56 MN22	.110+00					.13	ORC001	87
25 56 MN23	.110+00					.13	ORC001	88
26 55 FE 1	.110+04	.800+03	.100+00	.300-00	.100+01	.650-02	ORCLIA	102
26 55 FE 4	.110+04	.554+03	.130-01	.400-01	.130-00	.650-02	ORCLIA	103
26 55 FE 5	.110+04	.600+03	.200-02	.600-02	.200-01	.650-02	ORCLIA	104
26 55 FE 6	.110+04	.168+04	.100-01	.300-01	.100+00	.650-02	ORCLIA	105
26 55 FE 8	.110+04	.320+04	.200-02	.600-02	.200-01	.650-02	ORCLIA	106
26 55 FE20	.110+04					.0065	ORC001	89
26 55 FE21	.110+04					.0065	ORC001	90
26 55 FE22	.110+04					.0065	ORC001	91
26 55 FE23	.110+04					.0065	ORC001	92
26 59 FE 1	.451+02	.800+03	.100+00	.300-00	.100+01	.810-00	ORCLIA	107
26 59 FE 4	.451+02	.554+03	.130-01	.400-01	.130-00	.420-00	ORCLIA	108
26 59 FE 5	.451+02	.600+03	.200-02	.600-02	.200-01	.340-00	ORCLIA	109
26 59 FE 8	.451+02	.320+04	.200-02	.600-02	.200-01	.420-00	ORCLIA	110
26 59 FE20	.451+02					.42	ORC001	93
26 59 FE21	.451+02					.81	ORC001	94
26 59 FE22	.451+02					.29	ORC001	95
26 59 FE23	.451+02					.29	ORC001	96
27 57 CO 1	.270+03	.950+01	.300-00	.400-00	.100+01	.900-01	ORCLIA	111
27 57 CO 4	.270+03	.950+01	.700-02	.200-01	.400-01	.530-01	ORCLIA	112
27 57 CO 5	.270+03	.950+01	.420-03	.560-03	.140-02	.450-01	ORCLIA	113
27 57 CO 8						.530-01	ORCLIA	114
27 57 CO17	.270+03	.950+01	.600-03	.800-03	.200-02	.400-01	ORCLIA	115
27 57 CO20	.270+03					.053	ORC001	97
27 57 CO21	.270+03					.090	ORC001	98
27 57 CO22	.270+03					.040	ORC001	99
27 57 CO23	.270+03					.040	ORC001	100
27 58 CO 1	.720+02	.950+01	.300-00	.400-00	.100+01	.610-00	ORCLIA	116
27 58 CO 4	.720+02	.950+01	.700-02	.200-01	.400-01	.290-00	ORCLIA	117
27 58 CO 5	.720+02	.950+01	.420-03	.560-03	.140-02	.220-00	ORCLIA	118
27 58 CO 8						.290+00	ORCLIA	119
27 58 CO17	.720+02	.950+01	.600-03	.800-03	.200-02	.170-00	ORCLIA	120
27 58 CO20	.720+02					.29	ORC001	101
27 58 CO21	.720+02					.61	ORC001	102
27 58 CO22	.720+02					.17	ORC001	103
27 58 CO23	.720+02					.17	ORC001	104
27 581CO 1	.380+00	.950+01	.300-00	.400-00	.100+01	.990-01	ORCLIA	121
27 581CO 4	.380+00	.950+01	.700-02	.200-01	.400-01	.590-01	ORCLIA	122
27 581CO 5	.380+00	.950+01	.420-03	.560-03	.140-02	.480-01	ORCLIA	123
27 581CO 8						.280-01.14-00.28-00	ORCLIA	124
27 581CO17	.380+00	.950+01	.600-03	.800-03	.200-02	.390-01	ORCLIA	125
27 581CO20	.380+00					.024	ORC001	105
27 581CO21	.380+00					.026	ORC001	106
27 581CO22	.380+00					.019	ORC001	107
27 581CO23	.380+00					.019	ORC001	108
27 60 CO 1	.190+04	.950+01	.300-00	.400-00	.100+01	.150+01	ORCLIA	126
27 60 CO 4	.190+04	.950+01	.700-02	.200-01	.400-01	.720-00	ORCLIA	127
27 60 CO 5	.190+04	.950+01	.420-03	.560-03	.140-02	.560-00	ORCLIA	128
27 60 CO 8						.720+00	ORCLIA	129
27 60 CO17	.190+04	.950+01	.600-03	.800-03	.200-02	.440-00	ORCLIA	130
27 60 CO20	.190+04					.72	ORC001	109

27	60	C021	.190+04					1.5	ORC001	110
27	60	C022	.190+04					.44	ORC001	111
27	60	C023	.190+04					.44	ORC001	112
28	59	NI 1	.290+08	.667+03	.300-00	.400-00	.100+01	.770-02	ORCLIA	131
28	59	NI 4	.290+08	.500+03	.200-01	.300-01	.700-01	.770-02	ORCLIA	132
28	59	NI 6	.290+08	.800+03	.150-00	.200-00	.500-00	.770-02	ORCLIA	133
28	59	NI A						.770-02	ORCLIA	134
28	59	NI20	.290+08					.0077	ORC001	113
28	59	NI21	.290+08					.0077	ORC001	114
28	59	NI22	.290+08					.0077	ORC001	115
28	59	NI23	.290+08					.0077	ORC001	116
28	63	NI 1	.290+05	.667+03	.300-00	.400-00	.100+01	.210-01	ORCLIA	135
28	63	NI 4	.290+05	.500+03	.200-01	.300-01	.700-01	.210-01	ORCLIA	136
28	63	NI 6	.290+05	.800+03	.150-00	.200-00	.500-00	.110+00	ORCLIA	137
28	63	NI 8						.210-01	ORCLIA	138
28	63	NI20	.290+05					.021	ORC001	117
28	63	NI21	.290+05					.021	ORC001	118
28	63	NI22	.290+05					.021	ORC001	119
28	63	NI23	.290+05					.021	ORC001	120
28	65	NI 1	.110+00	.667+03	.300-00	.400-00	.100+01	.140+01	ORCLIA	139
28	65	NI 4	.110+00	.500+03	.200-01	.300-01	.700-01	.120+01	ORCLIA	140
28	65	NI 6	.110+00	.800+03	.150-00	.200-00	.500-00	.530+01	ORCLIA	141
28	65	NI 8						.120+01	ORCLIA	142
28	65	NI20	.110+00					1.2	ORC001	121
28	65	NI21	.110+00					1.4	ORC001	122
28	65	NI22	.110+00					1.1	ORC001	123
28	65	NI23	.110+00					1.1	ORC001	124
29	64	CU 1	.530-00	.800+02	.250-00	.390-00	.100+01	.250-00	ORCLIA	143
29	64	CU 3	.530-00	.160+02	.100-01	.200-01	.500-01	.170-00	ORCLIA	144
29	64	CU 4	.530-00	.150+03	.200-01	.300-01	.800-01	.190-00	ORCLIA	145
29	64	CU 5	.530-00	.200+01	.200-01	.300-01	.700-01	.170-00	ORCLIA	146
29	64	CU 8						.190+00	ORCLIA	147
29	64	CU13	.530-00	.800+03	.300-02	.400-02	.100-01	.210-00	ORCLIA	148
29	64	CU18	.530-00	.800+02	.300-02	.400-02	.100-01	.170-00	ORCLIA	149
29	64	CU20	.530+00					.19	ORC001	125
29	64	CU21	.530+00					.25	ORC001	126
29	64	CU22	.530+00					.16	ORC001	127
29	64	CU23	.530+00					.16	ORC001	128
30	65	ZN 1	.245+03	.933+03	.100+00	.300-00	.100+01	.320-00	ORCLIA	150
30	65	ZN 3	.245+03	.149+03	.400-02	.120-01	.400-01	.110+00	ORCLIA	151
30	65	ZN 4	.245+03	.910+02	.350-01	.110+00	.350-00	.150-00	ORCLIA	152
30	65	ZN 6	.245+03	.130+04	.150-01	.450-01	.150-00	.940-01	ORCLIA	153
30	65	ZN A						.150+00	ORCLIA	154
30	65	ZN10	.245+03	.270+03	.900-04	.270-03	.900-03	.560-01	ORCLIA	155
30	65	ZN11	.245+03	.107+03	.400-04	.120-03	.400-03	.560-01	ORCLIA	156
30	65	ZN14	.245+03	.196+04	.300-01	.900-01	.300-00	.320-00	ORCLIA	157
30	65	ZN15	.245+03	.140+02	.600-02	.200-01	.600-01	.560-01	ORCLIA	158
30	65	ZN17	.245+03	.250+02	.300-02	.400-02	.300-01	.840-01	ORCLIA	159
30	65	ZN20	.245+03					0.15	ORC001	129
30	65	ZN21	.245+03					0.32	ORC001	130
30	65	ZN22	.245+03					0.084	ORC001	131
30	65	ZN23	.245+03					0.084	ORC001	132
30	69	ZN 1	.360-01	.933+03	.100+00	.300-00	.100+01	.370-00	ORCLIA	160
30	69	ZN 3	.360-01	.149+03	.400-02	.120-01	.400-01	.370-00	ORCLIA	161
30	69	ZN 4	.360-01	.910+02	.350-01	.110+00	.350-00	.370-00	ORCLIA	162
30	69	ZN 6	.360-01	.130+04	.150-01	.450-01	.150-00	.190+01	ORCLIA	163
30	69	ZN A						.370+00	ORCLIA	164
30	69	ZN10	.360-01	.270+03	.900-04	.270-03	.900-03	.370-00	ORCLIA	165
30	69	ZN11	.360-01	.107+03	.400-04	.120-03	.400-03	.370-00	ORCLIA	166
30	69	ZN14	.360-01	.196+04	.300-01	.900-01	.300-00	.370-00	ORCLIA	167

30 69 ZN15	.360-01	.140+02	.600-02	.200-01	.600-01	.370-00	ORCLIA	168	
30 69 ZN17	.360-01	.250+02	.300-02	.900-02	.300-01	.370-00	ORCLIA	169	
30 69 ZN20	.360-01					0.37	ORC001	133	
30 69 ZN21	.360-01					0.37	ORC001	134	
30 69 ZN22	.360-01					0.37	ORC001	135	
30 69 ZN23	.360-01					0.37	ORC001	136	
30 691ZN 1	.580-00	.933+03	.100+00	.300-00	.100+01	.640-00	ORCLIA	170	
30 691ZN 3	.580-00	.149+03	.400-02	.120-01	.400-01	.470-00	ORCLIA	171	
30 691ZN 4	.580-00	.910+02	.350-01	.110+00	.350-00	.500-00	ORCLIA	172	
30 691ZN 6	.580-00	.130+04	.150-01	.450-01	.150-00	.210+01	ORCLIA	173	
30 691ZN 8						.487-00	.50-00 .50-00	ORCLIA	174
30 691ZN10	.580-00	.270+03	.900-04	.270-03	.900-03	.430-00	ORCLIA	175	
30 691ZN11	.580-00	.107+03	.400-04	.120-03	.400-03	.430-00	ORCLIA	176	
30 691ZN14	.580-00	.196+04	.300-01	.900-01	.300-00	.640-00	ORCLIA	177	
30 691ZN15	.580-00	.140+02	.600-02	.200-01	.600-01	.430-00	ORCLIA	178	
30 691ZN17	.580-00	.250+02	.300-02	.900-02	.300-01	.450-00	ORCLIA	179	
30 691ZN20	.580-00					0.13	ORC001	137	
30 691ZN21	.580-00					0.27	ORC001	138	
30 691ZN22	.580-00					0.081	ORC001	139	
30 691ZN23	.580-00					0.081	ORC001	140	
31 72 GA 1	.590-00	.600+01	.100-02	.250-00	.100+01	.180+01	ORCLIA	180	
31 72 GA 3	.590-00	.900+01	.200-04	.500-02	.200-01	.890-00	ORCLIA	181	
31 72 GA 4	.590-00	.480+01	.250-03	.630-01	.250-00	.110+01	ORCLIA	182	
31 72 GA 5	.590-00	.600+01	.100-04	.250-02	.100-01	.890-00	ORCLIA	183	
31 72 GA 6	.590-00	.120+02	.300-03	.750-01	.300-00	.260+01	ORCLIA	184	
31 72 GA 8						.110+01	ORCLIA	185	
31 72 GA20	.590-00					1.1	ORC001	141	
31 72 GA21	.590-00					1.8	ORC001	142	
31 72 GA22	.590-00					0.78	ORC001	143	
31 72 GA23	.590-00					0.78	ORC001	144	
32 71 GE 1	.120+02	.100+01	.100-01	.260-00	.100+01	.100-01	ORCLIA	186	
32 71 GE 3	.120+02	.120+02	.300-03	.800-02	.300-01	.100-01	ORCLIA	187	
32 71 GE 4	.120+02	.750+01	.200-03	.500-02	.200-01	.100-01	ORCLIA	188	
32 71 GE 8						.100-01	ORCLIA	189	
32 71 GE20	.120+02					0.010	ORC001	145	
32 71 GE21	.120+02					0.010	ORC001	146	
32 71 GE22	.120+02					0.010	ORC001	147	
32 71 GE23	.120+02					0.010	ORC001	148	
33 73 AS 1	.760+02	.280+03	.300-01	.270-00	.100+01	.610-01	ORCLIA	190	
33 73 AS 3	.760+02	.550+03	.300-03	.270-02	.100-01	.360-01	ORCLIA	191	
33 73 AS 4	.760+02	.550+03	.900-03	.800-02	.300-01	.410-01	ORCLIA	192	
33 73 AS 8						.410-01	ORCLIA	193	
33 73 AS20	.760+02					0.041	ORC001	149	
33 73 AS21	.760+02					0.061	ORC001	150	
33 73 AS22	.760+02					0.033	ORC001	151	
33 73 AS23	.760+02					0.033	ORC001	152	
33 74 AS 1	.175+02	.280+03	.300-01	.270-00	.100+01	.560-00	ORCLIA	194	
33 74 AS 3	.175+02	.550+03	.300-03	.270-02	.100-01	.340-00	ORCLIA	195	
33 74 AS 4	.175+02	.550+03	.900-03	.800-02	.300-01	.380-00	ORCLIA	196	
33 74 AS 8						.380+00	ORCLIA	197	
33 74 AS20	.175+02					0.38	ORC001	153	
33 74 AS21	.175+02					0.56	ORC001	154	
33 74 AS22	.175+02					0.32	ORC001	155	
33 74 AS23	.175+02					0.32	ORC001	156	
33 76 AS 1	.111+01	.280+03	.300-01	.270-00	.100+01	.130+01	ORCLIA	198	
33 76 AS 3	.111+01	.550+03	.300-03	.270-02	.100-01	.110+01	ORCLIA	199	
33 76 AS 4	.111+01	.550+03	.900-03	.800-02	.300-01	.110+01	ORCLIA	200	
33 76 AS 8						.110+01	ORCLIA	201	
33 76 AS20	.111+01					1.1	ORC001	157	
33 76 AS21	.111+01					1.3	ORC001	158	

33 76 AS22	.111+01					1.1		ORC001	159
33 76 AS23	.111+01					1.1		ORC001	160
33 77 AS 1	.162+01	.280+03	.300-01	.270-00	.100+01	.240-00		ORCLIB	202
33 77 AS 3	.162+01	.550+03	.300-03	.270-02	.100-01	.240-00		ORCLIB	203
33 77 AS 4	.162+01	.550+03	.300-03	.800-02	.300-01	.240-00		ORCLIB	204
33 77 AS 8	.162+01					.240+00		ORCLIB	205
33 77 AS20	.162+01					0.24		ORC001	161
33 77 AS21	.162+01					0.24		ORC001	162
33 77 AS22	.162+01					0.24		ORC001	163
33 77 AS23	.162+01					0.24		ORC001	164
34 75 SE 1	.127+03	.110+02	.900-00	.700-00	.100+01	.200-00		ORCLIB	206
34 75 SE 3	.127+03	.110+02	.400-01	.300-01	.400-01	.720-01		ORCLIB	207
34 75 SE 4	.127+03	.240+02	.600-01	.500-01	.700-01	.940-01		ORCLIB	208
34 75 SE 5	.127+03	.180+02	.450-02	.350-02	.500-02	.720-01		ORCLIB	209
34 75 SE 8	.127+03					.940+01		ORCLIB	210
34 75 SE20	.127+03					0.094		ORC001	165
34 75 SE21	.127+03					0.20		ORC001	166
34 75 SE22	.127+03					0.056		ORC001	167
34 75 SE23	.127+03					0.056		ORC001	168
34 79 SE 1	2.37E7	11.	.9	.7	1.	.042		ORCLIB	211
34 79 SE 3	2.37E7	11.	.04	.03	.04	.042		ORCLIB	212
34 79 SE 4	2.37E7	24.	.06	.05	.07	.042		ORCLIB	213
34 79 SE 8	2.37E7					.042	.042 .042	ORCLIB	214
34 79 SE20	2.37E7					0.042		ORC001	169
34 79 SE21	2.37E7					0.042		ORC001	170
34 79 SE22	2.37E7					0.042		ORC001	171
34 79 SE23	2.37E7					.042		ORC004	3
35 82 BR 1	.150+01	.800+01	.100+01	.750-00	.100+01	.180+01		ORCLIB	216
35 82 BR 8	.150+01					.850+00		ORCLIB	217
35 82 BR20	.150+01					0.85		ORC001	172
35 82 BR21	.150+01					1.8		ORC001	173
35 82 BR22	.150+01					0.53		ORC001	174
35 82 BR23	.150+01					0.53		ORC001	175
37 86 RB 1	.186+02	.450+02	.100+01	.750-00	.100+01	.700-00		ORCLIB	218
37 86 RB 4	.186+02	.630+02	.500-01	.400-01	.500-01	.660-00		ORCLIB	219
37 86 RB 5	.186+02	.450+02	.400-02	.300-02	.400-02	.660-00		ORCLIB	220
37 86 RB 8	.186+02					.660+00		ORCLIB	221
37 86 RB14	.186+02	.800+02	.450-00	.340-00	.450-00	.700-00		ORCLIB	222
37 86 RB17	.186+02	.600+02	.300-02	.230-02	.300-02	.650-00		ORCLIB	223
37 86 RB20	.186+02					0.66		ORC001	176
37 86 RB21	.186+02					0.70		ORC001	177
37 86 RB22	.186+02					0.65		ORC001	178
37 86 RB23	.186+02					0.65		ORC001	179
37 87 RB 1	.180+14	.450+02	.100+01	.750-00	.100+01	.900-01		ORCLIB	224
37 87 RB 4	.180+14	.630+02	.500-01	.400-01	.500-01	.900-01		ORCLIB	225
37 87 RB 5	.180+14	.450+02	.400-02	.300-02	.400-02	.900-01		ORCLIB	226
37 87 RB 8	.180+14					.900-01		ORCLIB	227
37 87 RB14	.180+14	.800+02	.450-00	.340-00	.450-00	.900-01		ORCLIB	228
37 87 RB17	.180+14	.600+02	.300-02	.230-02	.300-02	.900-01		ORCLIB	229
37 87 RB20	.180+14					0.090		ORC001	180
37 87 RB21	.180+14					0.090		ORC001	181
37 87 RB22	.180+14					0.090		ORC001	182
37 87 RB23	.180+14					0.090		ORC001	183
38 85 SR 1	.650+02	.130+05	.300-00	.400-00	.100+01	.330-00		ORCLIB	230
38 85 SR 6	.650+02	.180+05	.900-01	.120+00	.175-00	.910-01		ORCLIB	231
38 85 SR 8	.650+02					.160+00		ORCLIB	232
38 85 SR20	.650+02					0.16		ORC001	184
38 85 SR21	.650+02					0.33		ORC001	185
38 85 SR22	.650+02					0.091		ORC001	186
38 85 SR23	.650+02					0.		ORC001	187

3A 851 SR 1	.490-01	.130+05	.300-00	.400-00	.100+01	.470-00	ORCLIA	233
3A 851 SR 6	.490-01	.180+05	.900-01	.120+00	.175-00	.130-00	ORCLIA	234
3A 851 SR 8						.150+00.17+00.23+00	ORCLIA	235
3A 851 SR 20	.490-01					0.051	ORC001	188
3A 851 SR 21	.490-01					0.095	ORC001	189
3A 851 SR 22	.490-01					0.034	ORC001	190
3A 851 SR 23	.490-01					0.03	ORC001	191
3A 89 SR 1	.505+02	.130+05	.300-00	.400-00	.100+01	.550-00	ORCLIA	236
3A 89 SR 6	.505+02	.180+05	.900-01	.120+00	.175-00	.280+01	ORCLIA	237
3A 89 SR 8						.550+00	ORCLIA	238
3A 89 SR 20	.505+02	.300-00	.100+01	.625-00	.000	.550-00	ORCLIA	239
3A 89 SR 21	.505+02	.300-00	.100+01	.625-00	.000	.550-00	ORCLIA	240
3A 89 SR 22	.505+02	.300-00	.100+01	.625-00	.000	.550-00	ORCLIA	241
3A 89 SR 23	.505+02	.300-00	.100+01	.625-00	.000	.550-00	ORCLIA	242
3A 90 SR 1	.100+05	.130+05	.300-00	.400-00	.100+01	.110+01	ORCLIA	243
3A 90 SR 6	.100+05	.180+05	.900-01	.120+00	.750-01	.550+01	ORCLIA	244
3A 90 SR 8						.452-00.11+01.11+01	ORCLIA	245
3A 90 SR 20	.100+05					0.21	ORC001	192
3A 90 SR 21	.100+05					0.21	ORC001	193
3A 90 SR 22	.100+05					0.21	ORC001	194
3A 90 SR 23	.100+05					0.21	ORC001	195
3A 91 SR 1	.400-00	.130+05	.300-00	.400-00	.100+01	.240+01	ORCLIA	246
3A 91 SR 6	.400-00	.180+05	.900-01	.120+00	.175-00	.740+01	ORCLIA	247
3A 91 SR 8						.115+01.14+01.17+01	ORCLIA	248
3A 91 SR 20	.400-00					0.68	ORC001	196
3A 91 SR 21	.400-00					0.98	ORC001	197
3A 91 SR 22	.400-00					0.58	ORC001	198
3A 91 SR 23	.400-00					0.58	ORC001	199
3A 92 SR 1	.110+00	.130+05	.300-00	.400-00	.100+01	.260+01	ORCLIA	249
3A 92 SR 6	.110+00	.180+05	.900-01	.120+00	.175-00	.800+01	ORCLIA	250
3A 92 SR 8						.175+01.19+01.19+01	ORCLIA	251
3A 92 SR 20	.110+00					0.45	ORC001	200
3A 92 SR 21	.110+00					0.96	ORC001	201
3A 92 SR 22	.110+00					0.37	ORC001	202
3A 92 SR 23	.110+00					0.37	ORC001	203
3A 90 Y 1	.268+01	.140+05	.100-03	.250-00	.100+01	.890-00	ORCLIA	252
3A 90 Y 6	.268+01	.180+05	.750-04	.190-00	.750-00	.440+01	ORCLIA	253
3A 90 Y 8						.890+00	ORCLIA	254
3A 90 Y 20	.268+01					0.89	ORC004	4
3A 90 Y 21	.268+01					0.89	ORC004	5
3A 90 Y 22	.268+01					0.89	ORC004	6
3A 90 Y 23	.268+01					0.89	ORC004	7
3A 91 Y 1	.580+02	.140+05	.100-03	.250-00	.100+01	.590-00	ORCLIA	255
3A 91 Y 6	.580+02	.180+05	.750-04	.190-00	.750-00	.290+01	ORCLIA	256
3A 91 Y 8						.590+00	ORCLIA	257
3A 91 Y 20	.580+02					0.59	ORC001	208
3A 91 Y 21	.580+02					0.59	ORC001	209
3A 91 Y 22	.580+02					0.59	ORC001	210
3A 91 Y 23	.580+02					0.59	ORC001	211
3A 911 Y 1	.350-01	.140+05	.100-03	.250-00	.100+01	.930-00	ORCLIA	258
3A 911 Y 6	.350-01	.180+05	.750-04	.190-00	.750-00	.300+01	ORCLIA	259
3A 911 Y 8						.160-00.42-00.68-00	ORCLIA	260
3A 911 Y 20	.350-01					0.59	ORC001	212
3A 911 Y 21	.350-01					0.59	ORC001	213
3A 911 Y 22	.350-01					0.59	ORC001	214
3A 911 Y 23	.350-01					0.59	ORC001	215
3A 92 Y 1	.150-00	.140+05	.100-03	.250-00	.100+01	.160+01	ORCLIA	261
3A 92 Y 6	.150-00	.180+05	.750-04	.190-00	.750-00	.690+01	ORCLIA	262
3A 92 Y 8						.150+01	ORCLIA	263
3A 92 Y 20	.150-00					1.5	ORC001	216

30	92	Y21	.150-00						1.6	ORC001	217
30	92	Y22	.150-00						1.4	ORC001	218
30	92	Y23	.150-00						1.4	ORC001	219
30	93	Y 1	.420-00	.140+05	.100-03	.250-00	.100+01	.170+01		ORCLIA	264
30	93	Y 6	.420-00	.180+05	.750-04	.190-00	.750-00	.650+01		ORCLIA	265
30	93	Y A						.150+01, .15+01, .15+01		ORCLIA	266
30	93	Y20	.420-00						1.5	ORC001	220
30	93	Y21	.420-00						1.7	ORC001	221
30	93	Y22	.420-00						1.4	ORC001	222
30	93	Y23	.420-00						1.4	ORC001	223
40	93	ZR 1	.480+09	.450+03	.100-03	.250-00	.100+01	.240-01		ORCLIA	267
40	93	ZR 3	.480+09	.900+03	.200-05	.500-02	.200-01	.240-01		ORCLIA	268
40	93	ZR 4	.480+09	.320+03	.700-05	.200-01	.700-01	.250-01		ORCLIA	269
40	93	ZR 5	.480+09	.900+03	.600-06	.150-02	.600-02	.250-01		ORCLIA	270
40	93	ZR 6	.480+09	.100+04	.360-04	.900-01	.360-00	.110+00		ORCLIA	271
40	93	ZR 8						.190-01, .20-01, .24-01		ORCLIA	272
40	93	ZR20	.480+09						0.019	ORC001	224
40	93	ZR21	.480+09						0.019	ORC001	225
40	93	ZR22	.480+09						0.019	ORC001	226
40	93	ZR23	.480+09						0.019	ORC001	227
40	95	ZR 1	.633+02	.450+03	.100-03	.250-00	.100+01	.110+01		ORCLIA	273
40	95	ZR 3	.633+02	.900+03	.200-05	.500-02	.200-01	.460-00		ORCLIA	274
40	95	ZR 4	.633+02	.320+03	.700-05	.200-01	.700-01	.570-00		ORCLIA	275
40	95	ZR 5	.633+02	.900+03	.600-06	.150-02	.600-02	.460-00		ORCLIA	276
40	95	ZR 6	.633+02	.100+04	.360-04	.900-01	.360-00	.110+01		ORCLIA	277
40	95	ZR 8						.327-00, .47-00, .56-00		ORCLIA	278
40	95	ZR20	.633+02						.32	ORC001	228
40	95	ZR21	.633+02						.57	ORC001	229
40	95	ZR22	.633+02						.24	ORC001	230
40	95	ZR23	.633+02						.24	ORC001	231
40	97	ZR 1	.710-00	.450+03	.100-03	.250-00	.100+01	.210+01		ORCLIA	279
40	97	ZR 3	.710-00	.900+03	.200-05	.500-02	.200-01	.150+01		ORCLIA	280
40	97	ZR 4	.710-00	.320+03	.700-05	.200-01	.700-01	.160+01		ORCLIA	281
40	97	ZR 5	.710-00	.900+03	.600-06	.150-02	.600-02	.150+01		ORCLIA	282
40	97	ZR 6	.710-00	.100+04	.360-04	.900-01	.360-00	.620+01		ORCLIA	283
40	97	ZR 8						.155+01, .16+01, .16+01		ORCLIA	284
40	97	ZR20	.710-00						.94	ORC001	232
40	97	ZR21	.710-00						1.2	ORC001	233
40	97	ZR22	.710-00						.85	ORC001	234
40	97	ZR23	.710-00						.85	ORC001	235
41	931NB 1		.370+04	.760+03	.100-03	.250-00	.100+01	.380-01		ORCLIA	285
41	931NB 3		.370+04	.760+03	.200-05	.500-02	.200-01	.380-01		ORCLIA	286
41	931NB 4		.370+04	.845+03	.900-05	.200-01	.900-01	.380-01		ORCLIA	287
41	931NB 5		.370+04	.950+02	.800-06	.200-02	.800-02	.380-01		ORCLIA	288
41	931NB 6		.370+04	.100+04	.380-04	.100+00	.380-00	.120+00		ORCLIA	289
41	931NB 8							.380-01		ORCLIA	290
41	931NB20		.370+04						0.038	ORC001	236
41	931NB21		.370+04						0.038	ORC001	237
41	931NB22		.370+04						0.038	ORC001	238
41	931NB23		.370+04						0.038	ORC001	239
41	95 NB 1		.350+02	.760+03	.100-03	.250-00	.100+01	.510-00		ORCLIA	291
41	95 NB 3		.350+02	.760+03	.200-05	.500-02	.200-01	.200-00		ORCLIA	292
41	95 NB 4		.350+02	.840+03	.900-05	.200-01	.900-01	.260-00		ORCLIA	293
41	95 NB 5		.350+02	.950+02	.800-06	.200-02	.800-02	.200-00		ORCLIA	294
41	95 NB 6		.350+02	.100+04	.380-04	.100+00	.380-00	.370-00		ORCLIA	295
41	95 NB 8							.260+00		ORCLIA	296
41	95 NB20		.350+02						0.26	ORC001	240
41	95 NB21		.350+02						0.51	ORC001	241
41	95 NB22		.350+02						0.16	ORC001	242
41	95 NB23		.350+02						0.16	ORC001	243

41	97	NR 1	.510-01	.740+03	.100-03	.250-00	.100+01	.870-00	ORCLIA	297
41	97	NR 3	.510-01	.740+03	.200-05	.500-02	.200-01	.600-00	ORCLIA	298
41	97	NR 4	.510-01	.840+03	.900-05	.200-01	.900-01	.640-00	ORCLIA	299
41	97	NR 5	.510-01	.950+02	.800-06	.200-02	.800-02	.600-00	ORCLIA	300
41	97	NR 6	.510-01	.100+04	.380-04	.100+00	.380-00	.240+01	ORCLIA	301
41	97	NR 8						.640+00	ORCLIA	302
41	97	NR20	.510-01					.065	ORCLIA	244
41	97	NR21	.510-01					.087	ORCLIA	245
41	97	NR22	.510-01					.056	ORCLIA	246
41	97	NR23	.510-01					.056	ORCLIA	247
42	93	MO 1	1.10E6	5.	.8	.65	1.	.048	ORCLIA	303
42	93	MO 3	1.10E6	2.	.06	.05	.08	.046	ORCLIA	304
42	93	MO 4	1.10E6	45.	.08	.065	.1	.048	ORCLIA	305
42	93	MO 8	1.10E6					.048	ORCLIA	306
42	93	MO20	1.10E6					.048	ORCLIA	248
42	93	MO21	1.10E6					.048	ORCLIA	249
42	93	MO22	1.10E6					.048	ORCLIA	250
42	93	MO23	1.10E6						ORCLIA	8
42	99	MO 1	.270+01	.500+01	.800-00	.650-00	.100+01	.510-00	ORCLIA	308
42	99	MO 3	.270+01	.300+01	.600-01	.500-01	.800-01	.480-00	ORCLIA	309
42	99	MO 4	.270+01	.450+02	.800-01	.650-01	.100+00	.480-00	ORCLIA	310
42	99	MO 8						.470-00, .47-00, .47-00	ORCLIA	311
42	99	MO20	.270+01					.044	ORCLIA	251
42	99	MO21	.270+01					.048	ORCLIA	252
42	99	MO22	.270+01					.043	ORCLIA	253
42	99	MO23	.270+01					.043	ORCLIA	254
43	96	TC 1	.430+01	.100+01	.500-00	.500-00	.100+01	.140+01	ORCLIA	312
43	96	TC 3	.430+01	.200+02	.500-02	.500-02	.100-01	.470-00	ORCLIA	313
43	96	TC 4	.430+01	.300+02	.150-02	.150-02	.300-02	.640-00	ORCLIA	314
43	96	TC 6	.430+01	.250+02	.100-02	.100-02	.200-02	.350-00	ORCLIA	315
43	96	TC 8	.430+01	.500+01	.450-03	.450-03	.900-03	.640-00	ORCLIA	316
43	96	TC12	.430+01	.100+02	.500-02	.500-02	.100-01	.830-02	ORCLIA	317
43	96	TC20	.430+01					.064	ORCLIA	255
43	96	TC21	.430+01					1.4	ORCLIA	256
43	96	TC22	.430+01					.035	ORCLIA	257
43	96	TC23	.430+01					.035	ORCLIA	258
43	961	TC 1	.360-01	.100+01	.500-00	.500-00	.100+01	.300-00	ORCLIA	318
43	961	TC 3	.360-01	.200+02	.500-02	.500-02	.100-01	.420-00	ORCLIA	319
43	961	TC 4	.360-01	.300+02	.150-02	.150-02	.300-02	.600-00	ORCLIA	320
43	961	TC 6	.360-01	.250+02	.100-02	.100-02	.200-02	.390-00	ORCLIA	321
43	961	TC 8	.360-01					.155-00, .62-00, .67-00	ORCLIA	322
43	961	TC12	.360-01	.100+02	.500-02	.500-02	.100-01	.210-01	ORCLIA	323
43	961	TC20	.360-01					.034	ORCLIA	259
43	961	TC21	.360-01					.034	ORCLIA	260
43	961	TC22	.360-01					.032	ORCLIA	261
43	961	TC23	.360-01					.032	ORCLIA	262
43	97	TC 1	.370+07	.100+01	.500-00	.500-00	.100+01	.200-01	ORCLIA	324
43	97	TC 3	.370+07	.200+02	.500-02	.500-02	.100-01	.200-01	ORCLIA	325
43	97	TC 4	.370+07	.300+02	.150-02	.150-02	.300-02	.200-01	ORCLIA	326
43	97	TC 6	.370+07	.250+02	.100-02	.100-02	.200-02	.190-01	ORCLIA	327
43	97	TC 8	.370+07	.500+01	.450-03	.450-02	.900-03	.200-01	ORCLIA	328
43	97	TC12	.370+07	.100+02	.500-02	.500-02	.100-01	.110-02	ORCLIA	329
43	97	TC20	.370+07					.020	ORCLIA	263
43	97	TC21	.370+07					.020	ORCLIA	264
43	97	TC22	.370+07					.019	ORCLIA	265
43	97	TC23	.370+07					.019	ORCLIA	266
43	971	TC 1	.920+02	.100+01	.500-00	.500-00	.100+01	.900-01	ORCLIA	330
43	971	TC 3	.920+02	.200+02	.500-02	.500-02	.100-01	.900-01	ORCLIA	331
43	971	TC 4	.920+02	.300+02	.150-02	.150-02	.300-02	.900-01	ORCLIA	332
43	971	TC 6	.920+02	.250+02	.100-02	.100-02	.200-02	.370-00	ORCLIA	333

43	971TC	A							.900-01	.90-01	.90-01	ORCLIA	334
43	971TC12		.920+02	.100+02	.500-02	.500-02	.100-01		.710-01			ORCLIA	335
43	971TC20		.920+02						0.09			ORCLIA	267
43	971TC21		.920+02						0.09			ORCLIA	268
43	971TC22		.920+02						0.089			ORCLIA	269
43	971TC23		.920+02						0.089			ORCLIA	270
43	99 TC 1		.730+0A	.100+01	.500-00	.500-00	.100+01		.940-01			ORCLIA	336
43	99 TC 3		.730+0A	.200+02	.500-02	.500-02	.100-01		.940-01			ORCLIA	337
43	99 TC 4		.730+0A	.300+02	.150-02	.150-02	.300-02		.940-01			ORCLIA	338
43	99 TC 6		.730+0A	.250+02	.100-02	.100-02	.200-02		.940-01			ORCLIA	339
43	99 TC A		.730+0A	.500+01	.450-03	.450-03	.900-03		.940-01			ORCLIA	340
43	99 TC12		.730+0A	.100+02	.500-02	.500-02	.100-01		.470-00			ORCLIA	341
43	99 TC20		.730+0A						0.094			ORCLIA	271
43	99 TC21		.730+0A						0.094			ORCLIA	272
43	99 TC22		.730+0A						0.094			ORCLIA	273
43	99 TC23		.730+0A						0.094			ORCLIA	274
44	97 RU 1		.280+01	.730+01	.300-01	.270-00	.100+01		.150-00			ORCLIA	342
44	97 RU 3		.280+01	.250+01	.600-02	.500-01	.200-00		.770-01			ORCLIA	343
44	97 RU 6		.280+01	.160+02	.240-02	.200-01	.800-01		.130-00			ORCLIA	344
44	97 RU 8								.790-01	.11+00	.15-00	ORCLIA	345
44	97 RU20		.280+01						0.078			ORCLIA	275
44	97 RU21		.280+01						0.15			ORCLIA	276
44	97 RU22		.280+01						0.05			ORCLIA	277
44	97 RU23		.280+01						0.05			ORCLIA	278
44	103 RU 1		.410+02	.730+01	.300-01	.270-00	.100+01		.440-00			ORCLIA	346
44	103 RU 3		.410+02	.250+01	.600-02	.500-01	.200-00		.220-00			ORCLIA	347
44	103 RU 6		.410+02	.160+02	.240-02	.200-01	.800-01		.620-00			ORCLIA	348
44	103 RU 8								.263-00	.26-00	.26-00	ORCLIA	349
44	103 RU20		.410+02						0.21			ORCLIA	279
44	103 RU21		.410+02						0.38			ORCLIA	280
44	103 RU22		.410+02						0.14			ORCLIA	281
44	103 RU23		.410+02						0.14			ORCLIA	282
44	105 RU 1		.190-00	.730+01	.300-01	.270-00	.100+01		.120+01			ORCLIA	350
44	105 RU 3		.190-00	.250+01	.600-02	.500-01	.200-00		.840-00			ORCLIA	351
44	105 RU 6		.190-00	.160+02	.240-02	.200-01	.800-01		.350+01			ORCLIA	352
44	105 RU 8								.795-00	.90-00	.91-00	ORCLIA	353
44	105 RU20		.190-00						0.72			ORCLIA	283
44	105 RU21		.190-00						0.98			ORCLIA	284
44	105 RU22		.190-00						0.62			ORCLIA	285
44	105 RU23		.190-00						0.62			ORCLIA	286
44	106 RU 1		.365+03	.730+01	.300-01	.270-00	.100+01		.140+01			ORCLIA	354
44	106 RU 3		.365+03	.250+01	.600-02	.500-01	.200-00		.130+01			ORCLIA	355
44	106 RU 6		.365+03	.160+02	.240-02	.200-01	.800-01		.650+01			ORCLIA	356
44	106 RU 8								.140+01			ORCLIA	357
44	106 RU20		.365+03	.300-01	.100+01	.625-00	.000		.140+01			ORCLIA	358
44	106 RU21		.365+03	.300-01	.100+01	.625-00	.000		.140+01			ORCLIA	359
44	106 RU22		.365+03	.300-01	.100+01	.625-00	.000		.130+01			ORCLIA	360
44	106 RU23		.365+03	.300-01	.100+01	.625-00	.000		.130+01			ORCLIA	361
45	1031RH 1		.380-01	.104+02	.200-00	.350-00	.100+01		.550-01			ORCLIA	362
45	1031RH 3		.380-01	.280+02	.600-02	.100-01	.300-01		.540-01			ORCLIA	363
45	1031RH 4		.380-01	.182+02	.800-02	.140-01	.400-01		.550-01			ORCLIA	364
45	1031RH 5		.380-01	.208+02	.200-02	.350-02	.100-01		.540-01			ORCLIA	365
45	1031RH 6		.380-01	.166+02	.100-01	.200-01	.500-01		.190-00			ORCLIA	366
45	1031RH 8								.550-01			ORCLIA	367
45	1031RH20		.380-01						0.055			ORCLIA	287
45	1031RH21		.380-01						0.055			ORCLIA	288
45	1031RH22		.380-01						0.053			ORCLIA	289
45	1031RH23		.380-01						0.053			ORCLIA	290
45	105 RH 1		.152+01	.104+02	.200-00	.350-00	.100+01		.200-00			ORCLIA	368
45	105 RH 3		.152+01	.280+02	.600-02	.100-01	.300-01		.190-00			ORCLIA	369

45105 RH 4	.152+01	.182+02	.800-02	.140-01	.400-01	.190-00	ORCLIB	370
45105 RH 5	.152+01	.208+02	.200-02	.350-02	.100-01	.190-00	ORCLIB	371
45105 RH 6	.152+01	.166+02	.100-01	.200-01	.500-01	.950-00	ORCLIB	372
45105 RH 8						.190-01	ORCLIB	373
45105 RH20	.152+01					0.19	ORC001	291
45105 RH21	.152+01					0.20	ORC001	292
45105 RH22	.152+01					0.19	ORC001	293
45105 RH23	.152+01					0.19	ORC001	294
46103 PD 1	.170+02	.500+01	.200-00	.350-00	.100+01	.640-01	ORCLIB	374
46103 PD 3	.170+02	.300+02	.200-01	.300-01	.800-01	.610-01	ORCLIB	375
46103 PD 4	.170+02	.190+02	.200-01	.300-01	.900-01	.630-01	ORCLIB	376
46103 PD 5	.170+02	.150+02	.200-02	.350-02	.100-01	.610-01	ORCLIB	377
46103 PD 8						.625-01, .64-01, .64-01	ORCLIB	378
46103 PD20	.170+02					0.022	ORC001	295
46103 PD21	.170+02					0.023	ORC001	296
46103 PD22	.170+02					0.019	ORC001	297
46103 PD23	.170+02					0.019	ORC001	298
46107 PD 1	2.37E9	5.	.2	.35	1.	.0089	ORCLIB	379
46107 PD 3	2.37E9	10.	.02	.03	.08	.0089	ORCLIB	380
46107 PD 4	2.37E9	10.	.02	.03	.09	.0089	ORCLIB	381
46107 PD 8	2.37E9					.0089	ORCLIB	382
46107 PD20	2.37E9					.0089, .0089, .0089	ORC001	299
46107 PD21	2.37E9					0.0089	ORC001	300
46107 PD22	2.37E9					0.0089	ORC001	301
46107 PD23						.048	ORC004	9
46109 PD 1	.570-00	.500+01	.200-00	.350-00	.100+01	.420-00	ORCLIB	384
46109 PD 3	.570-00	.300+02	.200-01	.300-01	.800-01	.420-00	ORCLIB	385
46109 PD 4	.570-00	.190+02	.200-01	.300-01	.900-01	.420-00	ORCLIB	386
46109 PD 5	.570-00	.150+02	.200-02	.350-02	.100-01	.420-00	ORCLIB	387
46109 PD 8						.420+00	ORCLIB	388
46109 PD20	.570-00					0.42	ORC001	302
46109 PD21	.570-00					0.42	ORC001	303
46109 PD22	.570-00					0.42	ORC001	304
46109 PD23	.570-00					0.42	ORC001	305
47105 AG 1	.400+02	.500+01	.100-01	.260-00	.100+01	.630-00	ORCLIB	389
47105 AG 3	.400+02	.100+02	.200-03	.500-02	.200-01	.220-00	ORCLIB	390
47105 AG 4	.400+02	.150+02	.300-03	.770-02	.300-01	.290-00	ORCLIB	391
47105 AG 6	.400+02	.300+02	.500-03	.130-01	.500-01	.160-00	ORCLIB	392
47105 AG 8						.290+00	ORCLIB	393
47105 AG20	.400+02					0.29	ORC001	306
47105 AG21	.400+02					0.63	ORC001	307
47105 AG22	.400+02					0.16	ORC001	308
47105 AG23	.400+02					0.16	ORC001	309
471101 AG 1	.270+03	.500+01	.100-01	.260-00	.100+01	.170+01	ORCLIB	394
471101 AG 3	.270+03	.100+02	.200-03	.500-02	.200-01	.650-00	ORCLIB	395
471101 AG 4	.270+03	.150+02	.300-03	.770-02	.300-01	.840-00	ORCLIB	396
471101 AG 6	.270+03	.300+02	.500-03	.130-01	.500-01	.110+01	ORCLIB	397
471101 AG 8						.840+00	ORCLIB	398
471101 AG20	.270+03					0.84	ORC001	310
471101 AG21	.270+03					1.7	ORC001	311
471101 AG22	.270+03					0.51	ORC001	312
471101 AG23	.270+03					0.51	ORC001	313
47111 AG 1	.750+01	.500+01	.100-01	.260-00	.100+01	.400-00	ORCLIB	399
47111 AG 3	.750+01	.100+02	.200-03	.500-02	.200-01	.370-00	ORCLIB	400
47111 AG 4	.750+01	.150+02	.300-03	.770-02	.300-01	.380-00	ORCLIB	401
47111 AG 6	.750+01	.300+02	.500-03	.130-01	.500-01	.180+01	ORCLIB	402
47111 AG 8						.380+00	ORCLIB	403
47111 AG20	.750+01					0.38	ORC001	314
47111 AG21	.750+01					0.40	ORC001	315
47111 AG22	.750+01					0.37	ORC001	316

47111 AG23	.750+01					0.37			ORC001	317
48109 CD 1	.475+03	.200+03	.250-02	.250-00	.100+01	.110+00			ORCLIB	404
48109 CD 3	.475+03	.300+03	.250-03	.250-01	.100+00	.980-01			ORCLIB	405
48109 CD 4	.475+03	.200+03	.190-02	.190-00	.750-00	.100+00			ORCLIB	406
48109 CD A						.100+00			ORCLIB	407
48109 CD20	.475+03					0.10			ORC001	318
48109 CD21	.475+03					0.11			ORC001	319
48109 CD22	.475+03					0.092			ORC001	320
48109 CD23	.475+03					0.092			ORC001	321
481131 CD 1	5.33F3	200.	2.5E-3	.25	1.	.184			ORCLIB	408
481131 CD 3	5.33F3	200.	2.5E-4	.025		.184			ORCLIB	409
481131 CD 4	5.33F3	200.	1.0E-3	.19		.184			ORCLIB	410
481131 CD A	5.33F3					.184	.184	.184	ORCLIB	411
481131 CD20	5.33F3					.184			ORC004	10
481131 CD21	5.33F3					.184			ORC004	11
481131 CD22	5.33F3					.184			ORC004	12
481131 CD23	5.33F3					.184			ORCLIB	412
48115 CD 1	.220+01	.200+03	.250-02	.250-00	.100+01	.710-00			ORCLIB	413
48115 CD 3	.220+01	.300+03	.250-03	.250-01	.100+00	.560-00			ORCLIB	414
48115 CD 4	.220+01	.200+03	.190-02	.190-00	.750-00	.580-00			ORCLIB	415
48115 CD 8						.650-18, 38-16, 39-15			ORCLIB	416
48115 CD20	.220+01					0.38			ORC001	325
48115 CD21	.220+01					0.45			ORC001	326
48115 CD22	.220+01					0.36			ORC001	327
48115 CD23	.220+01					0.36			ORC001	328
481151 CD 1	.430+02	.200+03	.250-02	.250-00	.100+01	.610-00			ORCLIB	417
481151 CD 3	.430+02	.300+03	.250-03	.250-01	.100+00	.610-00			ORCLIB	418
481151 CD 4	.430+02	.200+03	.190-02	.190-00	.750-00	.610-00			ORCLIB	419
481151 CD A						.610-00, 61-00, 61-00			ORCLIB	420
481151 CD20	.430+02					0.20			ORC001	329
481151 CD21	.430+02					0.26			ORC001	330
481151 CD22	.430+02					0.18			ORC001	331
481151 CD23	.430+02					0.18			ORC001	332
491131 IN 1	.730-01	.480+02	.200-02	.250-00	.100+01	.290-00			ORCLIB	421
491131 IN 3	.730-01	.600+02	.800-04	.100-01	.400-01	.190-00			ORCLIB	422
491131 IN 4	.730-01	.580+02	.280-03	.400-01	.140-00	.210-00			ORCLIB	423
491131 IN 5	.730-01	.480+02	.400-04	.500-02	.200-01	.190-00			ORCLIB	424
491131 IN 6	.730-01	.570+02	.340-03	.400-01	.170-00	.680-00			ORCLIB	425
491131 IN 8						.210+00			ORCLIB	426
491131 IN12	.730-01	.670+02	.360-03	.500-01	.180-00	.130-00			ORCLIB	427
491131 IN16	.730-01	.840+01	.800-06	.100-03	.400-03	.160-00			ORCLIB	428
491131 IN20	.730-01					0.21			ORC001	333
491131 IN21	.730-01					0.29			ORC001	334
491131 IN22	.730-01					0.17			ORC001	335
491131 IN23	.730-01					0.17			ORC001	336
491141 IN 1	.490+02	.480+02	.200-02	.250-00	.100+01	.970-00			ORCLIB	429
491141 IN 3	.490+02	.600+02	.800-04	.100-01	.400-01	.930-00			ORCLIB	430
491141 IN 4	.490+02	.580+02	.280-03	.400-01	.140-00	.940-00			ORCLIB	431
491141 IN 5	.490+02	.480+02	.400-04	.500-02	.200-01	.930-00			ORCLIB	432
491141 IN 6	.490+02	.570+02	.340-03	.400-01	.170-00	.450+01			ORCLIB	433
491141 IN 8						.940+00			ORCLIB	434
491141 IN12	.490+02	.670+02	.360-03	.500-01	.180-00	.900-00			ORCLIB	435
491141 IN16	.490+02	.840+01	.800-06	.100-03	.400-03	.920-00			ORCLIB	436
491141 IN20	.490+02					0.94			ORC001	337
491141 IN21	.490+02					0.97			ORC001	338
491141 IN22	.490+02					0.93			ORC001	339
491141 IN23	.490+02					0.93			ORC001	340
49115 IN 1	.220+18	.480+02	.200-02	.250-00	.100+01	.170-00			ORCLIB	437
49115 IN 3	.220+18	.600+02	.800-04	.100-01	.400-01	.170-00			ORCLIB	438
49115 IN 4	.220+18	.580+02	.280-03	.400-01	.140-00	.170-00			ORCLIB	439

49115	IN 5	.220+18	.480+02	.400-04	.500-02	.200-01	.170-00	ORGLIB	440
49115	IN 6	.220+18	.570+02	.340-03	.400-01	.170-00	.250-00	ORGLIB	441
49115	IN 8						.170+00	ORGLIB	442
49115	IN 12	.220+18	.670+02	.360-03	.500-01	.180-00	.170-00	ORGLIB	443
49115	IN 16	.220+18	.840+01	.800-06	.170-03	.400-03	.170-00	ORGLIB	444
49115	IN 20	.220+18					0.17	ORC001	341
49115	IN 21	.220+18					0.17	ORC001	342
49115	IN 22	.220+18					0.17	ORC001	343
49115	IN 23	.220+18					0.17	ORC001	344
49115	IN 1	.190-00	.480+02	.200-02	.250-00	.100+01	.260-00	ORGLIB	445
49115	IN 3	.190-00	.600+02	.800-04	.100-01	.400-01	.190-00	ORGLIB	446
49115	IN 4	.190-00	.580+02	.280-03	.400-01	.140-00	.200-00	ORGLIB	447
49115	IN 5	.190-00	.480+02	.400-04	.500-02	.200-01	.190-00	ORGLIB	448
49115	IN 6	.190-00	.570+02	.340-03	.400-01	.170-00	.740-00	ORGLIB	449
49115	IN 8						.773-18, 39-16, 39-15	ORGLIB	450
49115	IN 12	.190-00	.670+02	.360-03	.500-01	.180-00	.140-00	ORGLIB	451
49115	IN 16	.190-00	.840+01	.800-06	.100-03	.400-03	.160-00	ORGLIB	452
49115	IN 20	.190-00					0.20	ORC001	345
49115	IN 21	.190-00					0.26	ORC001	346
49115	IN 22	.190-00					0.18	ORC001	347
49115	IN 23	.190-00					0.18	ORC001	348
50113	SN 1	.112+03	.350+02	.500-01	.280-00	.100+01	.320-00	ORGLIB	453
50113	SN 4	.112+03	.700+02	.500-03	.280-02	.100-01	.230-00	ORGLIB	454
50113	SN 6	.112+03	.100+03	.200-01	.800-01	.300-01	.700-00	ORGLIB	455
50113	SN 8						.220-00, 23-00, 23-00	ORGLIB	456
50113	SN 15	.112+03	.350+02	.800-04	.440-03	.160-02	.160-00	ORGLIB	457
50113	SN 16	.112+03	.700+02	.500-05	.280-04	.100-03	.160-00	ORGLIB	458
50113	SN 20	.112+03					0.024	ORC001	349
50113	SN 21	.112+03					0.028	ORC001	350
50113	SN 22	.112+03					0.018	ORC001	351
50113	SN 23	.112+03					0.018	ORC001	352
50125	SN 1	.950+01	.350+02	.500-01	.280-00	.100+01	.940-00	ORGLIB	459
50125	SN 4	.950+01	.700+02	.500-03	.280-02	.100-01	.940-00	ORGLIB	460
50125	SN 6	.950+01	.100+03	.200-01	.800-02	.300-00	.480+01	ORGLIB	461
50125	SN 8						.930-00, 94-00, 10+01	ORGLIB	462
50125	SN 15	.950+01	.350+02	.800-04	.440-03	.160-02	.940-00	ORGLIB	463
50125	SN 16	.950+01	.700+02	.500-05	.280-04	.100-03	.930-00	ORGLIB	464
50125	SN 20	.950+01					0.93	ORC001	353
50125	SN 21	.950+01					0.93	ORC001	354
50125	SN 22	.950+01					0.93	ORC001	355
50125	SN 23	.950+01					0.93	ORC001	356
50126	SN 1	3.65E7	35.	.05	.28	1.	1.3	ORGLIB	465
50126	SN 4	3.65E7	70.	.0005	.0028	.0016	1.1	ORGLIB	466
50126	SN 6	3.65E7	100.	.02	.08	.3	4.	ORGLIB	467
50126	SN 8	3.65E7					1.1 1.1 1.1	ORGLIB	468
50126	SN 16	3.65E7	70.	6.E-6	2.8E-5	.0001	.38	ORGLIB	469
50126	SN 20	.365+08					1.1	ORC001	357
50126	SN 21	.365+08					1.3	ORC001	358
50126	SN 22	.365+08					0.2	ORC001	359
50126	SN 23	.365+08					0.2	ORC001	360
51122	SR 1	.280+01	.380+02	.300-01	.270-00	.100+01	.820-00	ORGLIB	471
51122	SR 4	.280+01	.380+02	.600-04	.500-03	.200-02	.670-00	ORGLIB	472
51122	SR 6	.280+01	.100+03	.300-02	.300-01	.100-01	.270+01	ORGLIB	473
51122	SR 8	.280+01	.100+03	.900-03	.800-02	.300-01	.670-00	ORGLIB	474
51122	SR 16	.280+01	.400+01	.900-06	.800-05	.300-04	.590-00	ORGLIB	475
51122	SR 20	.280+01					0.67	ORC001	361
51122	SR 21	.280+01					0.82	ORC001	362
51122	SR 22	.280+01					0.61	ORC001	363
51122	SR 23	.280+01					0.61	ORC001	364
51124	SR 1	.600+02	.380+02	.300-01	.270-00	.100+01	.160+01	ORGLIB	476

51124	SA 4	.600+02	.380+02	.600-04	.500-03	.200-02	.920-00	ORCLIA	477
51124	SA A	.600+02	.100+03	.300-02	.300-01	.100+00	.230+01	ORCLIA	478
51124	SA B	.600+02	.100+03	.900-03	.800-02	.300-01	.920-00	ORCLIA	479
51124	SA16	.600+02	.400+01	.900-06	.800-05	.300-04	.570-00	ORCLIA	480
51124	SA20	.600+02					0.92	ORCLIA	365
51124	SA21	.600+02					1.6	ORCLIA	366
51124	SA22	.600+02					0.68	ORCLIA	367
51124	SA23	.600+02					0.68	ORCLIA	368
51125	SB 1	0.877+3	380.	.03	.27	1.0	0.36	6/8/76	2
51125	SB 4	0.877+3	380.	.600-4	.500-3	.200-2	0.24	6/8/76	3
51125	SB 6	0.877+3	1000.	.003	.03	.1	0.64	6/8/76	4
51125	SA A						.211-00, .23-00, .26-00	ORCLIA	484
51125	SA16	.877+03	.400+01	.900-06	.800-05	.300-04	.150-00	ORCLIA	485
51125	SA20	.877+03					0.21	ORCLIA	369
51125	SA21	0.877+3					0.34	6/9/76	5
51125	SA22	0.877+3					0.16	6/9/76	6
51125	SA23	0.877+3					0.16	6/9/76	7
51126	SA 1	12.4	38.	.03	.27	1.	1.4	ORCLIA	486
51126	SA 4	12.4	78.	6.E-5	5.E-4	.002	.96	ORCLIA	487
51126	SA 6	12.4	100.	.003	.03	.1	3.3	ORCLIA	488
51126	SA16	12.4					.96	ORCLIA	489
51126	SA20	12.4	4.	9.E-7	8.E-6	.00003	.7	ORCLIA	490
51126	SA21	.124+02					0.96	ORCLIA	373
51126	SA22	.124+02					1.4	ORCLIA	374
51126	SA23	.124					0.78	ORCLIA	375
521251TE 1		.580+02	.150+02	.250-00	.380-00	.100+01	.150-00	ORCLIA	492
521251TE 3		.580+02	.300+02	.200-01	.300-01	.700-01	.140-00	ORCLIA	493
521251TE 4		.580+02	.300+02	.100-01	.200-01	.500-01	.140-00	ORCLIA	494
521251TE 5		.580+02	.300+02	.250-02	.380-02	.100-01	.140-00	ORCLIA	495
521251TE 6		.580+02	.300+02	.230-01	.340-01	.900-01	.510-00	ORCLIA	496
521251TE 8							.140+00	ORCLIA	497
521251TE10		.580+02	.300+02	.750-03	.110-02	.300-02	.110+00	ORCLIA	498
521251TE16		.580+02	.900+01	.250-03	.380-03	.300-00	.110+00	ORCLIA	499
521251TE20		.580+02					0.14	ORCLIA	376
521251TE21		.580+02					0.15	ORCLIA	377
521251TE22		.580+02					0.13	ORCLIA	378
521251TE23		.580+02					0.13	ORCLIA	379
52127 TE 1		.390-00	.150+02	.250-00	.380-00	.100+01	.240-00	ORCLIA	500
52127 TE 3		.390-00	.300+02	.200-01	.300-01	.700-01	.240-00	ORCLIA	501
52127 TE 4		.390-00	.300+02	.100-01	.200-01	.500-01	.240-00	ORCLIA	502
52127 TE 5		.390-00	.300+02	.250-02	.380-02	.100-01	.240-00	ORCLIA	503
52127 TE 6		.390-00	.300+02	.230-01	.340-01	.900-01	.120+01	ORCLIA	504
52127 TE A							.240+00	ORCLIA	505
52127 TE10		.390-00	.300+02	.750-03	.110-02	.300-02	.240-00	ORCLIA	506
52127 TE16		.390-00	.900+01	.250-03	.380-03	.300-00	.240-00	ORCLIA	507
52127 TE20		.390-00					0.24	ORCLIA	380
52127 TE21		.390-00					0.24	ORCLIA	381
52127 TE22		.390-00					0.24	ORCLIA	382
52127 TE23		.390-00					0.24	ORCLIA	383
521271TE 1		.105+03	.150+02	.250-00	.380-00	.100+01	.320-00	ORCLIA	508
521271TE 3		.105+03	.300+02	.200-01	.300-01	.700-01	.320-00	ORCLIA	509
521271TE 4		.105+03	.300+02	.100-01	.200-01	.500-01	.320-00	ORCLIA	510
521271TE 5		.105+03	.300+02	.250-02	.380-02	.100-01	.320-00	ORCLIA	511
521271TE 6		.105+03	.300+02	.230-01	.340-01	.900-01	.150+01	ORCLIA	512
521271TE A							.256-00, .32-00, .32-00	ORCLIA	513
521271TE10		.105+03	.300+02	.750-03	.110-02	.300-02	.310-00	ORCLIA	514
521271TE16		.105+03	.900+01	.250-03	.380-03	.300-00	.300-00	ORCLIA	515
521271TE20		.105+03					0.083	ORCLIA	384
521271TE21		.105+03					0.089	ORCLIA	385

521271TE22	.105+03					0.076	ORC001	386
521271TE23	.105+03					0.076	ORC001	387
52129 TE 1	.510-01	.150+02	.250-00	.380-00	.100+01	.980-00	ORCLIB	516
52129 TE 3	.510-01	.300+02	.200-01	.300-01	.700-01	.680-00	ORCLIB	517
52129 TE 4	.510-01	.300+02	.100-01	.200-01	.500-01	.730-00	ORCLIB	518
52129 TE 5	.510-01	.300+02	.250-02	.380-02	.100-01	.680-00	ORCLIB	519
52129 TE 6	.510-01	.300+02	.230-01	.340-01	.900-01	.280+01	ORCLIB	520
52129 TE 8						.730-00,73-00,73-00	ORCLIB	521
52129 TE10	.510-01	.300+02	.750-03	.110-02	.300-02	.600-00	ORCLIB	522
52129 TE16	.510-01	.900+01	.250-03	.380-03	.300-00	.600-00	ORCLIB	523
52129 TE20	.510-01					0.73	ORC001	388
52129 TE21	.510-01					0.98	ORC001	389
52129 TE22	.510-01					0.64	ORC001	390
52129 TE23	.510-01					0.64	ORC001	391
521291TE 1	.330+02	.150+02	.250-00	.380-00	.100+01	.110+01	ORCLIB	524
521291TE 3	.330+02	.300+02	.200-01	.300-01	.700-01	.780-00	ORCLIB	525
521291TE 4	.330+02	.300+02	.100-01	.200-01	.500-01	.830-00	ORCLIB	526
521291TE 5	.330+02	.300+02	.250-02	.380-02	.100-01	.780-00	ORCLIB	527
521291TE 6	.330+02	.300+02	.230-01	.340-01	.900-01	.320+01	ORCLIB	528
521291TE 8						.795-00,83-00,83-00	ORCLIB	529
521291TE10	.330+02	.300+02	.750-03	.110-02	.300-02	.690-00	ORCLIB	530
521291TE16	.330+02	.900+01	.250-03	.380-03	.300-00	.680-00	ORCLIB	531
521291TE20	.330+02					0.10	ORC001	392
521291TE21	.330+02					0.11	ORC001	393
521291TE22	.330+02					0.093	ORC001	394
521291TE23	.330+02					0.093	ORC001	395
521311TE 1	.125+01	.150+02	.250-00	.380-00	.100+01	.160+01	ORCLIB	532
521311TE 3	.125+01	.300+02	.200-01	.300-01	.700-01	.810-00	ORCLIB	533
521311TE 4	.125+01	.300+02	.100-01	.200-01	.500-01	.970-00	ORCLIB	534
521311TE 5	.125+01	.300+02	.250-02	.380-02	.100-01	.800-00	ORCLIB	535
521311TE 6	.125+01	.300+02	.230-01	.340-01	.900-01	.260+01	ORCLIB	536
521311TE 8						.763-00,99-00,10+01	ORCLIB	537
521311TE16	.125+01	.900+01	.250-03	.380-03	.300-00	.690-00	ORCLIB	538
521311TE20	.125+01					0.73	ORC001	396
521311TE21	.125+01					1.2	ORC001	397
521311TE22	.125+01					0.55	ORC001	398
521311TE23	.125+01					0.55	ORC001	399
52132 TE 1	.320+01	.150+02	.250-00	.380-00	.100+01	.190+01	ORCLIB	539
52132 TE 3	.320+01	.300+02	.200-01	.300-01	.700-01	.960-00	ORCLIB	540
52132 TE 4	.320+01	.300+02	.100-01	.200-01	.500-01	.110+01	ORCLIB	541
52132 TE 5	.320+01	.300+02	.250-02	.380-02	.100-01	.960-00	ORCLIB	542
52132 TE 6	.320+01	.300+02	.230-01	.340-01	.900-01	.310+01	ORCLIB	543
52132 TE 8						.104+01,11+01,11+01	ORCLIB	544
52132 TE10	.320+01	.300+02	.750-03	.110-02	.300-02	.730-00	ORCLIB	545
52132 TE16	.320+01	.900+01	.250-03	.380-03	.300-00	.160-00	ORCLIB	546
52132 TE20	.125+01					0.13	ORC001	400
52132 TE21	.125+01					0.21	ORC001	401
52132 TE22	.125+01					0.10	ORC001	402
52132 TE23	.125+01					0.10	ORC001	403
53125 I 1	60.2	.138+03	1.	.75	1.	.053	I125	1
53125 I 8	60.2					.028	I125	2
53125 I16	60.2	.138+03	.3	.23	.3	.024	I125	3
53125 I20	60.2					.031	I125	4
53125 I21	60.2					.034	I125	5
53125 I22	60.2					.027	I125	6
53125 I23	60.2					.025	I125	7
53126 I 1	.133+02	.138+03	.100+01	.750-00	.100+01	.230-00	ORCLIB	547
53126 I 8						.180+01	ORCLIB	548
53126 I16	.133+02	.138+03	.300-00	.230-00	.300-00	.160-00	ORCLIB	549
53126 I20	.133+02					0.18	ORC001	404

53126	121	.133+02						0.23	ORC001	405
53126	122	.133+02						0.17	ORC001	406
53126	123	.133+02						0.17	ORC001	407
53129	1 1	.630+10	.138+03	.100+01	.750-00	.100+01	.890-01		ORCLIB	550
53129	1 3	.630+10	.700+01	.400-01	.300-01	.400-01	.210-09		ORCLIB	551
53129	1 4	.630+10	.700+01	.120+00	.900-01	.120+00	.460-09		ORCLIB	552
53129	1 5	.630+10	.700+01	.500-02	.380-02	.500-02	.170-09		ORCLIB	553
53129	1 6	.630+10	.140+02	.700-01	.530-01	.700-01	.960-10		ORCLIB	554
53129	1 8						.820-01		ORCLIB	555
53129	110	.630+10	.700+01	.500-02	.380-02	.500-02	.150-09		ORCLIB	556
53129	116	.630+10	.138+03	.300-00	.230-00	.300-00	.680-01		ORCLIB	557
53129	120	.630+10					0.082		ORC001	408
53129	121	.630+10					0.089		ORC001	409
53129	122	.630+10					0.073		ORC001	410
53129	123	.630+10					0.073		ORC001	411
53131	1 1	.805+01	.138+03	.100+01	.750-00	.100+01	.440-00		ORCLIB	558
53131	1 3	8.05	7.	.04	.03	0.04	0.27		6/9/76	8
53131	1 4	8.05	7.	.12	.09	.12	0.30		6/9/76	9
53131	1 5	8.05	7.	.005	.0038	.005	0.27		6/9/76	10
53131	1 6	8.05	14.	.07	.053	.07	1.0		6/9/76	11
53131	1 8						.300+00		ORCLIB	559
53131	116	.805+01	.138+03	.300-00	.230-00	.300-00	.230-00		ORCLIB	560
53131	120	.805+01					0.30		ORC001	412
53131	121	.805+01					0.44		ORC001	413
53131	122	.805+01					0.25		ORC001	414
53131	123	.805+01					0.25		ORC001	415
53132	1 1	.970-01	.138+03	.100+01	.750-00	.100+01	.170+01		ORCLIB	561
53132	1 3	.970-01	.700+01	.400-01	.300-01	.400-01	.850-00		ORCLIB	562
53132	1 4	.970-01	.700+01	.120+00	.900-01	.120+00	.990-00		ORCLIB	563
53132	1 5	.970-01	.700+01	.500-02	.380-02	.500-02	.850-00		ORCLIB	564
53132	1 6	.970-01	.140+02	.700-01	.530-01	.700-01	.270+01		ORCLIB	565
53132	1 8						.100+00		ORCLIB	566
53132	110	.970-01	.700+01	.500-02	.380-02	.500-02	.640-00		ORCLIB	567
53132	116	.970-01	.138+03	.300-00	.230-00	.300-00	.650-00		ORCLIB	568
53132	120	.970-01					1.0		ORC001	416
53132	121	.970-01					1.7		ORC001	417
53132	122	.970-01					0.76		ORC001	418
53132	123	.970-01					0.76		ORC001	419
53133	1 1	.870-00	.138+03	.100+01	.750-00	.100+01	.840-00		ORCLIB	569
53133	1 8						.666-00	.78-00 .80-00	ORCLIB	570
53133	116	.870-00	.138+03	.300-00	.230-00	.300-00	.540-00		ORCLIB	571
53133	120	.870-00					0.64		ORC001	420
53133	121	.870-00					0.84		ORC001	421
53133	122	.870-00					0.57		ORC001	422
53133	123	.870-00					0.57		ORC001	423
53134	1 1	.360-01	.138+03	.100+01	.750-00	.100+01	.150+01		ORCLIB	572
53134	1 8						.110+01		ORCLIB	573
53134	116	.360-01	.138+03	.300-00	.230-00	.300-00	.820-00		ORCLIB	574
53134	120	.360-01					1.1		ORC001	424
53134	121	.360-01					1.5		ORC001	425
53134	122	.360-01					0.90		ORC001	426
53134	123	.360-01					0.90		ORC001	427
53135	1 1	.280-00	.138+03	.100+01	.750-00	.100+01	.130+01		ORCLIB	575
53135	1 8						.990-00	.11+01 .11+01	ORCLIB	576
53135	116	.280-00	.138+03	.300-00	.230-00	.300-00	.520-00		ORCLIB	577
53135	120	.280-00					0.70		ORC001	428
53135	121	.280-00					0.12		ORC001	429
53135	122	.280-00					0.54		ORC001	430
53135	123	.280-00					0.54		ORC001	431
55131	CS 1	.100+02	.700+02	.100+01	.750-00	.100+01	.290-01		ORCLIB	578

55131	CS 3	.100+02	.420+02	.100-01	.750-02	.100-01	.210-01	ORGLIA	579
55131	CS 4	.100+02	.900+02	.700-01	.500-01	.700-01	.240-01	ORGLIA	580
55131	CS 5	.100+02	.980+02	.500-02	.380-02	.500-02	.210-01	ORGLIA	581
55131	CS 6	.100+02	.140+03	.400-01	.300-01	.400-01	.170-01	ORGLIA	582
55131	CS 8	.100+02	.140+03	.300-02	.230-02	.300-02	.240-01	ORGLIA	583
55131	CS14	.100+02	.140+03	.400-00	.300-00	.400-00	.290-01	ORGLIA	584
55131	CS20	.100+02					0.024	ORGLIA	432
55131	CS21	.100+02					0.029	ORGLIA	433
55131	CS22	.100+02					0.017	ORGLIA	434
55131	CS23	.100+02					0.017	ORGLIA	435
55134	CS 1	.840+03	.700+02	.100+01	.750-00	.100+01	.110+01	ORGLIA	585
55134	CS 3	.840+03	.420+02	.100-01	.750-02	.100-01	.460-00	ORGLIA	586
55134	CS 4	.840+03	.900+02	.700-01	.500-01	.700-01	.570-00	ORGLIA	587
55134	CS 5	.840+03	.980+02	.500-02	.380-02	.500-02	.460-00	ORGLIA	588
55134	CS 6	.840+03	.140+03	.400-01	.300-01	.400-01	.990-00	ORGLIA	589
55134	CS 8	.840+03	.140+03	.300-02	.230-02	.300-02	.570-00	ORGLIA	590
55134	CS14	.840+03	.140+03	.400-00	.300-00	.400-00	.110+01	ORGLIA	591
55134	CS20	.840+03					0.57	ORGLIA	436
55134	CS21	.840+03					1.1	ORGLIA	437
55134	CS22	.840+03					0.38	ORGLIA	438
55134	CS23	.840+03					0.38	ORGLIA	439
55134	CS 1	.130-00	.700+02	.100+01	.750-00	.100+01	.190-00	ORGLIA	592
55134	CS 3	.130-00	.420+02	.100-01	.750-02	.100-01	.110+00	ORGLIA	593
55134	CS 4	.130-00	.900+02	.700-01	.500-01	.700-01	.150-00	ORGLIA	594
55134	CS 5	.130-00	.980+02	.500-02	.380-02	.500-02	.130-00	ORGLIA	595
55134	CS 6	.130-00	.140+03	.400-01	.300-01	.400-01	.490-00	ORGLIA	596
55134	CS 8	.130-00					.927-01, 12+00, 30-00	ORGLIA	597
55134	CS14	.130-00	.140+03	.400-00	.300-00	.400-00	.260-00	ORGLIA	598
55134	CS20	.130-00					0.092	ORGLIA	440
55134	CS21	.130-00					0.011	ORGLIA	441
55134	CS22	.130-00					0.083	ORGLIA	442
55134	CS23	.130-00					0.083	ORGLIA	443
55135	CS 1	.110+10	.700+02	.100+01	.750-00	.100+01	.660-01	ORGLIA	599
55135	CS 3	.110+10	.420+02	.100-01	.750-02	.100-01	.660-01	ORGLIA	600
55135	CS 4	.110+10	.900+02	.700-01	.500-01	.700-01	.660-01	ORGLIA	601
55135	CS 5	.110+10	.980+02	.500-02	.380-02	.500-02	.660-01	ORGLIA	602
55135	CS 6	.110+10	.140+03	.400-01	.300-01	.400-01	.330-00	ORGLIA	603
55135	CS 8	.110+10	.140+03	.300-02	.230-02	.300-02	.660-01	ORGLIA	604
55135	CS14	.110+10	.140+03	.400-00	.300-00	.400-00	.660-01	ORGLIA	605
55135	CS20	.110+10					0.066	ORGLIA	444
55135	CS21	.110+10					0.066	ORGLIA	445
55135	CS22	.110+10					0.066	ORGLIA	446
55135	CS23	.110+10					0.066	ORGLIA	447
55136	CS 1	.130+02	.700+02	.100+01	.750-00	.100+01	.650-00	ORGLIA	606
55136	CS 3	.130+02	.420+02	.100-01	.750-02	.100-01	.290-00	ORGLIA	607
55136	CS 4	.130+02	.900+02	.700-01	.500-01	.700-01	.350-00	ORGLIA	608
55136	CS 5	.130+02	.980+02	.500-02	.380-02	.500-02	.290-00	ORGLIA	609
55136	CS 6	.130+02	.140+03	.400-01	.300-01	.400-01	.720-00	ORGLIA	610
55136	CS 8	.130+02	.140+03	.300-02	.230-02	.300-02	.350-00	ORGLIA	611
55136	CS14	.130+02	.140+03	.400-00	.300-00	.400-00	.650-00	ORGLIA	612
55136	CS20	.130+02					0.35	ORGLIA	448
55136	CS21	.130+02					0.65	ORGLIA	449
55136	CS22	.130+02					0.24	ORGLIA	450
55136	CS23	.130+02					0.24	ORGLIA	451
55137	CS 1	.110+05	.700+02	.100+01	.750-00	.100+01	.590-00	ORGLIA	613
55137	CS 3	.110+05	.420+02	.100-01	.750-02	.100-01	.370-00	ORGLIA	614
55137	CS 4	.110+05	.900+02	.700-01	.500-01	.700-01	.410-00	ORGLIA	615
55137	CS 5	.110+05	.980+02	.500-02	.380-02	.500-02	.370-00	ORGLIA	616
55137	CS 6	.110+05	.140+03	.400-01	.300-01	.400-01	.140+01	ORGLIA	617
55137	CS 8	.110+05	.140+03	.300-02	.230-02	.300-02	.410-00	ORGLIA	618

55137	CS14	.110+05	.140+03	.400-00	.300-00	.400-00	.590-00	ORCLIB	619
55137	CS20	.110+05					0.41	ORC001	452
55137	CS21	.110+05					0.59	ORC001	453
55137	CS22	.110+05					0.34	ORC001	454
55137	CS23	.110+05					0.34	ORC001	455
56131	BA 1	.116+02	.650+02	.500-01	.280-00	.100+01	.380-00	ORCLIB	620
56131	BA 3	.116+02	.850+01	.500-05	.280-04	.100-03	.140-00	ORCLIB	621
56131	BA 4	.116+02	.975+03	.300-04	.170-03	.600-03	.190-00	ORCLIB	622
56131	BA 5	.116+02	.130+02	.250-05	.140-04	.500-04	.140-00	ORCLIB	623
56131	BA 6	.116+02	.650+02	.350-01	.190-00	.700-00	.110+00	ORCLIB	624
56131	BA A						.172-00,19-00,19-00	ORCLIB	625
56131	BA14	.116+02	.200+04	.150-03	.830-03	.300-02	.380-00	ORCLIB	626
56131	BA20	.116+02					0.17	ORC001	456
56131	BA21	.116+02					0.35	ORC001	457
56131	BA22	.116+02					0.093	ORC001	458
56131	BA23	.116+02					0.093	ORC001	459
56140	BA 1	.128+02	.650+02	.500-01	.280-00	.100+01	.230+01	ORCLIB	627
56140	BA 3	.128+02	.850+01	.500-05	.280-04	.100-03	.120+01	ORCLIB	628
56140	BA 4	.128+02	.975+03	.300-04	.170-03	.600-03	.140+01	ORCLIB	629
56140	BA 5	.128+02	.130+02	.250-05	.140-04	.500-04	.120+01	ORCLIB	630
56140	BA 6	.128+02	.650+02	.350-00	.190-00	.700-00	.420+01	ORCLIB	631
56140	BA A						.751-00,14+01,14+01	ORCLIB	632
56140	BA14	.128+02	.200+04	.150-03	.830-03	.300-02	.230+01	ORCLIB	633
56140	BA20	.128+02					0.34	ORC001	460
56140	BA21	.128+02					0.40	ORC001	461
56140	BA22	.128+02					0.32	ORC001	462
56140	BA23	.128+02					0.32	ORC001	463
57140	LA 1	.168+01	.500+03	.100-03	.250-00	.100+01	.190+01	ORCLIB	634
57140	LA 4	.168+01	.400+03	.150-04	.400-01	.150-00	.110+01	ORCLIB	635
57140	LA 6	.168+01	.100+04	.400-04	.100+00	.400-00	.270+01	ORCLIB	636
57140	LA A						.110+01	ORCLIB	637
57140	LA20	.168+01					1.1	ORC001	464
57140	LA21	.168+01					1.9	ORC001	465
57140	LA22	.168+01					0.80	ORC001	466
57140	LA23	.168+01					0.80	ORC001	467
58141	CE 1	.320+02	.563+03	.100-03	.250-00	.100+01	.210-00	ORCLIB	638
58141	CE 3	.320+02	.563+03	.200-05	.500-02	.200-01	.180-00	ORCLIB	639
58141	CE 4	.320+02	.293+03	.250-04	.600-01	.250-00	.180-00	ORCLIB	640
58141	CE 6	.320+02	.150+04	.300-04	.750-01	.300-00	.810-00	ORCLIB	641
58141	CE A						.180+00	ORCLIB	642
58141	CE20	.320+02					0.18	ORC001	468
58141	CE21	.320+02					0.21	ORC001	469
58141	CE22	.320+02					0.17	ORC001	470
58141	CE23	.320+02					0.17	ORC001	471
58143	CE 1	.133+01	.563+03	.100-03	.250-00	.100+01	.970-00	ORCLIB	643
58143	CE 3	.133+01	.563+03	.200-05	.500-02	.200-01	.820-00	ORCLIB	644
58143	CE 4	.133+01	.293+03	.250-04	.600-01	.250-00	.850-00	ORCLIB	645
58143	CE 6	.133+01	.150+04	.300-04	.750-01	.300-00	.380+01	ORCLIB	646
58143	CE A						.562-00,79-00,85-00	ORCLIB	647
58143	CE20	.133+01					0.54	ORC001	472
58143	CE21	.133+01					0.66	ORC001	473
58143	CE22	.133+01					0.49	ORC001	474
58143	CE23	.133+01					0.49	ORC001	475
58144	CE 1	.290+03	.563+03	.100-03	.250-00	.100+01	.130+01	ORCLIB	648
58144	CE 3	.290+03	.563+03	.200-05	.500-02	.200-01	.130+01	ORCLIB	649
58144	CE 4	.290+03	.293+03	.250-04	.600-01	.250-00	.130+01	ORCLIB	650
58144	CE 6	.290+03	.150+04	.300-04	.750-01	.300-00	.630+01	ORCLIB	651
58144	CE A						.130+01,13+01,13+01	ORCLIB	652
58144	CE20	.290+03					1.3	ORC001	476
58144	CE21	.290+03					1.3	ORC001	477

5A144	CE22	.290+03				1.3	ORC001	478
5A144	CE23	.290+03				1.3	ORC001	479
5A142	PR 1	.800-00	.750+03	.100-03	.250-00	.100+01	.850-00	ORCLIA 653
5A142	PR 3	.800-00	.750+03	.200-05	.500-02	.200-01	.810-00	ORCLIA 654
5A142	PR 4	.800-00	.375+03	.200-04	.500-01	.200-00	.810-00	ORCLIA 655
5A142	PR 6	.800-00	.150+04	.400-04	.100+00	.400-00	.390+01	ORCLIA 656
5A142	PR 8						.810+00	ORCLIA 657
5A142	PR20	.800-00					0.81	ORC001 480
5A142	PR21	.800-00					0.85	ORC001 481
5A142	PR22	.800-00					0.80	ORC001 482
5A142	PR23	.800-00					0.80	ORC001 483
5A143	PR 1	.137+02	.750+02	.100-03	.250-00	.100+01	.320-00	ORCLIA 658
5A143	PR 3	.137+02	.750+03	.200-05	.500-02	.200-01	.320-00	ORCLIA 659
5A143	PR 4	.137+02	.375+03	.200-04	.500-01	.200-00	.320-00	ORCLIA 660
5A143	PR 6	.137+02	.150+04	.400-04	.100+00	.400-00	.160+01	ORCLIA 661
5A143	PR 8						.320+00	ORCLIA 662
5A143	PR20	.137+02					0.32	ORC001 484
5A143	PR21	.137+02					0.32	ORC001 485
5A143	PR22	.137+02					0.32	ORC001 486
5A143	PR23	.137+02					0.32	ORC001 487
6A144	ND 1	.730+08	.656+03	.100-03	.250-00	.100+01	.200+02	ORCLIA 663
6A144	ND 3	.730+08	.656+03	.500-05	.100-01	.500-01	.200+02	ORCLIA 664
6A144	ND 4	.730+08	.131+03	.500-04	.130-00	.500-00	.200+02	ORCLIA 665
6A144	ND 6	.730+08	.150+04	.350-04	.900-01	.350-00	.100+03	ORCLIA 666
6A144	ND 8						.200+02	ORCLIA 667
6A144	ND20	.730+08					0.19	ORC001 488
6A144	ND21	.730+08					0.19	ORC001 489
6A144	ND22	.730+08					0.19	ORC001 490
6A144	ND23	.730+08					0.19	ORC001 491
6A147	ND 1	.113+02	.656+03	.100-03	.250-00	.100+01	.400-00	ORCLIA 668
6A147	ND 3	.113+02	.656+03	.500-05	.100-01	.500-01	.310-00	ORCLIA 669
6A147	ND 4	.113+02	.131+03	.500-04	.130-00	.500-00	.320-00	ORCLIA 670
6A147	ND 6	.113+02	.150+04	.350-04	.900-01	.350-00	.140+01	ORCLIA 671
6A147	ND 8						.290-00, .29-00, .31-00	ORCLIA 672
6A147	ND20	.113+02					0.29	ORC001 492
6A147	ND21	.113+02					0.37	ORC001 493
6A147	ND22	.113+02					0.26	ORC001 494
6A147	ND23	.113+02					0.26	ORC001 495
6A149	ND 1	.830-01	.656+03	.100-03	.250-00	.100+01	.110+01	ORCLIA 673
6A149	ND 3	.830-01	.656+03	.500-05	.100-01	.500-01	.970-00	ORCLIA 674
6A149	ND 4	.830-01	.131+03	.500-04	.130-00	.500-00	.990-00	ORCLIA 675
6A149	ND 6	.830-01	.150+04	.350-04	.900-01	.350-00	.470+01	ORCLIA 676
6A149	ND 8						.688-00, .97-00, .99-00	ORCLIA 677
6A149	ND20	.830-01					0.55	ORC001 496
6A149	ND21	.830-01					0.55	ORC001 497
6A149	ND22	.830-01					0.55	ORC001 498
6A149	ND23	.830-01					0.55	ORC001 499
61147	PM 1	.920+03	.656+03	.100-03	.250-00	.100+01	.690-01	ORCLIA 678
61147	PM 3	.920+03	.656+03	.200-05	.500-02	.200-01	.690-01	ORCLIA 679
61147	PM 4	.920+03	.656+03	.600-05	.200-01	.600-01	.690-01	ORCLIA 680
61147	PM 6	.920+03	.150+04	.350-04	.900-01	.350-00	.350-00	ORCLIA 681
61147	PM 8						.690-01, .69-01, .69-01	ORCLIA 682
61147	PM20	.920+03					0.069	ORC001 500
61147	PM21	.920+03					0.069	ORC001 501
61147	PM22	.920+03					0.069	ORC001 502
61147	PM23	.920+03					0.069	ORC001 503
61149	PM 1	.220+01	.656+03	.100-03	.250-00	.100+01	.540-00	ORCLIA 683
61149	PM 3	.220+01	.656+03	.200-05	.500-02	.200-01	.420-00	ORCLIA 684
61149	PM 4	.220+01	.656+03	.600-05	.200-01	.600-01	.440-00	ORCLIA 685
61149	PM 6	.220+01	.150+04	.350-04	.900-01	.350-00	.190+01	ORCLIA 686

61149	PM 8							.440+00	ORGLIA	687
61149	PM20	.220+01						0.44	ORC001	504
61149	PM21	.220+01						0.54	ORC001	505
61149	PM22	.220+01						0.41	ORC001	506
61149	PM23	.220+01						0.41	ORC001	507
62147	SM 1	.480+14	.656+03	.100-03	.250-00	.100+01	.230+02		ORGLIB	688
62147	SM 3	.480+14	.656+03	.200-05	.500-02	.200-01	.230+02		ORGLIA	689
62147	SM 4	.480+14	.187+03	.350-04	.900-01	.350-00	.230+02		ORGLIA	690
62147	SM 6	.480+14	.150+04	.350-04	.900-01	.350-00	.115+03		ORGLIA	691
62147	SM 8						.230+02		ORGLIB	692
62147	SM20	.480+14					0.22		ORC001	508
62147	SM21	.480+14					0.22		ORC001	509
62147	SM22	.480+14					0.22		ORC001	510
62147	SM23	.480+14					0.22		ORC001	511
62151	SM 1	.370+05	.656+03	.100-03	.250-00	.100+01	.420-01		ORGLIB	693
62151	SM 3	.370+05	.656+03	.200-05	.500-02	.200-01	.420-01		ORGLIA	694
62151	SM 4	.370+05	.187+03	.350-04	.900-01	.350-00	.420-01		ORGLIA	695
62151	SM 6	.370+05	.150+04	.350-04	.900-01	.350-00	.130-00		ORGLIB	696
62151	SM 8						.420-01		ORGLIB	697
62151	SM20	.370+05					0.042		ORC001	512
62151	SM21	.370+05					0.042		ORC001	513
62151	SM22	.370+05					0.041		ORC001	514
62151	SM23	.370+05					0.041		ORC001	515
62153	SM 1	.196+01	.656+03	.100-03	.250-00	.100+01	.300-00		ORGLIA	698
62153	SM 3	.196+01	.656+03	.200-05	.500-02	.200-01	.250-00		ORGLIA	699
62153	SM 4	.196+01	.187+03	.350-04	.900-01	.350-00	.260-00		ORGLIB	700
62153	SM 6	.196+01	.150+04	.350-04	.900-01	.350-00	.110+01		ORGLIB	701
62153	SM 8						.260+00		ORGLIB	702
62153	SM20	.196+01					0.26		ORC001	516
62153	SM21	.196+01					0.30		ORC001	517
62153	SM22	.196+01					0.24		ORC001	518
62153	SM23	.196+01					0.24		ORC001	519
63152	EU 1	.470+04	.635+03	.100-03	.250-00	.100+01	.660-00		ORGLIB	703
63152	EU 3	.470+04	.148+04	.300-05	.750-02	.300-01	.250-00		ORGLIA	704
63152	EU 4	.470+04	.127+03	.250-04	.600-01	.250-00	.330-00		ORGLIB	705
63152	EU 6	.470+04	.150+04	.360-04	.900-01	.360-00	.450-00		ORGLIB	706
63152	EU 8						.330+00		ORGLIB	707
63152	EU20	.470+04					0.71		ORC001	520
63152	EU21	.470+04					0.88		ORC001	521
63152	EU22	.470+04					0.65		ORC001	522
63152	EU23	.470+04					0.65		ORC001	523
63154	EU 1	.580+04	.635+03	.100-03	.250-00	.100+01	.130+01		ORGLIA	708
63154	EU 3	.580+04	.148+04	.300-05	.750-02	.300-01	.760-00		ORGLIA	709
63154	EU 4	.580+04	.127+03	.250-04	.600-01	.250-00	.860-00		ORGLIA	710
63154	EU 6	.580+04	.150+04	.360-04	.900-01	.360-00	.270+01		ORGLIB	711
63154	EU 8						.860+00		ORGLIB	712
63154	EU20	.580+04					0.86		ORC001	524
63154	EU21	.580+04					1.3		ORC001	525
63154	EU22	.580+04					0.69		ORC001	526
63154	EU23	.580+04					0.69		ORC001	527
63155	EU 1	.621+03	.635+03	.100-03	.250-00	.100+01	.160-00		ORGLIA	713
63155	EU 3	.621+03	.148+04	.300-05	.750-02	.300-01	.830-01		ORGLIA	714
63155	EU 4	.621+03	.127+03	.250-04	.600-01	.250-00	.950-01		ORGLIB	715
63155	EU 6	.621+03	.150+04	.360-04	.900-01	.360-00	.280-00		ORGLIB	716
63155	EU 8						.950-01		ORGLIA	717
63155	EU20	.621+03					0.095		ORC001	528
63155	EU21	.621+03					0.16		ORC001	529
63155	EU22	.621+03					0.075		ORC001	530
63155	EU23	.621+03					0.075		ORC001	531
64153	GD 1	.236+03	.550+03	.100-03	.250-00	.100+01	.170-00		ORGLIA	718

64153	GD 4	.236+03	.460+03	.120-04	.300-01	.120+00	.990-01	ORCLIA	719
64153	GD 6	.236+03	.100+04	.450+04	.110+00	.450-00	.230-00	ORCLIA	720
64153	GD 8						.990-01	ORCLIA	721
64153	GD20	.236+03					0.099	ORCLIA	532
64153	GD21	.236+03					0.17	ORCLIA	533
64153	GD22	.236+03					0.072	ORCLIA	534
64153	GD23	.236+03					0.072	ORCLIA	535
64159	GD 1	.750-00	.550+03	.100-03	.250-00	.100+01	.360-00	ORCLIA	722
64159	GD 4	.750-00	.460+03	.120-04	.300-01	.120+00	.330-00	ORCLIA	723
64159	GD 6	.750-00	.100+04	.450-04	.110+00	.450-00	.750-00	ORCLIA	724
64159	GD 8						.330+00	ORCLIA	725
64159	GD20	.750-00					0.33	ORCLIA	536
64159	GD21	.750-00					0.36	ORCLIA	537
64159	GD22	.750-00					0.32	ORCLIA	538
64159	GD23	.750-00					0.32	ORCLIA	539
65160	TR 1	.730+02	.670+03	.100-03	.250-00	.100+01	.850-00	ORCLIA	726
65160	TR 3	.730+02	.700+03	.300-05	.750-02	.300-01	.400-00	ORCLIA	727
65160	TR 6	.730+02	.100+04	.600-04	.150-00	.600-00	.110+01	ORCLIA	728
65160	TR 8						.480+00	ORCLIA	729
65160	TR20	.730+02					0.48	ORCLIA	540
65160	TR21	.730+02					0.85	ORCLIA	541
65160	TR22	.730+02					0.34	ORCLIA	542
65160	TR23	.730+02					0.34	ORCLIA	543
66165	DY 1	.970-01	.700+03	.100-03	.250-00	.100+01	.510-00	ORCLIA	730
66165	DY 4	.970-01	.500+03	.600-05	.200-01	.600-01	.390-00	ORCLIA	731
66165	DY 6	.970-01	.100+04	.600-04	.150-00	.600-00	.150+01	ORCLIA	732
66165	DY 8						.390+00	ORCLIA	733
66165	DY20	.970-01					0.39	ORCLIA	544
66165	DY21	.970-01					0.51	ORCLIA	545
66165	DY22	.970-01					0.34	ORCLIA	546
66165	DY23	.970-01					0.34	ORCLIA	547
66166	DY 1	.340+01	.700+03	.100-03	.250-00	.100+01	.790-00	ORCLIA	734
66166	DY 4	.340+01	.500+03	.600-05	.200-01	.600-01	.780-00	ORCLIA	735
66166	DY 6	.340+01	.100+03	.600-04	.150-00	.600-00	.390+01	ORCLIA	736
66166	DY 8						.423-00, .77-00, .78-00	ORCLIA	737
66166	DY20	.340+01					0.094	ORCLIA	548
66166	DY21	.340+01					0.094	ORCLIA	549
66166	DY22	.340+01					0.094	ORCLIA	550
66166	DY23	.340+01					0.094	ORCLIA	551
67166	HO 1	.110+01	.750+03	.100-03	.250-00	.100+01	.700-00	ORCLIA	738
67166	HO 3	.110+01	.800+03	.200-05	.500-02	.200-01	.690-00	ORCLIA	739
67166	HO 4	.110+01	.875+03	.600-05	.200-01	.600-01	.690-00	ORCLIA	740
67166	HO 6	.110+01	.100+04	.640-04	.160-00	.640-00	.340+01	ORCLIA	741
67166	HO 8						.690+00	ORCLIA	742
67166	HO20	.110+01					0.69	ORCLIA	552
67166	HO21	.110+01					0.70	ORCLIA	553
67166	HO22	.110+01					0.69	ORCLIA	554
67166	HO23	.110+01					0.69	ORCLIA	555
671661	HO 1	4.3AF5	750.	.0001	.25	1.	.81	ORCLIA	743
671661	HO 3	4.3AF5	800.	2.E-6	.005	.02	.32	ORCLIA	744
671661	HO 4	4.3AF5	875.	6.E-6	.02	.06	.37	ORCLIA	745
671661	HO 6	4.3AF5	1000.	6.4E-5	.16	.64	.4	ORCLIA	746
671661	HO 8	4.3AF5					.37	ORCLIA	747
671661	HO20	.438+06					0.37	ORCLIA	556
671661	HO21	.438+06					0.81	ORCLIA	557
671661	HO22	.438+06					0.20	ORCLIA	558
671661	HO23	4.3AF5					.2	ORCLIA	1
68169	ER 1	.940+01	.650+03	.100-03	.250-00	.100+01	.370-00	ORCLIA	749
68169	ER 3	.940+01	.650+03	.200-05	.500-02	.200-01	.190-00	ORCLIA	750
68169	ER 4	.940+01	.433+03	.300-05	.750-02	.600-01	.220-00	ORCLIA	751

6A169	ER 6	.940+01	.100+04	.500-04	.150-00	.640-00	.580-00	ORCLIB	752
6A169	ER 8						.220+00	ORCLIB	753
6A169	ER20	.940+01					0.22	ORC001	559
6A169	ER21	.940+01					0.37	ORC001	560
6A169	ER22	.940+01					0.17	ORC001	561
6A169	ER23	.940+01					0.17	ORC001	562
6A171	ER 1	.310-00	.650+03	.100-03	.250-00	.100+01	.650-00	ORCLIB	754
6A171	ER 3	.310-00	.650+03	.200-05	.500-02	.200-01	.460-00	ORCLIB	755
6A171	ER 6	.310-00	.100+04	.600-04	.150-00	.600-00	.200+01	ORCLIB	756
6A171	ER 8						.400-00, .49-00, .50-00	ORCLIB	757
6A171	ER20	.310-00					0.49	ORC001	563
6A171	ER21	.310-00					0.64	ORC001	564
6A171	ER22	.310-00					0.43	ORC001	565
6A171	ER23	.310-00					0.43	ORC001	566
6Q170	TM 1	.127+03	.675+03	.100-03	.250-00	.100+01	.340-00	ORCLIB	758
6Q170	TM 3	.127+03	.335+03	.200-05	.500-02	.200-01	.340-00	ORCLIB	759
6Q170	TM 6	.127+03	.100+04	.650-04	.160-00	.650-00	.170+01	ORCLIB	760
6Q170	TM 8						.340+00	ORCLIB	761
6Q170	TM20	.127+03					0.34	ORC001	567
6Q170	TM21	.127+03					0.34	ORC001	568
6Q170	TM22	.127+03					0.34	ORC001	569
6Q170	TM23	.127+03					0.34	ORC001	570
6Q171	TM 1	.694+03	.675+03	.100-03	.250-00	.100+01	.300-01	ORCLIB	762
6Q171	TM 3	.694+03	.335+03	.200-05	.500-02	.200-01	.300-01	ORCLIB	763
6Q171	TM 6	.694+03	.100+04	.550-04	.160-00	.650-00	.150-00	ORCLIB	764
6Q171	TM 8						.300-01	ORCLIB	765
6Q171	TM20	.694+03					0.030	ORC001	571
6Q171	TM21	.694+03					0.030	ORC001	572
6Q171	TM22	.694+03					0.030	ORC001	573
6Q171	TM23	.694+03					0.030	ORC001	574
7Q175	YB 1	.410+01	.685+03	.100-03	.250-00	.100+01	.160-00	ORCLIB	766
7Q175	YB 3	.410+01	.685+03	.500-05	.130-01	.500-01	.150-00	ORCLIB	767
7Q175	YB 6	.410+01	.100+04	.580-04	.150-00	.580-00	.710-00	ORCLIB	768
7Q175	YB 8						.150+00	ORCLIB	769
7Q175	YB20	.410+01					0.15	ORC001	575
7Q175	YB21	.410+01					0.16	ORC001	576
7Q175	YB22	.410+01					0.15	ORC001	577
7Q175	YB23	.410+01					0.15	ORC001	578
71177	LU 1	.670+01	.750+03	.100-03	.250-00	.100+01	.170-00	ORCLIB	770
71177	LU 3	.670+01	.750+03	.100-05	.250-02	.100-01	.160-00	ORCLIB	771
71177	LU 6	.670+01	.100+04	.680-04	.170-00	.680-00	.760-00	ORCLIB	772
71177	LU 8						.160+00	ORCLIB	773
71177	LU20	.670+01					0.16	ORC001	579
71177	LU21	.670+01					0.17	ORC001	580
71177	LU22	.670+01					0.16	ORC001	581
71177	LU23	.670+01					0.16	ORC001	582
72181	HF 1	.460+02	.563+03	.100-03	.250-00	.100+01	.500-00	ORCLIB	774
72181	HF 3	.460+02	.563+03	.200-05	.500-02	.200-01	.250-00	ORCLIB	775
72181	HF 4	.460+02	.625+03	.450-04	.110+00	.450-00	.290-00	ORCLIB	776
72181	HF 5	.460+02	.350+03	.130-04	.300-01	.130-00	.250-00	ORCLIB	777
72181	HF 6	.460+02	.600+03	.150-04	.400-01	.150-00	.740-00	ORCLIB	778
72181	HF 8						.290+00	ORCLIB	779
72181	HF20	.460+02					0.29	ORC001	583
72181	HF21	.460+02					0.50	ORC001	584
72181	HF22	.460+02					0.22	ORC001	585
72181	HF23	.460+02					0.22	ORC001	586
73182	TA 1	.112+03	.240+03	.100-03	.250-00	.100+01	.110+01	ORCLIB	780
73182	TA 3	.112+03	.406+03	.300-05	.750-02	.300-01	.450-00	ORCLIB	781
73182	TA 4	.112+03	.400+03	.300-04	.800-01	.300-00	.560-00	ORCLIB	782
73182	TA 5	.112+03	.240+03	.100-05	.250-02	.100-01	.450-00	ORCLIB	783

73182	TA 6	.112+03	.300+03	.200-04	.500-01	.200-00	.100+01	ORCLIA	784
73182	TA A	.112+03					.560+00	ORCLIA	785
73182	TA20	.112+03					0.56	ORC001	587
73182	TA21	.112+03					1.1	ORC001	588
73182	TA22	.112+03					0.3A	ORC001	589
73182	TA23	.112+03					0.3A	ORC001	590
74181	W 1	.140+03	.100+01	.100+00	.300-00	.100+01	.200-00	ORCLIA	786
74181	W 4	.140+03	.400+01	.600-02	.200-01	.600-01	.670-01	ORCLIA	787
74181	W A	.140+03	.900+01	.700-02	.200-01	.700-01	.470-01	ORCLIA	788
74181	W A	.140+03					.970-01	ORCLIA	789
74181	W20	.140+03					0.0A7	ORC001	591
74181	W21	.140+03					0.20	ORC001	592
74181	W22	.140+03					0.047	ORC001	593
74181	W23	.140+03					0.047	ORC001	594
74185	W 1	.740+02	.100+01	.100+00	.300-00	.100+01	.140-00	ORCLIA	790
74185	W 4	.740+02	.400+01	.600-02	.200-01	.600-01	.140-00	ORCLIA	791
74185	W 6	.740+02	.900+01	.700-02	.200-01	.700-01	.6A0-00	ORCLIA	792
74185	W A	.740+02					.140+00	ORCLIA	793
74185	W20	.740+02					0.14	ORC001	595
74185	W21	.740+02					0.14	ORC001	596
74185	W22	.740+02					0.14	ORC001	597
74185	W23	.740+02					0.14	ORC001	598
74187	W 1	.100+01	.100+01	.100+00	.300-00	.100+01	.6A0-00	ORCLIA	794
74187	W 4	.100+01	.400+01	.600-02	.200-01	.600-01	.440-00	ORCLIA	795
74187	W 6	.100+01	.900+01	.700-02	.200-01	.700-01	.140+01	ORCLIA	796
74187	W A	.100+01					.440-00, .44-00, .44-00	ORCLIA	797
74187	W20	.100+01					0.44	ORC001	599
74187	W21	.100+01					0.68	ORC001	600
74187	W22	.100+01					0.36	ORC001	601
74187	W23	.100+01					0.36	ORC001	602
75183	RE 1	.730+02	.700+01	.500-00	.500-00	.100+01	.240-00	ORCLIA	798
75183	RE 4	.730+02	.140+02	.500-02	.500-02	.100-01	.100+00	ORCLIA	799
75183	RE 6	.730+02	.350+01	.500-02	.500-02	.100-01	.550-01	ORCLIA	800
75183	RE A	.730+02					.100+00	ORCLIA	801
75183	RE12	.730+02	.250+02	.130-00	.130-00	.250-00	.120+02	ORCLIA	802
75183	RE16	.730+02	.300+01	.350-02	.350-02	.700-02	.340-01	ORCLIA	803
75183	RE20	.730+02					0.10	ORC001	603
75183	RE21	.730+02					0.24	ORC001	604
75183	RE22	.730+02					0.055	ORC001	605
75183	RE23	.730+02					0.055	ORC001	606
75186	RE 1	.379+01	.700+01	.500-00	.500-00	.100+01	.380-00	ORCLIA	804
75186	RE 4	.379+01	.140+02	.500-02	.500-02	.100-01	.370-00	ORCLIA	805
75186	RE 6	.379+01	.350+01	.500-02	.500-02	.100-01	.1A0+01	ORCLIA	806
75186	RE A	.379+01					.370+00	ORCLIA	807
75186	RE12	.379+01	.250+02	.130-00	.130-00	.250-00	.360-00	ORCLIA	808
75186	RE16	.379+01	.300+01	.350-02	.350-02	.700-02	.370-00	ORCLIA	809
75186	RE20	.379+01					0.37	ORC001	607
75186	RE21	.379+01					0.3A	ORC001	608
75186	RE22	.379+01					0.36	ORC001	609
75186	RE23	.379+01					0.36	ORC001	610
75187	RE 1	.1A0+14	.700+01	.500-00	.500-00	.100+01	.120-01	ORCLIA	810
75187	RE 4	.1A0+14	.140+02	.500-02	.500-02	.100-01	.120-01	ORCLIA	811
75187	RE 6	.1A0+14	.350+01	.500-02	.500-02	.100-01	.620-01	ORCLIA	812
75187	RE A	.1A0+14					.120-01	ORCLIA	813
75187	RE12	.1A0+14	.250+02	.130-00	.130-00	.250-00	.120-01	ORCLIA	814
75187	RE16	.1A0+14	.300+01	.350-02	.350-02	.700-02	.120-01	ORCLIA	815
75187	RE20	.1A0+14					0.012	ORC001	611
75187	RE21	.1A0+14					0.012	ORC001	612
75187	RE22	.1A0+14					0.012	ORC001	613
75187	RE23	.1A0+14					0.012	ORC001	614

75188	RE 1	.710-00	.700+01	.500-00	.500-00	.100+01	.940-00	ORGLIB	816
75188	RE 4	.710-00	.140+02	.500-02	.500-02	.100-01	.850-00	ORGLIB	817
75188	RE 6	.710-00	.350+01	.500-02	.500-02	.100-01	.390+01	ORGLIB	818
75188	RE 8						.850+00	ORGLIB	819
75188	RE12	.710-00	.250+02	.130-00	.130-00	.250-00	.780-00	ORGLIB	820
75188	RE16	.710-00	.300+01	.350-02	.350-02	.700-02	.800-00	ORGLIB	821
75188	RE20	.710-00					0.85	ORC001	615
75188	RE21	.710-00					0.94	ORC001	616
75188	RE22	.710-00					0.82	ORC001	617
75188	RE23	.710-00					0.82	ORC001	618
76185	OS 1	.950+02	.200+01	.100+00	.300-00	.100+01	.510-00	ORGLIB	822
76185	OS 3	.950+02	.500+01	.500-02	.200-01	.500-01	.250-00	ORGLIB	823
76185	OS 4	.950+02	.550+01	.400-02	.100-01	.400-01	.290-00	ORGLIB	824
76185	OS 8						.290+00	ORGLIB	825
76185	OS20	.950+02					0.29	ORC001	619
76185	OS21	.950+02					0.51	ORC001	620
76185	OS22	.950+02					0.23	ORC001	621
76185	OS23	.950+02					0.23	ORC001	622
76191	OS 1	.160+02	.200+01	.100+00	.300-00	.100+01	.160-00	ORGLIB	826
76191	OS 3	.160+02	.500+01	.500-02	.200-01	.500-01	.110+00	ORGLIB	827
76191	OS 4	.160+02	.550+01	.400-02	.100-01	.400-01	.120+00	ORGLIB	828
76191	OS 8						.120+00	ORGLIB	829
76191	OS20	.160+02					0.12	ORC001	623
76191	OS21	.160+02					0.16	ORC001	624
76191	OS22	.160+02					0.10	ORC001	625
76191	OS23	.160+02					0.10	ORC001	626
7619110S 1		.580-00	.200+01	.100+00	.300-00	.100+01	.600-01	ORGLIB	830
7619110S 3		.580-00	.500+01	.500-02	.200-01	.500-01	.390-01	ORGLIB	831
7619110S 4		.580-00	.550+01	.400-02	.100-01	.400-01	.490-01	ORGLIB	832
7619110S 8							.251-01,11+00,13-00	ORGLIB	833
7619110S20		.580-00					0.018	ORC001	627
7619110S21		.580-00					0.042	ORC001	628
7619110S22		.580-00					0.097	ORC001	629
7619110S23		.580-00					0.097	ORC001	630
76193	OS 1	.131+01	.200+01	.100+00	.300-00	.100+01	.380-00	ORGLIB	834
76193	OS 3	.131+01	.500+01	.500-02	.200-01	.500-01	.380-00	ORGLIB	835
76193	OS 4	.131+01	.550+01	.400-02	.100-01	.400-01	.380-00	ORGLIB	836
76193	OS 8						.380+00	ORGLIB	837
76193	OS20	.131+01					0.38	ORC001	631
76193	OS21	.131+01					0.38	ORC001	632
76193	OS22	.131+01					0.38	ORC001	633
76193	OS23	.131+01					0.38	ORC001	634
77190	IR 1	.120+02	.200+02	.100+00	.300-00	.100+01	.370-00	ORGLIB	838
77190	IR 3	.120+02	.500+02	.450-02	.140-01	.450-01	.120+00	ORGLIB	839
77190	IR 4	.120+02	.270+02	.230-01	.700-01	.230-00	.160-00	ORGLIB	840
77190	IR 5	.120+02	.500+02	.200-02	.600-02	.200-01	.120+00	ORGLIB	841
77190	IR 8						.160+00	ORGLIB	842
77190	IR20	.120+02					0.16	ORC001	635
77190	IR21	.120+02					0.37	ORC001	636
77190	IR22	.120+02					0.087	ORC001	637
77190	IR23	.120+02					0.087	ORC001	638
77192	IR 1	.745+02	.200+02	.100+00	.300-00	.100+01	.110+01	ORGLIB	843
77192	IR 3	.745+02	.500+02	.450-02	.140-01	.450-01	.500-00	ORGLIB	844
77192	IR 4	.745+02	.270+02	.230-01	.700-01	.230-00	.600+00	ORGLIB	845
77192	IR 5	.745+02	.500+02	.200-02	.600-02	.200-01	.500+00	ORGLIB	846
77192	IR 8						.600+00	ORGLIB	847
77192	IR20	.745+02					0.60	ORC001	639
77192	IR21	.745+02					1.1	ORC001	640
77192	IR22	.745+02					0.42	ORC001	641
77192	IR23	.745+02					0.42	ORC001	642

77194	IR 1	.790-00	.200+02	.100+00	.300-00	.100+01	.810-00	ORGLIA	848
77194	IR 3	.790-00	.500+02	.450-02	.140-00	.450-01	.810-00	ORGLIA	849
77194	IR 4	.790-00	.270+02	.230-01	.700-01	.230-00	.810-00	ORGLIA	850
77194	IR 5	.790-00	.500+02	.200-02	.600-02	.200-01	.810-00	ORGLIA	851
77194	IR 8						.810+00	ORGLIA	852
77194	IR20	.790-00					0.81	ORGLIA	843
77194	IR21	.790-00					0.81	ORGLIA	844
77194	IR22	.790-00					0.81	ORGLIA	845
77194	IR23	.790-00					0.81	ORGLIA	846
7A191	PT 1	.300+01	.240+02	.100+00	.300-00	.100+01	.700-00	ORGLIA	853
7A191	PT 3	.300+01	.800+02	.100-01	.300-01	.100+00	.220-00	ORGLIA	854
7A191	PT 4	.300+01	.200+02	.800-03	.240-02	.800-02	.310-00	ORGLIA	855
7A191	PT 5	.300+01	.600+02	.800-03	.240-02	.800-02	.220-00	ORGLIA	856
7A191	PT 8						.310+00	ORGLIA	857
7A191	PT20	.300+01					0.31	ORGLIA	847
7A191	PT21	.300+01					0.70	ORGLIA	848
7A191	PT22	.300+01					0.16	ORGLIA	849
7A191	PT23	.300+01					0.16	ORGLIA	850
7A193	PT 1	.180+06	.240+02	.100+00	.300-00	.100+01	.430-01	ORGLIA	858
7A193	PT 3	.180+06	.600+02	.100-01	.300-01	.100+00	.140-01	ORGLIA	859
7A193	PT 4	.180+06	.200+02	.800-03	.240-02	.800-02	.100-01	ORGLIA	860
7A193	PT 5	.180+06	.600+02	.800-03	.240-02	.800-02	.140-01	ORGLIA	861
7A193	PT 8						.190-01	ORGLIA	862
7A193	PT20	.180+06					0.019	ORGLIA	851
7A193	PT21	.180+06					0.043	ORGLIA	852
7A193	PT22	.180+06					0.0099	ORGLIA	853
7A193	PT23	.180+06					0.0099	ORGLIA	854
7A193	PT 1	.350+01	.240+02	.100+00	.300-00	.100+01	.750-01	ORGLIA	863
7A193	PT 3	.350+01	.600+02	.100-01	.300-01	.100+00	.230-01	ORGLIA	864
7A193	PT 4	.350+01	.200+02	.800-03	.240-02	.800-02	.320-01	ORGLIA	865
7A193	PT 5	.350+01	.600+02	.800-03	.240-02	.800-02	.230-01	ORGLIA	866
7A193	PT 8						.320-01, .32-01, .32-01	ORGLIA	867
7A193	PT20	.350+01					0.032	ORGLIA	855
7A193	PT21	.350+01					0.075	ORGLIA	856
7A193	PT22	.350+01					0.017	ORGLIA	857
7A193	PT23	.350+01					0.017	ORGLIA	858
7A197	PT 1	.750-00	.240+02	.100+00	.300-00	.100+01	.260-00	ORGLIA	868
7A197	PT 3	.750-00	.600+02	.100-01	.300-01	.100+00	.230-00	ORGLIA	869
7A197	PT 4	.750-00	.200+02	.800-03	.240-02	.800-02	.240-00	ORGLIA	870
7A197	PT 5	.750-00	.600+02	.800-03	.240-02	.800-02	.230-00	ORGLIA	871
7A197	PT 8						.240+00	ORGLIA	872
7A197	PT20	.750-00					0.24	ORGLIA	859
7A197	PT21	.750-00					0.26	ORGLIA	860
7A197	PT22	.750-00					0.23	ORGLIA	861
7A197	PT23	.750-00					0.23	ORGLIA	862
7A197	PT 1	.560-01	.240+02	.100+00	.300-00	.100+01	.550-00	ORGLIA	873
7A197	PT 3	.560-01	.600+02	.100-01	.300-01	.100+00	.500-00	ORGLIA	874
7A197	PT 4	.560-01	.200+02	.800-03	.240-02	.800-02	.510-00	ORGLIA	875
7A197	PT 5	.560-01	.600+02	.800-03	.240-02	.800-02	.500-00	ORGLIA	876
7A197	PT 8						.417-00, .52-00, .52-00	ORGLIA	877
7A197	PT20	.560-01					0.28	ORGLIA	863
7A197	PT21	.560-01					0.30	ORGLIA	864
7A197	PT22	.560-01					0.27	ORGLIA	865
7A197	PT23	.560-01					0.27	ORGLIA	866
7Q196	AU 1	.560+01	.120+03	.100+00	.300-00	.100+01	.460-00	ORGLIA	878
7Q196	AU 3	.560+01	.280+03	.300-02	.900-02	.300-01	.150-00	ORGLIA	879
7Q196	AU 4	.560+01	.300+03	.400-02	.100-01	.400-01	.210-00	ORGLIA	880
7Q196	AU 5	.560+01	.240+03	.500-03	.150-02	.500-02	.150-00	ORGLIA	881
7Q196	AU 8						.210+00	ORGLIA	882
7Q196	AU20	.560+01					0.21	ORGLIA	867

81201	TL 4	.300+01	.500+01	.200-01	.200-01	.400-01	.120+00	ORGLIA	916
81201	TL 6	.300+01	.700+01	.250-01	.260-01	.550-01	.440-00	ORGLIA	917
81201	TL 8	.300+01	.600+01	.270-02	.290-02	.600-02	.120+00	ORGLIA	918
81201	TL14	.300+01	.550+01	.240-00	.260-00	.540-00	.170-00	ORGLIA	919
81201	TL20	.300+01					0.12	ORGLIA	695
81201	TL21	.300+01					0.17	ORGLIA	696
81201	TL22	.300+01					0.10	ORGLIA	697
81201	TL23	.300+01					0.10	ORGLIA	698
81202	TL 1	.120+02	.500+01	.450-00	.440-00	.100+01	.340-00	ORGLIA	920
81202	TL 3	.120+02	.700+01	.230-01	.240-01	.500-01	.240-00	ORGLIA	921
81202	TL 4	.120+02	.500+01	.200-01	.200-01	.400-01	.270-00	ORGLIA	922
81202	TL 6	.120+02	.700+01	.250-01	.260-01	.550-01	.940-00	ORGLIA	923
81202	TL 8	.120+02	.600+01	.270-02	.290-02	.600-02	.270-00	ORGLIA	924
81202	TL14	.120+02	.550+01	.240-00	.260-00	.540-00	.380-00	ORGLIA	925
81202	TL20	.120+02					0.27	ORGLIA	699
81202	TL21	.120+02					0.38	ORGLIA	700
81202	TL22	.120+02					0.23	ORGLIA	701
81202	TL23	.120+02					0.23	ORGLIA	702
81204	TL 1	.110+04	.500+01	.450-00	.480-00	.100+01	.250-00	ORGLIA	926
81204	TL 3	.110+04	.700+01	.230-01	.240-01	.500-01	.250-00	ORGLIA	927
81204	TL 4	.110+04	.500+01	.200-01	.200-01	.400-01	.250-00	ORGLIA	928
81204	TL 6	.110+04	.700+01	.250-01	.260-01	.550-01	.130+01	ORGLIA	929
81204	TL 8	.110+04	.600+01	.270-02	.290-02	.600-02	.250-00	ORGLIA	930
81204	TL14	.110+04	.550+01	.240-00	.260-00	.540-00	.250-00	ORGLIA	931
81204	TL20	.110+04					0.25	ORGLIA	703
81204	TL21	.110+04					0.25	ORGLIA	704
81204	TL22	.110+04					0.25	ORGLIA	705
81204	TL23	.110+04					0.25	ORGLIA	706
82203	PR 1	.217+01	.146+04	.800-01	.290-00	.100+01	.220-00	ORGLIA	932
82203	PR 3	.217+01	.531+03	.100-01	.400-01	.140-00	.690-01	ORGLIA	933
82203	PR 4	.217+01	.195+04	.640-02	.230-01	.800-01	.940-01	ORGLIA	934
82203	PR 6	.217+01	.365+04	.200-01	.800-01	.280-00	.510-01	ORGLIA	935
82203	PR 8						.940-01	ORGLIA	936
82203	PR20	.217+01					0.094	ORGLIA	707
82203	PR21	.217+01					0.22	ORGLIA	708
82203	PR22	.217+01					0.051	ORGLIA	709
82203	PR23	.217+01					0.051	ORGLIA	710
82210	PR 1	.710+04	.146+04	.800-01	.290-00	.100+01	.520+01	ORGLIA	937
82210	PR 3	.710+04	.531+03	.100-01	.400-01	.140-00	.100+02	ORGLIA	938
82210	PR 4	.710+04	.195+04	.640-02	.230-01	.800-01	.100+02	ORGLIA	939
82210	PR 6	.710+04	.365+04	.200-01	.800-01	.280-00	.290+02	ORGLIA	940
82210	PR 8						.157-00, .14+02, .43+02	ORGLIA	941
82210	PR20	.710+04					0.027	ORGLIA	711
82210	PR21	.710+04					0.045	ORGLIA	712
82210	PR22	.710+04					0.019	ORGLIA	713
82210	PR23	.710+04					0.019	ORGLIA	714
82212	PR 1	.440-00	.146+04	.800-01	.290-00	.100+01	.820+02	ORGLIA	942
82212	PR 3	.440-00	.531+03	.100-01	.400-01	.140-00	.810+02	ORGLIA	943
82212	PR 4	.440-00	.195+04	.640-02	.230-01	.800-01	.830+02	ORGLIA	944
82212	PR 6	.440-00	.365+04	.200-01	.804-01	.280-00	.410+03	ORGLIA	945
82212	PR 8						.799+02, .83+02, .83+02	ORGLIA	946
82212	PR20	.440-00					0.24	ORGLIA	715
82212	PR21	.440-00					0.29	ORGLIA	716
82212	PR22	.440-00					0.22	ORGLIA	717
82212	PR23	.440-00					0.22	ORGLIA	718
83206	BI 1	.640+01	.500+01	.100-01	.260-00	.100+01	.180+01	ORGLIA	947
83206	BI 3	.640+01	.600+01	.300-02	.600-01	.300-00	.580-00	ORGLIA	948
83206	BI 4	.640+01	.150+02	.150-02	.400-01	.150-00	.800-00	ORGLIA	949
83206	BI 5	.640+01	.100+02	.100-03	.260-02	.100-01	.580-00	ORGLIA	950
83206	BI 6	.640+01	.133+02	.300-03	.770-02	.300-01	.430-00	ORGLIA	951

83206	BI 8						.800+00	ORCLIB	952
83206	BI20	.640+01					0.80	ORC001	719
83206	BI21	.640+01					1.6	ORC001	720
83206	BI22	.640+01					0.43	ORC001	721
83206	BI23	.640+01					0.43	ORC001	722
83207	BI 1	.290+04	.500+01	.100-01	.260-00	.100+01	.100+01	ORCLIB	953
83207	BI 3	.290+04	.600+01	.300-02	.800-01	.300-00	.330-00	ORCLIB	954
83207	BI 4	.290+04	.150+02	.150-02	.400-01	.150-00	.450-00	ORCLIB	955
83207	BI 5	.290+04	.100+02	.100-03	.260-02	.100-01	.330-00	ORCLIB	956
83207	BI 6	.290+04	.133+02	.300-03	.770-02	.300-01	.240-00	ORCLIB	957
83207	BI 8						.450+00	ORCLIB	958
83207	BI20	.290+04					0.45	ORC001	723
83207	BI21	.290+04					1.0	ORC001	724
83207	BI22	.290+04					0.24	ORC001	725
83207	BI23	.290+04					0.24	ORC001	726
83210	BI 1	.500+01	.500+01	.100-01	.260-00	.100+01	.100+02	ORCLIB	959
83210	BI 3	.500+01	.600+01	.300-02	.800-01	.300-00	.190+02	ORCLIB	960
83210	BI 4	.500+01	.150+02	.150-02	.400-01	.150-00	.130+02	ORCLIB	961
83210	BI 5	.500+01	.100+02	.100-03	.260-02	.100-01	.170+02	ORCLIB	962
83210	BI 6	.500+01	.133+02	.300-03	.770-02	.300-01	.400+02	ORCLIB	963
83210	BI 8						.795-00,15+02,43+02	ORCLIB	964
83210	BI20	.500+01					0.40	ORC001	727
83210	BI21	.500+01					0.40	ORC001	728
83210	BI22	.500+01					0.40	ORC001	729
83210	BI23	.500+01					0.40	ORC001	730
83212	BI 1	.420-01	.500+01	.100-01	.260-00	.100+01	.830+02	ORCLIB	965
83212	BI 3	.420-01	.600+01	.300-02	.800-01	.300-00	.820+02	ORCLIB	966
83212	BI 4	.420-01	.150+02	.150-02	.400-01	.150-00	.830+02	ORCLIB	967
83212	BI 5	.420-01	.100+02	.100-03	.260-02	.100-01	.820+02	ORCLIB	968
83212	BI 6	.420-01	.133+02	.300-03	.770-02	.300-01	.411+03	ORCLIB	969
83212	BI 8						.830+02	ORCLIB	970
83212	BI20	.420-01					1.8	ORC001	731
83212	BI21	.420-01					2.2	ORC001	732
83212	BI22	.420-01					1.7	ORC001	733
83212	BI23	.420-01					1.7	ORC001	734
84210	PO 1	.138+03	.300+02	.600-01	.280-00	.100+01	.550+02	ORCLIB	971
84210	PO 3	.138+03	.700+02	.400-02	.200-01	.700-01	.550+02	ORCLIB	972
84210	PO 4	.138+03	.410+02	.100-01	.500-01	.170-00	.550+02	ORCLIB	973
84210	PO 5	.138+03	.600+02	.200-02	.100-01	.400-01	.550+02	ORCLIB	974
84210	PO 6	.138+03	.240+02	.600-02	.300-01	.100+00	.280+03	ORCLIB	975
84210	PO 8						.550+02	ORCLIB	976
84210	PO20	.138+03					0.53	ORC001	735
84210	PO21	.138+03					0.53	ORC001	736
84210	PO22	.138+03					0.53	ORC001	737
84210	PO23	.138+03					0.53	ORC001	738
85211	AT 1	.300-00	.270+02	.100+01	.750-00	.100+01	.610+02	ORCLIB	977
85211	AT 5	.300-00	.270+02	.300-01	.200-01	.300-01	.610+02	ORCLIB	978
85211	AT 8						.700+02,70+02,70+02	ORCLIB	979
85211	AT11	.300-00	.135+02	.200-02	.150-02	.200-02	.610+02	ORCLIB	980
85211	AT16	.300-00	.360+02	.300-01	.230-01	.300-01	.610+02	ORCLIB	981
85211	AT20	.300-00					0.76	ORC001	739
85211	AT21	.300-00					0.79	ORC001	740
85211	AT22	.300-00					0.75	ORC001	741
85211	AT23	.300-00					0.75	ORC001	742
88223	RA 1	.117+02	.810+04	.300-00	.400-00	.100+01	.280+03	ORCLIB	982
88223	RA 3	.11.7	10.	.6.00-4	.8.00-4	.002	275.	6/10/76	1
88223	RA 4	.11.7	10.	.61.2-4	1.6-4	4.0-4	275.	6/9/76	13
88223	RA 6	.117+02	.164+05	.150-00	.200-00	.500-00	.280+03	ORCLIB	983
88223	RA 8						.280+03	ORCLIB	984
88223	RA20	.117+02					3.7	ORC001	743

0A223	RA21	.117+02				3.8	744	ORC001
0A223	RA22	.117+02				3.7	745	ORC001
0A223	RA23	.117+02				3.7	746	ORC001
0A224	RA 1	.364+01	.910+04	.300-00	.400-00	.100+01	.280+03	ORCL18
0A224	RA 6	.364+01	.144+05	.150-00	.200-00	.500-00	.280+03	ORCL18
0A224	RA 8					.249+03	.28+03	ORCL18
0A224	RA20	.364+01				1.9	747	ORC001
0A224	RA21	.364+01				1.9	748	ORC001
0A224	RA22	.364+01				1.9	749	ORC001
0A224	RA23	.364+01				1.9	750	ORC001
0A225	RA 1	14.8	8100.	.3	.4	1.	.280.	ORCL18
0A225	RA 3	14.8	10.	.6.E-4	.8.E-4	.002	.250.	ORCL18
0A225	RA 4	14.8	10.	.00012	.00015	.0004	.250.	ORCL18
0A225	RA 6	14.8	16400.	.15	.2	.5	.280.	ORCL18
0A225	RA 8	14.8				.250.	.250.	ORCL18
0A225	RA20	14.8				3.5	250.	ORCL18
0A225	RA21	14.8				3.5		ORCL18
0A225	RA22	14.8				3.5		ORCL18
0A225	RA23	14.8				3.5		ORCL18
0A226	RA 1	.590+06	.410+04	.300-00	.400-00	.100+01	.110+03	ORCL18
0A226	RA 6	.590+06	.164+05	.400-01	.300-01	.100+00	.110+03	ORCL18
0A226	RA 8					.110+03		ORCL18
0A226	RA20	.590+06				0.48		ORC001
0A226	RA21	.590+06				0.48		ORC001
0A226	RA22	.590+06				0.48		ORC001
0A226	RA23	.590+06				0.48		ORC001
0A226	RA 1	.240+04	.610+04	.300-00	.400-00	.100+01	.230+03	ORCL18
0A226	RA 6	.240+04	.144+05	.400-01	.300-01	.190+00	.190+03	ORCL18
0A226	RA 8					.716-00	.22+02	ORCL18
0A226	RA20	.240+04				0.0046		ORC001
0A226	RA21	.240+04				0.0046		ORC001
0A226	RA22	.240+04				0.0046		ORC001
0A226	RA23	.240+04				0.0046		ORC001
0A225	AC 1	10.0	24000.	.0001	.25	1.	.280.	ORCL18
0A225	AC 3	10.0	24000.	1.E-6	.003	.01	.280.	ORCL18
0A225	AC 4	10.0	2400.	5.E-5	.13	.5	.280.	ORCL18
0A225	AC 6	10.0	73000.	3.E-5	.08	.3	1390.	ORCL18
0A225	AC 8	10.0				.270.	.270.	ORCL18
0A225	AC20	10.0				3.3		ORCL18
0A225	AC21	10.0				3.3		ORCL18
0A225	AC22	10.0				3.3		ORCL18
0A225	AC23	10.0				3.3		ORCL18
0A227	AC 1	.800+04	.240+05	.100-03	.250-00	.100+01	.200+03	ORCL18
0A227	AC 3	.800+04	.240+05	.100-05	.300-02	.100-01	.620+02	ORCL18
0A227	AC 4	.800+04	.240+04	.500-04	.130-00	.500-00	.620+02	ORCL18
0A227	AC 6	.800+04	.365+05	.300-04	.400-01	.100+04	.100+04	ORCL18
0A227	AC 8					.489+01	.21+03	ORCL18
0A227	AC20	.800+04				0.019		ORC001
0A227	AC21	.800+04				0.019		ORC001
0A227	AC22	.800+04				0.019		ORC001
0A227	AC23	.800+04				0.019		ORC001
0A228	AC 1	.240+05	.100+05	.100-03	.250-00	.100+01	.230+03	ORCL18
0A228	AC 3	.240+05	.100+05	.100-05	.300-02	.100-01	.550+02	ORCL18
0A228	AC 4	.240+05	.240+04	.500-04	.250-00	.500-00	.560+02	ORCL18
0A228	AC 6	.240+05	.365+05	.300-04	.400-01	.300-00	.970+03	ORCL18
0A228	AC 8					.897-00	.22+02	ORCL18
0A228	AC20	.260+00				0.74		ORC001
0A228	AC21	.260+00				1.1		ORC001
0A228	AC22	.260+00				0.62		ORC001
0A228	AC23	.260+00				0.62		ORC001

90227	TH 1	.184+02	.570+05	.100-03	.250-00	.100+01	.200+03	ORCLIR	1016
90227	TH 3	.184+02	.220+05	.500-05	.100-01	.500-01	.610+02	ORCLIR	1017
90227	TH 4	.184+02	.570+05	.500-05	.100-01	.500-01	.610+02	ORCLIR	1018
90227	TH 6	.184+02	.365+05	.700-04	.180-00	.700-00	.990+03	ORCLIR	1019
90227	TH 8						.827+02.28+03.33+03	ORCLIR	1020
90227	TH20	.184+02					0.64	ORC001	769
90227	TH21	.184+02					0.69	ORC001	770
90227	TH22	.184+02					0.62	ORC001	771
90227	TH23	.184+02					0.62	ORC001	772
90228	TH 1	.700+03	.570+05	.100-03	.250-00	.100+01	.230+03	ORCLIR	1021
90228	TH 3	.700+03	.220+05	.500-05	.100-01	.500-01	.560+02	ORCLIR	1022
90228	TH 4	.700+03	.570+05	.500-05	.100-01	.500-01	.560+02	ORCLIR	1023
90228	TH 6	.700+03	.365+05	.700-04	.180-00	.700-00	.970+03	ORCLIR	1024
90228	TH 8						.110+03.31+03.33+03	ORCLIR	1025
90228	TH20	.700+03					0.54	ORC001	773
90228	TH21	.700+03					0.54	ORC001	774
90228	TH22	.700+03					0.54	ORC001	775
90228	TH23	.700+03					0.54	ORC001	776
90229	TH 1	2.68E6	57000.	.0001	.25	1.	330.	ORCLIR	1026
90229	TH 3	2.68E6	22000.	5.E-6	.01	.05	49.	ORCLIR	1027
90229	TH 4	2.68E6	57000.	5.E-6	.01	.05	49.	ORCLIR	1028
90229	TH 6	2.68E6	73000.	7.E-5	.18	.7	940.	ORCLIR	1029
90229	TH 8	2.68E6					270. 270. 270.	ORCLIR	1030
90229	TH20	2.68E6					4.0	3/12/76	8
90229	TH21	2.68E6					4.0	3/12/76	9
90229	TH22	2.68E6					4.0	3/12/76	10
90229	TH23	2.68E6					4.	ORCLIR	1031
90230	TH 1	.290+08	.570+05	.100-03	.250-00	.100+01	.480+02	ORCLIR	1032
90230	TH 3	.290+08	.220+05	.500-05	.100-01	.500-01	.480+02	ORCLIR	1033
90230	TH 4	.290+08	.570+05	.500-05	.100-01	.500-01	.480+02	ORCLIR	1034
90230	TH 6	.290+08	.365+05	.700-04	.180-00	.700-00	.240+03	ORCLIR	1035
90230	TH 8						.480+02.48+02.48+02	ORCLIR	1036
90230	TH20	.290+08					0.47	ORC001	777
90230	TH21	.290+08					0.47	ORC001	778
90230	TH22	.290+08					0.47	ORC001	779
90230	TH23	.290+08					0.47	ORC001	780
90231	TH 1	.107+01	.570+05	.100-03	.250-00	.100+01	.180-00	ORCLIR	1037
90231	TH 3	.107+01	.220+05	.500-05	.100-01	.500-01	.140-00	ORCLIR	1038
90231	TH 4	.107+01	.570+05	.500-05	.100-01	.500-01	.160-00	ORCLIR	1039
90231	TH 6	.107+01	.365+05	.700-04	.180-00	.700-00	.560-00	ORCLIR	1040
90231	TH 8						.110+00.11+00.11+00	ORCLIR	1041
90231	TH20	.107+01					0.11	ORC001	781
90231	TH21	.107+01					0.14	ORC001	782
90231	TH22	.107+01					0.093	ORC001	783
90231	TH23	.107+01					0.093	ORC001	784
90232	TH 1	.510+13	.570+05	.100-03	.250-00	.100+01	.620+02	ORCLIR	1042
90232	TH 3	.510+13	.220+05	.500-05	.100-01	.500-01	.410+02	ORCLIR	1043
90232	TH 4	.510+13	.570+05	.500-05	.100-01	.500-01	.410+02	ORCLIR	1044
90232	TH 6	.510+13	.365+05	.700-04	.130-00	.700-00	.270+03	ORCLIR	1045
90232	TH 8						.410+02.41+02.65+02	ORCLIR	1046
90232	TH20	.510+13					0.40	ORC001	785
90232	TH21	.510+13					0.41	ORC001	786
90232	TH22	.510+13					0.40	ORC001	787
90232	TH23	.510+13					0.40	ORC001	788
90234	TH 1	.241+02	.570+05	.100-03	.250-00	.100+01	.910-00	ORCLIR	1047
90234	TH 3	.241+02	.570+05	.500-05	.100-01	.500-01	.900-00	ORCLIR	1048
90234	TH 4	.241+02	.570+05	.500-05	.100-01	.500-01	.900-00	ORCLIR	1049
90234	TH 6	.241+02	.365+05	.500-05	.100-01	.700-00	.450+01	ORCLIR	1050
90234	TH 8						.900+00	ORCLIR	1051
90234	TH20	.241+02					0.90	ORC001	789

90234	TH21	.241+02					0.91	ORC001	790
90234	TH22	.241+02					0.90	ORC001	791
90234	TH23	.241+02					0.90	ORC001	792
91230	PA 1	.177+02	.410+05	.100-03	.250-00	.100+01	.670-01	ORCLIB	1052
91230	PA 3	.177+02	.510+05	.400-05	.100-01	.400-01	.310-01	ORCLIB	1053
91230	PA 6	.177+02	.365+05	.450-04	.110+00	.450-00	.110+00	ORCLIB	1054
91230	PA 8						.320+01, .50+02, .68+02	ORCLIB	1055
91230	PA20	.177+02					0.042	ORC001	793
91230	PA21	.177+02					0.064	ORC001	794
91230	PA22	.177+02					0.035	ORC001	795
91230	PA23	.177+02					0.035	ORC001	796
91231	PA 1	.130+08	.410+05	.100-03	.250-00	.100+01	.140+03	ORCLIB	1056
91231	PA 3	.130+08	.510+05	.400-05	.100-01	.400-01	.790+02	ORCLIB	1057
91231	PA 4	.130+08	.580+05	.500-05	.130-01	.500-01	.630+02	ORCLIB	1058
91231	PA 6	.130+08	.365+05	.450-04	.110+00	.450-00	.750+03	ORCLIB	1059
91231	PA 8						.510+02, .52+02, .70+02	ORCLIB	1060
91231	PA20	.130+08					0.60	ORC001	797
91231	PA21	.130+08					0.70	ORC001	798
91231	PA22	.130+08					0.56	ORC001	799
91231	PA23	.130+08					0.56	ORC001	800
91233	PA 1	.274+02	.410+05	.100-03	.250-00	.100+01	.320-00	ORCLIB	1061
91233	PA 3	.274+02	.510+05	.400-05	.100-01	.400-01	.150-00	ORCLIB	1062
91233	PA 4	.274+02	.580+05	.500-05	.130-01	.500-01	.180-00	ORCLIB	1063
91233	PA 6	.274+02	.365+05	.450-04	.110+00	.450-00	.410-00	ORCLIB	1064
91233	PA 8						.180+00	ORCLIB	1065
91233	PA20	.274+02					0.18	ORC001	801
91233	PA21	.274+02					0.32	ORC001	802
91233	PA22	.274+02					0.13	ORC001	803
91233	PA23	.274+02					0.13	ORC001	804
92230	U 1	.208+02	.100+03	.100-03	.250-00	.100+01	.350+03	ORCLIB	1066
92230	U 3	.208+02	.150+02	.110-04	.280-01	.110+00	.350+03	ORCLIB	1067
92230	U 6	.208+02	.300+03	.110-04	.280-01	.110+00	.180+04	ORCLIB	1068
92230	U 8						.348+03, .35+03, .35+03	ORCLIB	1069
92230	U20	.208+02					3.4	ORC001	805
92230	U21	.208+02					3.4	ORC001	806
92230	U22	.208+02					3.4	ORC001	807
92230	U23	.208+02					3.4	ORC001	808
92232	U 1	.270+05	.100+03	.100-03	.250-00	.100+01	.280+03	ORCLIB	1070
92232	U 3	.270+05	.150+02	.110-04	.280-01	.110+00	.110+03	ORCLIB	1071
92232	U 6	.270+05	.300+03	.110-04	.280-01	.110+00	.120+04	ORCLIB	1072
92232	U 8						.552+02, .76+02, .19+03	ORCLIB	1073
92232	U20	.270+05					0.54	ORC001	809
92232	U21	.270+05					0.54	ORC001	810
92232	U22	.270+05					0.53	ORC001	811
92232	U23	.270+05					0.53	ORC001	812
92233	U 1	.590+08	.100+03	.100-03	.250-00	.100+01	.500+02	ORCLIB	1074
92233	U 3	.590+08	.150+02	.110-04	.280-01	.110+00	.500+02	ORCLIB	1075
92233	U 6	.590+08	.300+03	.110-04	.280-01	.110+00	.250+03	ORCLIB	1076
92233	U 8						.500+02	ORCLIB	1077
92233	U20	.590+08					0.49	ORC001	813
92233	U21	.590+08					0.49	ORC001	814
92233	U22	.590+08					0.49	ORC001	815
92233	U23	.590+08					0.49	ORC001	816
92234	U 1	.910+08	.100+03	.100-03	.250-00	.100+01	.490+02	ORCLIB	1078
92234	U 3	.910+08	.150+02	.110-04	.280-01	.110+00	.490+02	ORCLIB	1079
92234	U 6	.910+08	.300+03	.110-04	.280-01	.110+00	.240+03	ORCLIB	1080
92234	U 8						.490+02	ORCLIB	1081
92234	U20	.910+08					0.48	ORC001	817
92234	U21	.910+08					0.49	ORC001	818
92234	U22	.910+08					0.48	ORC001	819

92234	U23	.910+08						0.48	ORC001	820
92235	U 1	.260+12	.100+03	.100-03	.250-00	.100+01	.460+02		ORCLIA	1082
92235	U 3	.260+12	.150+02	.110-04	.280-01	.110+00	.460+02		ORCLIA	1083
92235	U 6	.260+12	.300+03	.110-04	.280-01	.110+00	.230+03		ORCLIA	1084
92235	U 8						.461+02.46+02.46+02		ORCLIA	1085
92235	U20	.260+12					0.56		ORC001	821
92235	U21	.260+12					0.77		ORC001	822
92235	U22	.260+12					0.52		ORC001	823
92235	U23	.260+12					0.52		ORC001	824
92236	U 1	.870+10	.100+03	.100-03	.250-00	.100+01	.470+02		ORCLIA	1086
92236	U 3	.870+10	.150+02	.110-04	.280-01	.110+00	.477+02		ORCLIA	1087
92236	U 6	.870+10	.300+03	.110-04	.280-01	.110+00	.230+03		ORCLIA	1088
92236	U 8						.470+02		ORCLIA	1089
92236	U20	.870+10					0.45		ORC001	825
92236	U21	.870+10					0.46		ORC001	826
92236	U22	.870+10					0.45		ORC001	827
92236	U23	.870+10					0.45		ORC001	828
92238	U 1	.160+13	.100+03	.100-03	.250-00	.100+01	.430+02		ORCLIA	1090
92238	U 3	.160+13	.150+02	.110-04	.280-01	.110+00	.430+02		ORCLIA	1091
92238	U 6	.160+13	.300+03	.110-04	.280-01	.110+00	.220+03		ORCLIA	1092
92238	U 8						.430+02		ORCLIA	1093
92238	U20	.160+13					0.43		ORC001	829
92238	U21	.160+13					0.43		ORC001	830
92238	U22	.160+13					0.43		ORC001	831
92238	U23	.160+13					0.43		ORC001	832
93237	NP 1	.800+09	.300+05	.100-03	.250-00	.100+01	.490+02		ORCLIA	1094
93237	NP 3	.800+09	.640+05	.300-05	.750-02	.300-01	.490+02		ORCLIA	1095
93237	NP 4	.800+09	.540+05	.500-05	.130-01	.500-01	.490+02		ORCLIA	1096
93237	NP 6	.800+09	.365+05	.540-04	.110+00	.450-00	.250+03		ORCLIA	1097
93237	NP 8						.490+02.49+02.49+02		ORCLIA	1098
93237	NP20	.800+09					0.50		ORC001	833
93237	NP21	.800+09					0.52		ORC001	834
93237	NP22	.800+09					0.49		ORC001	835
93237	NP23	.800+09					0.49		ORC001	836
93239	NP 1	.233+01	.390+05	.100-03	.250-00	.100+01	.290-00		ORCLIA	1099
93239	NP 3	.233+01	.640+05	.300-05	.750-02	.300-01	.210-00		ORCLIA	1100
93239	NP 4	.233+01	.540+05	.500-05	.130-01	.500-01	.220-00		ORCLIA	1101
93239	NP 6	.233+01	.365+05	.540-04	.110+00	.450-00	.980-00		ORCLIA	1102
93239	NP 8						.160-00.16-00.16-00		ORCLIA	1103
93239	NP20	.233+01					0.16		ORC001	837
93239	NP21	.233+01					0.22		ORC001	838
93239	NP22	.233+01					0.14		ORC001	839
93239	NP23	.233+01					0.14		ORC001	840
94236	PU 1	2.85	.650+05	.30-4	.25	1.0	.61.		10/28/75	2
94236	PU 3	2.85	.320+05	.60-5	.005	.02	.60.		10/28/75	3
94236	PU 4	2.85	.145+05	.45-5	.038	.45	.60.		10/28/75	4
94236	PU 6	2.85	.365+05	.24-4	.20	.45	312.		10/28/75	5
94236	PU 8	2.85					.60.	60. 61.	10/28/75	6
94236	PU20	2.85	.300-04	1.0	.625	.0	.61		10/28/75	7
94236	PU21	2.85	.300-04	1.0	.625	.0	.61		10/28/75	8
94236	PU22	2.85	.300-04	1.0	.625	.0	.61		10/28/75	9
94236	PU23	2.85	.300-04	1.0	.625	.0	.61		10/28/75	10
94237	PU 1	45.6	.650+05	.300-04	.250	.100+01	.038		PU237	1
94237	PU 3	45.6	.320+05	.600-06	.500-02	.200-01	.024		PU237	2
94237	PU 4	45.6	.145+5	.450-05	.380-01	.450-00	.027		10/30/75	2
94237	PU 6	45.6	.365+05	.240-04	.2	.450-00	.068		PU237	4
94237	PU 8	45.6					.027		PU237	5
94237	PU20	45.6					.027		PU237	6
94237	PU21	45.6					.038		PU237	7
94237	PU22	45.6					.022		PU237	8

94237	PU23	45.6					.022		PU237	9
94238	PU 1	.330+05	.650+05	.300-04	.250-00	.100+01	.570+02		ORCLIA	1104
94238	PU 3	.330+05	.320+05	.600-06	.500-02	.200-01	.570+02		ORCLIA	1105
94238	PU 4	.330+05	.146+05	.450-05	.380-01	.450-00	.570+02		ORCLIA	1106
94238	PU 6	.330+05	.365+05	.240-04	.200-00	.450-00	.280+03		ORCLIA	1107
94238	PU 8	.330+05	.120+03	.300-04	.125-00	.000	.570+02		ORCLIA	1108
94238	PU20	.330+05	.300-04	.100+01	.625-00	.000	.550-00		ORCLIA	1109
94238	PU21	.330+05	.300-04	.100+01	.625-00	.000	.550-00		ORCLIA	1110
94238	PU22	.330+05	.300-04	.100+01	.625-00	.000	.550-00		ORCLIA	1111
94238	PU23	.330+05	.300-04	.100+01	.625-00	.000	.550-00		ORCLIA	1112
94239	PU 1	.890+07	.650+05	.300-04	.250-00	.100+01	.530+02		ORCLIA	1113
94239	PU 3	.890+07	.320+05	.600-06	.500-02	.200-01	.530+02		ORCLIA	1114
94239	PU 4	.890+07	.146+05	.450-05	.380-01	.450-00	.530+02		ORCLIA	1115
94239	PU 6	.890+07	.365+05	.240-04	.200-00	.450-00	.270+03		ORCLIA	1116
94239	PU 8	.890+07	.120+03	.300-04	.125-00	.000	.530+02		ORCLIA	1117
94239	PU20	.890+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1118
94239	PU21	.890+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1119
94239	PU22	.890+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1120
94239	PU23	.890+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1121
94240	PU 1	.240+07	.650+05	.300-04	.250-00	.100+01	.530+02		ORCLIA	1122
94240	PU 3	.240+07	.320+05	.600-06	.500-02	.200-01	.530+02		ORCLIA	1123
94240	PU 4	.240+07	.146+05	.450-05	.380-01	.450-00	.530+02		ORCLIA	1124
94240	PU 6	.240+07	.365+05	.240-04	.200-00	.450-00	.270+03		ORCLIA	1125
94240	PU 8	.240+07	.120+03	.300-04	.125-00	.000	.530+02		ORCLIA	1126
94240	PU20	.240+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1127
94240	PU21	.240+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1128
94240	PU22	.240+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1129
94240	PU23	.240+07	.300-04	.100+01	.625-00	.000	.520-00		ORCLIA	1130
94241	PU 1	.480+04	.650+05	.300-04	.250-00	.100+01	.230+01		ORCLIA	1131
94241	PU 3	.480+04	.320+05	.600-06	.500-02	.200-01	.250+01		ORCLIA	1132
94241	PU 4	.480+04	.146+05	.450-05	.380-01	.450-00	.220+01		ORCLIA	1133
94241	PU 6	.480+04	.365+05	.240-04	.200-00	.450-00	.130+02		ORCLIA	1134
94241	PU 8						.133-01, 30-01, 18-00		ORCLIA	1135
94241	PU20	.480+04	.300-04	.100+01	.625-00	.000	.011		PU241GI	1
94241	PU21	.480+04	.300-04	.100+01	.625-00	.000	.012		PU241GI	2
94241	PU22	.480+04	.300-04	.100+01	.625-00	.000	.010		PU241GI	3
94241	PU23	.480+04	.300-04	.100+01	.625-00	.000	.010		PU241GI	4
94242	PU 1	.140+09	.650+05	.300-04	.250-00	.100+01	.510+02		ORCLIA	1140
94242	PU 3	.140+09	.320+05	.600-06	.500-02	.200-01	.510+02		ORCLIA	1141
94242	PU 4	.140+09	.146+05	.450-05	.380-01	.450-00	.510+02		ORCLIA	1142
94242	PU 6	.140+09	.365+05	.240-04	.200-00	.450-00	.250+03		ORCLIA	1143
94242	PU 8	.140+09	.120+03	.300-04	.125-00	.000	.510+02		ORCLIA	1144
94242	PU20	.140+09	.300-04	.100+01	.625-00	.000	.490-00		ORCLIA	1145
94242	PU21	.140+09	.300-04	.100+01	.625-00	.000	.490-00		ORCLIA	1146
94242	PU22	.140+09	.300-04	.100+01	.625-00	.000	.490-00		ORCLIA	1147
94242	PU23	.140+09	.300-04	.100+01	.625-00	.000	.490-00		ORCLIA	1148
94243	PU 1	.208	.650+05	.300-04	.250	.100+01	.37		PU243	1
94243	PU 3	.208	.320+05	.600-06	.500-02	.200-01	.37		PU243	2
94243	PU 4	.208	.1.5+4	.45-5	.038	.45	.25		10/28/75	11
94243	PU 6	.208	.365+05	.240-04	.2	.450-00	.2		PU243	4
94243	PU 8	.208					.19		PU243	5
94243	PU20	.208					.18		PU243	6
94243	PU21	.208					.19		PU243	7
94243	PU22	.208					.18		PU243	8
94243	PU23	.208					.18		PU243	9
94244	PU 1	3.03E10	45000.	.000003	.25	1.	58.4		ORCLIA	1149
94244	PU 3	3.03E10	32000.	6.E-7	.005	.02	58.4		ORCLIA	1150
94244	PU 4	3.03E10	1.46E4	4.5E-6	.038	.45	58.4		ORCLIA	1151
94244	PU 6	3.03E10	.365E5	2.4E-5	.2	.45	292.1		ORCLIA	1152
94244	PU 8	3.03E10					58.4 58.4 58.4		ORCLIA	1153

94244	PU20	.303+11					0.76	ORC003	2
94244	PU21	.303+11					0.76	ORC003	3
94244	PU22	.303+11					0.76	ORC003	4
94244	PU23	3.03E10					.76	ORCLIA	1154
95241	AM 1	.170+06	.200+05	.100-03	.250-00	.100+01	.570+02	ORCLIA	1155
95241	AM 3	.170+06	.270+05	.300-05	.750-02	.300-01	.570+02	ORCLIA	1156
95241	AM 4	.170+06	.146+5	.350-04	.880-01	.350-00	.570+02	ORCLIA	1157
95241	AM 6	.170+06	.365+05	.250-04	.630-01	.250-00	.280+03	ORCLIA	1158
95241	AM 8	.167+06	.120+03	.300-04	.125-00	.000	.570+02	ORCLIA	1159
95241	AM20	.167+06					.56	ORC003	5
95241	AM21	.167+06					.59	ORC003	6
95241	AM22	.167+06					.56	ORC003	7
95241	AM23	.1700+06					.56	ORC002	2
95242	AM 1	.667+00	.200+05	.100-03	.250+00	.100+01	.670+02	ORCLIA	1160
95242	AM 3	.667+00	.270+05	.300-05	.750-02	.030+00	.660+02	ORCLIA	1161
95242	AM 4	.667+00	.146+5	.350-04	.088+00	.350+00	.630+02	10/30/75	3
95242	AM 6	.667+00	.365+05	.250-04	.063+00	.250+00	.340+03	ORCLIA	1163
95242	AM 8						.540+00.13+02.40+02	ORCLIA	1164
95242	AM20	.667+00					.22	ORC003	8
95242	AM21	.667+00					.22	ORC003	9
95242	AM22	.667+00					.20	ORC003	10
95242	AM23	.667					.2	ORC002	3
952421	AM 1	.560+05	.200+05	.100-03	.250+00	.100+01	.610+02	ORCLIA	1165
952421	AM 3	.560+05	.270+05	.300-05	.750-02	.030+00	.610+02	ORCLIA	1166
952421	AM 4	.560+05	.146+5	.350-04	.088+00	.350+00	.570+02	10/30/75	4
952421	AM 6	.560+05	.365+05	.250-04	.063+00	.250+00	.300+03	ORCLIA	1168
952421	AM 8						.340+00.13+02.40+02	ORCLIA	1169
952421	AM20	.560+05					.019	ORC003	11
952421	AM21	.560+05					.037	ORC003	12
952421	AM22	.560+05					.011	ORC003	13
952421	AM23	.560+05					.011	ORC002	4
95243	AM 1	.290+07	.200+05	.100-03	.250-00	.100+01	.540+02	ORCLIA	1170
95243	AM 3	.290+07	.270+05	.300-05	.750-02	.300-01	.540+02	ORCLIA	1171
95243	AM 4	.290+07	.146+5	.350-04	.880-01	.350-00	.540+02	10/30/75	5
95243	AM 6	.290+07	.365+05	.250-04	.630-01	.250-00	.270+03	ORCLIA	1173
95243	AM 8						.540+02.54+02.54+02	ORCLIA	1174
95243	AM20	.290+07					0.54	ORC003	14
95243	AM21	.290+07					0.56	ORC003	15
95243	AM22	.290+07					.54	ORC003	16
95243	AM23	.290+07					.54	ORC002	5
95244	AM 1	.421	.200+05	.100-03	.250-00	.100+01	.44.	AM244	1
95244	AM 3	.421	.270+05	.300-05	.750-02	.300-01	.44.	AM244	2
95244	AM 4	.421	.146+5	.350-04	.880-08	.350-00	.20.	10/30/75	6
95244	AM 6	.421	.365+05	.250-04	.630-01	.250-00	.250.	AM244	4
95244	AM 8	.421					1.6	AM244	5
95244	AM20	.421					.52	AM244	6
95244	AM21	.421					.52	AM244	7
95244	AM22	.421					.52	AM244	8
95244	AM23	.421					.52	AM244	9
96242	CM 1	.163+03	.240+05	.100-03	.250-00	.100+01	.800+02	10/30/75	7
96242	CM 3	.163+03	.240+05	.200-05	.500-02	.200-01	.780+02	ORCLIA	1176
96242	CM 4	.163.	.1.5+4	.4=4	.1	.4	.78.	10/28/75	12
96242	CM 6	.163+03	.365+05	.300-04	.750-01	.300-00	.400+03	ORCLIA	1178
96242	CM 8						.630+02.63+02.64+02	ORCLIA	1179
96242	CM20	.163+03					0.62	ORC003	17
96242	CM21	.163+03					0.62	ORC003	18
96242	CM22	.163+03					0.61	ORC003	19
96242	CM23	.163+03					.61	ORC002	6
96243	CM 1	.130+05	.240+05	.100-03	.250-00	.100+01	.600+02	ORCLIA	1180
96243	CM 3	.130+05	.240+05	.200-05	.500-02	.200-01	.600+02	ORCLIA	1181

96243	CM 4	.13+5	1.5+4	.4-4	.1	.4	.60.	10/28/75	13
96243	CM 6	.130+05	.365+05	.300-04	.750-01	.300-00	.300+03	ORGLIB	1183
96243	CM 8						.600+02.60+02.60+02	ORGLIB	1184
96243	CM20	.130+05					.64	ORGLIB	20
96243	CM21	.130+05					.71	ORGLIB	21
96243	CM22	.130+05					.61	ORGLIB	22
96243	CM23	.130+05					.61	ORGLIB	7
96244	CM 1	.670+04	.240+05	.100-03	.250-00	.100+01	.600+02	ORGLIB	1185
96244	CM 3	.670+04	.240+05	.200-05	.500-02	.200-01	.600+02	ORGLIB	1186
96244	CM 4	.67+4	1.5+4	.4-4	.1	.4	.60.	10/28/75	14
96244	CM 6	.670+04	.365+05	.300-04	.750-01	.300-00	.300+03	ORGLIB	1188
96244	CM 8						.600+02.60+02.60+02	ORGLIB	1189
96244	CM10	.670+04	.100+09			.0005	.600+02	ORGLIB	1190
96244	CM11	.670+04	.100+09			.0001	.600+02	ORGLIB	1191
96244	CM20	.670+04					.59	ORGLIB	23
96244	CM21	.670+04					.59	ORGLIB	24
96244	CM22	.670+04					.59	ORGLIB	25
96244	CM23	.670+04					.58	ORGLIB	8
96245	CM 1	.730+07	.240+05	.100-03	.250-00	.100+01	.560+02	ORGLIB	1192
96245	CM 3	.730+07	.240+05	.200-05	.500-02	.200-01	.560+02	ORGLIB	1193
96245	CM 4	.73+7	1.5+4	.4-4	.1	.4	.56.	10/28/75	15
96245	CM 6	.730+07	.365+05	.300-04	.750-01	.300-00	.280+03	ORGLIB	1195
96245	CM 8						.550+02.55+02.55+02	ORGLIB	1196
96245	CM20	.730+07					.57	ORGLIB	26
96245	CM21	.730+07					.61	ORGLIB	27
96245	CM22	.730+07					.56	ORGLIB	28
96245	CM23	.730+07					.55	ORGLIB	9
96246	CM 1	.240+07	.240+05	.100-03	.250-00	.100+01	.560+02	ORGLIB	1197
96246	CM 3	.240+07	.240+05	.200-05	.500-02	.200-01	.560+02	ORGLIB	1198
96246	CM 4	.24+7	1.5+4	.4-4	.1	.4	.56.	10/28/75	16
96246	CM 6	.240+07	.365+05	.300-04	.750-01	.300-00	.280+03	ORGLIB	1199
96246	CM 8						.560+02	ORGLIB	1200
96246	CM20	.240+07					.54	ORGLIB	29
96246	CM21	.240+07					.54	ORGLIB	30
96246	CM22	.240+07					.54	ORGLIB	31
96246	CM23	.240+07					.54	ORGLIB	32
96247	CM 1	5.62E9	24000.	.0001	.25	1.	.55.	ORGLIB	1201
96247	CM 3	5.62E9	24000.	2.E-6	.005	.02	.55.	ORGLIB	1202
96247	CM 4	5.62+9	1.5+4	.4-4	.1	.4	.270.	10/28/75	17
96247	CM 6	5.62E9	.365E5	.00003	.075	.3	.55.	ORGLIB	1204
96247	CM 8	5.62E9					.55.	ORGLIB	1205
96247	CM20	5.62E9					.53	ORGLIB	841
96247	CM21	5.62E9					.53	ORGLIB	842
96247	CM22	5.62E9					.53	ORGLIB	843
96247	CM23	5.62E9					.53	ORGLIB	15
96248	CM 1	1.70E8	24000.	.0001	.25	1.	453.3	10/30/75	8
96248	CM 3	1.70E8	24000.	2.E-6	.005	.02	453.3	10/30/75	9
96248	CM 4	1.70E8	.146+5	.40-5	.1	.4	453.3	10/30/75A	1
96248	CM 6	1.70E8	.365E5	.00003	.075	.3	2244.	10/30/75	11
96248	CM 8	1.70E8					453.3	10/30/75	12
96248	CM20	1.70E8					11.45	10/30/75	13
96248	CM21	1.70E8					11.45	10/30/75	14
96248	CM22	1.70E8					11.45	10/30/75	15
96248	CM23	1.70E8					11.45	10/30/75	16
97249	HK 1	.290+03	.650+05	.300-04	.250-00	.100+01	.380+01	ORGLIB	1213
97249	HK 6	.290+03	.365+05	.240-04	.200-00	.800-00	.200+02	ORGLIB	1214
97249	HK 8						.264-01.44-01.20-00	ORGLIB	1215
97249	HK20	.290+03					.032	ORGLIB	847
97249	HK21	.290+03					.032	ORGLIB	848
97249	HK22	.290+03					.032	ORGLIB	849

97249	BK23	.290+03						0.32		ORC001	850
9A249	CF 1	.170+06	.650+05	.300-04	.250-00	.100+01	.600+02			ORCLIA	1216
9A249	CF 6	.170+06	.365+05	.240-04	.200-00	.800-00	.300+03			ORCLIA	1217
9A249	CF R						.600+02			ORCLIB	1218
9A249	CF20	.170+06						0.66		ORC001	851
9A249	CF21	.170+06						0.76		ORC001	852
9A249	CF22	.170+06						0.63		ORC001	853
9A249	CF23	.170+06						0.63		ORC001	854
9A250	CF 1	.370+04	.650+05	.300-04	.250-00	.100+01	.620+02			ORCLIA	1219
9A250	CF 6	.370+04	.365+05	.240-04	.200-00	.800-00	.310+03			ORCLIB	1220
9A250	CF R						.620+02	.62+02,62+02		ORCLIA	1221
9A250	CF20	.370+04						0.61		ORC001	855
9A250	CF21	.370+04						0.61		ORC001	856
9A250	CF22	.370+04						0.61		ORC001	857
9A250	CF23	.370+04						0.61		ORC001	858
9A252	CF 1	.804+03	.650+05	.300-04	.250-00	.100+01	.210+03			ORCLIB	1222
9A252	CF 6	.804+03	.365+05	.240-04	.200-00	.800-00	.110+04			ORCLIB	1223
9A252	CF R						.210+03			ORCLIA	1224

REFERENCES FOR APPENDIX D

1. The International Commission on Radiological Protection, Report of Committee II on Permissible Dose for Internal Radiation. ICRP Publication 2, Pergamon Press, Oxford, 1972.
2. The International Commission on Radiological Protection, Recommendations of the International Commission on Radiological Protection. ICRP Publication 6, Pergamon Press, Oxford, 1962.
3. The International Commission on Radiological Protection, The Metabolism of Compounds of Plutonium and Other Actinides. ICRP Publication 19, Pergamon Press, Oxford, 1972.

APPENDIX E

PROGRAM LISTING

PROGRAM LISTING

A FORTRAN listing of the entire REDIQ program is shown in Figure E-1.
The order of the modules is given below.

MAIN
LIBB
LIBK
DEP
ERFXP
SIMPS
ORDOSE
ORDOT1
ORDOT2
QNT1
QLUNT1
QLMIT1
UNIT
QUINT1
QUINT2
GIDOT
IORG1
IORG2

FIGURE E-1. FORTRAN Listing of REDIQ

1	PROGRAM MAIN(INPUT,OUTPUT,TAPE5=INPUT,TAPE6=OUTPUT,PUNCH,	MAIN	2
	ORGLIB,KNOLIB,TAPE28=ORGLIB,TAPE29=KNOLIB,TAPE1)	8/25/76	4
	COMMON HFP,NAC,NTOT,NDFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),	COMMON	1
	CHAINS,NFC(620),ML(620),IC(620)	REDIO	1
5	COMMON MA(620),LAMB10(2400),FWAT(2400),FAIR(2400),F2P(2400),	COMMON	3
	IOEG(2400),ENG(2400,3)	COMMON	4
	(COMMON F1(620),IBEG(620),IEND(620)	COMMON	5
	COMMON DOSTIM,D3,D4,D5,DIAF,UPTIME(5),KORG(25)	REDIO	2
	COMMON TITLF2(8),TLN,TLH	REDIO	3
10	COMMON ISM(620)	8/23/76	1
	COMMON IPAGE,ORGAN(2,10)	COMMON	9
	COMMON/NAM/ORGNAM(2,25)	COMMON	10
	REAL LAMB10,LAMBDA,MASS	COMMON	11
	INTEGER CHAINS,SKIP	COMMON	12
15	LOGICAL FISPRD,ACTPRD	COMMON	13
	COMMON ACTPRD,FISPRD,KR,KUPT,D0Y	COMMON	14
	COMMON LTRJ(7)	9/9/74	3
	DIMENSION DILN(5),DTLH(5),ORGANS(14)	8/23/76	3
	INTEGER REC,ORGANS	MAIN	8
20	DIMENSION NAME(600),M(600)	MAIN	10
	DIMENSION CTLM(10),CILN(10),TSL(600)	MAIN	11
	DIMENSION IARY(5)	SYSTC	1
	COMMON/RISK/RL(25),RWB	10/11/76	6
	DATA ((ORGNAM(I,J),I=1,2),J=1,23) /"TOTAL ","BODY ","BODY W",	MAIN	24
25	1"ATER "," KION","EYS "," LIV","ER "," SPIE","EN ","	MAIN	25
	2"RONN","E "," FA","T "," LUN","GS "," ADREN","	MAIN	26
	3"ALS "," TES","TES "," OVAR","IES "," SKI","N "	MAIN	27
	4" BRA","IN "," MUSC","LE "," PROST","ATE "," THYR","	MAIN	28
	5"OID "," PANCR","EAS "," HEA","RT "," GI TR","ACT "	3/5/75	3
30	6" STDH","ACH "," S","I "," UL","I "," LL","	1/23/75	4
	7"IT "/	1/23/75	5
	NAMELIST/INPUT/NEXT,D3,D4,D5,DIAF,UPTIME,DOSTIM,ORGANS,RL,INGEST	REDIO	58
	,RWB	10/11/76	7
	C UNIT 29 IS FOR RIBD LIBRARY, USE LOGICAL FILE NAME AND PERMANENT	MAIN	34
35	C FILE NAME OF -RIBLIB- ON ATTACH CARD.	MAIN	35
	C	MAIN	36
	C UNIT 28 IS FOR THE ORGAN DATA LIBRARY, USE LOGICAL AND PERMANENT	MAIN	37
	C FILE NAME OF -ORGLIB- ON ATTACH CARD.	MAIN	38
	C	MAIN	39
40	IARY(1)=0	SYSTC	2
	IARY(2)=0	SYSTC	3
	CALL SYSTEMC(115,IARY)	SYSTC	4
	CALL DATE(D0Y)	MAIN	40
	DOSTIM=1.5779E9	REDIO	59
45	IFR=0	MAIN	41
	IPAGE=1	MAIN	43
100	READ 1050, TITLE2	MAIN	44
	IFR=0	JULY1	1
	READ (5,INPUT)	MAIN	45

PROGRAM MAIN

73/75 OPT=1

FTN 4,6+420

11/02/76 17,54,50

```

50      IF (NEXT.GT.0.AND.NEXT.LE.4) GO TO 110
        PRINT 900,NEXT
        STOP
110     GO TO (120,130,270,810),NEXT
        C      READ NUCLEIDE DATA LIBRARY
120     CONTINUE
        CALL LIBK
        CALL LIBR
130     DO 140 I=1,CHAINS
        SKIP(I)=0
140     CONTINUE
        IER=0
        C      INITIALIZE NUCLEIDE MASS ARRAY
        DO 150 I=1,NTOT
        MASS(I,2)=0.
150     MASS(I,1)=0.0
        N1=NFP
        N2=NTOT
        C      READ NUCLEIDE INVENTORY FROM CARDS
        READ 850, NUMBER
        READ 860, (NAME(I),M(I),ISL(I),I=1,NUMBER)
        LIM=282
        PRINT 855,D0Y
        PRINT 856,(LIBR(I),I=1,7)
        PRINT 860
        ISTART=1
160     CONTINUE
        ISTOP=MIN0(NUMBER,LIM)
        DO 170 J=ISTART,ISTOP,6
        JSTOP=MIN0(I+5,ISTOP)
170     PRINT 870, (NAME(J),M(J),ISL(J),J=I,JSTOP)
        IF (ISTOP.EQ.NUMBER) GO TO 180
        ISTART=JSTOP+1
        PRINT 820,D0Y
        LIM=LIM+330
        GO TO 160
        C
        C      TRY TO IDENTIFY NUCLEIDES READ FROM CARDS
180     DO 210 I=1,NUMBER
        DO 190 J=1,NTOT
        JJ=J
        IF (NAME(I).EQ.REC(J).AND.M(I).EQ.M(J)) GO TO 200
        CONTINUE
190     C
        C      IF CAN NOT IDENTIFY NUCLEIDE -STOP
        PRINT 890, NAME(I),M(I)
        IER=IER+1
        C      CONVERT CURIES TO CUPTIE-SEC
        C      200 MASS(JJ,1)=1.E-6/LAMBDA(JJ)

```

11/02/76 17.54.50

PTH 4.6+420

PROGRAM MAIN 73/73 OPT=1

```

100      ICL(J)=ISL(I)
      IF (ISL(I).GE.1).AND.(ISL(I).LE.3) GO TO 210
      IF NO SOLUBILITY INDEX ON NUCLIDE PRINT OFFENDER
      IF (ICL(I).GE.1).AND.(ICL(I).LE.3) GO TO 210
      PRINT 1060, NAME(I),M(I),ICL(I)
      IER=IER+1
105      CONTINUE
      C      FLIMINATE UNUSED CHAINS
      C      FISPRD = FALSE IF NO FISSION PRODUCTS PRESENT
      C      ACTPRD = FALSE IF NO ACTIVATION PRODUCTS PRESENT
      ACTPRD=.FALSE.
      FISPRD=.FALSE.
      ISOTOP=0
      DO 250 K=1,CHAINS
      (LM=NOFNUC(K)
      IF (SKIP(K).NE.0) GO TO 240
      DO 220 I=1,LIM
      I=ISOTOP+I
      IF (MASS(L,I).GT.1.E=30.AND.(LAMBDA(L).GT.1.E=30) GO TO 230
      CONTINUE
      SKIP(K)=LIM
      GO TO 240
120      CONTINUE
      FISPRD=.TRUE.
      ISOTOP=ISOTOP+LIM
125      CONTINUE
      DO 260 L=N1,N2
      IF (MASS(L,1).LT.1.E=30.OR.(LAMBDA(L).LT.1.E=30) GO TO 260
      ACTPRD=.TRUE.
      CONTINUE
      C      COUNT UPTAKE TIMES
      NUPT=0
130      IF (NEXT.LT.3) GO TO 275
      PRINT 855,NOY
      PRINT 856, (LHT(I),I=1,7)
      DO 320 I=1,5
      IF (UPTIME(I).LE.0) GO TO 320
      IF (NUPT.GE.5.OR.(I.GT.5.OR.(UPTIME(I).LE.0.) GO TO 320
      NUPT=NUPT+1
      UPTIME(NUPT)=UPTIME(I)
140      CONTINUE
      CALL UNIT (DILH,DILN,NUPT,UPTIME)
      CALL UNIT(CTLH,CTLN,1,DOSYIM)
      I0=0
      DO 330 I=1,25
      KORG(I)=0
145      DO 340 I=1,14
      YNO=ORGANS(I)
      IF (IND.LF.0) GO TO 340

```


PROGRAM MAIN 73/73 OPT=1 FTM 4,6+420 11/02/76 17,54,50

```

150      10=10+1
        KORG(IND)=1
        CONTINUE
340      IF (10.GT.0) GO TO 350
        PRINT 910, ORGANS
        IER=IER+1
350      IF (10.LE.220) GO TO 390
        PRINT 820,DOY
390      IF (INGEST.GT.0) GO TO 401
        IF (DIAM.GT.0.) CALL DEP
        IF (D5.GT.0.) GO TO 400
        IF (D4.GT.0.) GO TO 400
        IF (D3.GT.0.) GO TO 400
        IER=IER+1
400      PRINT 830,DIAM,D3,D4,D5
        401 IF (CONSTIM.LT.0) IER=IER+1
        PRINT 960, NUPT,(UPTIME(I),I=1,NUPT)
        PRINT 970,DOSTIM
        IF (IER.LT.1) GO TO 410
        PRINT 1020, IER
        STOP
410      CONTINUE
C      PRINT RISK FACTORS
        PRINT 1030
        DO 420 I=1,10
        IF (ORGANS(I).GT.19) GO TO 420
        PRINT 1040, (ORGAN(I),J=1,2),RL(I)
420      CONTINUE
        PRINT 1070,RHR
        IF (INGEST.GT.0) PRINT 825
        KUPT=1
        KR=1
        DO 817 I=1,NUPT
        DO 816 J=1,NTOT
        MASS(J,2)=MASS(J,1)+1.E+6/UPTIME(I)
        TLH=OTLH(I)
        TLM=OTLN(I)
        KUPT=I
        KR=I
        CALL ORDOOSE(INGEST)
817      CONTINUE
        GO TO 100
816      IER=IER+1
        PRINT 1020,IER
815      STOP
C
820      FORMAT(1H1,122X,A9/)
825      FORMAT(1H0,5X,"ORGAN DOSE CALCULATIONS MADE FOR INGESTED RADIONUCL
        1IDES"/)

```

```

PROGRAM MAIN      73/73      UPT=1      FTN 4,6,4,20      11/02/76  17,54,50

      200      430      FORMAT (1H,"DIAM E",F9.5," MICROMETERS"/1H,"DS E",F9.3)
      450      1H,F9.3/1H,"DS E",F9.3)
      855      FORMAT (13)
      856      FORMAT (1H,5X,"***** INPUT DATA *****",40X,A9///)
      860      FORMAT (1H0,7A10)
      870      FORMAT (1H0,20X,"NUCLIDE LIST"//)
      880      FORMAT (3X,6(2X,A3,13,12))
      890      FORMAT (4(A3,13,12,12X))
      900      FORMAT ("UNKNOWN ISOTOPE = "A3,13)
      910      FORMAT (" INVALID VALUE FOR NEXT = "I6,)
      920      FORMAT (" NO ORGANS SPECIFIED = ORGANS",10I2)
      930      FORMAT (1H,13," UPTAKE TIMES, SECONDS ",1P5E10.3)
      940      FORMAT (5X,"DOSE TIME, SECONDS ",1P5E10.3)
      1020      FORMAT (" IER = "I3," ERRORS IN INPUT DATA = STOP")
      1030      FORMAT ("0 RELATIVE RISK FACTORS"/" ORGANS R.//)
      1040      FORMAT (1X,A6,A5,1P5E9.1)
      1050      FORMAT (8A10)
      1060      FORMAT (" IMPROPER SOLUBILITY INDEX SPECIFIED FOR ",A3,13,12)
      1070      FORMAT (1H0, "WHOLE BODY ",1P5E9.1)
      215      END

```

```

      372      MAIN
      373      MAIN
      375      MAIN
      8      8/27/76
      19      9/4/74
      70      REDIQ
      71      REDIQ
      72      REDIQ
      380      MAIN
      381      MAIN
      382      MAIN
      388      MAIN
      73      REDIQ
      390      MAIN
      4      9/2/76A
      7      9/1/76
      400      MAIN
      401      MAIN
      3      10/22/76
      411      MAIN

```

```

1 SUBROUTINE LIBR
2 LIBR READS AN ORGAN DATA LIBRARY
3 COMMON NFP,NAC,NTOT,NOFNIC(96),SKIP(96),MASS(620,2),LAMBDA(620),
4 CHAINS,REC(620),ML(620),ICL(620)
5 COMMON MA(620),LAMBIO(2400),FWAT(2400),FAIR(2400),F2P(2400),
6 JORG(2400),ENG(2400,3)
7 COMMON FI(620),IREG(620),IEND(620)
8 COMMON DOSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)
9 COMMON TITL2(8),TLN,TLH
10 COMMON ISM(620)
11 COMMON IPAGE,ORGAN(2,10)
12 COMMON/NAM/ORGNAM(2,25)
13 REAL LAMBIO,LAMBDA,MASS
14 INTEGER CHAINS,SKIP
15 LOGICAL FISPRD,ACTPRO
16 COMMON ACTPRD,FISPRD,KR,KUPT,DOY
17 COMMON LIAT(7)
18 LOGICAL SKIPO
19 C READ R10LOGICAL DATA LIBRARY
20 1 FORMAT(I4,7A10)
21 2 FORMAT(2I3,I1,A2,I2,6E8,3,2E6,2)
22 3 FORMAT(" LIBRARY DATA SEQUENCE ERROR"/" "2I3,I1,A2,I2,6E10,4)
23 SKIPO=.FALSE.
24 DO 100 I=1,620
25 100 IREG(I)=0
26 KR=0
27 KET=0
28 KIST=0
29 KMT=0
30 INT=0
31 KJ=0
32 READ(28,1) NCDS,(LIAT(K),K=1,7)
33 DO 300 I=1,NCDS
34 READ(28,2) KE,KIS,KM,ELT,IO,TR,TB,FW,FA,FP2,EFF1,EFF2,EFF3
35 IF(EOF(28)) 99,105
36 105 IF(KE-KET) 150,110,160
37 110 IF(KIS-KIST) 150,120,160
38 120 IF(KM-KMT) 150,130,160
39 130 IF(IO-INT) 150,150,210
40 LIBRARY DATA SEQUENCE ERROR
41 150 PRINT 3, KE,KIS,KM,ELT,IO,TR,TB,FW,FA,FP2,EFF1,EFF2,EFF3
42 STOP
43 160 INT=1
44 KET=KE
45 KIST=KIS
46 KMT=KM
47 IF(IO=1) 150,170,150
48 170 IF(KRN.GT.0) IEND(K.I)=KRN
49 SKIP=.FALSE.

```

```

50      GO 190 J=1,NTOT
      IF(KE.NE.MA(J).OR.KIS.NE.ML(J)) GO TO 190
      IF(KM) 175,175,1A0
      175 IF(KM+2.EQ.ISM(J)) GO TO 200
      GO TO 190
55      1A0 IF(KM.EQ.ISM(J)) GO TO 200
      190 CONTINUE
      C ISOTOPF NOT IN RIRD LIBRARY
      SKIPD=.TRUE.
      GO TO 300
60      C NEW ISOTOPE
      200 KJ=1
      IFEG(KJ)=KRN+1
      F1(KJ)=FW
      210 IF(SKIPD) GO TO 300
      TOT=10
      KRN=KRN+1
      IF(TRA.LE.0.) GO TO 220
      LAMBIO(KRN)=.69314/(86400.*TB)
      GO TO 230
70      220 LAMBIO(KRN)=0.
      230 FMAT(KRN)=FW
      FAIR(KRN)=FA
      F2P(KRN)=FP2
      IORG(KRN)=10
      ENG(KRN,1)=EFF1
      ENG(KRN,2)=EFF2
      ENG(KRN,3)=EFF3
      IF(EFF2.LE.0.) ENG(KRN,2)=EFF1
      IF(EFF3.LE.0.) ENG(KRN,3)=EFF1
80      300 CONTINUE
      IEND(KJ)=KRN
      REWIND 28
      REWIND 29
      RETURN
85      99 PRINT 199
      REWIND 28
      REWIND 29
      RETURN
90      199 FORMAT("OEND OF FILE READ ON OMGLIR, UNIT 28")
      END
LIBH 36
LIBH 37
LIBH 38
LIBH 39
LIBH 40
LIBH 41
LIBH 42
LIBH 43
LIBH 44
LIBH 45
LIBH 46
LIBH 47
LIBH 48
LIBH 49
LIBH 50
LIBH 51
LIBH 52
LIBH 53
LIBH 54
LIBH 55
LIBH 56
LIBH 57
LIBH 58
LIBH 59
LIBH 60
LIBH 61
LIBH 62
LIBH 63
LIBH 64
LIBH 65
LIBH 66
LIBH 67
LIBH 1
LIBH 2
LIBH 3
LIBH 4
LIBH 5
LIBH 6
LIBH 7
LIBH 69

```

SUBROUTINE LIBK

73/73 OPT=1

FTN 4,6+420

09/02/76 13,12,52

```
1      SUBROUTINE LIBK
      LIBK READS AN ISOTOPE DATA LIBRARY
      COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),
      .CHAINS,REC(620),ML(620),ICL(620)
      COMMON MA(620),LAMHID(2400),FWAT(2400),FAIR(2400),F2P(2400),
      .IORG(2400),ENG(2400,3)
      COMMON FI(620),IBEG(620),IEND(620)
      COMMON DOSTIM,D3,D4,D5,DIAM,OPTIME(5),KORG(25)
      COMMON TITLE2(8),TLN,TLH
      COMMON ISM(620)
      COMMON IPAGE,ORGAN(2,10)
      COMMON/NAM/ORGNAM(2,25)
      REAL LAMBIO,LAMBDA,MASS
      INTEGER CHAINS,SKIP
      LOGICAL FISPRD,ACTPRD
      COMMON ACTPRD,FISPRD,KR,KUPT,DOY
      LOGICAL ERROR

      C READ RIRD DATA LIBRARY
      READ (29,1) NCD
      1 FORMAT(I3)
      2 READ(29,2) (ML(J),MA(J),REC(J),ISM(J),LAMBDA(J),J=1,NCD)
      2 FORMAT(I3,I2,A3,I1,E9,1)
      READ(29,1) N2
      N1=NCD+1
      NAC=N2
      N2=N2+NCD
      NFP=NCD
      NTOT=N2
      READ(29,2) (ML(J),MA(J),REC(J),ISM(J),LAMBDA(J),J=N1,N2)
      DO 202 L=N1,N2
      IF(LAMBDA(L).LT.1.E-30) GO TO 202
      LAMBDA(L)=.69314/86400./LAMBDA(L)
      202 CONTINUE
      ERROR=.FALSE.
      MP=0
      CHAINS=0
      DO 3 I=1,96
      3 NOFNUC(I)=0
      C CALCULATE LAMBDA IN SEC-1
      DO 10 J=1,NCD
      IF(LAMBDA(J).LT.1.E-30) GO TO 40
      LAMBDA(J)=.69314/LAMBDA(J)/86400.
      40 IF(MP-ML(J)) 4,5,6
      4 MP=ML(J)
      C NEW MASS CHAIN
      CHAINS=CHAINS+1
      C COUNT NUMBER OF NUCLIDES IN THIS CHAIN
      5 NOFNUC(CHAINS)=NOFNUC(CHAINS)+1
```

LIBK 2
LIBK 3
COMNA 1
REDIO 1
COMNA 3
COMNA 4
COMNA 5
REDIO 2
REDIO 3
8/23/76 1
COMN 9
COMN 10
COMN 11
COMN 12
COMN 13
COMN 14
LIBK 6
LIBK 7
LIBK 8
LIBK 9
LIBK 10
8/25/76 1
8/25/76 2
LIBK 13
LIBK 14
LIBK 15
LIBK 16
LIBK 17
LIBK 18
8/25/76 3
LIBK 21
LIBK 22
LIBK 23
LIBK 24
LIBK 25
LIBK 26
LIBK 27
LIBK 28
LIBK 29
LIBK 30
LIBK 31
LIBK 32
LIBK 33
LIBK 34
LIBK 35
LIBK 36
LIBK 37
LIBK 38
LIBK 39

SUBROUTINE LIBK	73/73	OPT=1	FTN 4.6+420	09/02/76	13.12.52
-----------------	-------	-------	-------------	----------	----------


```

50      GO TO 10
        6 ERROR=.TRUE.
        PRINT 7,J
        7 FORMAT("OLIBRARY ENTRY"14," IS OUT OF PLACE")
        10 CONTINUE
        IF(ERROR) STOP
        RETURN
        END
55

```

READ	7
LIBK	41
LIBK	42
LIBK	43
LIBK	46
LIBK	47
LIBK	74
LIBK	75

09/02/76 13.12.52

FTN 4.6+420

73/73 OPT=1

SUBROUTINE DEP

```

1      SUBROUTINE DEP
C      DEP CALCULATES THE RESPIRATORY TRACT DEPOSITION FACTORS FROM THE
C      ACTIVITY MEDIAN ATMOSPHERIC DIAMETER OF AN AEROSOL DISTRIBUTION
COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMRDA(620),
      .CHAINS,REC(620),XL(620),ICL(620)
COMMON MA(620),LAMHIO(2400),FWAT(2400),FAIR(2400),F2P(2400),
      .IORG(2400),ENG(2400,3)
COMMON FI(620),IREG(620),TEND(620)
COMMON DOSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)
COMMON TITLE2(R),TLN,TLH
COMMON ISM(620)
COMMON IPAGE,ORGAN(2,10)
COMMON/NAM/ORGNAM(2,25)
REAL LAMTIO,LAMRDA,MASS
INTEGER CHAINS,SKIP
LOGICAL FISPRD,ACTPRD
COMMON ACTPRD,FISPRD,KR,KUPT,D0Y
EXTERNAL ERFXP
DELTA=.000001
DP=.1
SP=24.
DPL=ALOG10(DP)
SPL=ALOG10(SP)
XL=ALOG10(DIAM)
XP=(XL-DPL)/SPL
FPE=SIMPS(-5.0,XP,DELTA,ERFXP)
FAC=SQRT(2.*3.1415927)
DSE1=-FP/FAC
DP=2.
SP=3.45
DPL=ALOG10(DP)
SPL=ALOG10(SP)
XP=(XL-DPL)/SPL
FPE=SIMPS(-5.0,XP,DELTA,ERFXP)
D3=FP/FAC
D4=.08
RETURN
END

```

DEP 2
 DEP 3
 DEP 4
 COMNR 1
 REDIQ 1
 COMNR 3
 COMNR 4
 COMNR 5
 REDIQ 2
 REDIQ 3
 8/23/76 1
 COMN 9
 COMN 10
 COMN 11
 COMN 12
 COMN 13
 COMN 14
 DEP 6
 DEP 7
 DEP 8
 DEP 9
 DEP 10
 DEP 11
 DEP 12
 DEP 13
 DEP 14
 DEP 15
 DEP 16
 DEP 17
 DEP 18
 DEP 19
 DEP 20
 DEP 21
 DEP 22
 DEP 23
 DEP 24
 DEP 25
 DEP 26

FUNCTION ERFXP		73/73	OPT=1	FTN 4.6+420	09/02/76	13.12.52
1	C	FUNCTION ERFXP(ARG)				
		ERFXP IS THE ERROR FUNCTION				
		EX=-.5*(ARG**2)				
5		ERFXP=EXP(EX)				
		RETURN				
		END				
		ERFXP				2
		ERFXP				3
		ERFXP				4
		ERFXP				5
		ERFXP				6
		ERFXP				7

09/02/76 13.12.52

FTN 4.6+420

FUNCTION SIMPS 73/73 OPT=1

```

1      FUNCTION SIMPS(A,R,DELTA,F00000)
      C      A AND R ARE MIN AND MAX OF THE DEFINITE INTEGRAL
      C      DELTA IS THE PERMISSIBLE DIFFERENCE BETWEEN TWO SUCCESSIVE SUMS.
      N=1
      H=(R-A)/2.
      FJAY=H*(F00000(A)+F00000(B))
      C      A MAXIMUM OF 2049 POINTS WILL BE USED WHEN L=11
      DO 35 L=1,11
      10  S=0.0
      DO 20 K=1,N
      20  S=S+F00000(A+(2.0*FLOAT(K)-1.0)*H)
      F1=FJAY+4.0*H*S
      IF(L=3)26,26,23
      23  CONTINUE
      IF(DELTA-ABS((F1-BAR)/F1))30,40,40
      26  CONTINUE
      30  BAR=F1
      FJAY=(F1+FJAY)/4.0
      N=2*N
      H=H/2.0
      35  CONTINUE
      40  SIMPS =F1/3.0
      RETURN
      END
SIMPS 2
SIMPS 3
SIMPS 4
SIMPS 5
SIMPS 6
SIMPS 7
SIMPS 8
SIMPS 9
SIMPS 10
SIMPS 11
SIMPS 12
SIMPS 13
SIMPS 14
SIMPS 15
SIMPS 16
SIMPS 17
SIMPS 18
SIMPS 19
SIMPS 20
SIMPS 21
SIMPS 22
SIMPS 23
SIMPS 24
SIMPS 25

```

11/02/75 17.54.50

FTH 4.64420

SUBROUTINE DOUSE 75/75 OPT=1

```

1      SUBROUTINE DOUSE (IMEST)
2
3      THIS ROUTINE CALCULATES THE DOSES TO SELECTED ORGANS DUE TO
4      POLLUTION OF SELECTED GEOLOGICAL LAYERS.
5
6      *PARAMETER INUC(500),DEUT(500)
7      *COMMON MPF,NAC,NTOT,NOFNUC(96),SKIN(96),MASS(620,2),LAMBDA(620),
8      *CHAINS,REC(620),ML(620),LC(620)
9      *COMMON MA(620),LAMHIN(2400),EWAT(2400),FAIR(2400),F2P(2400),
10     *TUGG(2400),ENG(2400,3)
11     *COMMON F1(620),IREG(620),TEND(620)
12     *COMMON DOSTIM,DS,DS4,DS5,DIAN,OPTIME(5),KORG(25)
13     *COMMON TITLE2(8),ILN,ILM
14     *COMMON ISM(620)
15     *COMMON IPAGE,ORGAN(2,10)
16     *COMMON/NAN/ORGAN(2,25)
17     *REAL LAMHIO,LAMBDA,MASS
18     *INTEGER CHAINS,SWTP
19     *LOGICAL FTSPRD,ACTPRD
20     *COMMON ACTPRD,FISPRD,KK,KUPT,DDY
21     *COMMON/COMO/ALAMO,ALH(9),ALL(9),C(9),FT(9),NSOL,OMF,J1(9),
22     *OMF,J2(9),OMENT,OMEN2,II,IP,VUMTI,VOLUTI(8),OMASS(25)
23     *DIMENSION DOSE(11),ALLB(9,3),F(9,3),INLNK(10),IFMT(17),
24     *KMT(21),ISPACE(10)
25     *DIMENSION TITLI(2)
26     *REAL IGORI,IGOR2
27     *COMMON/RISK/RL(25),KMH
28     DATA (IFMT(I),I=1,6)/"1H","X,1X","A3,13","7X","2X"/
29     DATA TITLI/"INHALED","INGESTED"/
30     DATA (KMT(I),I=1,21)/"1H","X","X","X","X","X","X","X","X","X",
31     "1X","X","X","X","X","X","X","X","X","X","X","X","X","X","X",
32     "2X","X","X","X","X","X","X","X","X","X","X","X","X","X","X",
33     DATA ISPACE/"46","41","36","31","26","21","16","11","6","1"/
34     DATA ((ALLH(I,J),I=1,9),J=1,3)/3*8.023E-4,4.012E-5,1.605E-5,2*0.,
35     12*1.605E-5,8.023E-4,2.006E-5,8.023E-4,4.012E-5,1.605E-5,8.023E-6,
36     23*1.605E-7,8.023E-4,2.006E-5,8.023E-4,4.012E-5,1.605E-5,8.023E-6,
37     32*1.605E-8,8.023E-9/
38     DATA ((F(I,J),I=1,9),J=1,3)/2*5.95E-05,8.2E-6,2.1E-6,1.9E-6,4.
39     1E-5,2*4.05E-1,1.01E-01,99.01E-01,99.05E-01,15.0/
40     DATA (OMASS(I),I=1,25)/7.64E-03,4.36E-03,1700.150,7000.1E-4,
41     11000.20,40.8E-03,1500.3E-03,20.70,300.2000,250.,
42     2100.135,150.0,0./
43     *INITIALIZE VARIABLES
44     DIMMY=0
45     IM=0
46     IS=0
47     TTIME=60
48     SET T1 EQUAL TO THE CURRENT CPU TAKE TIME
49     T1=OPTIME(KUPT)

```

SURVIVALTIME ORIGIN 73/75 OPT=1 FTH 0.0+020 11/02/76 17,54,50

```

50      DO 100 J=1,11
      CUSE(I)=0.
      100 CONTINUE
      C      SET UP ORGAN NAMES FOR PRINT OUT
      C      LORG=0
      11=1
      IF (TNGEST.GT.0) IT=2
      IY=DOUSTIN/3.156E7 +1
      DO 106 I=1,19
      IF (KORG(I).EQ.0) GO TO 106
      LORG=LORG+1
      IF (LORG.GT.10) GO TO 107
      IF (I.EQ.19) LGI=LORG
      NORG=LORG
      DO 105 J=1,2
      105 ORGAN(J,LORG)= ORGNAM(J,I)
      106 CONTINUE
      IF (LORG+7)=""
      107 CONTINUE
      IF (FISPRD) GO TO 200
      IF (ACTPRD) GO TO 700
      WRITE(6,110) KUPT
      110 FORMAT(1H0,"NO FISSION PRODUCTS OR ACTIVATION PRODUCTS SPECIFIED FOR
      14 CASE",I3)
      GO TO 3000
      75      C      LOOP ON NUCLEIDE CHAINS
      200 DO 600 ICH=1,CHAINS
      LIM=NOFNUC(ICH)
      C      BYPASS UNUSED CHAINS
      IF (SKIP(ICH).EQ.0) GO TO 300
      ISO=ISO+LIM
      GO TO 600
      300 DO 500 K=1,LIM
      ISO=ISO + 1
      IF (MASS(ISO,2).LE.0.) GO TO 500
      I1=IREG(ISO)
      I2=IEND(ISO)
      LORG=0
      IF (TNGEST.GT.0) GO TO 307
      80
      85      C
      C      IF DAUGHTER NUCLEIDE SOLUBILITY INDEX HAS NOT BEEN SPECIFIED USE
      C      THE SOLUBILITY INDEX OF THE PARENT
      DO 302 J=1,K
      IF (ICL(ISO).GT.0) GO TO 304
      ICL(ISO)=ICL(ISO-J)
      302 CONTINUE
      PRINT 303,JSU
      303 FORMAT(1H0,"*** NO SOLUBILITY CLASS NUMBER FOR",I5," FOUND")
      304 NISOL=ICL(ISO)
      90
      95

```

INER 6
KEDIQ 11
ORDUSE 41
ORDUSE 42
ORDUSE 43
8/26/76 4
8/26/76 5
8/27/76 1
4/7/75 1
ORDUSE 45
ORDUSE 46
TNER 9
LGI 1
INER 9
ORDUSE 47
ORDUSE 48
ORDUSE 49
ORDUSE 50
INER 10
ORDUSE 52
ORDUSE 53
ORDUSE 54
ORDUSE 55
ORDUSE 56
ORDUSE 57
ORDUSE 58
ORDUSE 59
ORDUSE 60
ORDUSE 61
ORDUSE 62
ORDUSE 63
ORDUSE 64
ORDUSE 65
ORDUSE 66
ORDUSE 67
8/26/76 4
8/26/76 5
8/26/76 6
8/26/76 7
ORDUSE 68
ORDUSE 69
ORDUSE 70
ORDUSE 71
ORDUSE 72
ORDUSE 73
ORDUSE 74
ORDUSE 75
ORDUSE 76
ORDUSE 77

```

100      I1=TRRG(ISO)
      I2=TRMO(ISO)
      IORG=0
      DO 305 L=1,9
      ALH(L)=ALH(L,NSOL) + LAMBDA*(ISO)
      FT(L)=F(L,NSOL)
      ARG=ALH(L)*I1
      OMP1(I1)=1. - EXP(-ARG)
      IF (ARG.GT.1000.) OMP1(I1)=1.
      ALH(L)=ALH(L,NSOL)
305 CONTINUE
110      C(1)=ALH(1)*FT(1)*D3/ALL(1)
      C(2)=ALH(2)*FT(2)*D3/ALL(2)*F1(ISO)
      C(3)=ALH(3)*FT(3)*D4/ALL(3)
      C(4)=ALH(4)*FT(4)*D4/ALL(4)*F1(ISO)
      C(5)=ALH(5)*FT(5)*D5/ALL(5)
      C(6)=ALH(6)*FT(6)*D5/ALL(6)*F1(ISO)
      C(7)=ALH(7)*FT(7)*D5/ALL(7)*F1(ISO)
      C(8)=ALH(8)*ALB(9)*FT(8)*FT(9)*D5/ALL(8)
      C(9)=C(8)/ALB(9)
      VOLUME=QLIMIT(DUMMY)
      DO 306 J=1,8
306      VOLUME(J)=VOLUME(J)
      C ORG=LOO
      C 307 DO 400 MORG=1,25
      C TEST FOR ORGAN INCLUSION
      C IF (MORG(MORG).EQ.0) GO TO 400
      C TEST FOR ORGAN=NUCLIDE COMBINATION
      LOO=LOO + 1
      IF (MORG.GE.20) LOO = 11
      IF (L1.FD.0.OR.L2.EQ.0) GO TO 312
      DO 310 I=1,L2
      KR=10
      IF (ORG(I).EQ.MORG) GO TO 320
310 CONTINUE
      IF (MORG.LT.19) GO TO 312
      IF (MORG.GT.19) GO TO 400
      C INITIALIZE DOSE ARRAYS FOR GI TISSUE
      DOSE(LGI)=0.
      IMAX(LGI)=0.
      GO TO 400
      C NO ORGAN DATA AVAILABLE FOR THIS NUCLIDE - BLANK THE DOSE
312 IMAX(LORG)=1
      DOSE(LORG)=0
      GO TO 400
320 ALAM=(ALAM*ORG(I)) + LAMBDA*(ISO)
      OMP1=1. - EXP(-ALAM*I1)
      IF (MGE$T.LE.0) VQNT1=QNT1*(KR)
      O1=0.

```

```

SUBROUTINE ORG05      73/73      OPT=1      FTM 0.0+420      11/02/70 17.54.50
      I2=0
      I2=00STIM
      C      IF(EN OUT D0SE TIME FOR PRINT OUT IF LESS THAN 1 SEC
      IF(I2,I1,I.) I2=0.
      IF(MORG.LT.1) IALNK(LORG)=0
      C      C=2=1. - EXP(-ALAMBDA*I2)
      IF(LNGEST,GT.0) GO TO 341
      DO 325 J=1,9
      AMR=ALL(J)*I2
      ONEP2(J)=1. - EXP(-AMR)
      IF(ARG,GT.1000.) ONEP2(J)=1.
      325 CONTINUE
      330 CONTINUE
      IF(MORG.LE.19) D1=00DOT1(KRN,MORG)
      IF(MORG,GT.19.AND.MORG.LT.24) D1=6IDOT(KRN,MORG,ISO,1)
      340 IF(I2.LE.0.) GO TO 345
      IF(MORG.LE.19) D2=00DOT2(KRN,MORG,ISO)
      IF(MORG,GT.19.AND.MORG.LT.24) D2=6IDOT(KRN,MORG,ISO,2)
      345 D0SF(LORG)=MASS(ISO,2)*LAMBDA(ISO)*(D1+D2)
      GO TO 385
      C      AND LUNG DOSE DUE TO PRIMARY DEPOSITION
      360 SUM2=0.
      SUM1=0.
      DO 365 J=5,8
      SUM1=SUM1 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*DS/ALL(J)
      365 SUM1=SUM1 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*DS/ALL(J)
      370 IF(I2.LE.0.) GO TO 380
      DO 375 J=5,8
      SUM2=SUM2 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*DS/ALL(J)**2
      375 SUM2=SUM2 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*DS/ALL(J)**2
      380 D0SE(LORG)=MASS(ISO,2)*LAMBDA(ISO)*(SUM1+SUM2+D1+D2)
      GO TO 385
      C      INGESTION DOSE CALCULATION
      C
      C
      341 IF(MORG.LT.19) D1=IGORI(KRN,MORG)
      IF(MORG,GT.19.AND.MORG.LT.24) D1=6IDOT(KRN,MORG,ISO,3)
      IF(I2.LE.0) GO TO 382
      IF(MORG.LT.19) D2=IGORI(KRN,MORG)
      342 D0SE(LORG)=MASS(ISO,2)*LAMBDA(ISO)*(D1+D2)
      IF(D0SE(LORG).LE.0) GO TO 312
      345 CONTINUE
      IF(MORG(19).EQ.0.OR.MORG.LT.20) GO TO 395
      D0SF(LGI)=D0SE(LGI)+D0SE(LORG)
      395 CONTINUE
      C      END OF ORGAN LOOP
      400 CONTINUE
      C      SFT UP TO WRITE DATA FOR ONE NUCLEIDE

```

E.18

```

        ARG=ALL(1,1,1)
        C(1)=1. - EXP(-ARG)
        IF (ARG.GT.1000.) OR(1)=1.
        ALPH(1)=ALPH(1,NSOL)
        705 CONTINUE
        C(1)=ALH(1)*F(1)*D3/ALL(1)
        C(2)=ALH(2)*F(2)*D3/ALL(2)*F1(1S)
        C(3)=ALH(3)*F(3)*D4/ALL(3)
        C(4)=ALH(4)*F(4)*D4/ALL(4)*F1(1S)
        C(5)=ALH(5)*F(5)*D5/ALL(5)
        C(6)=ALH(6)*F(6)*D5/ALL(6)*F1(1S)
        C(7)=ALH(7)*F(7)*D5/ALL(7)*F1(1S)
        C(8)=ALH(8)*ALH(9)*F(8)*F1(9)*D5/ALL(8)
        C(9)=C(8)/ALH(9)
        VOLMIT=9LHMIT(100000)
        DO 706 J=1,N
        706 VOLUT(J)=VOLUT(J)
        C ORGAN LOOP
        C 707 DO 900 MORG=1,25
        C TEST FOR ORGAN INCLUSION
        IF (MORG(MORG).EQ.0) GO TO 900
        C TEST FOR ORGAN-NUCLIDE COMBINATION DATA
        IORG=LONG + 1
        IF (MORG.EQ.20) LONG = 11
        DO 810 I=1,L2
        IF (MORG.EQ.1) GO TO 809
        IF (ML(1S).NE.3) GO TO 808
        IF (MORG.EQ.6.OR.MORG.GT.18) GO TO 814
        GO TO 822
        808 IF (ML(1S).NE.14) GO TO 809
        IF (MORG.GT.19) GO TO 820
        IF (MORG.EQ.19) GO TO 810
        IF (MORG.NE.6) GO TO 822
        809 CONTINUE
        KRN=10
        IF (IORG(10).EQ.MORG) GO TO 820
        810 CONTINUE
        IF (MORG.GT.19) GO TO 814
        IF (MORG.GT.19) GO TO 900
        C INITIALIZE DOSE ARRAYS FOR GI TISSUE
        DOSE(LGI)=0.
        INLNG(LGI)=0
        GO TO 900
        814 CONTINUE
        C NO ORGAN DATA FOR THIS NUCLIDE - BLANK DOSE ARRAY
        INLNG(LORG)=1
        DOSE(LORG)=" "
        GO TO 900
        820 ALAMO=LAMHIO(10) + LAMHDA(1S)
    
```

```

295      D1=1. - EXP(-ALAM0*11)
      IF(INGEST.LE.0) VQNT1=QNT1(KRN)
      D1=0.
      C   THE FOLLOWING TWO CARDS WERE ADDED TO ALLOW CHANGING THE MASS OF
      C   THE LUNG TO 570 GRAMS IF A ALPHA EMITTER DOSE IS BEING COMPUTED.
      D1=1.
      IF(MORG.EQ.0.5.AND.ENG(KRN,MORG).GT.10.) D1=1.754
      C   LOOP OVER DOSE TIMES
      R22 CONTINUE
      IF(ML(TS).NE.3) GO TO R21
      IF(MORG.EQ.1) GO TO R21
      C   SET IRTIUM DOSE TO TOTAL BODY DOSE
      IRLNK(LORG)=0
      DOSE(LORG)=DOSE(1)
      GO TO R45
      R21 CONTINUE
      IF(ML(TS).NE.14) GO TO R24
      IF(MORG.GT.18) GO TO R24
      IF(MORG.EQ.1.0M.MORG.EQ.0) GO TO R24
      C   FOR CARBON 14 SET DOSE EQUAL TO TOTAL BODY DOSE EXCEPT FOR HONE
      IRLNK(LORG)=0
      DOSE(LORG)=DOSE(1)
      GO TO R45
      R24 CONTINUE
      R2=0.
      C   ZERO OUT DOSE TIME FOR PRINT OUT IF LESS THAN 1 SEC
      IF(T2.LT.1.) T2=0.
      IF(LORG.LT.11) IRLNK(LORG)=0
      D1=21. - EXP(-ALAM0*T2)
      IF(INGEST.GT.0) GO TO R41
      DO R25 J=1,9
      ARG=ALL(J)*12
      DMEJ2(J)=1. - EXP(-ARG)
      IF(ARG.GT.1000.) DMEJ2(J)=1.
      R25 CONTINUE
      R30 CONTINUE
      IF(MORG.LE.19) D1=OROOT1(KRN,MORG)
      IF(MORG.GT.19.AND.MORG.LT.24) D1=GI00T(KRN,MORG,IS,1)
      R40 IF(T2.LE.0) GO TO R45
      IF(MORG.LE.19) D2=OROOT2(KRN,MORG,IS)
      IF(MORG.GT.19.AND.MORG.LT.24) D2=GI00T(KRN,MORG,IS,2)
      R45 IF(MORG.EQ.0) GO TO R60
      DOSE(LORG)=MASS(IS,2)*LAMDA(IS)*(D1+D2)
      IF(ML(IS).EQ.3.AND.MORG.EQ.1) DOSE(1)=DOSE(1)*2.
      GO TO R45
      C   ADD LUNG DOSE FOR THAT DEPOSITED DIRECTLY
      R60 SUM2=0.
      SUM1=0.

```


SUBROUTINE ORDOSE 73/73 OPT=1 FTN 4,6,420 11/02/76 17,54,50

```

345      DO 865 J=5,8
      SUM1=SUM1 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*05/ALL(J)
      1*(1) = OMF1(J)/ALL(J) + OMCF
      870 IF(T2,LE,0.) GO TO 880
      DO 875 J=5,8
      SUM2=SUM2 + 5.92E-4*ENG(KRN,NSOL)/OMASS(MORG)*FT(J)*05/ALL(J)**2
      1*(2) = OMF1(J)*OMEJ2(J) + OMCF
      880 DOSE(LORG)=MASS(TS,2)*LAMRDA(TS)*(SUM1+SUM2+01+02)
      GO TO 885
      C
      C INGESTION DOSE CALCULATION
      C
      881 IF(MORG,LT,19) D1=IGOR1(KRN,MORG)
      IF(MORG,GT,19) A1C,MCH(.LT,24) D1=IGIDUT(KRN,MORG,TS,3)
      IF(T2,LE,0) GO TO 882
      IF(MORG,LT,19) D2=IGOR2(KRN,MORG)
      882 DOSE(LORG)=MASS(TS,2)*LAMRDA(TS)*(D1+D2)
      IF(DOSE(LORG),LE,0) GO TO 814
      885 CONTINUE
      IF(KORG(19),EQ,0,OR,MORG,LT,20) GO TO 895
      DOSE(LGI)=DOSE(LGI)+DOSE(LORG)
      C      END OF TIME LOOP
      895 CONTINUE
      C      END OF ORGAN LOOP
      900 CONTINUE
      C      SET UP TO WRITE DATA FOR ONE NUCLIDE
      IF(TLINE+2,LE,60) GO TO 920
      WRITE NEW PAGE HEADER
      WRITE(6,410) DUV,TY,TITLE(1),TITLE2
      KFM1(2)=ISPACE(NORG)
      KFM1(1)=KFM1(2)
      WRITE(6,KFM1) ((ORGAN(M,N),M=1,2),N=1,NORG)
      IFMT(2)=KFM1(2)
      IFMT(NORG+7)=" "
      TLINE=10
      920 CONTINUE
      DE=0.
      DI = 0.
      DO 930 I=1,NORG
      IFMT(I+6)="IPE11,1"
      IF(TLNK(I),EQ,1) GO TO 930
      D1=DI+DOSE(I)*KLC1
      930 IF (TLNK(I),EQ,1) IFMT(I+6)="5x,A6"
      IF(D1,GT,0.) DE=DE+D1
      IFMT(1)="IHO,"
      IFMT(4)="A3,I3,"
      IF(TLNK(1),EQ,1) GO TO 1000
      IHN=IHN+1
      DEQ(IHN)=DE

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TITLE	30	
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8/26/76A	15	
TITLE	33	
ORDOSE	327	
ORDOSE	328	

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1      C      FUNCTION ORDOT1(KRN,MORG)
      C      ORDOT1 CALCULATES THE NORMALIZED DOSE TO AN URGAN DURING THE TIME
      C      OF UPTAKE T1.
      C
5      C      "C" ARE THE COEF. FOR THE RESPIRATORY TRACT CLEARANCE
      C      "ALAMO" IS THE EFFECTIVE REMOVAL CONSTANT FOR THE ORGAN
      C      "ALL" ARE THE EFFECTIVE REMOVAL CONSTANTS FOR THE LUNG COMPARTMENT
      C      "OMEN1" IS (1 - EXP(-ALAMO * T1))
      C      "T1" IS THE UPTAKE TIME
10     C      "NSOL" IS THE SOLUBILITY INDEX
      C      "F2P" IS THE BLOOD TO ORGAN FRACTION
      C      "FT" ARE THE RESPIRATORY TRACT CLEARANCE PATHWAY FRACTIONS
      C      "ALH" ARE THE BIOLOGICAL REMOVAL CONSTANTS FOR THE LUNG
      C      "ENG" IS THE EFFECTIVE ENERGY FOR THE NUCLIDE IN THE ORGAN
15     C      "OMASS" IS THE ORGAN MASS
      C      "D3,D4,D5" ARE THE FRACTION INHALED DEPOSITION FACTORS
      C      "OMEJ1" IS (1 - EXP(-ALL*T1))
      C      COMMON NPP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),
      C      *CHAINS,REC(620),ML(620),ICL(620)
20     C      COMMON MA(620),LAMBIO(2400),FWAT(2400),FAIR(2400),F2P(2400),
      C      *TORG(2400),ENG(2400,3)
      C      COMMON FI(620),IBEG(620),IEND(620)
      C      COMMON DOSTIM,O3,D4,D5,DIAM,UPTIME(5),KORG(25)
      C      COMMON TITLE2(8),TLN,TLH
25     C      COMMON ISM(620)
      C      COMMON IPAGE,ORGAN(2,10)
      C      COMMON NAM/ORGNAM(2,25)
      C      REAL LAMBIO,LAMBDA,MASS
      C      INTEGER CHAINS,SKIP
30     C      LOGICAL FISPRD,ACTPRD
      C      COMMON ACTPRD,FISPRD,KR,KUPT,DOY
      C      COMMON/COMO/ALAMO,ALH(9),ALL(9),C(9),FT(9),NSOL,OMEJ1(9),
      C      IOMEJ2(9),OMEN1,OMEN2,T1,T2,VONT1,VOLMT1,VOLUT1(8),OMASS(25)
      C      FIRST=0.
      C      ME1/ALAMO
      C      Y=OMEN1/ALAMO
      C      Z=Y/ALAMO
      C      DO 30 I=1,7
      C      IF(NSOL.EQ.1.AND.(I.EQ.6.OR.I.EQ.7)) GO TO 30
      C      FIRST=FIRST +C(I)*(W-Z*(Y -OMEJ1(I)/ALL(I))/(ALL(I)-ALAMO))
40     C      30 CONTINUE
      C      SECOND=C(8)*(W-Z*(Y/(ALL(9)-ALAMO)+OMEJ1(9)/ALL(9))/(ALL(9)-
      C      ALAMO))/ALL(9)
      C      IF(NSOL.LE.2) GO TO 40
      C      ALL(8).NE.ALL(9)
45     C      THIRDO=C(8)/(ALL(8)-ALL(9))*(Y-OMEJ1(9)/ALL(9))/(ALL(9)-ALAMO)
      C      1-(Y-OMEJ1(8)/ALL(8))/(ALL(8)-ALAMO)
      C      GO TO 100
      C      ALL(8).EQ.ALL(9)
50     C      40 THIRDO=C(8)/(ALL(9)-ALAMO)*2 * (OMEJ1(9)/ALL(9)-Y+(ALL(9)-ALAMO)
      C      1/ALL(9))*2*(1. -EXP(-ALL(9)*T1)*(ALL(9)*T1 +1.))
      C      100 ORDOT1=5.92E-4*ENG(KRN,NSOL)*F2P(KRN)/OMASS(MORG)*(FIRST+SECOND
      C      1 + THIRD)
      C      END

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1  FUNCTION ORDOT2(KRN,MORG,ISO)
C  ORDOT2 CALCULATES THE NORMALIZED DOSE TO AN ORGAN DURING THE TIME
C  FOLLOWING TERMINATION OF UPTAKE T2
C
C  "C" ARE THE COEF. FOR RESPIRATORY TRACT CLEARANCE
C  "ALAMO" IS THE EFFECTIVE REMOVAL CONSTANT FOR THE ORGAN
C  "ALL" ARE THE EFFECTIVE REMOVAL CONSTANTS FOR THE LUNG COMPARTMENTS
C  "OMFN1" AND "OMEN2" ARE (1 -EXP(-ALAMO*T1)) AND (1 -EXP(-ALAMO*T2))
C  "OME11" AND "OMEJ2" ARE (1 -EXP(-ALL*T1)) AND (1 -EXP(-ALL*T2))
C  "T1" IS THE UPTAKE TIME
C  "T2" IS THE DOSE TIME FOLLOWING UPTAKE
C  "NSOL" IS THE SOLUBILITY INDEX
C  "F2P" IS THE BLOOD TO ORGAN INDEX
C  "FT" ARE THE RESPIRATORY TRACT CLEARANCE PATHWAY FRACTIONS
C  "ALB" ARE THE BIOLOGICAL REMOVAL CONSTANTS FOR THE LUNG
C
COMMON NFP,NAC,NTOT,NDFNUC(96),SKIP(96),MASS(620,2),LAMRDA(620),
*CHATS,REC(620),ML(620),ICL(620)
COMMON MA(620),LAMBIO(2400),FWAT(2400),FAIR(2400),F2P(2400),
*IORG(2400),ENG(2400,3)
COMMON F1(620),IREG(620),IEND(620)
COMMON ONSTIM,D3,D4,D5,D1AM,UPTIME(5),KORG(25)
COMMON TITLE2(8),TLN,TLH
COMMON ISM(620)
COMMON IPAGE,ORGAN(2,10)
COMMON/NAM/ORGNAM(2,25)
REAL LAMBIO,LAMRDA,MASS
INTEGER CHAINS,SKIP
LOGICAL FTSPRD,ACTPRD
COMMON ACTPRD,FISPRD,KR,KUPT,D0Y
COMMON/COMO/ALAMO,ALB(9),C(9),FT(9),NSOL,OMFJ1(9),
1 OMEJ2(9),OMEN1,OMEN2,T1,T2,VQNT1,VQLMT1,VQLUT1(8),OMASS(25)
FIRST=OMEN2/ALAMO * VQNT1
SECOND=0.
DO 30 I=1,7
  FGIR=1.
  IF(MON(I,2).EQ.0.OR.I.EQ.7) FGIR=FI(ISO)
  IF(NSOL.EQ.1.AND.(I.EQ.6.OR.I.EQ.7)) GO TO 30
  SECOND=SECOND + ALB(I) / (ALL(I)-ALAMO) * (OMEN2/ALAMO-OMEJ2(I) /
  1 ALL(I)) * VQLUT1(I) * FGIB
30 CONTINUE
  IF(NSOL.LE.2) GO TO 40
  THIRD=ALB(8) * ALB(9) * FT(9) * VQLUT1(8) / (ALL(8)-ALL(9)) *
  1 (OMEN2 /ALAMO-OMEJ2(9) /ALL(9)) / (ALL(9)-ALAMO)
  2=(OMEN2 /ALAMO - OMEJ2(8) /ALL(8)) / (ALL(8)-ALAMO))
  GO TO 100
40 THIRD=ALB(8) * ALB(9) * FT(9) * VQLUT1(8) / (ALL(9)-ALAMO) * (OMEN2/ALAMO
  1 - OMEJ2(9) /ALL(9)) / (ALL(9)-ALAMO) - (1 -EXP(-ALL(9)*T2) * (ALL(9)*T2
  2 + 1.)) / ALL(9) **2
100 FOURTH=ALB(9) * VQLMT1 / (ALAMO-ALL(9)) * (OMEJ2(9) / ALI(9)
  1 - OMEN2 /ALAMO)
ORDOT2=5.92E-4 * ENG(KRN,NSOL) / OMASS(MORG) * (FIRST + F2P(KRN)
  1 * (SECOND + THIRD + FOURTH))
RETURN
END

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1      FUNCTION QNT1(KRN)
2      THIS FUNCTION CALCULATES THE QUANTITY OF A NUCLIDE PRESENT IN AN OR
3      FOLLOWING CONTINUOUS UPTAKE AT A UNIT RATE FOR A TIME T1 USING
4      THE NEW ICRP LUNG MODEL.
5
6      "T1" IS THE UPTAKE TIME
7      "C" ARE THE COEF. FOR THE RESPIRATORY TRACT CLEARANCE
8      "ALAMO" IS THE EFFECTIVE REMOVAL CONSTANT FOR THE ORGAN
9      "ALL" ARE THE EFFECTIVE REMOVAL CONSTANTS FOR THE LUNG COMPARTMENTS
10     "OMEN" IS (1 - EXP(-ALAMO*T1))
11     "OMEJ" ARE (1 - EXP(-ALL(J)*T1))
12     "NSOL" IS THE SOLUBILITY INDEX
13     "F2P" IS THE FLOOD TO ORGAN FRACTION
14
15     COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),
16     .CHAINS,REC(620),ML(620),ICL(620)
17     COMMON MA(620),LAMBIO(2400),FWAT(2400),FAIR(2400),F2P(2400),
18     .IORG(2400),ENG(2400,3)
19     COMMON FI(620),IREG(620),IEND(620)
20     COMMON DOSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)
21     COMMON TITLE2(8),TLN,TLH
22     COMMON ISM(620)
23     COMMON IPAGE,ORGAN(2,10)
24     COMMON NAM/ORGNAM(2,25)
25     REAL LAMBIO,LAMBDA,MASS
26     INTEGER CHAINS,SKIP
27     LOGICAL FISPRD,ACTPRD
28     COMMON ACTPRD,FISPRD,KR,KUPT,DOY
29     COMMON/COMO/ALAMO,ALB(9),ALL(9),C(9),FT(9),NSOL,OMFJ1(9),
30     IOMFJ2(9),OMEN1,OMEN2,T1,T2,VQNT1,VQLMT1,VOLUT1(8),OMASS(25)
31     SUM=0.
32     DO 50 I=1,7
33     IF(NSOL.EQ.1.AND.(I.EQ.6.OR.I.EQ.7)) GO TO 50
34     SUM=SUM + C(I) * (OMEN1/ALAMO - (OMEJ1(I) - OMEN1)/(ALL(I)-ALAMO))
35     50 CONTINUE
36
37     SUM=SUM + C(8)/ALL(9)*(OMEN1/ALAMO-(OMEJ1(9)-OMEN1)/(ALL(9)-ALAMO))
38     IF (NSOL.LE.2) GO TO 70
39     THIS CASE IS FOR WHEN ALL(8) NOT EQUAL TO ALL(9)
40     SUM=SUM - C(8)/(ALL(8)-ALL(9))*(OMEJ1(9)-OMEN1)/(ALL(9)-ALAMO)
41     1 - (OMEJ1(8) - OMEN1)/(ALL(8)-ALAMO))
42     GO TO 100
43
44     THIS CASE IS FOR ALL(8)=ALL(9)
45     70 SUM=SUM-C(8)/(ALL(9)-ALAMO)*2 * (EXP(-ALAMO*T1)
46     1-EXP(-ALL(9)*T1) * ((ALL(9)-ALAMO) *T1 + 1.))
47     100 QNT1=SUM * F2P(KRN)
48     RETURN
49     END

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1	FUNCTION QLUNT1(I)	QLUNT1	2
	C	QLUNT1	3
	C THIS FUNCTION CALCULATES THE QUANTITY OF A NUCLIDE PRESENT IN	QLUNT1	4
	C EACH OF THE LUNG SUB COMPARTMENTS FOLLOWING CONTINUOUS INHALATION	QLUNT1	5
5	C AT A UNIT RATE FOR A TIME T1 USING THE NEW ICRP LUNG MODEL.	QLUNT1	6
	C	QLUNT1	7
	C "F1" ARE THE RESPIRATORY TRACT CLEARANCE PATHWAY FRACTIONS	QLUNT1	8
	C "D3,D4,D5" ARE THE LUNG DEPOSITION FACTORS	QLUNT1	9
	C "OMEJ1" IS (1 - EXP(-ALL*T1))	QLUNT1	10
10	C "ALL" ARE THE EFFECTIVE REMOVAL CONSTANTS FOR THE LUNG COMPARTMENTS	QLUNT1	11
	C	QLUNT1	12
	COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),	COMNB	1
	.CHAINS,REC(620),ML(620),ICL(620)	REDIO	1
	COMMON HA(620),LAMBTO(2400),FWAT(2400),FAIR(2400),F2P(2400),	COMNB	3
15	.IORG(2400),ENG(2400,3)	COMNB	4
	COMMON F1(620),IBEG(620),IEND(620)	COMNB	5
	COMMON DOSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)	REDIO	2
	COMMON TITLE2(8),TLN,TLH	REDIO	3
	COMMON ISM(620)	8/23/76	1
20	COMMON IPAGE,ORGAN(2,10)	COMN	9
	COMMON/NAM/ORGNAM(2,25)	COMN	10
	REAL LAMBIO,LAMBDA,MASS	COMN	11
	INTEGER CHAINS,SKIP	COMN	12
	LOGICAL FISPRD,ACTPRD	COMN	13
25	COMMON ACTPRD,FISPRD,KR,KUPT,DQY	COMN	14
	COMMON/COMO/ALAMO,ALB(9),ALL(9),C(9),FT(9),NSOL,OMEJ1(9),	COMO	2
	1OMEJ2(9),OMEN1,OMEN2,T1,T2,VGNT1,VQLMT1,VQLUT1(8),nMASS(25)	COMO	3
	GO TO (10,10,20,20,30,30,30,30), I	QLUNT1	15
	10 QLUNT1= FT(I) * D3 * OMEJ1(I)/ALL(I)	QLUNT1	16
30	GO TO 100	QLUNT1	17
	20 QLUNT1= FT(I) * D4 * OMEJ1(I)/ALL(I)	QLUNT1	18
	GO TO 100	QLUNT1	19
	30 QLUNT1= FT(I) * D5 * OMEJ1(I)/ALL(I)	QLUNT1	20
	100 RETURN	QLUNT1	21
35	END	QLUNT1	22

1	FUNCTION QLIMIT1(DUMMY)	QLMIT1	2
	C	QLMIT1	3
	C THIS FUNCTION CALCULATES THE QUANTITY OF NUCLIDE PRESENT IN THE	QLMIT1	4
	C LYMPH, THAT IS REMOVABLE, FOLLOWING CONTINUOUS UPTAKE AT A UNIT	QLMIT1	5
5	C RATE FOR A TIME T1 USING THE NEW LUNG MODEL.	QLMIT1	6
	C	QLMIT1	7
	C "ALL" ARE THE REMOVAL CONSTANTS FOR THE RESPIRATORY TRACT	QLMIT1	8
	C "OMFJ1" ARE (1 - EXP(-ALL(J)*T1))	QLMIT1	9
	C "C" ARE THE COEF. FOR THE RESPIRATORY TRACT CLEARANCE	QLMIT1	10
10	C "T1" IS THE UPTAKE TIME	QLMIT1	11
	C "NSOL" IS THE SOLUBILITY INDEX	QLMIT1	12
	COMMON NFP, NAC, NTOT, NOFNUC(96), SKIP(96), MASS(620,2), LAMBDA(620),	COMNB	1
	CHAINS, REC(620), ML(620), ICL(620)	REDIO	1
	COMMON MA(620), LAMBO(2400), FWAT(2400), FAIR(2400), F2P(2400),	COMNB	3
15	IORG(2400), ENG(2400,3)	COMNB	4
	COMMON F1(620), IBEG(620), IEND(620)	COMNB	5
	COMMON DOSTIM, D3, D4, D5, DIAM, UPTIME(5), KORG(25)	REDIO	2
	COMMON TITLE2(8), TLN, TLH	REDIO	3
	COMMON ISM(620)	8/23/76	1
20	COMMON IPAGE, ORGAN(2,10)	COMN	9
	COMMON/NAM/ORGNAM(2,25)	COMN	10
	REAL LAMBIO, LAMBDA, MASS	COMN	11
	INTEGER CHAINS, SKIP	COMN	12
	LOGICAL FISPRD, ACTPRD	COMN	13
25	COMMON ACTPRD, FISPRD, KR, KIPT, DOY	COMN	14
	COMMON/COMO/ALAMO, ALB(9), ALL(9), C(9), FT(9), NSOL, OMFJ1(9),	COMO	2
	OMFJ2(9), OMEN1, OMEN2, T1, T2, VQNT1, VQLMT1, VQLUT1(8), OMASS(25)	COMO	3
	DUM=DUMMY	QLMIT1	15
	FIRST= OMFJ1(9)/ALL(9)	QLMIT1	16
30	IF(NSOL.LE.2) GO TO 50	QLMIT1	17
	C ALL8, NE, ALL9	QLMIT1	18
	QLMIT1= C(9)*(FIRST -(OMFJ1(8) - OMFJ1(9))/(ALL(8)-ALL(9)))	QLMIT1	19
	GO TO 100	QLMIT1	20
	C ALL8, EQ, ALL9	QLMIT1	21
35	50 QLMIT1= C(9)* (FIRST - T1 * EXP(-ALL(9)*T1))	QLMIT1	22
	100 RETURN	QLMIT1	23
	END	QLMIT1	24

SUBROUTINE UNIT	73/73	DPT=1	FTN 4.6+420	09/02/76	13.12.52
-----------------	-------	-------	-------------	----------	----------


```

1      C
      SUBROUTINE UNIT(DTLH,DTLN,NUPT,UPTIME)
      UNIT CONVERTS TIME IN SECONDS TO MORE CONVENIENT UNITS
      DIMENSION DTLH(10),DTLN(10),UPTIME(10)
      DO 100 I=1,NUPT
      IF(UPTIME(I).GT.60.) GO TO 10
      DTLH(I)=UPTIME(I)
      DTLN(I)="SEC"
      GO TO 100
10      IF(UPTIME(I).GT.3600.) GO TO 20
      DTLH(I)=UPTIME(I)/60.
      DTLN(I)="MIN"
      GO TO 100
20      IF(UPTIME(I).GT.86400.) GO TO 30
      DTLH(I)=UPTIME(I)/3600.
      DTLN(I)="HOURS"
      GO TO 100
30      IF(UPTIME(I).GT.3.1536E7) GO TO 40
      DTLH(I)=UPTIME(I)/86400.
      DTLN(I)="DAYS"
      GO TO 100
40      DTLH(I)=UPTIME(I)/3.1536E7
      DTLN(I)="YEARS"
100      CONTINUE
      RETURN
25      END

```

UNIT	2
UNIT	3
UNITA	1
UNIT	5
UNIT	6
UNIT	7
UNIT	8
UNIT	9
UNIT	10
UNIT	11
UNIT	12
UNIT	13
UNIT	14
UNIT	15
UNIT	16
UNIT	17
UNIT	18
UNIT	19
UNIT	20
UNIT	21
UNIT	22
UNIT	23
UNIT	24
UNIT	25
UNIT	26

09/02/76 13.12.52

FTN 4.0+420

FUNCTION QUINT1 73/73 OPT=1

```

1  FUNCTION QUINT1(QUM)
COMMON/COMO/ALAMO,ALB(Q),ALL(Q),C(Q),FT(Q),NSOL,OMFJ1(Q),
OMF12(Q),OMEN1,OMEN2,T1,T2,VQNT1,VQVMT1,VQVUT1(A),OMASS(25)
QUINT1=0.
IF(T1.LE.1.) RETURN
QQ=0.
DO 1 I=2,6,2
1  QQ=QQ+C(I)*(T1-OMEJ1(I)/ALL(I))
   QQ=QQ+C(7)*(T1-OMEJ1(7)/ALL(7))
QUINT1=QQ
RETURN
END

```

```

1/14/74 37
COMO 2
COMO 3
1/14/74 39
1/14/74 40
1/14/74 41
1/14/74 42
1/14/74 43
1/14/74 44
1/14/74 45
1/14/74 46
1/14/74 47

```

09/02/76 13.12.52

FTN 4.6+420

FUNCTION QUINT2 73/73 QPT=1

```

1      FUNCTION QUINT2(DUM)
      COMMON/COMO/ALAMO,ALB(9),ALL(9),C(9),FT(9),NSOL,OMEJ1(9),
      OMEJ2(9),OMEN1,OMEN2,I1,I2,VQNT1,VQLMT1,VQLUT1(R),OMASS(25)
      QUINT2=0.
      IF (I2.LE.1.) RETURN
      QQ=0.
      DO 1 I=2,6,2
      1  QQ=QQ+ALB(I)*VQLUT1(I)*OMEJ2(I)/ALL(I)
      QQ=QQ+ALB(7)*VQLUT1(7)*OMEJ2(7)/ALL(7)
      QUINT2=QQ
      RETURN
      END
10

```

```

      1/14/74 49
      COMO 2
      COMO 3
      1/14/74 51
      1/14/74 52
      1/14/74 53
      1/14/74 54
      1/14/74 55
      1/14/74 56
      1/14/74 57
      1/14/74 58
      1/14/74 59

```

```

1      FUNCTION GINT(KRN,MORG,ISO,IT)
        DIMENSION TAU(4)
        COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),
          .CHAINS,REC(620),ML(620),ICL(620)
          COMMON MA(620),LAMBDA(2400),FWAT(2400),FAIR(2400),F2P(2400),
          .IORG(2400),ENG(2400,3)
          COMMON F1(620),IREG(620),IEND(620)
          COMMON POSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)
          COMMON TITLE2(8),TLN,TLH
          COMMON ISM(620)
          COMMON IPAGE,ORGAN(2,10)
          COMMON/NAM/ORGNAH(2,25)
          REAL LAMBDA,LAMBDA,MASS
          INTEGER CHAINS,SKIP
          LOGICAL FISPRD,ACTPRD
          COMMON ACTPRD,FISPRD,KR,KUPT,D0Y
          COMMON/COMO/ALAMO,ALB(9),ALL(9),C(9),FT(9),NSOL,OMFJ1(9),
          IOMEJ2(9),OMEN1,OMEN2,T1,T2,VONT1,VOLMT1,VOLUT1(8),OMASS(25)
          DATA TAU/3600.,14400.,28800.,64800./

20      C
        C  QS IS TIME INTEGRAL OF ACTIVITY REACHING GI SYSTEM
        C
        C  IT = 1 FOR PERIOD 1
        C  IT = 2 FOR PERIOD 2
        C  IT = 3 FOR INGESTION
        C
        C  QS=0.
        C  IF(IT.EQ.1) QS=QUINT1(DUM)/F1(ISO)
        C  IF(IT.EQ.2) QS=QUINT2(DUM)
        C  IF(IT.EQ.3) QS=T1
        C  IGO=MORG-19
        C  IF(TGO.GT.4) GO TO 10
        C  EF=2.96E-4*ENG(KRN,NSOL)/OMASS(MORG)
        C  FONE=F1(ISO)
        C  IF(FONE.GT..95) FONE=.95
        C  TRANSFER TO GI COMPARTMENT DESIRED
        C  GO TO (1,2,3,4),IGO
        C
        C  STOMACH
        C  1 ARG=LAMBDA(ISO)*TAU(1)
        C  OM=1.-EXP(-ARG)
        C  IF(ARG.GT.1000.) OM=1.
        C  IF(ARG.LT..0001) OM=ARG
        C  FACT=EF*OM/LAMBDA(ISO)
        C  GO TO 5
        C
        C  SMALL INTESTINE
        C  2 ALF= ALNG(1./(1.-FONE))/TAU(2)
        C  ARG=(ALF+LAMBDA(ISO))*TAU(2)
        C  FACT=EF*EXP(-LAMBDA(ISO)*TAU(1))*(1.-EXP(-ARG))/(ALF+LAMBDA(ISO))
        C  GO TO 5
    
```

FUNCTION	GIOUT	73/73	OPT=1	FTN 4.6+420	09/02/76	13.12.52
50	C UPPER LARGE INTESTINE				1/14/74	25
	3 FACT=EF*EXP(-LAMHDA(ISO)*(TAU(2)+TAU(1)))*(1.-FONE)*TAU(3)				1/23/75	2
	GO TO 5				1/14/74	27
	C LOWER LARGE INTESTINE				1/14/74	28
55	4 FACT=EF*EXP(-LAMHDA(ISO)*(TAU(1)+TAU(2)+TAU(3)))*(1.-FONE)*TAU(4)				1/23/75	3
	5 GIOUT=QS*FACT				1/22/75	2
	RETURN				1/14/74	31
	10 PRINT 20, MORG				1/14/74	32
	20 FORMAT("1 MORG TOO LARGE FOR GI DOSE, = "I10)				1/14/74	33
	STOP				1/14/74	34
60	END				1/14/74	35

FUNCTION IGOR2

73/73 OPT=1

FTN 4,6+420

09/02/76 13.12.52

1	REAL FUNCTION IGOR2(KRN,MORG)	8/26/76	2
	C	IGOR	23
	C THIS FUNCTION CALCULATES THE NORMALIZED DOSE TO TN ORGAN DURING	IGOR	24
	C THE TIME FOLLOWING THE TERMINATION OF INGESTION(T2).	IGOR	25
5	C	IGOR	26
	C "ALAMO" IS THE EFFECTIVE REMOVAL CONSTANT FOR THE ORGAN	IGOR	27
	C "T2" IS THE TIME FOLLOWING THE TERMINATION OF INGESTION	IGOR	28
	C "OMEN1" IS (1 - EXP(-ALAMO * T1))	IGOR	29
	C "OMEN2" IS (1 - EXP(-ALAMO * T2))	IGOR	30
10	C "T1" IS THE INGESTION TIME	IGOR	31
	C "FWAT" IS THE FRACTION OF THE TOTAL INGESTED ACTIVITY RETAINED IN A	IGOR	32
	C CRITICAL ORGAN	IGOR	33
	C "ENG" IS THE EFFECTIVE ENERGY FOR THE NUCLIDE IN THE ORGAN	IGOR	34
	C "OMASS" IS THE ORGAN MASS	IGOR	35
15	C	IGOR	36
	COMMON/COMMON/ALAMO,ALB(9),ALL(9),C(9),FT(9),NSOL,OMFJ1(9),	COMMON	2
	10ME12(9),OMEN1,OMEN2,T1,T2,VQNT1,VQLMT1,VQLUT1(8),OMASS(25)	COMMON	3
	COMMON NFP,NAC,NTOT,NOFNUC(96),SKIP(96),MASS(620,2),LAMBDA(620),	COMMONB	1
	.CHAINS,REC(620),ML(620),ICL(620)	REDIQ	1
20	COMMON MA(620),LAMBIO(2400),FWAT(2400),FAIR(2400),F2P(2400),	COMMONB	3
	.IORG(2400),ENG(2400,3)	COMMONB	4
	COMMON F1(620),IBEG(620),IEND(620)	COMMONB	5
	COMMON DOSTIM,D3,D4,D5,DIAM,UPTIME(5),KORG(25)	REDIQ	2
	COMMON TITLE2(8),TLN,TLH	REDIQ	3
25	COMMON ISM(620)	8/23/76	1
	COMMON IPAGE,ORGAN(2,10)	COMMON	9
	COMMON/NAM/ORGNAM(2,25)	COMMON	10
	REAL LAMBIO,LAMBDA,MASS	COMMON	11
	INTEGER CHAINS,SKIP	COMMON	12
30	LOGICAL FISPRD,ACTPRD	COMMON	13
	COMMON ACTPRD,FISPRD,KR,KUPT,DOY	COMMON	14
	IGOR2=5.92E-4*ENG(KRN,NSOL)*FWAT(KRN)/(OMASS(MORG)*ALAMO)*OMEN1*(O	IGOR	39
	1MEN2/ALAMO)	IGOR	40
	RETURN	IGOR	41
35	END	IGOR	42

APPENDIX F

INPUT PREPARATION

INPUT PREPARATION

The input data needed for the calculations fall into two general categories: (1) program control variables, and (2) parameters associated with the organ dose calculation. Most of the data required by the code are contained in two data libraries (see Appendix D), thus eliminating much time-consuming preparation of input.

Program control variables consist of parameters to control the reading of the data libraries, the optional printing of some input and intermediate data, the relative risk factor for each organ specified, and the type of dose calculation to be performed (i.e., inhalation or ingestion).

The remainder of this appendix describes in detail the input variables, their use, and the manner in which they are supplied to the program.

DATA CARD DESCRIPTIONS

CARD 1 - Title Card

<u>COLUMN</u>	<u>FORMAT</u>	<u>VARIABLE</u>	<u>USE</u>
1-72	12A6	TITLE 2	Words entered here are reprinted as a title on the summary page. Each case requires a title card or blank card.

CARDS 2 to N - Namelist Data Cards (one or more namelist cards).

The minimum data for each case consist of one title card (Card 1) and one or more cards using the Namelist format (Cards 2 to N). The first Namelist card (Card 2) must have a blank in Column 1, \$INPUT in Columns 2-7, and at least one blank following, before entry of data items. Data items are separated by commas, and the last item must be followed by a \$. Each data item must have one of the three following forms:

1. Variable name = constant, where the variable name may be either subscripted or not.

2. Array name = set of constants (separated by commas). The number of constants must not exceed the number of elements in the array and they must be in the same order as the array is in storage, i.e., the first subscript changes most rapidly.
3. Subscripted variable = set of constants (separated by commas). This form results in the set of constants being placed consecutively in an array, starting with the element designated by the subscripted variable.

The Namelist variables retain their values throughout the execution of the program and need not be respecified unless a change is wished. Namelist input variables are shown in Table F-1.

When the Namelist variable NEXT has a value of 1 or 2, cards are read that select nuclides for which calculations are to be performed. The first of these cards (N+1) gives the number of nuclides to be input, while the rest (N+2 to M) give the nuclide identification parameters.

CARD N+1 - Number of Radionuclides Card

<u>COLUMN</u>	<u>FORMAT</u>	<u>VARIABLE</u>	<u>USE</u>
1-3	13	NUMBER	Controls the number of radionuclides (maximum: 500) to be read from subsequent input cards

CARDS N+2 to M - Radionuclide Cards

<u>COLUMN</u>	<u>FORMAT</u>	<u>VARIABLE</u>	<u>USE</u>
1-3	A3	NAME	Names an element selected from the Radionuclide Data Library
4-6	13	M	Gives the mass number of the selected radionuclide
7-8	12	ISL	Gives solubility class of the nuclide (1=D, 2=W, 3=Y)
9-20	12X	--	Blank space before next radionuclide entry

The format shown may be repeated 4 times on each card, starting in columns 21, 41, and 61 for additional nuclides.

TABLE F-1. Namelist Variables for Cards 2 to N

<u>VARIABLE</u>	<u>ARRAY SIZE</u>	<u>USE</u>	<u>VALUE UNITS</u>	<u>VALUES</u>
<u>I. PROGRAM CONTROL VARIABLE</u>				
NEXT	(1)	Next case options	None	1 to 4
<u>II. ORGAN DOSE VARIABLES</u>				
D3	(1)	Fraction of inhaled aerosol deposited in nasal passages	None	0 to 1
D4	(1)	Fraction of inhaled aerosol deposited in trachea and bronchia	None	0 to 1
D5	(1)	Fraction of inhaled aerosol deposited in pulmonary region	None	0 to 1
DIAM	(1)	Mass median aerodynamic diameter of inhaled material	μm	≥0
UPTIME(I)	(5)	The length of time during which inhalation intake takes place	sec	>0
DOSTIM	(1)	The length of time following the termination of inhalation intake for which the dose is to be calculated	sec	>0
ORGANS(I)	(10)	Selects the organs for which the dose is to be calculated. NOTE: Each calculation must use total body as the first organ, and supply other organs in increasing index order. (See Table F-2.)	None	1 to 18 (integer)
<u>III. DOSE MODEL CONTROL VARIABLE</u>				
INGEST	(1)	Bypasses inhalation dose model and calculates ingestion dose. (Default = 0 = inhalation model)	None	0 or 1
<u>IV. RELATIVE RISK FACTORS</u>				
RL(I)	(10)	Sets the relative risk factor for each organ specified (listed in the same order as the organs)	Events per Rem	≥0
RWB	(1)	Sets the relative risk factor for external whole-body irradiation	Events per Rem	>0

NAMelist VARIABLE EXPLANATION

NEXT is a variable controlling the dose calculations. It tells the program what to do after the Namelist data have been read, and controls library reading and the input of the radionuclide identification list. There are 4 options, corresponding to NEXT = 1,2,3,4.

NEXT = 1 Reads in libraries and a set of nuclide identification cards.

NEXT = 2 Reads in a new set of nuclide identification cards; Namelist variables may be changed.

NEXT = 3 Namelist variables may be changed.

NEXT = 4 End of job. No further calculations are done. Provides for normal exit.

Any of the Namelist variables may be changed when NEXT = 1, 2 or 3. NEXT must be specified as 1 in the first case so the libraries will be read.

ORGANS

Table F-2 shows the list of possible organs used in the REDIQ code, with their numerical indices.

TABLE F-2. Numerical Index of Organs

<u>INDEX</u>	<u>ORGAN</u>	<u>INDEX</u>	<u>ORGAN</u>
1	Total body	12	Skin
2	Body water	13	Brain
3	Kidneys	14	Muscle
4	Liver	15	Prostate
5	Spleen	16	Thyroid
6	Bone	17	Pancreas
7	Fat	18	Heart
8	Lungs	19	GI tract
9	Adrenals	20	Stomach
10	Testes	21	Small intestine
11	Ovaries	22	Upper large intestine
		23	Lower large intestine

Index 19 causes the sum of doses to the GI compartments to be printed.

RL, RWB

Values for risk factors must be supplied by the user in the same order that the organs are specified, with RWB corresponding to whole body external irradiation. The risk factors must all be related to the same biological effect. Typical units for risk factors are events per rem. At least one non-zero value must be given for organs (other than total body) for which nuclide data is given in the data library.

APPENDIX G

SAMPLE PROBLEM

SAMPLE PROBLEM

A sample problem is presented here to illustrate use of the computer program. The inhalation and ingestion intake equivalents are calculated for seven transuranium nuclides based on relative risk factors for cancer deaths. The inhalation dose calculation is performed for exposure to aerosols with activity median aerodynamic diameters (AMAD) of 0.05, 0.1, 1.0 and 5.0 μm . Inhalation of Class W and Class Y compounds is considered. The run consists of eight cases for inhalation (four particle sizes times two translocation classes) and one case for ingestion. The order of the cases is indicated below. The uptake time for each case is 1 minute (UPTIME(1) = 60).

<u>Case</u>	<u>Intake Mode</u>	<u>Parameters</u>
1	Inhalation	NEXT = 1, DIAM = 0.05, Translocation Class W
2	Inhalation	NEXT = 3, DIAM = 0.1, Translocation Class W
3	Inhalation	NEXT = 3, DIAM = 1.0, Translocation Class W
4	Inhalation	NEXT = 3, DIAM = 5.0, Translocation Class W
5	Inhalation	NEXT = 2, DIAM = 0.05, Translocation Class Y
6	Inhalation	NEXT = 3, DIAM = 0.1, Translocation Class Y
7	Inhalation	NEXT = 3, DIAM = 1.0, Translocation Class Y
8	Inhalation	NEXT = 3, DIAM = 5.0, Translocation Class Y
9	Ingestion	NEXT = 3, INGEST = 1
10	End of Run	NEXT = 4

The relative risk values used in this sample problem were developed by Strom and Watson⁽¹⁾ based on data presented in the BEIR Committee report.⁽²⁾

The following was taken from the report by Strom and Watson.

"There are no adequate data for estimating the risk of cancer in man from inhalation of any of the transuranics. The BEIR Committee estimates of the risk of excess deaths from cancer in the United States population from exposure to ionizing radiation are interpreted in this report in terms of risk of death per person per unit dose for several organs of reference. Described in these terms, the assumption of dose-effect linearity is implied. The linear extrapolation of effects at doses where effects have been observed to effects at lower doses remains unresolved. The estimates of absolute risk given in Table XIV for those 10 years of age and over have been used in the estimation of equivalent risks that might result from whole-body irradiation or from the inhalation of transuranium elements. Risk estimates provided by the BEIR Committee are not applicable to several organs of reference, e.g. liver and kidneys. Thus, for these organs risk estimates have been assumed that seem to be reasonable in light of comparable values provided in the BEIR Committee's report."

(Table XIV mentioned above is Table 3.2 of Appendix II of the BEIR Committee report.) The values of risk estimates suggested by Strom and Watson are given in Table G-1. These values are used in the sample problem for inhalation and ingestion intake (Namelist variable RL). A listing of input cards is given in Figure G-1. The nuclides considered are ^{236}Pu , ^{238}Pu , ^{239}Pu , ^{240}Pu , ^{241}Pu , ^{242}Pu and ^{241}Am . A listing of the output from the sample problem is given in Figure G-2.

TABLE G-1. Assumed Values Used in Calculating Estimates of Risk

<u>Type of Cancer</u>	<u>Excess Cancer (deaths/10^6/a/rem)</u>
GI tract including stomach	1.0(a)
Lungs	1.3(a)
Bone	0.2(a)
Kidneys	0.5(b)
Liver	0.5(b)
All other (total body)	2.5(c)

(a) Value from BEIR Committee report.

(b) Estimated equipartition of risks provided in BEIR Committee report from all cancers other than leukemia, breast, lung, GI tract, stomach, and bone.

(c) Estimated as sum of leukemia and breast cancer risks as provided in BIER Committee report.

```

                                TRANSLOCATION CLASS W      0.05 MICRON PARTICLES
$INPUT NEXT=1,DIAM=.05,UPTIME(1)=60.,      ORGANS(1)=1,3,4,6,8,19,20,21,
22,23,RL(1)=2.5E-6,.5E-6,.5E-6,.2E-6,1.3E-6,1.E-6,PWR=2.5E-06$
7      1.0
PU 236 2          PU 238 2          PU 239 2          PU 240 2
PU 241 2          PU 242 2          AM 241 2
                                TRANSLOCATION CLASS W      0.1 MICRON PARTICLES
$INPUT NEXT=3,DIAM=.1$
                                TRANSLOCATION CLASS W      1.0 MICRON PARTICLES
$INPUT NEXT=3,DIAM=1.$
                                TRANSLOCATION CLASS W      5.0 MICRON PARTICLES
$INPUT NEXT=3,DIAM=5.$
                                TRANSLOCATION CLASS Y      0.05 MICRON PARTICLES
$INPUT NEXT=2,DIAM=.05$
7      1.0
PU 236 3          PU 238 3          PU 239 3          PU 240 3
PU 241 3          PU 242 3          AM 241 3
                                TRANSLOCATION CLASS Y      0.1 MICRON PARTICLES
$INPUT NEXT=3,DIAM=.1$
                                TRANSLOCATION CLASS Y      1.0 MICRON PARTICLES
$INPUT NEXT=3,DIAM=1.$
                                TRANSLOCATION CLASS Y      5.0 MICRON PARTICLES
$INPUT NEXT=3,DIAM=5.$
                                SAMPLE PROBLEM FOR INGESTION OF RADIONUCLIDES
$INPUT NEXT=3,INGEST=1$
                                END OF PUN
$INPUT NEXT=4$

```

FIGURE G-1. Input Card Listing for Sample Problem

FIGURE G-2. Sample Problem Output

11/02/76

TASK GROUP LUNG MODEL
50-YEAR DOSE COMMITMENT
REM PER MICROCURIE INGESTED
SAMPLE PROBLEM FOR INGESTION OF RADIONUCLIDES

RADIONUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 234	5.5E-06	2.5E-05	3.3E-05	2.2E-04		1.1E-01
PU 238	1.7E-02	7.4E-02	8.0E-02	6.4E-01	1.5E-02	1.1E-01
PU 239	1.9E-02	8.2E-02	8.4E-02	7.3E-01	1.4E-02	1.0E-01
PU 240	1.9E-02	8.2E-02	8.7E-02	7.3E-01	1.4E-02	1.0E-01
PU 241	3.1E-04	1.5E-03	1.5E-03	1.3E-02		2.0E-03
PU 242	1.9E-02	7.9E-02	8.4E-02	6.4E-01	1.4E-02	9.8E-02
AM 241	5.5E-02	4.1E-01	7.1E-01	7.6E-01	1.5E-02	1.1E-01

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INTAKE EQUIVALENT VALUES FOR
SAMPLE PROBLEM FOR INGESTION OF RADIONUCLIDES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIES)
PU 234	2.3E+01
PU 238	6.6E+00
PU 239	6.2E+00
PU 240	6.2E+00
PU 241	3.6E+02
PU 242	6.6E+00
AM 241	2.5E+00

11/02/76

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NUCLIDE LIST

PU 236 2 PU 238 2 PU 239 2 PU 240 2 PU 241 2 PU 242 2

AM 241 2
DIAM = .050 MICROMETERS

D3 = .001

D4 = .080

D5 = .586

1 UPTAKE TIMES, SECONDS 4.000E+01
DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS
ORGAN RL

TOTAL BODY	2.5E-06
KIDNEYS	5.0E-07
LIVER	5.0E-07
BONE	2.0E-07
LUNGS	1.3E-06
GI TRACT	1.0E-06
WHOLE BODY	2.5E-06

11/02/76

TASK GROUP LUNG MODEL
 50-YEAR DOSE COMMITMENT
 REM PFR MICROCURIE INHALED
 TRANSLOCATION CLASS W 0.05 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 236	9.2E+03	3.8E+02	1.5E+01	1.9E+01	8.7E+00	2.5E+02
PU 238	9.1E+01	3.9E+02	1.3E+03	1.9E+03	1.3E+02	5.6E+02
PU 239	1.0E+02	4.3E+02	1.4E+03	2.1E+03	1.2E+02	5.3E+02
PU 240	1.0E+02	4.3E+02	1.4E+03	2.1E+03	1.2E+02	5.3E+02
PU 241	1.6E+00	7.6E+00	2.3E+01	3.9E+01	3.9E+02	1.0E+03
PU 242	9.7E+01	4.1E+02	1.3E+03	2.0E+03	1.2E+02	5.0E+02
AM 241	9.6E+01	6.4E+02	1.1E+03	1.2E+03	1.3E+02	5.7E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
 TRANSLOCATION CLASS W 0.05 MICRON PARTICLES

NUCLIDE EQUIVALENT INTAKE
 (MICROCURIES)

PU 236 2.2E+01
 PU 238 1.6E+03
 PU 239 1.4E+03
 PU 240 1.4E+03
 PU 241 9.2E+02
 PU 242 1.5E+03
 AM 241 1.7E+03

11/02/76

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ORGAN DATA LIBRARY REVISED AUGUST 18, 1976

DIAM = .100 MICROMETERS

D3 = .008

D4 = .080

D5 = .500

1 UPTAKE TIMES, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY 2.5E-06

KIDNEYS 5.0E-07

LIVER 5.0E-07

HONF 2.0E-07

LUNGS 1.3E-06

GI TRACT 1.0E-06

WHOLE BODY 2.5E-06

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11/02/76

TASK GROUP LUNG MODEL
50-YEAR DOSE COMMITMENT
WFM PER MICROCURIE INHALED
TRANSLLOCATION CLASS W 0.1 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 236	8.2E+03	3.8E+02	1.5E+01	1.9E+01	7.4E+00	2.2E+02
PU 238	8.1E+01	3.5E+02	1.1E+03	1.7E+03	1.1E+02	4.9E+02
PU 239	9.0E+01	3.8E+02	1.2E+03	1.9E+03	1.0E+02	4.6E+02
PU 240	9.0E+01	3.8E+02	1.2E+03	1.9E+03	1.0E+02	4.6E+02
PU 241	1.4E+00	6.8E+00	2.1E+01	3.5E+01	3.3E+02	8.9E+04
PU 242	8.7E+01	3.7E+02	1.2E+03	1.8E+03	1.0E+02	4.4E+02
AM 241	7.7E+01	5.8E+02	1.0E+03	1.1E+03	1.1E+02	5.0E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLLOCATION CLASS W 0.1 MICRON PARTICLES

NUCLIDE EQUIVALENT INTAKE
(MICROCURIES)

PU 236	2.5E+01
PU 238	1.8E+03
PU 239	1.6E+03
PU 240	1.6E+03
PU 241	1.0E+01
PU 242	1.7E+03
AM 241	1.9E+03

11/02/76

***** INPUT DATA *****

ORGAN DATA LTHQRY REVISED AUGUST 1A, 1976

DIA1 = 1.000 MICROMETERS

D1 = .288

D4 = .080

D5 = .234

1 UPTAKE TIMES, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY 2.5E-06

KIDNEYS 5.0E-07

LIVER 5.0E-07

BONE 2.0E-07

LUNGS 1.3E-06

GI TRACT 1.0E-06

WHOLE BODY 2.5E-06

11/02/76

TASK GROUP LUNG MODEL
50-YEAR DOSE COMMITMENT
REM PER MICROCURIE INHALED
TRANSLLOCATION CLASS W 1.0 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 236	1.3E+02	5.9E+02	2.4E+01	3.0E+01	3.5E+00	3.7E+02
PU 238	6.7E+01	2.8E+02	9.3E+02	1.4E+03	5.2E+01	5.3E+02
PU 239	7.4E+01	3.1E+02	1.0E+03	1.6E+03	4.9E+01	5.0E+02
PU 240	7.4E+01	3.1E+02	1.0E+03	1.6E+03	4.9E+01	5.0E+02
PU 241	1.2E+00	5.6E+00	1.7E+01	2.9E+01	1.6E+02	9.7E+04
PU 242	7.1E+01	3.0E+02	9.7E+02	1.5E+03	4.7E+01	4.7E+02
AM 241	6.3E+01	4.7E+02	8.2E+02	8.4E+02	5.3E+01	5.4E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLLOCATION CLASS W 1.0 MICRON PARTICLES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIIPS)
PU 236	5.2E-01
PU 238	2.2E-03
PU 239	2.0E-03
PU 240	2.0E-03
PU 241	1.2E-01
PU 242	2.1E-03
AM 241	2.4E-03

11/02/76

***** INPUT DATA *****

ORGAN DATA LIBRARY REVISED AUGUST 18, 1976
DIAM = 5.000 MICROMETERS
D3 = .770
D4 = .080
D5 = .109
1 UPTAKE TIMES, SECONDS 6.000E+01
DOSE TIME, SECONDS 1.574E+09

RELATIVE RISK FACTORS

ORGAN	RL
TOTAL BODY	2.5E-06
KIDNEYS	5.0E-07
LIVER	5.0E-07
BONE	2.0E-07
LUNGS	1.3E-06
GI TRACT	1.0E-06
WHOLE BODY	2.5E-06

11/02/76

TASK GROUP LUNG MODEL
50-YEAR DOSE COMMITMENT
REM PER MICROCURIE INHALED
TRANSLOCATION CLASS W 5.0 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 234	2.2E+02	9.9E+02	3.9E+01	5.0E+01	1.6E+00	7.5E+02
PU 238	8.0E+01	3.4E+02	1.1E+03	1.7E+03	2.4E+01	9.0E+02
PU 239	6.9E+01	3.8E+02	1.2E+03	1.9E+03	2.3E+01	8.5E+02
PU 240	8.0E+01	3.8E+02	1.2E+03	1.9E+03	2.3E+01	8.5E+02
PU 241	1.4E+00	6.8E+00	2.1E+01	3.4E+01	7.3E+03	1.6E+03
PU 242	8.6E+01	3.8E+02	1.2E+03	1.9E+03	2.2E+01	8.0E+02
AM 241	7.6E+01	5.7E+02	9.9E+02	1.1E+03	2.4E+01	9.2E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLOCATION CLASS W 5.0 MICRON PARTICLES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIES)
PU 236	9.7E-01
PU 238	1.9E-03
PU 239	1.7E-03
PU 240	1.8E-03
PU 241	1.0E-01
PU 242	1.8E-03
AM 241	2.1E-03

11/02/76

***** INPUT DATA *****

ORGAN DATA LIBRARY REVISED AUGUST 18, 1976

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NUCLIDE LIST

PU 236 3 PU 238 3 PU 239 3 PU 240 3 PU 241 3 PU 242 3

AM 241 3

DIAM = .050 MICROMETERS

D3 = .001

D4 = .080

D5 = .586

1 UPTAKE TIMES, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY 2.5E-06

KIDNEYS 5.0E-07

LIVER 5.0E-07

BONE 2.0E-07

LUNGS 1.3E-06

GI TRACT 1.0E-06

WHOLE BODY 2.5E-06

11/02/76

TASK GROUP LUNG MODPL
50-YEAR DOSE COMMITMENT
RFM PER MICROCURIE INHALED
TRANSLOCATION CLASS Y 0.05 MICRON PARTICLES

RADIONUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 236	1.8E+04	8.3E+04	3.3E+03	4.2E+03	9.2E+00	2.7E+02
PU 238	5.6E+01	2.4E+02	8.0E+02	1.2E+03	1.3E+03	6.0E+02
PU 239	6.4E+01	2.7E+02	8.9E+02	1.4E+03	1.2E+03	5.7E+02
PU 240	6.4E+01	2.7E+02	8.9E+02	1.4E+03	1.2E+03	5.7E+02
PU 241	8.7E+01	4.2E+00	1.3E+01	2.1E+01	2.1E+00	1.1E+03
PU 242	6.2E+01	2.6E+02	8.6E+02	1.3E+03	1.2E+03	5.4E+02
AM 241	5.5E+01	4.1E+02	7.2E+02	7.6E+02	1.3E+03	6.1E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLOCATION CLASS Y 0.05 MICRON PARTICLES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIES)
PU 236	2.1E+01
PU 238	9.8E+04
PU 239	9.7E+04
PU 240	9.7E+04
PU 241	1.4E+01
PU 242	1.0E+03
AM 241	9.8E+04

***** INPUT DATA *****

11/02/76

ORGAN DATA LIBRARY REVISED AUGUST 18, 1976
DIA = .100 MICROMETERS

D3 = .008

D4 = .080

D5 = .500

1 UPTAKE TIMES, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.574E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY 2.5E-06

KIDNEYS 5.0E-07

LIVER 5.0E-07

BONE 2.0E-07

LUNGS 1.3E-06

GT TRACT 1.0E-06

WHOLE BODY 2.5E-06

11/02/76

TASK GROUP LUNG MODFL
50-YEAR DOSE COMMITMENT
REM PER MICROCURIE INHALED
TRANSLOCATION CLASS Y 0.1 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 236	1.9E+04	8.6E+04	3.4E+03	4.3E+03	7.9E+00	2.5E+02
PU 238	4.8E+01	2.1E+02	6.9E+02	1.0E+03	1.1E+03	5.3E+02
PU 239	5.5E+01	2.3E+02	7.6E+02	1.2E+03	1.0E+03	5.0E+02
PU 240	5.5E+01	2.3E+02	7.6E+02	1.2E+03	1.0E+03	5.0E+02
PU 241	7.4E+01	3.6E+00	1.1E+01	1.8E+01	1.8E+00	9.4E+04
PU 242	5.3E+01	2.3E+02	7.4E+02	1.1E+03	9.9E+02	4.8E+02
AM 241	4.7E+01	3.5E+02	6.2E+02	6.5E+02	1.1E+03	5.4E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLOCATION CLASS Y 0.1 MICRON PARTICLES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIES)
PU 236	2.4E-01
PU 238	1.1E-03
PU 239	1.1E-03
PU 240	1.1E-03
PU 241	1.7E-01
PU 242	1.2E-03
AM 241	1.2E-03

11/02/76

***** INPUT DATA *****

ORGAN DATA LIBRARY REVISED AUGUST 18, 1976

DIAM = 1.000 MICROMETERS

D3 = .288

D4 = .080

D5 = .230

1 UPTAKE TIME, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY 2.5E-06

KIDNEYS 5.0E-07

LIVER 5.0E-07

BONE 2.0E-07

LUNGS 1.3E-06

GT TRACT 1.0E-06

WHOLE BODY 2.5E-06

11/02/76

TASK GROUP LUNG MODEL
50-YEAR DOSE COMMITMENT
RFM PER MICROCURIE INHALED
TRANSLLOCATION CLASS Y 1.0 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PII 236	6.9E+04	3.1E+03	1.3E+02	1.6E+02	3.7E+00	4.3E+02
PII 238	2.5E+01	1.1E+02	3.5E+02	5.1E+02	5.1E+02	6.0E+02
PII 239	2.8E+01	1.2E+02	3.9E+02	5.9E+02	4.8E+02	5.7E+02
PII 240	2.8E+01	1.2E+02	3.9E+02	5.9E+02	4.8E+02	5.7E+02
PII 241	3.8E+01	1.8E+00	5.7E+00	0.3E+00	4.5E+01	1.1E+03
PII 242	2.7E+01	1.1E+02	3.7E+02	5.5E+02	4.6E+02	5.4E+02
AM 241	2.4E+01	1.8E+02	3.1E+02	3.3E+02	5.2E+02	6.2E+02

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLLOCATION CLASS Y 1.0 MICRON PARTICLES

NUCLIDE	EQUIVALENT INTAKE (MICROCURIES)
PII 236	5.1E+01
PII 238	2.4E+03
PII 239	2.3E+03
PII 240	2.3E+03
PII 241	3.3E+01
PII 242	2.4E+03
AM 241	2.4E+03

11/02/76

***** INPUT DATA *****

ORGAN DATA LIBRARY REVISED AUGUST 14, 1976
DIAM = 5.000 MICROMETERS

D3 = .770

D4 = .000

D5 = .100

1 UPTAKE TIMES, SECONDS 6.000E+01

DOSE TIME, SECONDS 1.570E+02

RELATIVE RISK FACTORS

ORGAN PL

TOTAL BODY	2.5E-06
KIDNEYS	5.0E-07
LIVER	5.0E-07
BONE	2.0E-07
LUNGS	1.3E-06
GI TRACT	1.0E-06
WHOLE BODY	2.5E-06

11/02/76

TASK GROUP LUNG MODEL
50-YEAR DESE COMMITMENT
DEM PER MICROCURIE INHALED
TRANSLOCATION CLASS V 5.0 MICRON PARTICLES

RADIO- NUCLIDE	TOTAL BODY	KIDNEYS	LIVER	BONE	LUNGS	GI TRACT
PU 234	1.6E+03	7.2E+03	2.8E+02	3.6E+02	1.7E+00	8.5E+02
PU 234	1.5E+01	6.6E+01	2.2E+02	3.2E+02	2.4E+02	1.0E+01
PU 239	1.7E+01	7.4E+01	2.4E+02	3.7E+02	2.2E+02	9.6E+02
PU 240	1.7E+01	7.4E+01	2.4E+02	3.7E+02	2.2E+02	9.6E+02
PU 241	2.5E+01	1.2E+00	3.7E+00	6.0E+00	3.9E+01	1.9E+03
PU 242	1.7E+01	7.1E+01	2.3E+02	3.4E+02	2.2E+02	9.1E+02
AM 241	1.5E+01	1.1E+02	1.9E+02	2.1E+02	2.4E+02	1.0E+01

11/02/76

INTAKE EQUIVALENT VALUES FOR
TRANSLOCATION CLASS V 5.0 MICRON PARTICLES

NUCLIDE EQUIVALENT INTAKE
(MICROCURIES)

PU 234	1.1E+00
PU 234	4.5E+03
PU 239	4.4E+03
PU 240	4.4E+03
PU 241	5.2E+01
PU 242	4.6E+03
AM 241	4.6E+03

11/02/76

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ORGAN DATA LIBRARY REVISED AUGUST 18, 1976
1 UPTAKE TIMES, SECONDS 6.000E+01
DOSE TIME, SECONDS 1.578E+09

RELATIVE RISK FACTORS

ORGAN RL

TOTAL BODY	2.5E-06
KIDNEYS	5.0E-07
LIVER	5.0E-07
BONE	2.0E-07
LUNGS	1.3E-06
GT TRACT	1.0E-06
WHOLE BODY	2.5E-06

ORGAN DOSE CALCULATIONS MADE FOR INGESTED RADIONUCLIDES

REFERENCES FOR APPENDIX G

1. P. O. Strom and E. C. Watson, "Calculated Doses from Inhaled Trans-uranium Radionuclides and Potential Risk Equivalence to Whole-Body Radiation." Transuranium Nuclides in the Environment, IAEA-SM-199/114, Vienna, 1976.
2. The Advisory Committee on Biological Effects of Ionizing Radiation, The Effects on Populations of Exposure to Low Levels of Ionizing Radiation. National Academy of Sciences - National Research Council, Washington, DC 20006, 1972.

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