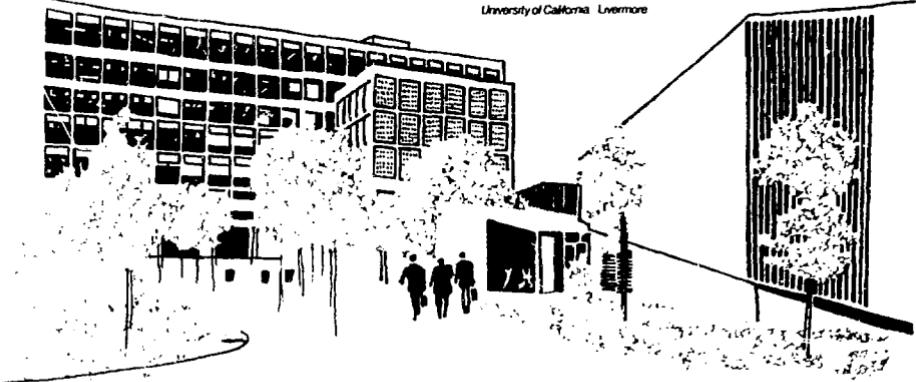# ACTL: EVALUATED NEUTRON ACTIVATION CROSS SECTION LIBRARY—EVALUATION TECHNIQUES AND REACTION INDEX

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ACTL: EVALUATED NEUTRON ACTIVATION CROSS SECTION LIBRARY—EVALUATION TECHNIQUES AND REACTION INDEX

ABSTRACT

We have compiled a library of evaluated neutron-induced activation cross sections (ACTL). The library covers incident neutron energies from 10^{-10} to 20 MeV. General descriptions of the evaluation methods and an index to the evaluated cross sections are presented.

INTRODUCTION

The ACTL library includes angle-integrated cross section evaluations of neutron-induced reactions on 255 target nuclei. It closely follows both the philosophy and the format of ENDL (the Evaluated Nuclear Data Library).[1]

The purpose of the ACTL library, as that of ENDL, is to provide evaluated nuclear data for use in the Laboratory's applied physics and engineering calculations—data that have been made as simple and succinct as possible, but that have been derived with as little sacrifice as possible of the real physics. To this end, some of the experimental detail has been restricted to a practical limit, as in the case of the (n,γ) capture reactions. Here, the inclusion of a very detailed measured resonance structure has been avoided, but all (n,γ) cross sections in the library have been smoothed and adjusted in such a way that any corresponding measured resonance integral values can be reproduced within the ex-

perimental error limits.* On the other hand, for most activation reactions, there are only a few measured cross section values extending over the full incident neutron energy range. These cases make it necessary to evoke the aid of nuclear systematics and statistical model calculations to fill in the "gaps" in the available experimental data.

The ACTL library represents a "first pass" attempt to update and improve data within a relatively short period. As such, we recognize the need to continue upgrading the library. Where necessary, further modification and improvement of the nuclear systematics will be carried out, and more extensive use will be made of statistical model calculations to fill in the gaps in the cross section data. The library will also be expanded in response to user requests.

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*Further discussion of (n,γ) cross section evaluations appears in the next section.

EVALUATED ACTIVATION CROSS SECTIONS

ACTIVATION REACTIONS

The ACTL library contains evaluated activation cross sections for 233 ground-state target isotopes as well as for 22 isomeric targets. The evaluations have been done for specific first-order reactions (where the targets are stable isotopes of an element) and for the related second-order reactions

(where the targets are the immediate activation products from reactions on these stable isotopes). Consequently, a large number of cross sections are provided for unstable targets. Cross sections are usually included for the following reactions: (n,γ), $(n,2n)$, $(n,3n)$, (n,p), $(n,n'p)$, (n,pn), (n,α), $(n,n'\alpha)$, and $(n,\alpha n)$. Some (n,d), (n,t), $(n,{}^3He)$, $(n,n'd)$, and $(n,n't)$ cross sections are also provided. On the

average, about five reactions per target isotope have been evaluated. Cross sections for reactions leading to isomeric products are included where appropriate. In the case of the isotopes ^{58}Co, ^{60}Co, ^{62}Co, ^{174}Lu, ^{176}Lu, and ^{204}Pb, cross section evaluations were made for the inelastic scattering processes that lead to the production of unstable ground states or isomers. A complete index of all available reaction cross sections in ACTL is given in the last section.

Although most of the ACTL cross section library consists of new evaluations, some evaluations of suitable, integrated activation cross sections from ENDL were incorporated into the ACTL file.

EVALUATION METHODS

Good experimental data, whenever available, are the basis for all ACTL evaluations, and the latest available measurements are used as much as possible in this first pass. The prime source of the experimental cross section data is ECSIL (Experimental Cross Section Information Library).[2] To the extent that time permitted, the ACTL evaluations follow the same guidelines that are used in the ENDL evaluations to examine the experimental data and to determine their validity. If only one set of cross section measurements was available and it was ascertained to be the result of good experimental procedures, then the evaluation followed the trend of that data. If several sets of cross section measurements existed over the same neutron energy range, and they disagreed beyond the experimental error limits, then it was necessary to investigate in more detail the experimental procedures that produced each set of cross sections before a choice was made as to which set or sets were the most reliable.

Nuclear systematics and, to some extent, statistical model calculations also contributed to the evaluation process. Given the range of incident neutron energies, targets both stable and unstable, and the great variety of reaction types leading to activation, it is not surprising that most of the desired cross section information has not been measured. Calculations based on formal or informal systematics must be used to fill the gaps. Where conflicting experimental data exist, as a result of what appear to be equally good experiments, systematics and theoretical calculations can serve as

guides in evaluating and choosing the "best" cross sections and cross sections trends. In cases where the systematics or theoretical calculations appear to be in disagreement with some part of the experimental data, the calculations are normalized to the experimental values, provided the experimental work is judged to be good.

SPECIFIC REACTIONS

(n,γ) Reaction

The cross section for the neutron capture reaction—for all but very light and closed-shell nuclei—is significantly large over most of the incident neutron energy range from 10^{-10} to 20 MeV. At thermal and other energies in this neutron energy range, experimental capture cross sections have been measured for most of the stable isotopes. Some capture cross sections have also been measured for unstable nuclei, mainly at thermal energies.

The usual starting point for an evaluation of a capture cross section is to use the measured value at thermal energy if such a measurement has been made. If there is no experimental thermal value, an estimate may be made from the trends of the measured thermal cross sections for other isotopes of that element. If we assume that the thermal cross section for a target is not affected by resonance structure and that the cross section reaction does not lead to a closed-shell product, then we know that the magnitude of the cross section will decrease as the isotopic mass number increases and that the magnitude will be larger for targets with an odd neutron number. Generally an estimate of the value can be made from the relation $\sigma(A + 2) = \sigma(A)/2$ or some similar fraction, depending on the trends in that particular Z, A range.

At energies greater than thermal, the magnitude of the cross section falls off, usually at a $1/v$ rate (v is the neutron velocity), until the resonance region is reached. For most stable isotopes, capture measurements have been made over some portion of the resonance region and beyond; from such measurements cross section information can either be obtained directly or can be derived from tabulated resonance parameter data. These experimental data can then be "pieced" together by following the general trend of capture cross sections for most medium- and heavy-weight

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nuclei, with the exception of those cases where closed-shell products are formed.

Resolved resonances in the cross section will appear at different neutron energy ranges, depending on the mass. For very low mass numbers, resolved resonances generally do not appear until about the MeV range; for targets with masses in the neighborhood of 100, these resonances begin to occur in the low eV range; and for very high mass numbers, the onset of resolved resonances may occur in the range of a fraction of an eV. These resonances, of course, are imposed upon a continuously decreasing $1/v$ background. The capture cross section continues to decrease slowly through the unresolved resonance region. At energies of a few hundred keV the cross section will begin to rise due to the contributions from incident neutrons with higher partial waves and the decrease in the competition from the compound elastic cross section. Over the next few hundred keV, it will level off due to competitive inelastic scattering. As the neutron energy continues to increase and many other reaction channels become available, the compound nucleus portion of the capture cross section drops off rapidly, becoming insignificant in the MeV range. Although semidirect and direct contributions to the capture cross section increase in the region of 10 to 20 MeV, their magnitudes seldom exceed the 1 to 10 mb range.

In the absence of any capture cross section data, information sometimes may be gleaned from total cross section measurements made in the resonance region and from estimates of the gamma-ray widths (Γ_γ). In the total absence of any type of cross section measurements, a capture cross section can be estimated by scaling from the magnitude of a known neighboring capture cross section—the scaling based on the relative thermal cross section values and estimates.

One of our goals during the (n,γ) evaluations was to ensure that every capture cross section yielded a resonance capture integral that was consistent with reliable measured values. The resonance capture integral is defined as[3]

$$I_{cap.} = \int_{E_c}^{\infty} \sigma_{cap.}(E) \frac{dE}{E} ,$$

where E_c is the cadmium cut-off energy, which is assumed to equal 0.5 eV. We have written two codes

to calculate the resonance integral obtained from each evaluated cross section and to modify the cross section if there is disagreement between the computed and measured resonance integrals. One code, CONTRACT, modifies data when there are too many cross section entries per energy decade. The modification consists of averaging these data to nine groups per decade and then assigning the midpoint energy to each group, producing a new pointwise (energy, cross section pair) file. When there are only a few cross section entries, the second code, NGAMPROC, expands the data to 200 entries by interpolating between the original entries; thins out the expanded data; averages the thinned data to nine groups per energy decade; and then assigns the midpoint energy to each group, producing the same type of pointwise file as CONTRACT. Having produced this new pointwise data file, each code calculates[4] the resonance integral and then offers the option of applying a constant multiplier of choice to the cross section over an energy range of choice. If the multiplier and energy range are supplied, the data are modified accordingly and the resonance integral is recomputed; this procedure can be repeated until the calculated resonance integral is in agreement with the experimental value. These two processing codes permit us to obtain uniform, pointwise files of evaluated cross section data. Clearly, if much detail is known in the resonance region, and we apply the CONTRACT code to the data, then considerable detail will be lost. It is to correct this that agreement with measured resonance integrals is forced. For specific problems that require detailed resonance data, ACTL should not be used if the equivalent evaluation is available in ENDL.[1]

$(n,2n)$, $(n,3n)$, $(n,4n)$ Reactions

Few experimental measurements of $(n,2n)$ cross sections have been made over an extended range of neutron energies; most measurements have only been made around 14 MeV. Even less experimental data are available for $(n,3n)$ and $(n,4n)$ reactions. Therefore, we must rely on systematics to obtain a full $(n,2n)$ excitation function for both stable and unstable targets.

Fortunately, it is fairly simple to construct an $(n,2n)$ excitation function from systematics. The cross section rises rapidly in a sigmoid shape above its threshold until it reaches a plateau value. The cross section at 14 MeV usually lies within the

plateau except when either the (n,2n) or (n,3n) threshold is only a few MeV below 14 MeV. As the cross section for the (n,3n) reaction (usually the most important competing reaction) begins to rise, the (n,2n) cross section drops off smoothly and rapidly. An (n,2n) excitation function rarely exhibits any other structure. This same basic description can be applied as well to the (n,3n) or the (n,4n) cross section, as a function of incident neutron energy. It is only necessary, then, to have systematics to predict the plateau cross section and to have an expression that describes the smooth rise-to and fall-from the plateau cross section.

To simplify the evaluation of (n,2n) excitation functions, a processing code, N2N3N, has been written. The code contains systematics that will predict the cross section at 14.4 MeV for any isotope, the assumption being that the cross section at that energy will equal the plateau cross section value. The built-in systematics are those of Lu and Fink[5]:

$$\sigma_{n,2n}(14.4\text{MeV}) = 61.6(A^{1/3} + 1)^2$$

$$\times (1. - 1.319e^{-8.744(N-Z)/A})\text{mb}$$

Lu and Fink state that this expression should predict reliable values to within ±20% for stable nuclei from $Z = 28$ to 82, except for the lightest stable isotope of even-Z elements. The N2N3N code will also accept an input value for the plateau cross section, allowing available measured plateau data or other systematics to be used for normalization. Gardner's 14.5 MeV neutron systematics[6] were used in some evaluations to supply the (n,2n) cross section ratios on adjacent isotopes.

Given a plateau value for the cross section, $\sigma_{n,2n}(\text{plat.})$, the code then constructs the remainder of the excitation function by computing the appropriate threshold energy (derived from the input Q-value) in the laboratory system, and by using the following expression:

$$\sigma_{n,2n}(E_n) = \sigma_{n,2n}(\text{plat.})$$

$$\times \left(1 - e^{-\left\{\frac{\left(E_n - E_{\text{thres.}(n,2n)}\right)^2}{E_{\text{plat.}(n,2n)} - E_{\text{thres.}(n,2n)}}\right\}}\right),$$

where $E_{\text{thres.}(n,2n)}$ is the threshold energy and $E_{\text{plat.}(n,2n)}$ is the energy at which the (n,2n) reaction

first reaches the plateau (an input value). If an (n,3n) Q-value is supplied, the code calculates the threshold in the laboratory system and then computes (n,3n) cross section values, using the expression:

$$\sigma_{n,3n}(E_n) \approx .6\sigma_{n,2n}(\text{plat.})$$

$$\times \left(1 - e^{-\left\{\frac{\left(E_n - E_{\text{thres.}(n,3n)}\right)^2}{E_{\text{plat.}(n,2n)} - E_{\text{thres.}(n,2n)} + 2}\right\}}\right)$$

The difference between $\sigma_{n,2n}(\text{plat.})$ and $\sigma_{n,3n}(E_n)$ is set equal to $\sigma_{n,2n}(E_n)$, allowing the n,2n cross section to drop smoothly while the n,3n cross section rises. Except for a few neutron-rich isotopes, the (n,4n) reaction threshold only occurs below 20 MeV for Z numbers above approximately 75. Therefore, systematics for it were not incorporated in the processing code. Some (n,4n) cross sections are entered into the ACTL library for high-Z targets, and these evaluations follow the same type of approach used for the (n,2n) and (n,3n) reactions.

(n,p), (n,n'p), and (n,pn) Reactions

Activation products due to the (n,p) reaction usually do not become important in an evaluation until incident neutron energies reach a few MeV because a Coulomb barrier must be overcome before proton emission can occur. Neutron-deficient targets, however, can have a positive (n,p) Q-value that is large relative to the Coulomb barrier height. In general, the (n,p) cross section is relatively small for medium- to heavy-weight targets because of Coulomb barrier effects and the subsequent strong competition from the emission of one or more neutrons. For the same reasons, the (n,n'p) and (n,pn) cross sections are found to be small over the entire neutron energy range. Experimental cross section data available for these reactions consist mainly of measurements made with 14 MeV neutrons; few cross section measurements have been made near threshold or at other low neutron energies. Again, we must apply systematics to obtain the energy dependence of these cross sections, even for the majority of the stable isotopes.

In the case of (n,p) reactions that have a threshold, an approach similar to that of generating an (n,2n) excitation function can be used to obtain an energy-dependent (n,p) cross section, except that the effect of the Coulomb barrier must be taken into account. For the ACTL evaluations a processing

code, NP, has been written that computes an appropriate Coulomb barrier and effective threshold. The code contains systematics that estimate a maximum or plateau cross section, if desired. The code then generates cross section values rising from the effective threshold up to the maximum value, allowing for estimated competition from the (n,pn) reaction.

The code computes the proton Coulomb barrier according to the expression:

$$B_p(MeV) = \frac{k_p(1.029)(Z_T - 1)}{(A_T)^{1/3} + 1} \quad ,$$

where Z_T and A_T are the atomic number and the mass of the target, and k_p takes on different values depending on the Z range.[7] The effective threshold in the laboratory system for the reaction is then calculated from the input Q-value and the computed Coulomb barrier. The code will also compute a cross section value for 14.4 MeV neutrons, using the Levkovskii formula[8]:

$$\sigma_{n,p}(14.4 \text{ MeV}) = 45.2(A^{1/3} + 1)^2 e^{-33(N-Z)/A} \text{ mb.}$$

This value can be used to estimate the maximum or plateau (n,p) cross section. The code will also accept, as input, a plateau cross section value based on experiment or on other systematics. The (n,p) cross section ratios on adjacent isotopes predicted by Gardner and Rosenblum[9] for 14.5 MeV neutrons were used in some of the evaluations. The cross section is then calculated as a function of energy by again using the expression:

$$\sigma_{n,p}(E_n) = \sigma_{n,p}(\text{plat.})$$
$$\times \left(1 - e^{-\left\{ \frac{\left(E_n - E_{thres.(n,p)}\right)^2}{E_{plat.(n,p)} - E_{thres.(n,p)}} \right\}} \right),$$

where all variables are defined as in the case of the (n,2n) cross section calculations.

If a Q-value for the (n,pn) reaction is supplied, an effective threshold for this reaction is similarly computed by the code, and (n,pn) cross sections are calculated using the expression:

$$\sigma_{n,pn}(E_n) = 0.5 \, \sigma_{n,p}(\text{plat.})$$
$$\times \left(1 - e^{-\left\{ \frac{\left(E_n - E_{thres.(n,pn)}\right)^2}{E_{plat.(n,p)} - E_{thres.(n,p)} + 2} \right\}} \right)$$

The difference between $\sigma_{n,p}(\text{plat.})$ and $\sigma_{n,pn}(E_n)$ is set equal to $\sigma_{n,p}(E_n)$, permitting the (n,p) cross section to smoothly decrease as a competitive (n,pn) reaction rises from its estimated threshold. Within the limits of the systematics, these computed (n,pn) cross section values are used to estimate the competition from both the (n,pn) and the (n,n'p) reactions. For a few of the evaluations, statistical model calculations were used to compute separate cross sections for the (n,n'p) reaction and for the (n,pn) reaction. However, all evaluations in the ACTL library for both reactions are entered together under the (n,n'p) reaction heading.

If an (n,p) reaction has a negative threshold, even after the effect of the Coulomb barrier has been included, the cross section evaluation should include all incident energies down to the thermal neutron energy (0.025 eV). However, there are only a few experimental measurements of the (n,p) cross section at that energy. For some cases, we can use statistical model calculations to compute the cross section over the energy range where such calculations are valid; at lower neutron energies or in the absence of statistical model calculations, we must rely on systematics to predict the cross section. As a first approximation, we can predict that the (n,p) reaction will behave in the same way as the evaluated (n,γ) cross section if appropriate scaling is applied. The scaling factors can be based on any available experimental thermal (n,p) data or on systematics similar to those described earlier that estimate the thermal value for an (n,γ) reaction.

(n,α), (n,n'α), and (n,αn) Reactions

Generally the (n,α) reaction only has a significant activation cross section for incident neutron energies of a few MeV or more because, again, there is a Coulomb barrier that must be overcome for α-particle emission. For most medium- to heavyweight targets, the (n,α) cross section remains relatively small over the full energy range because of preferential emission of one or more neutrons. Of course, for neutron-deficient isotopes, the (n,α) reaction can have a significant positive Q-value even after Coulomb barrier corrections are taken into account. The (n,n'α) and (n,αn) reactions, as well,

have small cross section values because of the Coulomb barrier effects and the competition from multiple neutron emission. Again, most (n,α) cross section measurements have only been made around neutron energies of 14 MeV: the threshold region and the rest of the neutron energy range are not characterized very well experimentally. Therefore, systematics must be used to generate full excitation functions.

For the evaluation of (n,α) reactions that have a threshold, a processing code, NALPHA, has been written. The code computes the α-particle Coulomb barrier, using the expression:

$$B_\alpha \text{ (MeV)} = \frac{k_\alpha 2.058(Z_T - 2)}{(A_T - 3)^{1/3} + 1.5874} \quad ,$$

where the Z_T and A_T are the atomic number and the mass of the target and k_α takes on different values depending on the Z range.[7] This calculated Coulomb barrier is then added to the mass difference threshold (calculated from the Q-value) to yield an effective threshold. A maximum or plateau (n,α) cross section must be supplied as input: NALPHA does not have any built-in systematics for estimating this value. Either experimental data around 14 MeV can be used, when available, or this value must be predicted in some manner; the relation $\sigma_{n,\alpha}(A + 2) = 0.5 \sigma_{n,\alpha}(A)$ is sometimes a good estimate. Some of the evaluations used the Gardner and Yu 14.5 MeV incident neutron systematics to predict (n,α) cross section ratios for adjacent isotopes.[10]

Given a maximum or plateau (n,α) cross section value, the NALPHA code will then generate an excitation function, using the expression:

$$\sigma_{n,\alpha}(E_n) = \sigma_{n,\alpha}(\text{plat.})$$
$$\times \left(1 - e^{-\left\{ \frac{\left(E_n - E_{\text{thres.}(n,\alpha)}\right)^2}{E_{\text{plat.}(n,\alpha)} - E_{\text{thres.}(n,\alpha)}} \right\}} \right)$$

Again, all variables are defined as in the case of the $(n,2n)$ cross section calculations.

If the Q-value for the $(n,\alpha n)$ reaction is supplied, an effective threshold can be calculated and the $(n,\alpha n)$ cross sections can be computed according to:

$$\sigma_{r,\alpha n}(E_n) = 0.66\, \sigma_{n,\alpha}(\text{plat.})$$
$$\times \left(1 - e^{-\left\{ \frac{\left(E_n - E_{\text{thres.}(n,\alpha n)}\right)^2}{E_{\text{plat.}(n,\alpha)} - E_{\text{thres.}(n,\alpha)} + 2} \right\}} \right)$$

The difference between $\sigma_{n,\alpha}(\text{plat.})$ and $\sigma_{n,\alpha n}(E_n)$ is set equal to $\sigma_{n,\alpha}(E_n)$ and the (n,α)cross section is allowed to drop smoothly at the same time as a competitive $(n,\alpha n)$ reaction rises from its computed effective threshold. Again, within the limits of the systematics, these computed $(n,\alpha n)$ cross sections are used to estimate the competition from both the $(n,\alpha n)$ and the $(n,n'\alpha)$ reactions. For a few of the evaluations, statistical model calculations were used to compute separate cross sections for the $(n,n'\alpha)$ and the $(n,\alpha n)$ reactions. For all cases, however, the ACTL library contains evaluations for both of the reactions under the $(n,n'\alpha)$ reaction heading.

If an (n,α) reaction has a large positive Q-value relative to the Coulomb barrier, the cross section should be evaluated down to the thermal neutron energy. However, as in the case of the (n,p) reaction, few thermal (n,α) cross section measurements are available, so systematics must be used to obtain estimates. Based on these estimates the (n,α) cross section is predicted to behave in approximately the same way as the (n,γ) cross section if appropriate scaling is applied.

(n,d), (n,t), $(n,^3\text{He})$ Reactions

The cross sections for these three reactions are, in general, always quite small over the entire neutron energy range for almost all isotopes. In cases where good experimental data existed over some portion of the energy range, an evaluation of the cross section was usually included in ACTL. However, most available experimental data for these three reactions are measurements that have only been made around 14 MeV. If it appeared that a reaction cross section would never be greater than 10 mb throughout the incident neutron energy range, no attempt was made to predict the full excitation function, and its evaluation was not included in ACTL.

$(n,n'd)$, $(n,n't)$, etc. Reactions

Cross sections have been measured for the $(n,n'd)$ reaction on ^6Li and ^{10}B and for the $(n,n't)$ reaction on ^7Li, and evaluations based on these data have been included in ACTL. Although these reactions are energetically possible for other light- to

intermediate-weight targets, no experimental data are available, and, therefore, no attempt was made to estimate and evaluate cross section values.

(n,n') Reaction

Inelastic scattering processes that lead to products with half-lives different from the half-life of the target (e.g., the production of isomers) should be considered in activation cross section evaluations. A number of such activation cross sections have been included in ACTL; their evaluations are based either on reliable experimental measurements or on statistical model calculations.

STATISTICAL MODEL CALCULATIONS

Some ACTL cross section evaluations are based on statistical model calculations made with the COMNUC[11] and STAPRE[12] codes, as modified by Gardner.[13] The COMNUC code was used more extensively because—in one computer run—it provides cross sections, over a given range of neutron energies, for all possible reactions on a particular target, i.e., it considers competing reactions, including γ-ray and fission competition. It also has a built-in optical model routine that can produce the particle transmission coefficient files needed as input to the STAPRE code. For the ACTL evaluations, COMNUC was modified so that it could write final cross section results in the format required by the routine used to update the cross section library. COMNUC does not allow for precompound emission; as a result, the code overestimates some cross section values—primarily for (n,2n) and (n,pn) reactions—while underestimating the values for others, such as the (n,p) reaction. Appropriate corrections were made for these cross sections, sometimes based on the results of STAPRE, a code that does contain a pre-equilibrium model.

STAPRE allows for precompound evaporation of particles from the first compound nucleus, following the "exciton" formalism of Kalbach-Cline and Blann.[14] Although the STAPRE code considers all possible competing reactions during a calculation, it computes cross sections for only one reaction sequence per computer run (up to six compound nuclei are allowed per sequence). STAPRE also carries out a detailed γ-ray cascade calculation

for all specified compound nuclei (including the final nucleus), which allows for the computation of cross section reactions leading to isomers.

Particle transmission coefficients had been calculated using the optical model parameters of Moldauer[15] for low-energy neutrons (up to ~2 MeV), of Wilmore and Hodgson[16] for high-energy neutrons (~2 to 20 MeV), of Perey[17] for protons, and of Igo[18] for alpha particles. Gamma-ray transmission coefficients were determined with the Brink-Axel giant-dipole formulation for El transitions[19] and the Weisskopf single-particle model for MI transitions.[20] A combined constant-temperature and Fermi gas model of the level density was used with Cook-modified[21] Gilbert and Cameron parameters.[22] Each code allows the input of discrete nuclear levels for all nuclei; this feature is important because level density formulas do not represent the first 20 or so levels properly. Both codes carry out a "correlation" correction, which provides for a more realistic estimate of decay back to the target nucleus through the entrance channel at low energies, where only a few exit channels are available.

The use of these statistical model codes led to more comprehensive cross section evaluations of some medium- to heavy-weight targets. For example, in the neutron energy region from 10 keV to 1 MeV, the (n,γ) cross section reflected the competition from the (n,n') and (n,γn) reactions. The excitation functions obtained for the (n,p) and (n,α) reactions had more structure because of the competition between the two processes. Further, these cross sections were more accurately computed near threshold because Coulomb barrier tunneling was described better. And for (n,p) and (n,α) reactions involving large positive Q-values, cross section estimates included energies that extended down to the resonance region. The inclusion of precompound evaporation in the calculations led to more accurate (n,2n), (n,p) and (n,pn) cross sections, as well as to better estimates of the (n,n'p) and (n,n'α) cross sections. The cross sections for reactions leading to isomeric products can be determined from the STAPRE code. The isomer ratio calculations also allowed us to compute the activation cross sections leading to unstable ground states and isomer products via the (n,n') process. Cross sections for isomeric targets (often quite different from those for the ground-state target) were also calculated with these codes.

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EVALUATED CROSS SECTION INDEX

The following index lists the evaluated cross sections in the ACTL library. Each target nucleus is listed in the right hand corner of a table of the reactions for which cross sections were evaluated. Every target nucleus is characterized by its mass, energy level, and half-life. Then, for each reaction, the following are given: the product nucleus and energy level, the number of evaluated data points entered into the library, the date of the evaluation, the reaction Q-value, the minimum and maximum energy values for which cross section data are available, and the activation product half-life. All energy values are given in MeV units.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,G	1-H -2	GROUND	102	8/15/76	2.2247+ 0	1.0000-10	2.0000+ 1	STABLE

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,G	1-H -3	GROUND	72	1/03/72	6.2600+ 0	1.0000-10	2.0000+ 1	1.2300+ 1 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	1-H -2	GROUND	11	7/07/72	-6.2600+ 0	8.3600+ 0	2.0000+ 1	STABLE

ATOMIC MASS = 3.0160+ 0   2-HE-3
GROUND STATE — STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,P	1-H -3	GROUND	102	8/15/76	7.6000- 1	1.9000-10	2.0000+ 1	1.2300+ 1 YRS.
N,D	1-H -2	GROUND	23	7/10/72	-3.2700+ 0	3.3500+ 0	2.0000+ 1	STABLE
N,G	2-HE-4	GROUND	2	11/01/72	2.0578+ 1	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 6.0151+ 0   3-LI-6
GROUND STATE — STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,N'D	2-HE-4	GROUND	20	8/15/76	-1.4600+ 1	1.7048+ 0	2.0000+ 1	STABLE
N,2NP	2-HE-4	GROUND	5	10/15/70	-3.6980+ 0	6.6100+ 0	2.0000+ 1	STABLE
N,P	2-HE-6	GROUND	14	4/01/71	-2.7300+ 0	3.1800+ 0	2.0000+ 1	8.0200- 1 SEC.
N,T	2-HE-4	GROUND	102	8/15/76	4.7900+ 0	1.0000-10	6.0300+ 1	STABLE
N,G	3-LI-7	GROUND	102	8/15/76	7.2600+ 0	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 7.0160+ 0   3-LI-7
GROUND STATE — STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	3-LI-6	GROUND	5	7/09/72	-7.2600+ 0	8.3100+ 0	2.0000+ 1	STABLE
N,N'T	2-HE-4	GROUND	14	7/09/72	-2.4700+ 0	2.8260+ 0	2.0000+ 1	STABLE
N,G	3-LI-8	GROUND	78	1/03/75	2.0300+ 0	1.0000-10	2.0000+ 1	8.5000- 1 SEC.

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4-BE-7
ATOMIC MASS = 7.0100+ 0
GROUND STATE
HALF-LIFE = 5.2998+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,P	3-LI-7	GROUND	113	2/16/70	1.6500+ 0	1.0000-10	2.0000+ 1	STABLE
N,A	2-HE-4	GROUND	9	2/15/74	1.8992+ 1	1.0000-10	2.0000+ 1	STABLE

4-BE-9
ATOMIC MASS = 9.0122+ 0
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	2-HE-4	GROUND	19	8/01/71	-1.6650+ 0	1.8660+ 0	2.0000+ 1	STABLE	
N,P	3-LI-9	GROUND	4	8/01/71	-1.2830+ 1	1.4260+ 1	2.0000+ 1	1.7500- 1	SEC.
N,D	3-LI-8	GROUND	9	8/01/71	-1.4660+ 1	1.6290+ 1	2.0000+ 1	8.5000- 1	SEC.
N,T	3-LI-7	GROUND	6	8/01/71	-1.0440+ 1	1.1600+ 1	2.0000+ 1	STABLE	
N,A	3-LI-6	GROUND	15	7/28/71	-6.0000- 1	6.7300- 1	2.0000+ 1	STABLE	
N,G	4-BE-10	GROUND	102	8/15/76	6.8200+ 0	1.0000-10	2.0000+ 1	2.5000+ 6	YRS.

5-B -10
ATOMIC MASS = 1.0013+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,N'D2A	2-HE-4	GROUND	5	9/08/70	-5.9280+ 0	6.7000+ 0	2.0000+ 1	STABLE
N,2NP	2-HE-4	GROUND	4	9/08/70	-8.1580+ 0	9.3000+ 0	2.0000+ 1	STABLE
N,T2A	2-HE-4	GROUND	13	9/08/70	3.3000- 1	1.5000+ 0	2.0000+ 1	STABLE
N,A	3-LI-7	GROUND	102	8/15/76	2.8000+ 0	1.0000-10	2.0000+ 1	STABLE
N,G	5-B -11	GROUND	56	9/08/70	1.1450+ 1	1.0000-10	2.0000+ 1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	5-B -10	GROUND	3	4/29/72	-1.1460+ 1	1.2510+ 1	2.0000+ 1	STABLE	
N,P	4-BE-11	GROUND	3	4/29/72	-1.0720+ 1	1.1700+ 1	2.0000+ 1	1.3600+ 1	SEC.
N,T	4-BE-9	GROUND	3	4/29/72	-9.5600+ 0	1.0430+ 1	2.0000+ 1	STABLE	
N,A	3-LI-8	GROUND	5	4/29/72	-6.6400+ 0	7.2400+ 0	2.0000+ 1	8.5000- 1	SEC.
N,G	5-B -12	GROUND	35	4/29/72	3.3700+ 0	1.0000-10	2.0000+ 1	2.0300- 2	SEC.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'3A	2-HE-4	GROUND	10	6/15/70	-7.3600+ 0	7.9800+ 0	2.0000+ 1	STABLE	
N,P	5-B -12	GROUND	4	6/15/70	-1.2580+ 1	1.3630+ 1	2.0000+ 1	2.0300- 2	SEC.
N,D	5-B -11	GROUND	4	6/15/70	-1.3720+ 1	1.4870+ 1	2.0000+ 1	STABLE	
N,A	4-BE-9	GROUND	9	6/15/70	-5.7000+ 0	6.1700+ 0	2.0000+ 1	STABLE	
N,G	6-C -13	GROUND	11	11/01/72	4.9460+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	7-N -13	GROUND	10	6/29/70	-1.0550+ 1	1.1310+ 1	2.0000+ 1	1.0000+ 1	MIN.
N,N'P	6-C -13	GROUND	11	6/29/70	-7.5500+ 0	8.0940+ 0	2.0000+ 1	STABLE	
N,P	6-C -14	GROUND	102	8/15/76	6.2600- 1	1.0000-10	2.0000+ 1	5.7300+ 3	YRS.
N,D	6-C -13	GROUND	19	6/29/70	-5.3200+ 0	5.7000+ 0	2.0000+ 1	STABLE	
N,T	6-C -12	GROUND		6/29/70	-4.0000+ 0	4.2900+ 0	2.0000+ 1	STABLE	
N,A	5-B -11	GROUND	228	12/15/71	-1.5000- 1	1.1000+ 0	2.0000+ 1	STABLE	
N,G	7-N -15	GROUND	50	6/29/70	1.0930+ 1	1.0000-10	2.0000+ 1	STABLE	

8-O -16
ATOMIC MASS = 1.5995+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	8-O -15	GROUND	3	1/22/70	-1.5670+ 1	1.6658+ 1	2.0000+ 1	2.0667+ 0	MIN.
N,N'P	7-N -15	GROUND	4	1/24/74	-1.2120+ 1	1.2884+ 1	2.0000+ 1	STABLE	
N,N'A	6-C -12	GROUND	12	1/24/74	-7.1500+ 0	7.6009+ 0	2.0000+ 1	STABLE	
N,P	7-N -16	GROUND	13	1/22/70	-9.6100+ 0	1.0220+ 1	2.0000+ 1	7.2000+ 0	SEC.
N,D	7-N -15	GROUND	4	1/22/70	-9.8900+ 0	1.0510+ 1	2.0000+ 1	STABLE	
N,A	6-C -13	GROUND	59	1/24/74	-2.2100+ 0	2.3600+ 0	2.0000+ 1	STABLE	

9-F -19
ATOMIC MASS = 1.8998+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	9-F -18	GROUND	9	11/30/74	-1.0430+ 1	1.0985+ 1	2.0000+ 1	1.3283+ 0	HRS.
N,N'P	8-O -18	GROUND	23	11/30/74	-7.9900+ 0	8.4200+ 0	2.0000+ 1	STABLE	
N,N'A	7-N -15	GROUND	34	11/30/74	-4.0100+ 0	5.1500+ 0	2.0000+ 1	STABLE	
N,P	8-O -19	GROUND	34	11/30/74	-4.0400+ 0	4.2503+ 0	2.0000+ 1	2.9000+ 1	SEC.
N,D	8-O -18	GROUND	15	11/30/74	-5.7700+ 0	6.0742+ 0	2.0000+ 1	STABLE	
N,T	8-O -17	GROUND	9	11/30/74	-7.5600+ 0	7.9582+ 0	2.0000+ 1	STABLE	
N,A	7-N -16	GROUND	17	11/30/74	-1.5200+ 0	1.6039+ 0	2.0000+ 1	7.2000+ 0	SEC.
N,G	9-F -20	GROUND	102	8/16/76	6.6000+ 0	1.0000-10	2.0000+ 1	1.1400+ 1	SEC.

11-NA-23
ATOMIC MASS = 2.2990+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	11-NA-22	GROUND	13	8/19/70	-1.2430+ 1	1.2980+ 1	2.0000+ 1	2.5999+ 0	YRS.
N,N'P	10-NE-22	GROUND	23	8/19/70	-8.7900+ 0	9.2500+ 0	2.0000+ 1	STABLE	
N,N'A	9-F -19	GROUND	13	8/19/70	-1.0500+ 1	1.1000+ 1	2.0000+ 1	STABLE	
N,P	10-NE-23	GROUND	106	8/19/70	-3.6000+ 0	4.0000+ 0	2.0000+ 1	3.7600+ 1	SEC.
N,A	9-F -20	GROUND	41	12/15/71	-3.8800+ 0	4.8000+ 0	2.0000+ 1	1.1400+ 1	SEC.
N,G	11-NA-24	GROUND	102	8/16/76	6.9700+ 0	1.0000-10	2.0000+ 1	1.5000+ 1	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	12-MG-22	GROUND	15	8/21/76	-1.3170+ 1	1.3743+ 1	2.0000+ 1	3.8600+ 0	SEC.
N,N'P	11-NA-22	GROUND	16	4/21/77	-7.5800+ 0	9.2584+ 0	2.0000+ 1	2.6012+ 0	YRS.
N,P	11-NA-23	GROUND	14	4/21/77	4.8400+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	10-NE-20	GROUND	9	8/21/76	7.2200+ 0	1.0000- 2	2.0000+ 1	STABLE	
N,G	12-MG-24	GROUND	102	8/21/76	1.6530+ 1	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	12-MG-23	GROUND	5	8/21/76	-1.6530+ 1	1.7219+ 1	2.0000+ 1	1.2100+ 1	SEC.
N,N'P	11-NA-23	GROUND	5	8/21/76	-1.1590+ 1	1.3500+ 1	2.0000+ 1	STABLE	
N,P	11-NA-24	GROUND	23	8/21/76	-4.7300+ 0	4.9300+ 0	2.0000+ 1	1.5000+ 1	HRS.
N,A	10-NE-21	GROUND	9	8/21/76	-2.5500+ 0	6.0000+ 0	2.0000+ 1	STABLE	
N,G	12-MG-25	GROUND	102	8/21/76	7.3300+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	12-MG-24	GROUND	16	8/21/76	-7.3300+ 0	7.6234+ 0	2.0000+ 1	STABLE	
N,P	11-NA-25	GROUND	12	8/21/76	-3.0500+ 0	4.5682+ 0	2.0000+ 1	1.0000+ 0	MIN.
N,A	10-NE-22	GROUND	16	8/21/76	4.8000- 1	3.0643+ 0	2.0000+ 1	STABLE	
N,G	12-MG-26	GROUND	102	8/21/76	1.1090+ 1	1.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 12-MG-26 = 2.5982+1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	12-MG-25	GROUND	19	8/21/76	-1.1030+1	1.1517+1	2.0000+1	STABLE	
N,3N	12-MG-24	GROUND	5	8/21/76	-1.8430+1	1.9139+1	2.0000+1	STABLE	
N,P	11-NA-26	GROUND	16	8/21/76	-7.9200+0	9.6073+0	2.0000+1	1.0000+0	SEC.
N,A	10-NE-23	GROUND	8	8/21/76	-5.4200+0	9.1583+0	2.0000+1	3.7600+1	SEC.
N,G	12-MG-27	GROUND	102	8/21/76	6.4400+0	1.0000-10	2.0000+1	9.5000+0	MIN.

ATOMIC MASS = 12-MG-27 = 2.6984+1
GROUND STATE
HALF-LIFE = 9.5000+0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	12-MG-26	GROUND	21	8/21/76	-6.4400+0	6.6787+0	2.0000+1	STABLE	
N,3N	12-MG-25	GROUND	8	8/21/76	-1.7540+1	1.8190+1	2.0000+1	STABLE	
N,A	10-NE-24	GROUND	15	8/21/76	-2.9900+0	6.5986+0	2.0000+1	3.3800+0	MIN.
N,G	12-MG-28	GROUND	102	8/21/76	8.5000+0	1.0000-10	2.0000+1	2.1278+1	HRS.

ATOMIC MASS = 13-AL-27 = 2.6983+1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	13-AL-26	GROUND	14	10/18/74	-1.3060+1	1.3545+1	2.0000+1	7.4011+5	YRS.
N,P	12-MG-27	GROUND	52	10/18/74	-1.8300+0	2.7000+0	2.0000+1	9.5000+0	MIN.
N,D	12-MG-26	GROUND	18	10/18/74	-5.0500+0	9.0000+0	2.0000+1	STABLE	
N,T	12-MG-25	GROUND	11	10/18/74	-1.0880+1	1.4000+0	2.0000+1	STABLE	
N,A	11-NA-24	GROUND	27	10/18/74	-3.1360+0	5.1000+0	2.0000+1	1.5000+1	HRS.
N,G	13-AL-28	GROUND	102	8/16/76	7.7300+0	1.0000-10	2.0000+1	2.3100+0	MIN.

ATOMIC MASS = 2.6697+ 1   [14-SI-27]
GROUND STATE
HALF-LIFE = 4.2000+ 0 SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	14-SI-26	GROUND	15	9/07/76	-1.3310+ 1	1.3803+ 1	2.0000+ 1	2.1000+ 0 SEC.
N,N'P	13-AL-26	GROUND	17	9/07/76	-7.4700+ 0	9.3879+ 0	2.0000+ 1	7.4011+ 5 YRS.
N,N'A	12-MG-23	GROUND	13	9/07/76	-9.3400+ 0	1.4089+ 1	2.0000+ 1	1.2100+ 1 SEC.
N,P	13-AL-27	GROUND	21	9/07/76	5.5900+ 0	1.0000- 2	2.0000+ 1	STABLE
N,A	12-MG-24	GROUND	20	9/07/76	7.1930+ 0	1.0000+ 0	2.0000+ 1	STABLE
N,G	14-SI-28	GROUND	102	9/07/76	1.7180+ 1	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 2.7977+ 1   [14-SI-28]
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	14-SI-27	GROUND	7	9/07/76	-1.7180+ 1	1.7794+ 1	2.0000+ 1	4.2000+ 0 SEC.
N,N'P	13-AL-27	GROUND	15	9/07/76	-1.1590+ 1	1.3941+ 1	2.0000+ 1	STABLE
N,N'A	12-MG-24	GROUND	13	9/07/76	-9.9800+ 0	1.4699+ 1	2.0000+ 1	STABLE
N,P	13-AL-28	GROUND	17	9/07/76	-3.8600+ 0	4.9146+ 0	2.0000+ 1	2.3100+ 0 MIN.
N,A	12-MG-25	GROUND	22	9/07/76	-2.6500+ 0	7.0695+ 0	2.0000+ 1	STABLE
N,G	14-SI-29	GROUND	102	9/07/76	8.4700+ 0	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 2.8976+ 1   [14-SI-29]
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	14-SI-28	GROUND	15	9/07/76	-8.4700+ 0	8.7623+ 0	2.0000+ 1	STABLE
N,N'P	13-AL-28	GROUND	15	9/07/76	-1.2330+ 1	1.4368+ 1	2.0000+ 1	2.3100+ 0 MIN.
N,N'A	12-MG-25	GROUND	11	9/07/76	-1.1130+ 1	1.5839+ 1	2.0000+ 1	STABLE
N,P	13-AL-29	GROUND	21	9/07/76	-2.9000+ 0	4.7017+ 0	2.0000+ 1	6.6000+ 0 MIN.
N,A	12-MG-26	GROUND	21	9/07/76	-3.0000- 2	4.3193+ 0	2.0000+ 1	STABLE
N,G	14-SI-30	GROUND	99	9/07/76	1.0610+ 1	1.0000-10	2.0000+ 1	STABLE

14-SI-30
ATOMIC MASS = 2.9974+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	14-SI-29	GROUND	15	9/07/76	-1.0610+ 1	1 0964+ 1	2.0000+ 1	STABLE	
N,3N	14-SI-28	GROUND	3	9/07/76	-1.9080+ 1	1.9717+ 1	2.0000+ 1	STABLE	
N,N'P	13-AL-29	GROUND	15	9/07/76	-1.3510+ 1	1.5560+ 1	2.0000+ 1	6.6000+ 0	MIN.
N,N'A	12-MG-26	GROUND	11	9/07/76	-1.0640+ 1	1 5283+ 1	2.0000+ 1	STABLE	
N,P	13-AL-30	GROUND	19	9/07/76	-7.7600+ 0	9.7059+ 0	2.0000 1	3.3000+ 0	SEC.
N,A	12-MG-27	GROUND	21	9/07/76	-4.2000+ 0	8.5932+ 0	2.0000+ 1	9.4600+ 0	MIN.
N,G	14-SI-31	GROUND	99	9/07/76	6.5900+ 0	1.0000-10	2.0000+ 1	2.6200+ 0	HRS.

14-SI-31
ATOMIC MASS = 3.0975+ 1
GROUND STATE
HALF-LIFE = 2.6200+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	14-SI-30	GROUND	19	9/07/76	-6.5900+ 0	6.8028+ 0	2.0000+ 1	STABLE	
N,3N	14-SI-29	GROUND	7	9/07/76	-1.7200+ 1	1.7755+ 1	2.0000+ 1	STABLE	
N,N'A	12-MG-27	GROUND	11	9/07/76	-1.0790+ 1	1.5391+ 1	2.0000+ 1	9.4600+ 0	MIN.
N,A	12-MG-28	GROUND	22	9/07/76	-2.2800+ 0	6.5731+ 0	2.0000+ 1	2.1200+ 1	HRS.
N,G	14-SI-32	GROUND	99	9/07/76	9.2200+ 0	1.0000-10	2.0000+ 1	6.5005+ 2	YRS.

15-P -31
ATOMIC MASS = 3.0974+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	15-P -30	GROUND	8	8/19/72	-1.2310+ 1	1.2711+ 1	2.0000+ 1	2.5000+ 0	MIN.
N,N'P	14-SI-30	GROUND	4	8/19/72	-7.3000+ 0	7.5377+ 0	2.0000+ 1	STABLE	
N,P	14-SI-31	GROUND	13	8/19/72	-7.1000- 1	1.5000+ 0	2.0000+ 1	2.6200+ 0	HRS.
N,A	13-AL-28	GROUND	6	8/19/72	-1.9400+ 0	3.0000+ 0	2.0000+ 1	2.3100+ 0	MIN.
N,G	15-P -32	GROUND	88	4/03/76	7.9300+ 0	1.0000-10	2.0000+ 1	1.4308+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	16-S -30	GROUND	14	9/08/76	-1.3000+ 1	1.3420+ 1	2.0000+ 1	1.4000+ 0	SEC.
N,N'P	15-P -30	GROUND	17	9/08/76	-6.0800+ 0	8.2273+ 0	2.0000+ 1	2.5000+ 0	MIN.
N,N'A	14-SI-27	GROUND	13	9/08/76	-9.0400+ 0	1.4482+ 1	2.0000+ 1	4.2000+ 0	SEC.
N,P	15-P -31	GROUND	16	9/08/76	6.2200+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	14-SI-28	GROUND	22	9/08/76	8.1400+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	16-S -32	GROUND	102	9/08/76	1.5090+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	16-S -31	GROUND	7	1/09/73	-1.5088+ 1	1.5560+ 1	2.0000+ 1	2.7000+ 0	SEC.
N,N'P	15-P -31	GROUND	3	8/23/72	-8.8600+ 0	9.1400+ 0	2.0000+ 1	STABLE	
N,P	15-P -32	GROUND	36	8/23/72	-9.2000- 1	1.6000+ 0	2.0000+ 1	1.4306+ 1	DAYS
N,T	15-P -30	GROUND	3	8/23/72	-1.2670+ 1	1.3100+ 1	2.0000+ 1	2.5000+ 0	MIN.
N,A	14-SI-29	GROUND	45	8/23/72	1.5300+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	16-S -33	GROUND	102	9/08/76	8.6400+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	16-S -32	GROUND	14	9/08/76	-8.6400+ 0	8.9020+ 0	2.0000+ 1	STABLE	
N,N'P	15-P -32	GROUND	15	9/08/76	-9.5700+ 0	1.1781+ 1	2.0000+ 1	1.4306+ 1	DAYS
N,N'A	14-SI-29	GROUND	15	9/08/76	-7.1200+ 0	1.2406+ 1	2.0000+ 1	STABLE	
N,P	15-P -33	GROUND	22	9/08/76	5.3000- 1	1.0000-10	2.0000+ 1	2.5000+ 1	DAYS
N,A	14-SI-30	GROUND	26	9/08/76	3.4900+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	16-S -34	GROUND	98	9/08/76	1.1420+ 1	1.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 3.3968+ 1
16-S -34
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	16-S -33	GROUND	15	9/08/76	-1.1420+ 1	1.1756+ 1	2.0000+ 1	STABLE
N,N'P	15-P -33	GROUND	16	9/08/76	-1.0880+ 1	1.3107+ 1	2.0000+ 1	2.5000+ 1 DAYS
N,N'A	14-SI-30	GROUND	15	9/08/76	-7.9200+ 0	1.3186+ 1	2.0000+ 1	STABLE
N,P	15-P -34	GROUND	21	9/08/76	-4.3200+ 0	6.4569+ 0	2.0000+ 1	1.2400+ 1 SEC.
N,A	14-SI-31	GROUND	25	9/08/76	-1.3400+ 0	6.3760+ 0	2.0000+ 1	2.6200+ 0 HRS.
N,G	16-S -35	GROUND	98	9/08/76	6.9900+ 0	1.0000-10	2.0000+ 1	8.7998+ 1 DAYS

ATOMIC MASS = 3.4969+ 1
16-S -35
GROUND STATE
HALF-LIFE = 8.7998+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	16-S -34	GROUND	19	9/08/76	-6.9900+ 0	7.1899+ 0	2.0000+ 1	STABLE
N,3N	16-S -33	GROUND	5	9/08/76	-1.8400+ 1	1.8926+ 1	2.0000+ 1	STABLE
N,N'A	14-SI-31	GROUND	14	9/08/76	-8.3200+ 0	1.3551+ 1	2.0000+ 1	2.6200+ 0 HRS.
N,A	14-SI-32	GROUND	24	9/08/76	8.9000+ 0	4.0461+ 0	2.0000+ 1	6.5005+ 2 YRS.
N,G	16-S -36	GROUND	97	9/08/76	9.8900+ 0	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 3.5967+ 1
16-S -36
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	16-S -35	GROUND	18	9/08/76	-9.8900+ 0	1.0165+ 1	2.0000+ 1	8.7998+ 1 DAYS
N,3N	16-S -34	GROUND	10	9/08/76	-1.6880+ 1	1.7349+ 1	2.0000+ 1	STABLE
N,G	16-S -37	GROUND	96	9/08/76	4.3100+ 0	1.0000-10	2.0000+ 1	5.0600+ 0 MIN.

16-S -37
ATOMIC MASS = 3.6971+ 1
GROUND STATE
HALF-LIFE = 5.0600+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	16-S -36	GROUND	24	9/08/76	-4.3100+ 0	4.4266+ 0	2.0000+ 1	STABLE	
N,3N	16-S -35	GROUND	14	9/08/76	-1.4200+ 1	1.4584+ 1	2.0000+ 1	8.7998+ 1	DAYS
N,G	16-S -38	GROUND	95	9/06/76	8.0300+ 0	1.0000-10	2.0000+ 1	2.8400+ 0	HRS.

17-CL-34
ATOMIC MASS = 3.397%+ 1
LEVEL = 1.4503- 1
HALF-LIFE = 3.2000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	17-CL-33	GROUND	14	9/09/76	-1.1380+ 1	1.1694+ 1	2.0000+ 1	2.5000+ 0	SEC.
N,N'P	16-S -33	GROUND	16	9/09/76	-5.0000+ 0	7.2442+ 0	2.0000+ 1	STABLE	
N,N'A	15-P -30	GROUND	14	9/09/76	-6.5200+ 0	1.2203+ 1	2.0000+ 1	2.5000+ 0	MIN.
N,P	16-S -34	GROUND	102	9/09/76	6.4100+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	15-P -31	GROUND	25	9/09/76	5.7900+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	17-CL-35	GROUND	95	9/09/76	1.2800+ 1	1.0000-10	2.5000+ 0	STABLE	

17-CL-35
ATOMIC MASS = 3.4969+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	17-CL-34	GROUND	6	9/09/76	-1.2650+ 1	1.3012+ 1	2.0000+ 1	1.5600+ 0	SEC.
N,2N	17-CL-34	1.4500- 1	15	9/09/76	-1.2800+ 1	1.3166+ 1	2.0000+ 1	3.2000+ 1	MIN.
N,N'P	16-S -34	GROUND	14	9/09/76	-6.3700+ 0	8.6342+ 0	2.0000+ 1	STABLE	
N,N'A	15-P -31	GROUND	14	9/09/76	-7.0000+ 0	1.2651+ 1	2.0000+ 1	STABLE	
N,P	16-S -35	GROUND	102	9/09/76	6.2000- 1	1.0000-10	2.0000+ 1	8.7998+ 1	DAYS
N,A	15-P -32	GROUND	27	9/09/76	9.4000- 1	1.0000-10	2.0000+ 1	1.4308+ 1	DAYS
N,G	17-CL-36	GROUND	95	9/09/76	8.5800+ 0	1.0000-10	2.0000+ 1	3.0120+ 5	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	17-CL-35	GROUND	14	9/09/76	-8.5800+ 0	8.8185+ 0	2.0000+ 1	STABLE	
N,N'P	16-S -35	GROUND	17	9/09/76	-7.9600+ 0	1.0249+ 1	2.0000+ 1	8.7998+ 1	DAYS
N,N'A	15-P -32	GROUND	15	9/09/76	-7.6400+ 0	1.3265+ 1	2.0000+ 1	1.4306+ 1	DAYS
N,P	16-S -36	GROUND	102	9/09/76	1.9300+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	15-P -33	GROUND	23	9/09/76	2.4600+ 0	2.8479+ 0	2.0000+ 1	2.5000+ 1	DAYS
N,G	17-CL-37	GROUND	95	9/09/76	1.0310+ 1	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	17-CL-36	GROUND	16	9/09/76	-1.0310+ 1	1.0589+ 1	2.0000+ 1	3.0120+ 5	YRS.
N,3N	17-CL-35	GROUND	3	9/09/76	-1.8890+ 1	1.9401+ 1	2.0000+ 1	STABLE	
N,N'P	16-S -36	GROUND	15	9/09/76	-8.3900+ 0	1.0671+ 1	2.0000+ 1	STABLE	
N,N'A	15-P -33	GROUND	14	9/09/76	-7.8500+ 0	1.3438+ 1	2.0000+ 1	2.5000+ 1	DAYS
N,P	16-S -37	GROUND	19	9/09/76	-4.0700+ 0	6.3426+ 0	2.0000+ 1	5.0500+ 0	MIN.
N,A	15-P -34	GROUND	23	9/09/76	-1.2800+ 0	6.6551+ 0	2.0000+ 1	1.2400+ 1	SEC.
N,G	17-CL-38	GROUND	64	9/09/76	6.1100+ 0	1.0000-10	2.0000+ 1	3.7300+ 1	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	17-CL-37	GROUND	19	9/09/76	-6.1100+ 0	6.2709+ 0	2.0000+ 1	STABLE	
N,3N	17-CL-36	GROUND	9	9/09/76	-1.6420+ 1	1.6852+ 1	2.0000+ 1	3.0120+ 5	YRS.
N,N'P	16-S -37	GROUND	15	9/09/76	-1.0180+ 1	1.2488+ 1	2.0000+ 1	5.0600+ 0	MIN.
N,P	16-S -38	GROUND	21	9/09/76	-2.1500+ 0	4.3544+ 0	2.0000+ 1	2.8400+ 0	HRS.
N,G	17-CL-39	GROUND	94	9/09/76	8.0700+ 0	1.0000-10	2.0000+ 1	5.5500+ 1	MIN.

ATOMIC MASS = 3.5970+1 18-AR-36
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-35	GROUND	14	8/09/76	-1.5250+1	1.5674+1	2.0000+1	1.8300+0	SEC.
N,P	17-CL-36	GROUND	15	8/09/76	7.0000-2	2.3111+3	2.0000+1	3.0120+5	YRS.
N,A	16-S -33	GROUND	15	8/09/76	2.0000+0	3.7821+0	2.0000+1	STABLE	
N,G	18-AR-37	GROUND	102	6/14/76	8.7900+0	1.0000-10	2.0000+1	3.5000+1	DAYS

ATOMIC MASS = 3.6670+1 18-AR-37
GROUND STATE
HALF-LIFE = 3.5000+1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	18-AR-36	GROUND	15	8/09/76	-8.7900+0	9.0218+1	2.0000+1	STABLE
N,P	17-CL-37	GROUND	15	8/09/76	1.6000+0	7.2317-1	2.0000+1	STABLE
N,A	16-S -34	GROUND	15	8/09/76	4.6300+0	1.0437+0	2.0000+1	STABLE
N,G	18-AR-38	GROUND	102	6/14/76	1.1840+1	1.0000-10	2.0000+1	STABLE

ATOMIC MASS = 3.7960+1 18-AR-38
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-37	GROUND	15	8/09/76	-1.1840+1	1.2152+1	2.0000+1	3.5000+1	DAYS
N,P	17-CL-38	GROUND	15	8/09/76	-4.1300+0	6.5890+0	2.0000+1	3.7300+1	MIN.
N,A	16-S -35	GROUND	15	8/09/76	-2.2000+0	5.9971+0	2.0000+1	8.7990+1	DAYS
N,G	18-AR-39	GROUND	102	6/14/76	6.6000+0	1.0000-10	2.0000+1	2.6930+2	YRS.

18-AR-39
ATOMIC MASS = 3.8960+ 1
GROUND STATE
HALF-LIFE = 2.6890+ 2 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-38	GROUND	20	8/09/76	-6.6000+ 0	6.7694+ 0	2.0000+ 1	STABLE	
N,3N	18-AR-37	GROUND	6	8/09/76	-1.8440+ 1	1.8913+ 1	2.0000+ 1	3.5000+ 1	DAYS
N,P	17-CL-39	GROUND	15	8/09/76	-2.8600+ 0	5.0628+ 0	2.0000+ 1	5.5500+ 1	MIN.
N,A	16-S -36	GROUND	15	8/09/76	3.0700+ 0	2.5762+ 0	2.0000+ 1	STABLE	
N,G	18-AR-40	GROUND	102	6/14/76	9.8700+ 0	1.0000-10	2.0000+ 1	STABLE	

18-AR-40
ATOMIC MASS = 3.9960+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-39	GROUND	21	8/09/76	-9.8700+ 0	1.0117+ 1	2.0000+ 1	2.6899+ 2	YRS.
N,3N	18-AR-38	GROUND	10	8/09/76	-1.6470+ 1	1.6882+ 1	2.0000+ 1	STABLE	
N,P	17-CL-40	GROUND	15	8/09/76	-6.7200+ 0	9.2075+ 0	2.0000+ 1	1.4000+ 0	MIN.
N,A	16-S -37	GROUND	15	8/09/76	-2.4900+ 0	8.2419+ 0	2.0000+ 1	5.0600+ 0	MIN.
N,G	18-AR-41	GROUND	102	6/14/76	6.1000+ 0	1.0000-10	2.0000+ 1	1.8300+ 0	HRS.

18-AR-41
ATOMIC MASS = 4.0960+ 1
GROUND STATE
HALF-LIFE = 1.8300+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-40	GROUND	21	8/09/76	-6.1000+ 0	6.2489+ 0	2.0000+ 1	STABLE	
N,3N	18-AR-39	GROUND	12	8/09/76	-1.5970+ 1	1.6360+ 1	2.0000+ 1	2.6899+ 2	YRS.
N,A	16-S -38	GROUND	15	8/09/76	-5.6000- 1	6.2291+ 0	2.0000+ 1	2.8400+ 0	HRS.
N,G	18-AR-42	GROUND	102	6/14/76	9.4300+ 0	1.0000-10	2.0000+ 1	3.3010+ 1	YRS.

                                                                    18-AR-42
                                                    ATOMIC MASS = 4.1960+ 1
                                                              GROUND STATE
                                                  HALF-LIFE = 3.3010+ 1 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-41	GROUND	24	8/09/76	-9.4300+ 0	9.6547+ 0	2.0000+ 1	1.8300+ 0	HRS.
N,3N	18-AR-40	GROUND	13	8/09/76	-1.5520+ 1	1.5890+ 1	2.0000+ 1	STABLE	
N,G	18-AR-43	GROUND	102	6/14/76	5.6000+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	SEC.

                                                                    18-AR-43
                                                    ATOMIC MASS = 4.2960+ 1
                                                              GROUND STATE
                                                  HALF-LIFE = 1.0000+ 0 SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	18-AR-42	GROUND	27	8/09/76	-5.6000+ 0	5.7304+ 0	2.0000+ 1	3.3010+ 1	YRS.
N,3N	18-AR-41	GROUND	14	8/09/76	-1.4800+ 1	1.5145+ 1	2.0000+ 1	1.8300+ 0	HRS.
N,G	18-AR-44	GROUND	102	6/14/76	9.1600+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	SEC.

                                                                    18-K -38
                                                    ATOMIC MASS = 3.7970+ 1
                                                              GROUND STATE
                                                  HALF-LIFE = 7.7100+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	19-K -37	GROUND	17	8/10/76	-1.2060+ 1	1.2378+ 1	2.0000+ 1	1.2000+ 0	SEC.
N,P	18-AR-38	GROUND	102	8/10/76	6.7100+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	17-CL-35	GROUND	102	8/10/76	5.8700+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	19-K -39	GROUND	102	8/10/76	1.3090+ 1	1.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 3.8960+1 — 19-K -39 — GROUND STATE — STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -38	GROUND	16	8/10/76	-1.3090+1	1.3426+1	2.0000+1	7.7100+0 MIN.
N,2N	19-K -38	1.3000-1	15	8/10/76	-1.3220+1	1.3559+1	2.0000+1	9.5000-1 SEC.
N,N'P	18-AR-38	GROUND	15	8/10/76	-6.3600+0	9.0873+0	2.0000+1	STABLE
N,P	18-AR-39	GROUND	17	8/10/76	2.2000-1	2.3180+0	2.0000+1	2.6899+2 YRS.
N,A	17-CL-36	GROUND	10	8/10/76	1.3600+0	2.0000+0	2.0000+1	3.0120+5 YRS.
N,G	19-K -40	GROUND	102	8/10/76	7.8000+0	1.0000-10	2.0000+1	1.2601+9 YRS.

ATOMIC MASS = 3.9960+1 — 19-K -40 — GROUND STATE — HALF-LIFE = 1.2601+9 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -39	GROUND	17	8/10/76	7.5600+0	7.9952+0	2.0000+1	STABLE
N,P	18-AR-40	GROUND	97	8/10/76	2.2900+0	1.0000-10	2.0000+1	STABLE
N,A	17-CL-37	GROUND	108	8/10/76	3.8700+0	1.0000-10	2.0000+1	STABLE
N,G	19-K -41	GROUND	102	8/10/76	1.0100+1	1.0000-10	2.0000+1	STABLE

ATOMIC MASS = 4.0960+1 — 19-K -41 — GROUND STATE — STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -40	GROUND	20	8/10/76	-1.0100+1	1.0347+1	2.0000+1	1.2601+9 YRS.
N,3N	19-K -39	GROUND	8	8/10/76	-1.7900+1	1.8337+1	2.0000+1	STABLE
N,P	18-AR-41	GROUND	17	8/10/76	-1.7100+0	4.2628+0	2.0000+1	1.8300+0 HRS.
N,A	17-CL-38	GROUND	12	8/10/76	-1.1000-1	6.2277+0	2.0000+1	3.7283+1 MIN.
N,G	19-K -42	GROUND	102	8/10/76	7.5300+0	1.0000-10	2.0000+1	1.2400+1 HRS.

ATOMIC MASS = 19-K -42
= 4.1950+ 1
GROUND STATE
HALF-LIFE = 1.2400+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -41	GROUND	20	8/10/76	-7.5310+ 0	7.7095+ 1	2.0000+ 1	STABLE
N,3N	19-K -40	GROUND	8	8/10/76	-1.7630+ 1	1.8050+ 1	2.0000+ 1	1.2601+ 9 YRS.
N,P	18-AR-42	GROUND	17	8/10/76	-1.8000- 1	2.3112+ 0	2.0000+ 1	3.3010+ 1 YRS.
N,A	17-CL-39	GROUND	14	8/10/76	4.2000- 1	5.6388+ 0	2.0000+ 1	5.5500- 1 MIN.
N,G	19-K -43	GROUND	102	8/10/76	9.6300+ 0	1.0000-10	2.0000+ 1	2.2400- 1 HRS.

ATOMIC MASS = 19-K -43
= 4.2960+ 1
GROUND STATE
HALF-LIFE = 2.2400+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -42	GROUND	21	8/10/76	-9.6300+ 0	9.8542+ 0	2.0000+ 1	1.2400+ 1 HRS.
N,3N	19-K -41	GROUND	9	8/10/76	-1.7170+ 1	1.7570+ 1	2.0000+ 1	STABLE
N,G	19-K -44	GROUND	102	8/10/76	7.2700+ 0	1.0000-10	2.0000+ 1	2.2000+ 1 MIN.

ATOMIC MASS = 19-K -44
= 4.3960+ 1
GROUND STATE
HALF-LIFE = 2.2000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -43	GROUND	20	8/10/76	-7.2700+ 0	7.4354+ 0	2.0000+ 1	2.2400+ 1 HRS.
N,3N	19-K -42	GROUND	9	8/10/76	-1.6900+ 1	1.7284+ 1	2.0000+ 1	1.2400+ 1 HRS.
N,G	19-K -45	GROUND	102	8/10/76	8.9004+ 0	1.0000-10	2.0000+ 1	1.6000+ 1 MIN.

ATOMIC MASS = 4.4950+ 1
19-K -45
GROUND STATE
HALF-LIFE = 1.6000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -44	GROUND	22	8/10/76	-8.9000+ 0	9.0980+ 0	2.0000+ 1	2.2000+ 1 MIN.
N,3N	19-K -43	GROUND	11	8/10/76	-1.6180+ 1	1.6540+ 1	2.0000+ 1	2.2400+ 1 HRS.
N,G	19-K -46	GROUND	102	8/10/76	6.8800+ 0	1.0000-10	2.0000+ 1	1.8000+ 0 MIN.

ATOMIC MASS = 4.5960+ 1
19-K -46
GROUND STATE
HALF-LIFE = 1.8000+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	19-K -45	GROUND	21	9/10/76	-6.8800+ 0	7.0297+ 0	2.0000+ 1	1.6000+ 1 MIN.
N,3N	19-K -44	GROUND	12	8/10/76	-1.5790+ 1	1.6134+ 1	2.0000+ 1	2.2000+ 1 MIN.
N,G	19-K -47	GROUND	102	8/10/76	8.3500+ 0	1.0000-10	2.0000+ 1	1.7500+ 0 SEC.

ATOMIC MASS = 3.8971+ 1
20-CA-39
GROUND STATE
HALF-LIFE = 8.7000- 1 SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	20-CA-38	GROUND	5	6/09/75	-1.3330+ 1	1.3670+ 1	2.0000+ 1	6.6000- 1 SEC.
N,N'P	19-K -38	GROUND	6	6/09/75	-5.7800+ 0	5.9300+ 0	2.0000+ 1	7.7100- 0 MIN.
N,N'A	18-AR-35	GROUND	6	6/09/75	-6.6600+ 0	6.8300+ 0	2.0000+ 1	1.8300- 0 SEC.
N,P	19-K -39	GROUND	102	6/09/76	7.3100+ 0	1.0000-10	2.0000+ 1	STABLE
N,A	18-AR-36	GROUND	102	6/09/76	2.6000+ 0	1.0000-10	2.0000+ 1	STABLE
N,G	20-CA-40	GROUND	102	6/09/76	1.5640+ 1	1.0000-10	2.0000+ 1	STABLE

20-CA-40
ATOMIC MASS = 3.9962+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-39	GROUND	6	6/09/76	-1.5640+ 1	1.6030+ 1	2.0000+ 1	8.7000- 1	SEC.
N,N'P	19-K -39	GROUND	5	6/09/76	-8.3300+ 0	8.5400+ 0	2.0000+ 1	STABLE	
N,N'A	18-AR-36	GROUND	4	6/09/76	-7.0400+ 0	7.2200+ 0	2.0000+ 1	STABLE	
N,P	19-K -40	GROUND	10	6/09/76	-5.3000- 1	5.4000- 1	2.0000+ 1	1.2589+ 9	YRS.
N,T	19-K -38	GROUND	3	6/09/76	-1.2930+ 1	1.3260+ 1	2.0000+ 1	7.7100+ 0	MIN.
N,A	18-AR-37	GROUND	10	6/09/76	1.7500+ 0	1.0000-10	2.0000+ 1	3.5000+ 1	DAYS
N,G	20-CA-41	GROUND	102	6/09/76	8.3600+ 0	1.0000-10	2.0000+ 1	8.0004+ 4	YRS.

20-CA-41
ATOMIC MASS = 4.0962+ 1
GROUND STATE
HALF-LIFE = 8.0004+ 4 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-40	GROUND	7	6/11/76	-8.3600+ 0	8.5700+ 0	2.0000+ 1	STABLE	
N,N'P	19-K -41	GROUND	6	6/11/76	-8.8900+ 0	9.1100+ 0	2.0000+ 1	1.2589+ 9	YRS.
N,N'A	18-AR-37	GROUND	6	6/11/76	-6.6100+ 0	6.7700+ 0	2.0000+ 1	3.5000+ 1	DAYS
N,P	19-K -41	GROUND	10	6/11/76	1.2100+ 0	1.5000+ 0	2.0000+ 1	STABLE	
N,T	19-K -39	GROUND	4	6/11/76	-8.2100+ 0	8.4100+ 0	2.0000+ 1	STABLE	
N,A	18-AR-38	GROUND	7	6/11/76	5.2300+ 0	1.0000+ 0	2.0000+ 1	STABLE	
N,G	20-CA-42	GROUND	102	6/10/76	1.1470+ 1	1.0000-10	2.0000+ 1	STABLE	

20-CA-42
ATOMIC MASS = 4.1959+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-41	GROUND	5	6/11/76	-1.1470+ 1	1.1750+ 1	2.0000+ 1	8.0004+ 4	YRS.
N,N'P	19-K -41	GROUND	4	6/11/76	-1.0270+ 1	1.0510+	2.0000+ 1	STABLE	
N,N'A	18-AR-38	GROUND	5	6/11/76	-6.2500+ 0	6.4000+ 0	2.0000+ 1	STABLE	
N,P	19-K -42	GROUND	8	6/11/76	-2.7300+ 0	2.8000+ 0	2.0000+ 1	1.2389+ 1	HRS.
N,A	18-AR-39	GROUND	6	6/11/76	3.5000- 1	5.0000+ 0	2.0000+ 1	2.6890+ 2	YRS.
N,G	20-CA-43	GROUND	102	6/10/76	7.9300+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-42	GROUND	8	6/12/76	-7.9300+ 0	8.1200+ 0	2.0000+ 1	STABLE	
N,N'A	18-AR-39	GROUND	6	6/12/76	-7.5600+ 0	7.7600+ 0	2.0000+ 1	2.6690+ 2	YRS.
N,P	19-K -43	GROUND	8	6/12/76	-1.0400+ 0	1.0600+ 0	2.0000+ 1	2.2389+ 1	HRS.
N,D	19-K -42	GROUND	4	6/12/76	-8.4400+ 0	8.6400+ 0	2.0000+ 1	1.2389+ 1	HRS.
N,A	18-AR-40	GROUND	7	6/12/76	2.2900+ 0	1.0000+ 0	2.0000+ 1	STABLE	
N,G	20-CA-44	GROUND	102	6/10/76	1.1140+ 1	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-43	GROUND	6	6/12/76	-1.1140+ 1	1.1390+ 1	2.0000+ 1	STABLE	
N,P	19-K -44	GROUND	6	6/12/76	-4.9000+ 0	5.0100+ 0	2.0000+ 1	2.2000+ 1	MIN.
N,D	19-K -43	GROUND	4	6/12/76	-9.9500+ 0	1.0130+ 1	2.0000+ 1	2.2389+ 1	HRS.
N,A	18-AR-41	GROUND	6	6/12/76	-2.7500+ 0	2.8100+ 0	2.0000+ 1	1.8300+ 0	HRS.
N,G	20-CA-45	GROUND	102	6/10/76	7.4100+ 0	1.0000-10	2.0000+ 1	1.6505+ 2	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-44	GROUND	8	6/13/76	-7.4100+ 0	7.5800+ 0	2.0000+ 1	STABLE	
N,P	19-K -45	GROUND	6	6/13/76	-3.4100+ 0	3.4900+ 0	2.0000+ 1	1.6000+ 1	MIN.
N,D	19-K -44	GROUND	4	6/13/76	-1.0090+ 1	1.0310+ 1	2.0000+ 1	2.2000+ 1	MIN.
N,A	18-AR-42	GROUND	5	6/13/76	-7.4000- 1	7.6000- 1	2.0000+ 1	3.2978+ 1	YRS.
N,G	20-CA-46	GROUND	102	6/10/76	1.0410+ 1	1.0000-10	2.0000+ 1	STABLE	

20-CA-46
ATOMIC MASS = 4.5954+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-45	GROUND	8	6/13/76	-1.0410+ 1	1.0630+ 1	2.0000+ 1	1.6505+ 2	DAYS
N,P	19-K -46	GROUND	5	6/13/76	-6.9300+ 0	7.0800+ 0	2.0000+ 1	1.8000+ 0	MIN.
N,A	18-AR-43	GROUND	4	6/13/76	-4.2000+ 0	4.2900+ 0	2.0000+ 1	1.0000+ 0	SEC.
N,G	20-CA-47	GROUND	102	6/10/76	7.2700+ 0	1.0000-10	2.0000+ 1	4.5255+ 0	DAYS

20-CA-47
ATOMIC MASS = 4.6954+ 1
GROUND STATE
HALF-LIFE = 4.5255+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-46	GROUND	7	6/13/76	-7.2700+ 0	7.4300+ 0	2.0000+ 1	STABLE	
N,P	19-K -47	GROUND	6	6/13/76	-5.8500+ 0	5.9800+ 0	2.0000+ 1	1.7500+ 1	SEC.
N,G	20-CA-48	GROUND	102	6/10/76	9.9500+ 0	1.0000-10	2.0000+ 1	STABLE	

20-CA-48
ATOMIC MASS = 4.7952+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-47	GROUND	7	6/13/76	-9.9500+ 0	1.0160+ 1	2.0000+ 1	4.5255+ 0	DAYS
N,P	19-K -48	GROUND	4	6/13/76	-9.0000+ 0	9.1900+ 0	2.0000+ 1	1.0000+ 0	SEC.
N,G	20-CA-49	GROUND	102	6/10/76	5.1400+ 0	1.0000-10	2.0000+ 1	8.8000+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	20-CA-49	GROUND	8	6/13/76	-5.1400+ 0	5.2500+ 0	2.0000+ 1	STABLE	
N,G	20-CA-50	GROUND	102	6/10/76	6.3600+ 0	1.0000-10	2.0000+ 1	9.0000+ 0	SEC.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-43	GROUND	15	8/19/76	-9.7100+ 0	9.9309+ 0	2.0000+ 1	3.9194+ 0	HRS.
N,P	20-CA-44	GROUND	14	8/19/76	4.4300+ 0	5.0000- 2	2.0000+ 1	STABLE	
N,A	19-K -41	GROUND	17	8/19/76	3.3900+ 0	3.4445+ 0	2.0000+ 1	STABLE	
N,G	21-SC-45	GROUND	102	8/19/76	1.1320+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-43	GROUND	15	8/19/76	-9.4400+ 0	9.6547+ 0	2.0000+ 1	3.9194+ 0	HRS.
N,P	20-CA-44	GROUND	13	8/19/76	4.7000+ 0	5.0000- 2	2.0000+ 1	STABLE	
N,A	19-K -41	GROUND	17	8/19/76	3.6600+ 0	3.1683+ 0	2.0000+ 1	STABLE	
N,G	21-SC-45	GROUND	102	9/19/76	1.1590+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-44	GROUND	14	8/19/76	-1.1320+ 1	1.1572+ 1	2.0000+ 1	3.9194+ 0	HRS.
N,2N	21-SC-44	2.7100- 1	15	8/19/76	-1.1590+ 1	1.1848+ 1	2.0000+ 1	2.4398+ 0	DAYS
N,P	20-CA-45	GROUND	17	8/19/76	5.3000- 1	2.3037+ 0	2.0000+ 1	1.6595+ 2	DAYS
N,A	19-K -42	GROUND	11	8/19/76	-3.9000- 1	7.2722+ 0	2.0000+ 1	1.2460+ 1	HRS.
N,G	21-SC-46	1.4200- 1	102	8/19/76	8.6300+ 0	1.0000-10	2.0000+ 1	2.0000+ 1	SEC.
N,G	21-SC-46	GROUND	102	8/19/76	8.7700+ 0	1.0000-10	2.0000+ 1	8.3900+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-45	GROUND	15	8/19/76	-8.7700+ 0	8.9608+ 0	2.0000+ 1	STABLE	
N,P	20-CA-46	GROUND	19	8/19/76	2.1700+ 0	6.1210- 1	2.0000+ 1	STABLE	
N,A	19-K -43	GROUND	17	8/19/76	4.7000- 1	6.3564+ 0	2.0000+ 1	2.2400+ 1	HRS.
N,G	21-SC-47	GROUND	102	8/19/76	1.0640+ 1	1.0000-10	2.0000+ 1	3.4306+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-45	GROUND	15	9/19/76	-8.6300+ 0	8.8178+ 0	2.0000+ 1	STABLE	
N,P	20-CA-46	GROUND	19	8/19/76	2.3100+ 0	4.6906- 1	2.0000+ 1	STABLE	
N,A	19-K -43	GROUND	17	8/19/76	6.1000- 1	6.2133+ 0	2.0000+ 1	2.2400+ 1	HRS.
N,G	21-SC-47	GROUND	102	8/19/76	1.0780+ 1	1.0000-10	2.0000+ 1	3.4306+ 0	DAYS

21-SC-47

ATOMIC MASS = 4.6952+ 1
GROUND STATE
HALF-LIFE = 3.4306+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-46	GROUND	16	8/20/76	-1.0640+ 1	1.0867+ 1	2.0000+ 1	8.3900+ 1	DAYS
N,3N	21-SC-45	GROUND	3	8/20/76	-1.9410+ 1	1.9823+ 1	2.0000+ 1	STABLE	
N,P	20-CA-47	GROUND	17	8/20/76	-1.2100+ 0	4.0492+ 0	2.0000+ 1	4.5301+ 0	DAYS
N,A	19-K-44	GROUND	17	8/20/76	-2.9000+ 0	9.7623+ 0	2.0000+ 1	2.2000+ 1	MIN.
N,G	21-SC-48	GROUND	102	8/20/76	8.2400+ 0	1.0000-10	2.0000+ 1	1.8299+ 0	DAYS

21-SC-48

ATOMIC MASS = 4.7952+ 1
GROUND STATE
HALF-LIFE = 1.8299+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	21-SC-47	GROUND	17	8/20/76	-8.2400+ 0	8.4118+ 0	2.0000+ 1	3.4306+ 0	DAYS
N,3N	21-SC-46	GROUND	4	8/20/76	-1.8880+ 1	1.9274+ 1	2.0000+ 1	8.3900+ 1	DAYS
N,P	20-CA-48	GROUND	17	8/20/76	5.1000- 1	2.2774+ 0	2.0000+ 1	STABLE	
N,A	19-K-45	GROUND	17	8/20/76	-2.2300+ 0	9.0420+ 0	2.0000+ 1	1.6000+ 1	MIN.
N,G	21-SC-49	GROUND	97	8/20/76	1.0130+ 1	1.0000-10	2.0000+ 1	5.7500+ 1	MIN.

22-TI-45

ATOMIC MASS = 4.4958+ 1
GROUND STATE
HALF-LIFE = 3.0778+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	22-TI-44	GROUND	16	8/22/76	-9.5300+ 0	9.7420+ 0	2.0000+ 1	4.8009+ 1	YRS.
N,N'F	21-SC-44	GROUND	16	8/22/76	-8.4800+ 0	1.1556+ 1	2.0000+ 1	3.9194+ 0	HRS.
N,N'P	21-SC-44	2.7100- 1	16	8/22/76	-8.7500+ 0	1.1932+ 1	2.0000+ 0	2.4398+ 0	DAYS
N,N'A	20-CA-41	GROUND	14	8/22/76	-6.2300+ 0	1.3787+ 1	2.0000+ 1	8.0004+ 4	YRS.
N,P	21-SC-45	GROUND	23	8/22/76	2.8500+ 0	1.2188- 1	2.0000+ 1	STABLE	
N,A	20-CA-42	GROUND	23	8/22/76	5.1900+ 0	2.0113+ 0	2.0000+ 1	STABLE	
N,G	22-TI-46	GROUND	102	8/22/76	1.3200+ 1	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	22-TI-45	GROUND	9	8/22/76	-1.3200+ 1	1.3487+ 1	2.0000+ 1	3.0778+ 0	HRS.
N,N'P	21-SC-45	GROUND	15	8/22/76	-1.0350+ 1	1.3446+ 1	2.0000+ 1	STABLE	
N,N'A	20-CA-42	GROUND	12	8/22/76	-8.0100+ 0	1.5501+ 1	2.0000+ 1	STABLE	
N,P	21-SC-46	GROUND	21	8/22/76	-1.5800+ 0	4.6322+ 0	2.0000+ 1	8.3900+ 1	DAYS
N,A	20-CA-43	GROUND	19	8/22/76	-8.0000- 2	7.3590+ 0	2.0000+ 1	STABLE	
N,G	22-TI-47	GROUND	98	8/22/76	8.8800+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	22-TI-46	GROUND	16	8/22/76	-8.8800+ 0	9.0691+ 0	2.0000+ 1	STABLE	
N,N'P	21-SC-46	GROUND	17	8/22/76	-1.0460+ 1	1.3538+ 1	2.0000+ 1	8.3900+ 1	DAYS
N,N'A	20-CA-43	GROUND	10	8/22/76	-8.9500+ 0	1.6418+ 1	2.0000+ 1	STABLE	
N,P	21-SC-47	GROUND	20	8/22/76	1.8000- 1	1.2172+ 0	2.0000+ 1	3.4306+ 0	DAYS
N,A	20-CA-44	GROUND	18	8/22/76	2.1800+ 0	5.0126+ 0	2.0000+ 1	STABLE	
N,G	22-TI-48	GROUND	100	8/22/76	1.1630+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	22-TI-47	GROUND	16	8/22/76	-1.1630+ 1	1.1873+ 1	2.0000+ 1	STABLE	
N,N'P	21-SC-47	GROUND	14	8/22/76	-1.1450+ 1	1.4427+ 1	2.0000+ 1	3.4306+ 0	DAYS
N,N'A	20-CA-44	GROUND	9	8/22/76	-9.4500+ 0	1.7631+ 1	2.0000+ 1	STABLE	
N,P	21-SC-48	GROUND	21	8/22/76	-3.2100+ 0	4.2300+ 0	2.0000+ 1	1.8299+ 0	DAYS
N,A	20-CA-45	GROUND	18	8/22/76	-2.0300+ 0	6.9668+ 0	2.0000+ 1	1.6505+ 2	DAYS
N,G	22-TI-49	GROUND	102	8/22/76	8.1400+ 0	1.0000-10	2.0000+ 1	STABLE	

22-TI-49

ATOMIC MASS = 4.8949+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	22-TI-48	GROUND	17	8/22/76	-8.1400+ 0	8.3063+ 0	2.0000+ 1	STABLE
N,N'P	21-SC-48	GROUND	14	8/22/76	-1.1350+ 1	1.4408+ 1	2.0000+ 1	1.8299+ 0 DAYS
N,N'A	20-CA-45	GROUND	9	8/22/76	-1.0180+ 1	1.7589+ 1	2.0000+ 1	1.6505+ 2 DAYS
N,P	21-SC-49	GROUND	21	8/22/76	-1.2200+ 0	4.2134+ 0	2.0000+ 1	5.7500+ 1 MIN.
N,A	20-CA-46	GROUND	18	8/22/76	2.3000+ 0	6.9305+ 0	2.0000+ 1	STABLE
N,G	22-TI-50	GROUND	98	8/22/76	1.0950+ 1	1.0000-10	2.0000+ 1	STABLE

22-TI-50

ATOMIC MASS = 4.9945+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	22-TI-49	GROUND	17	8/22/76	-1.0950+ 1	1.1169+ 1	2.0000+ 1	STABLE
N,3N	22-TI-48	GROUND	4	8/22/76	-1.9090+ 1	1.9472+ 1	2.0000+ 1	STABLE
N,N'P	21-SC-49	GROUND	13	8/22/76	-1.2170+ 1	1.5225+ 1	2.0000+ 1	5.7500+ 1 MIN.
N,N'A	20-CA-46	GROUND	9	8/22/76	-1.0720+ 1	1.8100+ 1	2.0000+ 1	STABLE
N,P	21-SC-50	GROUND	17	8/22/76	-6.1100+ 0	9.1850+ 0	2.0000+ 1	1.7200+ 0 MIN.
N,A	20-CA-47	GROUND	17	8/22/76	-3.4500+ 0	1.0649+ 1	2.0000+ 1	4.5301+ 0 DAYS
N,G	22-TI-51	GROUND	81	8/22/76	6.3800+ 0	1.0000-10	2.0000+ 1	5.7600+ 0 MIN.

22-TI-51

ATOMIC MASS = 5.0947+ 1
GROUND STATE
HALF-LIFE = 5.7600+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	22-TI-50	GROUND	20	8/22/76	-6.3800+ 0	6.5052+ 0	2.0000+ 1	STABLE
N,3N	22-TI-49	GROUND	8	8/22/76	-1.7330+ 1	1.7670+ 1	2.0000+ 1	STABLE
N,N'P	21-SC-50	GROUND	12	8/22/76	-1.2490+ 1	1.5532+ 1	2.0000+ 1	1.7200+ 0 MIN.
N,N'A	20-CA-47	GROUND	10	8/22/76	-9.8300+ 0	1.7152+ 1	2.0000+ 1	4.5301+ 0 DAYS
N,P	21-SC-51	GROUND	18	8/22/76	-5.7300+ 0	8.7799+ 0	2.0000+ 1	1.0000+ 0 MIN.
N,A	20-CA-48	GROUND	19	8/22/76	1.3000- 0	6.962+ 0	2.0000+ 1	STABLE
N,G	22-TI-52	GROUND	93	8/22/76	7.8000+ 0	1.0000-10	2.0000+ 1	1.7000+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	23-V -48	GROUND	102	5/25/77	1.0530+ 1	1.0000-10	2.0000+ 1	1.5972+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	23-V -47	GROUND	15	5/25/77	-1.0530+ 1	1.0750+ 1	2.0000+ 1	3.1200+ 1	MIN.
N,N'P	22-TI-47	GROUND	15	5/25/77	-6.8300+ 0	9.9949+ 0	2.0000+ 1	STABLE	
N,N'A	21-SC-44	GROUND	10	5/26/77	-9.0800+ 0	1.6955+ 1	2.0000+ 1	3.9306+ 0	HRS.
N,N'A	21-SC-44	2.7100- 1	9	5/26/77	-9.3510+ 0	1.7231+ 1	2.0000+ 1	2.4421+ 0	DAYS
N,P	22-TI-48	GROUND	17	5/25/77	4.8090+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	21-SC-45	GROUND	17	5/26/77	2.2400+ 0	5.3591+ 0	2.0000+ 1	STABLE	
N,G	23-V -49	GROUND	102	5/25/77	1.1560+ 1	1.0000-10	2.0000+ 1	3.3102+ 2	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	23-V -48	GROUND	15	5/25/77	-1.1560+ 1	1.1796+ 1	2.0000+ 1	1.5972+ 1	DAYS
N,N'P	22-TI-48	GROUND	16	5/25/77	-6.7600+ 0	9.9048+ 0	2.0000+ 1	STABLE	
N,N'A	21-SC-45	GROUND	9	5/26/77	-9.3200+ 0	1.7156+ 1	2.0000+ 1	STABLE	
N,P	22-TI-49	GROUND	22	5/25/77	1.3800+ 0	1.7503+ 0	2.0000+ 1	STABLE	
N,A	21-SC-46	GROUND	17	5/26/77	-5.5000- 1	8.1683+ 0	2.0000+ 1	8.3796+ 1	DAYS
N,A	21-SC-46	1.4200- 1	16	5/26/77	-6.9200- 1	8.3132+ 0	2.0000+ 1	1.8700+ 1	SEC.
N,G	23-V -50	GROUND	102	5/25/77	9.3300+ 0	1.0000-10	2.0000+ 1	5.9995+15	YRS.

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23-V -50
ATOMIC MASS = 4.9947+ 1
GROUND STATE
HALF-LIFE = 5.9995+15 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	23-V -49	GROUND	15	5/25/77	-9.3300+ 0	9.5168+ 0	2.0000+ 1	3.3102+ 2	DAYS
N,N'P	22-TI-49	GROUND	17	5/25/77	-7.9500+ 0	1.1101+ 1	2.0000+ 1	STABLE	
N,N'A	21-SC-46	GROUND	8	5/26/77	-5.8800+ 0	1.7685+ 1	2.0000+ 1	8.3796+ 1	DAYS
N,N'A	21-SC-46	1.4200- 1	9	5/26/77	-1.0022+ 1	1.7829+ 1	2.0000+ 1	1.8700+ 1	SEC.
N,P	22-TI-50	GROUND	21	5/25/77	3.0000+ 0	8.1783- 2	2.0000+ 1	STABLE	
N,A	21-SC-47	GROUND	17	5/26/77	7.6000- 1	6.7941+ 0	2.0000+ 1	3.4097+ 0	DAYS
N,G	23-V -51	GROUND	102	8/18/76	1.1050+ 1	1.0000-10	2.0000+ 1	STABLE	

23-V -51
ATOMIC MASS = 5.0942+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	23-V -50	GROUND	15	5/25/77	-1.1050+ 1	1.1267+ 1	2.0000+ 1	5.9995+15	YRS.
N,N'P	22-TI-50	GROUND	15	5/25/77	-8.0500+ 0	1.118+ 1	2.0000+ 1	STABLE	
N,N'A	21-SC-47	GROUND	6	8/19/76	-1.0290+ 1	1.3000+ 1	2.0000+ 1	3.4306+ 0	DAYS
N,P	22-TI-51	GROUND	22	5/25/77	-1.6700+ 0	4.8282+ 0	2.0000+ 1	5.7600+ 0	MIN.
N,A	21-SC-48	GROUND	6	9/04/73	-2.0600+ 0	9.0000+ 0	2.0000+ 1	1.8299+ 0	DAYS
N,G	23-V -52	GROUND	102	8/18/76	7.3200+ 0	1.0000-10	2.0000+ 1	3.7550+ 0	MIN.

23-V -52
ATOMIC MASS = 5.1945+ 1
GROUND STATE
HALF-LIFE = 3.7550+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	23-V -51	GROUND	17	5/25/77	-7.3100+ 0	7.4507+ 0	2.0000+ 1	STABLE	
N,3N	23-V -50	GROUND	6	5/25/77	-1.8350+ 1	1.8713+ 1	2.0000+ 1	5.9995+15	YRS.
N,N'P	22-TI-51	GROUND	15	5/25/77	-8.9800+ 0	1.2115+ 1	2.0000+ 1	5.7800+ 0	MIN.
N,N'A	21-SC-48	GROUND	10	5/26/77	-9.3700+ 0	1.7083+ 1	2.6000+ 1	1.8299+ 0	DAYS
N,P	22-TI-52	GROUND	20	5/25/77	-1.1800+ 0	4.3123+ 0	2.0000+ 1	1.7000+ 0	MIN.
N,A	21-SC-49	GROUND	16	5/26/77	7.6000- 1	6.7219+ 0	2.0000+ 1	5.7300+ 1	MIN.
N,G	23-V -53	GROUND	102	8/18/76	8.5000+ 0	1.0000-10	2.0000+ 1	1.5503+ 0	MIN.

ATOMIC MASS = 4.895i+ 1 (24-CR-49)
GROUND STATE
HALF-LIFE = 4.2000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	24-CR-48	GROUND	16	11/05/76	-1.0540+ 1	1.0857+ 1	2.0000+ 1	2.296i+ 1 HRS.
N,N'P	23-V-48	GROUND	10	11/08/76	-8.2100+ 0	1.1569+ 1	2.0000+ 1	1.597i+ 1 DAYS
N,N'A	22-TI-45	GROUND	8	11/17/76	-8.8100+ 0	1.7088+ 1	2.0000+ 1	3.0778+ 0 HRS.
N,P	23-V-49	GROUND	22	11/17/76	3.3500+ 0	1.0000- 4	2.0000+ 1	3.3102+ 2 DAYS
N,A	22-TI-46	GROUND	12	11/17/76	4.3900+ 0	3.5773+ 0	2.0000+ 1	STABLE
N,G	24-CR-50	GROUND	102	10/18/76	1.2940+ 1	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 4.9946+ 1 (24-CR-50)
GROUND STATE
HALF-LIFE = STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	24-CR-49	GROUND	11	11/05/76	-1.2940+ 1	1.3199+ 1	2.0000+ 1	4.2000+ 1 MIN.
N,N'P	23-V-49	GROUND	11	11/08/76	-9.5900+ 0	1.2957+ 1	2.0000+ 1	3.3102+ 2 DAYS
N,N'A	22-TI-46	GROUND	10	11/17/76	-8.5500+ 0	1.6778+ 1	2.0000+ 1	STABLE
N,P	23-V-50	GROUND	23	11/17/76	-2.6000- 1	3.6003+ 0	2.0000+ 1	5.9995+15 YRS.
N,A	22-TI-47	GROUND	18	11/17/76	3.2000+ 0	7.6905+ 0	2.0000+ 1	STABLE
N,G	24-CR-51	GROUND	102	10/13/76	9.2600+ 0	1.0000-10	2.0000+ 1	2.7708+ 1 DAYS

ATOMIC MASS = 5.0945+ 1 (24-CR-51)
GROUND STATE
HALF-LIFE = 2.7708+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	24-CR-50	GROUND	15	11/05/76	-9.2600+ 0	9.4418+ 0	2.0000+ 1	STABLE
N,N'P	23-V-50	GROUND	9	11/08/76	-9.5200+ 0	1.2866+ 1	2.0000+ 1	5.9995+15 YRS.
N,N'A	22-TI-47	GROUND	9	11/17/76	-8.3400+ 0	1.7132+ 1	2.0000+ 1	STABLE
N,P	23-V-51	GROUND	23	11/17/76	1.5300+ 0	1.7578+ 0	2.0000+ 1	STABLE
N,A	22-TI-48	GROUND	18	11/17/76	2.6900+ 0	5.2351+ 0	2.0000+ 1	STABLE
N,G	24-CR-52	GROUND	102	10/18/76	1.2040+ 1	1.0000-10	2.0000+ 1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	24-CR-51	GROUND	12	11/05/76	-1.2040+ 1	1.2271+ 1	2.0000+ 1	2.7708+ 1	DAYS
N,N'P	23-V -51	GROUND	10	11/08/76	-1.0510+ 1	1.3956+ 1	2.0000+ 1	STABLE	
N,N'A	22-TI-48	GROUND	9	11/17/76	-9.3500+ 0	1.7508+ 1	2.0000+ 1	STABLE	
N,P	23-V -52	GROUND	21	11/17/76	-3.2000+ 0	6.5625+ 0	2.0000+ 1	3.7550+ 0	MIN.
N,A	22-TI-49	GROUND	18	11/17/76	-1.2100+ 0	9.1730+ 0	2.0000+ 1	STABLE	
N,G	24-CR-53	GROUND	102	10/13/76	7.9400+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	24-CR-52	GROUND	14	11/05/76	-7.9400+ 0	8.0900+ 0	2.0000+ 1	STABLE	
N,N'P	23-V -52	GROUND	8	11/08/76	-1.1140+ 1	1.4479+ 1	2.0000+ 1	3.7550+ 0	MIN.
N,N'A	22-TI-49	GROUND	9	11/17/76	-9.1500+ 0	1.7262+ 1	2.0000+ 1	STABLE	
N,P	23-V -53	GROUND	19	11/17/76	-2.6400+ 0	5.9743+ 0	2.0000+ 1	1.5500+ 0	MIN.
N,A	22-TI-50	GROUND	17	11/17/76	1.8000+ 0	6.0686+ 0	2.0000+ 1	STABLE	
N,G	24-CR-54	GROUND	102	10/14/76	9.7200+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	24-CR-53	GROUND	17	11/05/76	-9.7200+ 0	9.9002+ 0	2.0000+ 1	STABLE	
N,3N	24-CR-52	GROUND	8	11/05/76	-1.7660+ 1	1.7987+ 1	2.0000+ 1	STABLE	
N,N'P	23-V -53	GROUND	8	11/08/76	-1.2360+ 1	1.5703+ 1	2.0000+ 1	1.5500+ 0	MIN.
N,N'A	22-TI-50	GROUND	12	11/18/76	-7.9200+ 0	1.5969+ 1	2.0000+ 1	STABLE	
N,P	23-V -54	GROUND	18	11/17/76	-6.1200+ 0	9.5017+ 0	2.0000+ 1	4.3000+ 1	SEC.
N,A	22-TI-51	GROUND	20	11/18/76	-1.5400+ 0	9.4347+ 0	2.0000+ 1	5.7600+ 0	MIN.
N,G	24-CR-55	GROUND	102	10/14/76	6.2600+ 0	1.0000-10	2.0000+ 1	3.5600+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	24-CR-54	GROUND	22	11/05/76	-6.2600+ 0	6.3739+ 0	2.0000+ 1	STABLE	
N,3N	24-CR-53	GROUND	13	11/05/76	-1.5980+ 1	1.6271+ 1	2.0000+ 1	STABLE	
N,N'P	23-V -54	GROUND	8	11/08/76	-1.2620+ 1	1.5949+ 1	2.0000+ 1	4.3000+ 1	SEC.
N,N'A	22-TI-51	GROUND	12	11/17/76	-7.8000+ 0	1.5808+ 1	2.0000+ 1	5.7600+ 0	MIN.
N,P	23-V -55	GROUND	19	11/17/76	-5.6000+ 0	8.9544+ 0	2.0000+ 1	1.7400+ 1	SEC.
N,A	22-TI-52	GROUND	19	11/17/76	1.0000- 2	7.8305+ 0	2.0000+ 1	1.7000+ 0	MIN.
N,G	24-CR-56	GROUND	102	10/19/76	8.2200+ 0	1.0000-10	2.0000+ 1	5.9000+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	24-CR-55	GROUND	25	11/05/76	-8.2200+ 0	8.3669+ 0	2.0000+ 1	3.5600+ 0	MIN.
N,3N	24-CR-54	GROUND	15	11/05/76	-1.4480+ 1	1.4739+ 1	2.0000+ 1	STABLE	
N,G	24-CR-57	GROUND	102	10/19/76	5.5900+ 0	1.0000-10	2.0000+ 1	2.2500- 1	SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	25-MN-52	3.8300- 1	102	5/17/77	1.0157+ 1	1.0000-10	2.0000+ 1	2.1400+ 1	MIN.
N,G	25-MN-52	GROUND	102	5/17/77	1.0540+ 1	1.0000-10	2.0000+ 1	5.6296+ 0	DAYS

ATOMIC MASS = 5.1946+1
GROUND STATE   25-MN-52
HALF-LIFE = 5.6206+0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	25-MN-51	GROUND	16	5/16/77	-1.0540+1	1.0743+1	2.0000+1	4.6000+1 MIN.
N,N'P	24-CR-51	GROUND	15	5/16/77	-6.5500+0	1.0007+1	2.0000+1	2.7708+1 DAYS
N,N'A	23-V-48	GROUND	9	5/16/77	-8.6600+0	1.7258+1	2.0000+1	1.5972+1 DAYS
N,P	24-CR-52	GROUND	19	5/16/77	5.4900+0	1.0000-10	2.0000+1	STABLE
N,A	23-V-49	GROUND	18	5/16/77	2.9000+0	5.4351+0	2.0000+1	3.3102+2 DAYS
N,G	25-MN-53	GROUND	102	5/17/77	1.2050+1	1.0000-10	2.0000+1	3.7005+6 YRS.

ATOMIC MASS = 5.2941+1
GROUND STATE   25-MN-53
HALF-LIFE = 3.7005+6 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	25-MN-52	GROUND	16	5/17/77	-1.2050+1	1.2278+1	2.0000+1	5.6296+0 DAYS
N,2N	25-MN-52	3.8300-1	16	5/17/77	-1.2433+1	1.2668+1	2.0000+1	2.1400+1 MIN.
N,N'P	24-CR-52	GROUND	15	5/16/77	-6.5600+0	9.9984+0	2.0000+1	STABLE
N,N'A	23-V-49	GROUND	9	11/17/76	-9.1600+0	1.7724+1	2.0000+1	3.3102+2 DAYS
N,P	24-CR-53	GROUND	23	5/16/77	1.3800+0	2.0732+0	2.0000+1	STABLE
N,A	23-V-50	GROUND	17	11/17/76	1.8000-1	8.1682+0	2.0000+1	5.9995+15 YRS.
N,G	25-MN-54	GROUND	102	11/16/76	8.9900+0	1.0000-10	2.0000+1	3.1250+2 DAYS

ATOMIC MASS = 5.3940+1
GROUND STATE   25-MN-54
HALF-LIFE = 3.1250+2 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	25-MN-53	GROUND	16	5/16/77	-8.9900+0	9.1057+0	2.0000+1	3.7005+6 YRS.
N,N'P	24-C4-53	GROUND	17	5/16/77	-7.5600+0	1.0999+1	2.0000+1	STABLE
N,N'A	23-V-50	GROUND	9	11/17/76	-8.7700+0	1.724H+1	2.0000+1	5.9995+15 YRS.
N,P	24-CR-54	GROUND	22	5/15/77	2.1600+0	1.2621+0	2.0000+1	STABLE
N,A	23-V-51	GROUND	17	11/17/76	2.2900+0	5.9807+0	2.0000+1	STABLE
N,G	25-MN-55	GROUND	102	11/16/76	1.0230+1	1.0000-10	2.0000+1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	25-MN-54	GROUND	11	8/31/72	-1.0230+ 1	1.0420+ 1	2.0000+ 1	3.1250+ 2	DAYS
N,N'P	24-CR-54	GROUND	17	5/16/77	-8.0700+ 0	1.1500+ 1	2.0000+ 1	STABLE	
N,N'A	23-V -51	GROUND	10	11/17/76	-7.9400+ 0	1.6397+ 1	2.0000+ 1	STABLE	
N,P	24-CR-55	GROUND	21	5/16/77	-1.8100+ 0	5.2883+ 0	2.0000+ 1	3.5600+ 0	MIN.
N,A	23-V -52	GROUND	18	11/17/76	-6.3000- 1	8.9169+ 0	2.0000+ 1	3.7550+ 0	MIN.
N,G	25-MN-56	GROUND	02	11/15/76	7.2700+ 0	1.0000-10	2.0000+ 1	2.5819+ 0	HRS.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	25-MN-55	GROUND	20	5/16/77	-7.2700+ 0	7.4000+ 0	2.0000+ 1	STABLE	
N,3N	25-MN-54	GROUND	9	5/16/77	-1.7500+ 1	1.7813+ 1	2.0000+ 1	3.1250+ 2	DAYS
N,N'P	24-CR-55	GROUND	16	5/16/77	-9.0800+ 0	1.2511+ 1	2.0000+ 1	3.5600+ 0	MIN.
N,N'A	23-V -52	GROUND	11	11/18/76	-7.9000+ 0	1.6317+ 1	2.0000+ 1	3.7550+ 0	MIN.
N,P	24-CR-56	GROUND	22	5/16/77	-8.6000- 1	4.3044+ 0	2.0000+ 1	5.9000+ 0	MIN.
N,A	23-V -53	GROUND	19	11/18/76	6.0000- 1	7.6279+ 0	2.0000+ 1	1.5500+ 0	MIN.
N,G	25-MN-57	GROUND	102	11/16/76	8.7800+ 0	1.0000-10	2.0000+ 1	1.5900+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	25-MN-56	GROUND	21	5/16/77	-8.7800+ 0	8.5342+ 0	2.0000+ 1	2.5819+ 0	HRS.
N,3N	25-MN-55	GROUND	10	5/16/77	-1.6050+ 1	1.6332+ 1	2.0000+ 1	STABLE	
N,N'P	24-CR-56	GROUND	17	5/16/77	-9.6400+ 0	1.3063+ 1	2.0000+ 1	5.9000+ 0	MIN.
N,N'A	23-V -53	GROUND	9	11/18/76	-8.1900+ 0	1.6572+ 1	2.0000+ 1	1.5500+ 0	MIN.
N,P	24-CR-57	GROUND	18	5/16/77	-4.9500+ 0	8.4499+ 0	2.0000+ 1	2.2500- 1	SEC.
N,A	23-V -54	GROUND	18	11/18/76	-1.4300+ 0	9.6577+ 0	2.0000+ 1	4.3000+ 1	SEC.
N,G	25-MN-58	GROUND	102	11/16/76	6.5000+ 0	1.0000-10	2.0000+ 1	1.0833+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	25-MN-57	GROUND	22	5/16/77	-6.5000+ 0	6.6122+ 0	2.0000+ 1	1.5900+ 0	MIN.
N,3N	25-MN-56	GROUND	12	5/16/77	-1.5280+ 1	1.5544+ 1	2.0000+ 1	2.5819+ 0	HRS.
N,G	25-MN-59	GROUND	102	11/16/76	7.3400+ 0	1.0000-10	2.0000+ 1	6.6700- 2	SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	26-FE-52	GROUND	15	12/09/76	-1.0680+ 1	1.0892+ 1	2.0000+ 1	8.3000+ 0	HRS.
N,N'P	25-MN-52	GROUND	8	12/09/76	-7.5300+ 0	1.1176+ 1	2.0000+ 1	5.6296+ 0	DAYS
N,N'P	25-MN-52	3.8300- 1	7	12/09/76	-7.9130+ 0	1.1566+ 1	2.0000+ 1	2.1400+ 1	MIN.
N,N'A	24-CR-49	GROUND	9	12/09/76	-7.9800+ 0	1.6980+ 1	2.0000+ 1	4.2000+ 1	MIN.
N,P	25-MN-53	GROUND	21	12/09/76	4.5300+ 0	1.0000- 4	2.0000+ 1	3.7005+ 6	YRS.
N,A	24-CR-50	GROUND	17	12/09/76	4.9600+ 0	3.7548+ 0	2.0000+ 1	STABLE	
N,G	26-FE-54	GROUND	102	12/19/76	1.3380+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	26-FE-53	GROUND	15	12/09/76	-1.3380+ 1	1.3628+ 1	2.0000+ 1	8.5300+ 0	MIN.
N,N'P	25-MN-53	GROUND	8	12/09/76	-8.8E00+ 0	1.2512+ 1	2.0000+ 1	3.7005+ 6	YRS.
N,N'A	24-CR-50	GROUND	9	12/09/76	-8.4200+ 0	1.7384+ 1	2.0000+ 1	STABLE	
N,P	25-MN-54	GROUND	23	12/09/76	9.0000- 2	5.0000- 2	2.0000+ 1	3.1250+ 2	DAYS
N,A	24-CR-51	GROUND	20	12/09/76	8.4000- 1	5.0000- 2	2.0000+ 1	2.7708+ 1	DAYS
N,G	26-FE-55	GROUND	102	12/20/76	9.3000+ 0	1.0000-10	2.0000+ 1	2.7001+ 0	YRS.

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ATOMIC MASS = 5.4938+ 1
GROUND STATE
HALF-LIFE = 2.7001+ 0 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	26-FE-54	GROUND	15	12/09/76	-9.3000+ 0	9.4693+ 0	2.0000+ 1	STABLE	
N,N'P	25-MN-54	GROUND	8	12/09/76	-9.2100+ 0	1.2849+ 1	2.0000+ 1	3.1250+ 2	DAYS
N,N'A	24-CR-51	GROUND	9	12/09/76	-8.4600+ 0	1.7382+ 1	2.0000+ 1	2.7708+ 1	DAYS
N,P	25-MN-55	GROUND	22	12/09/76	1.0100+ 0	2.6142+ 0	2.0000+ 1	STABLE	
N,A	24-CR-52	GROUND	18	12/09/76	3.5800+ 0	5.0830+ 0	2.0000+ 1	STABLE	
N,G	26-FE-56	GROUND	102	12/19/76	1.1200+ 1	1.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 5.5935+ 1
GROUND STATE
STABLE

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	26-FE-55	GROUND	15	12/09/76	-1.1200+ 1	1.1400+ 1	2.0000+ 1	2.7001+ 0	YRS.
N,N'P	25-MN-55	GROUND	7	12/09/76	-1.0190+ 1	1.3827+ 1	2.0000+ 1	STABLE	
N,N'A	24-CR-52	GROUND	9	12/09/76	-7.6200+ 0	1.6484+ 1	2.0000+ 1	STABLE	
N,P	25-MN-56	GROUND	19	12/09/76	-2.9100+ 0	3.5000+ 0	2.0000+ 1	2.5819+ 0	HRS.
N,A	24-CR-53	GROUND	18	12/09/76	3.2000- 1	8.3636+ 0	2.0000+ 1	STABLE	
N,G	26-FE-57	GROUND	102	12/17/76	7.6500+ 0	1.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 5.6935+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	26-FE-56	GROUND	17	12/09/76	-7.6500+ 0	7.7844+ 0	2.0000+ 1	STABLE	
N,3N	26-FE-55	GROUND	4	12/09/76	-1.8850+ 1	1.9181+ 1	2.0000+ 1	2.7001+ 0	YRS.
N,N'P	25-MN-56	GROUND	10	12/09/76	-1.0560+ 1	1.4185+ 1	2.0000+ 1	2.5819+ 0	HRS.
N,N'A	24-CR-53	GROUND	10	12/09/76	-7.3200+ 0	1.6138+ 1	2.0000+ 1	STABLE	
N,P	25-MN-57	GROUND	20	12/09/76	-1.7800+ 0	5.4195+ 0	2.0000+ 1	1.5900+ 0	MIN.
N,A	24-CR-54	GROUND	19	12/09/76	2.4000+ 0	6.2092+ 0	2.0000+ 1	STABLE	
N,G	26-FE-58	GROUND	102	12/20/76	1.0040+ 1	'.0000-10	2.0000+ 1	STABLE	

ATOMIC MASS = 5.7933+ 1

26-FE-58
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	26-FE-57	GROUND	18	12/09/76	-1.0040+ 1	1.0213+ 1	2.0000+ 1	STABLE
N,3N	26-FE-56	GROUND	9	12/09/76	-1.7690+ 1	1.7995+ 1	2.0000+ 1	STABLE
N,N'P	25-MN-57	GROUND	7	12/09/76	-1.1820+ 1	1.5448+ 1	2.0000+ 1	1.5900+ 0 MIN.
N,N'A	24-CR-54	GROUND	11	12/09/76	-7.6500+ 0	1.6433+ 1	2.0000+ 1	STABLE
N,P	25-MN-58	GROUND	20	12/09/76	-5.3200+ 0	9.0035+ 0	2.0000+ 1	1.0833+ 0 MIN.
N,A	24-CR-55	GROUND	18	12/09/76	-1.3900+ 0	1.0028+ 1	2.0000+ 1	3.5600+ 0 MIN.
N,G	26-FE-59	GROUND	102	12/20/76	6.5900+ 0	1.0000-10	2.0000+ 1	4.4595+ 1 DAYS

ATOMIC MASS = 5.8935+ 1

26-FE-59
GROUND STATE
HALF-LIFE = 4.4595+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	26-FE-58	GROUND	21	12/09/76	-6.5900+ 0	6.7018+ 0	2.0000+ 1	STABLE
N,3N	26-FE-57	GROUND	9	12/09/76	-1.6630+ 1	1.6912+ 1	2.0000+ 1	STABLE
N,N'P	25-MN-58	GROUND	7	12/09/76	-1.1910+ 1	1.5522+ 1	2.0000+ 1	1.0833+ 0 MIN.
N,N'A	24-CR-55	GROUND	10	12/09/76	-7.9700+ 0	1.6719+ 1	2.0000+ 1	3.5600+ 0 MIN.
N,P	25-MN-59	GROUND	18	12/09/76	-4.9400+ 0	8.5992+ 0	2.0000+ 1	6.6700+ 2 SEC.
N,A	24-CR-56	GROUND	17	12/09/76	2.4400- 1	8.3335+ 0	2.0000+ 1	5.9000+ 0 MIN.
N,G	26-FE-60	GROUND	102	12/19/76	8.8400+ 0	1.0000-10	2.0000+ 1	3.0004+ 5 YRS.

ATOMIC MASS = 5.9934+ 1

26-FE-60
GROUND STATE
HALF-LIFE = 3.0004+ 5 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	26-FE-59	GROUND	22	12/09/76	-8.8400+ 0	8.9875+ 0	2.0000+ 1	4.4595+ 1 DAYS
N,3N	26-FE-58	GROUND	12	12/09/76	-1.5420+ 1	1.5677+ 1	2.0000+ 1	STABLE
N,G	26-FE-61	GROUND	102	12/20/76	5.6700+ 0	1.0000-10	2.0000+ 1	6.1000+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	27-CO-56	GROUND	8	10/05/76	-1.1380+ 1	1.1580+ 1	2.0000+ 1	7.8495+ 1	DAYS
N,N'P	26-FE-56	GROUND	13	10/06/76	-6.0300+ 0	6.8400+ 0	2.0000+ 1	STABLE	
N,N'A	25-MN-53	GROUND	10	10/05/76	-7.0800+ 0	9.5000+ 0	2.0000+ 1	3.7005+ 6	YRS.
N,P	26-FE-57	GROUND	58	10/06/76	1.6200+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	25-MN-54	GROUND	18	10/05/76	1.8600+ 0	1.0000+ 0	2.0000+ 1	3.1250+ 2	DAYS
N,G	27-CO-58	2.4900- 2	102	10/01/76	8.5451+ 0	1.0000-10	2.0000+ 1	9.0000+ 0	HRS.
N,G	27-CO-58	GROUND	102	10/01/76	8.5700+ 0	1.0000-10	2.0000+ 1	7.1296+ 1	DAYS

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-58	2.4900- 2	30	10/08/76	-2.4900- 2	2.5330- 2	2.0000+ 1	9.0000+ 0	HRS.
N,2N	27-CO-57	GROUND	11	10/05/76	-8.5700+ 0	8.7200+ 0	2.0000+ 1	2.7002+ 2	DAYS
N,N'P	26-FE-57	GROUND	12	10/06/76	-6.9500+ 0	7.6700+ 0	2.0000+ 1	STABLE	
N,N'A	25-MN-54	GROUND	9	10/06/76	-6.7200+ 0	1.0000+ 1	2.0000+ 1	3.1250+ 2	DAYS
N,P	26-FE-58	GROUND	59	10/06/76	3.0900+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	25-MN-55	GROUND	60	10/06/76	3.5100+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	27-CO-59	GROUND	102	10/04/76	1.0460+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-58	GROUND	51	10/08/76	0.0000+ 0	1.0000-10	2.0000+ 1	7.1296+ 1	DAYS
N,2N	27-CO-57	GROUND	11	10/05/76	-8.5451+ 0	8.6924+ 0	2.0000+ 1	2.7002+ 2	DAYS
N,N'P	26-FE-57	GROUND	12	10/06/76	-6.9251+ 0	7.6451+ 0	2.0000+ 1	STABLE	
N,N'A	25-MN-54	GROUND	9	10/06/76	-6.6951+ 0	9.9750+ 0	2.0000+ 1	3.1250+ 2	DAYS
N,P	26-FE-58	GROUND	58	10/06/76	3.1149+ 0	1.0000-10	2.0000+ 1	STABLE	
N,A	25-MN-55	GROUND	58	10/06/76	3.5349+ 0	1.0000-10	2.0000+ 1	STABLE	
N,G	27-CO-59	GROUND	102	10/04/76	1.0485+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	27-CO-58	GROUND	13	10/05/76	-1.0461+ 1	1.0638+ 1	2.0000+ 1	7.1296+ 1	DAYS
N,2N	27-CO-58	2.4900- 2	13	10/05/76	-1.0486+ 1	1.0664+ 1	2.0000+ 1	9.0000+ 0	HRS.
N,N'P	26-FE-58	GROUND	11	10/06/76	-7.3700+ 0	8.1900+ 0	2.0000+ 1	STABLE	
N,N'A	25-MN-55	GROUND	10	10/06/76	-6.9500+ 0	9.3700+ 0	2.0500+ 1	STABLE	
N,P	26-FE-59	GROUND	19	10/06/76	-7.8000- 1	1.2930+ 0	2.0000+ 1	4.4595+ 1	DAYS
N,D	26-FE-58	GROUND	4	3/01/74	-5.1400+ 0	5.2320+ 0	2.0000+ 1	STABLE	
N,T	26-FE-57	GROUND	4	3/01/74	-8.9300+ 0	9.0810+ 0	2.0000+ 1	STABLE	
N,A	25-MN-56	GROUND	30	3/01/74	3.2000- 1	4.9000+ 0	2.0000+ 1	2.5819+ 0	HRS.
N,G	27-CO-60	5.8600- 2	102	8/18/76	7.4300+ 0	1.0000-10	2.0000+ 1	1.0500+ 1	MIN.
N,G	27-CO-60	GROUND	102	8/18/76	7.4900+ 0	1.0000-10	2.0000+ 1	5.2607+ 0	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-60	5.8600- 2	29	10/08/76	-5.8600- 2	5.9580- 2	2.0000+ 1	1.0500+ 1	MIN.
N,2N	27-CO-59	GROUND	12	10/05/76	-7.4900+ 0	7.6200+ 0	2.0000+ 1	STABLE	
N,3N	27-CO-58	GROUND	2	10/05/76	-1.7950+ 1	1.8250+ 1	2.0000+ 1	7.1296+ 1	DAYS
N,3N	27-CO-58	2.4900- 2	2	10/05/76	-1.7975+ 1	1.8275+ 1	2.0000+ 1	9.0000+ 0	HRS.
N,N'P	26-FE-59	GROUND	9	10/06/76	-8.2800+ 0	1.0000+ 1	2.0000+ 1	4.4595+ 1	DAYS
N,N'A	25-MN-56	GROUND	6	10/06/76	-7.1700+ 0	1.3000+ 1	2.0000+ 1	2.5819+ 0	HRS.
N,P	26-FE-60	GROUND	20	10/06/76	5.6000- 1	5.0000- 1	2.0000+ 1	3.0004+ 5	YRS.
N,A	25-MN-57	GROUND	17	10/06/76	1.6100+ 0	2.0000+ 0	2.0000+ 1	1.5900+ 0	MIN.
N,G	27-CO-61	GROUND	102	10/05/76	9.3400+ 0	1.0000-10	2.0000+ 1	1.6500+ 0	HRS.

27-CO-60
ATOMIC MASS = 5.9934+ 1
LEVEL = 5.8600- 2
HALF-LIFE = 1.0500+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-60	GROUND	58	10/08/76	0.0000+ 0	1.0000-10	2.0000+ 1	5.2607+ 0	YRS.
N,2N	27-CO-59	GROUND	12	10/05/76	-7.4314+ 0	7.5553+ 0	2.0000+ 1	STABLE	
N,3N	27-CO-58	GROUND	2	10/05/76	-1.7891+ 1	1.8190+ 1	2.0000+ 1	7.1296+ 1	DAYS
N,3N	27-CO-58	2.4900- 2	2	10/05/76	-1.7916+ 1	1.8215+ 1	2.0000+ 1	9.0000+ 0	HRS.
N,N'P	26-FE-59	GROUND	9	10/06/76	-8.2214+ 0	9.9404+ 0	2.0000+ 1	4.4695+ 1	DAYS
N,N'A	25-MN-56	GROUND	6	10/06/76	-7.1114+ 0	1.2940+ 1	2.0000+ 1	2.5819+ 0	HRS.
N,P	26-FE-60	GROUND	23	10/06/76	6.1860- 1	4.4040- 1	2.0000+ 1	3.0004+ 5	YRS.
N,A	25-MN-57	GROUND	17	10/06/76	1.6686+ 0	1.3404+ 0	2.0000+ 1	1.5900+ 0	MIN.
N,G	27-CO-61	GROUND	102	10/05/76	9.3986+ 0	1.0000-10	2.0000+ 1	1.6500+ 0	HRS.

27-CO-61
ATOMIC MASS = 6.0933+ 1
GROUND STATE
HALF-LIFE = 1.6500+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	27-CO-60	GROUND	20	10/05/76	-9.3400+ 0	9.4933+ 0	2.0000+ 1	5.2607+ 0	YRS.
N,2N	27-CO-60	5.8600- 2	20	10/05/76	-9.3986+ 0	9.5528+ 0	2.0000+ 1	1.0500+ 1	MIN.
N,3N	27-CO-59	GROUND	10	10/07/76	-1.6830+ 1	1.7106+ 1	2.0000+ 1	STABLE	
N,N'P	26-FE-60	GROUND	17	10/06/76	-8.7800+ 0	1.2492+ 1	2.0000+ 1	3.0004+ 5	YRS
N,P	26-FE-61	GROUND	21	10/06/76	-3.1100+ 0	6.9009+ 0	2.0000+ 1	6.1000+ 0	MIN.
N,G	27-CO-62	2.5000- 2	102	10/05/76	6.6550+ 0	1.0000-10	2.0000+ 1	1.3910+ 1	MIN.
N,G	27-CO-62	GROUND	102	10/05/76	6.6800+ 0	1.0000-10	2.0000+ 1	1.5000+ 0	MIN.

27-CO-62
ATOMIC MASS = 6.1934+ 1
GROUND STATE
HALF-LIFE = 1.5000+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-62	2.5000- 2	30	10/08/76	-2.5000- 2	2.5400- 2	2.0000+ 1	1.3910+ 1	MIN.
N,2N	27-CO-61	GROUND	22	10/05/76	-6.6800+ 0	6.7879+ 0	2.0000+ 1	1.6500+ 0	HRS.
N,3N	27-CO-60	GROUND	12	10/05/76	-1.6020+ 1	1.6279+ 1	2.0000+ 1	5.2607+ 0	YRS.
N,3N	27-CO-60	5.8600- 2	12	10/05/76	-1.6079+ 1	1.6338+ 1	2.0000+ 1	1.0500+ 1	MIN.
N,N'P	26-FE-60	GROUND	17	10/06/76	-9.7900+ 0	1.3501+ 1	2.0000+ 1	6.1000+ 0	MIN.
N,P	26-FE-62	GROUND	22	10/06/76	-2.1200+ 0	5.8780+ 0	2.0000+ 1	6.8000+ 1	SEC.
N,G	27-CO-63	GROUND	102	10/07/76	8.4000+ 0	1.0000-10	2.0000+ 1	2.7400+ 1	SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	27-CO-62	GROUND	58	10/08/76	0.0000+ 0	1.0000-10	2.0000+ 1	1.5090+ 0	MIN.
N,2N	27-CO-61	GROUND	22	10/05/76	-6.6550+ 0	6.7625+ 0	2.0000+ 1	1.6500+ 0	HRS.
N,3N	27-CO-60	GROUND	12	10/05/76	-1.5995+ 1	1.6253+ 1	2.0000+ 1	5.2607+ 0	YRS.
N,3N	27-CO-60	5.8600- 2	12	10/05/76	-1.6054+ 1	1.6313+ 1	2.0000+ 1	1.0500+ 1	MIN.
N,N'P	26-FE-61	GROUND	17	10/06/76	-9.7650+ 0	1.3475+ 1	2.0000+ 1	6.1000+ 0	MIN.
N,P	26-FE-62	GROUND	22	10/06/76	-2.0950+ 0	5.8526+ 0	2.0000+ 1	6.8000+ 1	SEC.
N,G	27-CO-63	GROUND	102	10/05/76	8.4250+ 0	1.0000-10	2.0000+ 1	2.7400+ 1	SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	27-CO-62	GROUND	23	10/05/76	-8.4000+ 0	8.5335+ 0	2.0000+ 1	1.5000+ 0	MIN.
N,2N	27-CO-62	2.5000- 2	24	10/05/76	-8.4250+ 0	8.5589+ 0	2.0000+ 1	1.3910+ 1	MIN.
N,3N	27-CO-61	GROUND	12	10/05/76	-1.5080+ 1	1.5320+ 1	2.0000+ 1	1.6500+ 0	HRS.
N,G	27-CO-54	GROUND	102	10/05/76	6.3200+ 0	1.0000-10	2.0000+ 1	4.0000- 1	SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	27-CO-63	GROUND	23	10/05/76	-6.3200+ 0	6.4188+ 0	2.0000+ 1	2.7400+ 1	SEC.
N,3N	27-CO-62	GROUND	14	10/05/76	-1.4720+ 1	1.4950+ 1	2.0000+ 1	1.5000+ 0	MIN.
N,3N	27-CO-62	2.5000- 2	14	10/05/76	-1.4745+ 1	1.4976+ 1	2.0000+ 1	1.3910+ 1	MIN.
N,G	27-CO-65	GROUND	102	10/05/76	7.3000+ 0	1.0000-10	2.0000+ 1	8.0000- 1	SEC.

28-NI-57 ATOMIC MASS = 5.6940+1 GROUND STATE HALF-LIFE = 1.5000+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	28-NI-56	GROUND	9	9/05/76	-1.0260+ 1	1.0440+ 1	2.0000+ 1	6.0995+ 0 DAYS
N,N'P	27-CO-56	GROUND	11	9/05/76	-7.3500+ 0	7.9800+ 0	2.0000+ 1	7.8495+ 1 DAYS
N,N'A	26-FE-53	GROUND	6	9/05/76	-7.5800+ 0	1.3500+ 1	2.0000+ 1	8.5300+ 0 MIN.
N,P	27-CO-57	GROUND	58	9/05/76	4.0300+ 0	1.0000-10	2.0000+ 1	2.7702+ 2 DAYS
N,A	26-FE-54	GROUND	58	9/05/76	5.8000+ 0	1.0000-10	2.0000+ 1	STABLE
N,G	28-NI-58	GROUND	110	9/02/76	1.2200+ 1	1.0000-10	2.0000+ 1	STABLE

28-NI-58 ATOMIC MASS = 5.7940+1 GROUND STATE STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	28-NI-57	GROUND	7	9/05/76	-1.2200+ 1	1.2410+ 1	2.0000+ 1	1.5000+ 0 DAYS
N,N'P	27-CO-57	GROUND	10	9/05/76	-8.1800+ 0	8.8200+ 0	2.0000+ 1	2.7702+ 2 DAYS
N,N'A	26-FE-54	GROUND	10	9/05/76	-6.4100+ 0	9.7500+ 0	2.0020+ 1	STABLE
N,P	27-CO-58	2.4900- 2	23	9/05/76	3.7500- 1	6.2500- 1	2.0900+ 1	9.0000+ 0 HRS.
N,P	27-CO-58	GROUND	22	9/05/76	4.0000- 1	6.0000- 1	2.0000+ 1	7.1296+ 1 DAYS
N,A	26-FE-55	GROUND		9/05/76	2.8900+ 0	5.0000- 1	2.0000+ 1	2.7001+ 0 YRS.
N,G	28-NI-59	GROUND	110	8/31/76	9.0000+ 0	1.0000-10	2.0000+ 1	8.0004+ 4 YRS.

28-NI-59 ATOMIC MASS = 5.8930+1 GROUND STATE HALF-LIFE = 8.0004+ 4 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	28-NI-58	GROUND	10	9/05/76	-9.0000+ 0	9.1600+ 0	2.0000+ 1	STABLE
N,N'P	27-CO-58	GROUND	9	9/05/76	-8.6000+ 0	1.0000+ 1	2.0000+ 1	7.1296+ 1 DAYS
N,N'P	27-CO-58	2.4900- 2	9	9/05/76	-8.6250+ 0	1.0025+ 1	2.0000+ 1	9.0000+ 0 HRS.
N,N'A	26-FE-55	GROUND	10	9/05/76	-6.1100+ 0	9.5000+ 0	2.0000+ 1	2.7001+ 0 YRS.
N,P	27-CO-59	GROUND	36	9/05/76	1.8600+ 0	8.0000- 1	2.0000+ 1	STABLE
N,A	26-FE-56	GROUND	58	9/05/76	5.0900+ 0	1.0000-10	2.0000+ 1	STABLE
N,G	28-NI-60	GROUND	110	9/02/76	1.1390+ 1	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 5.9930+ 1
28-NI-60
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	28-NI-59	GROUND	8	9/05/76	-1.1390+1	1.1580+1	2.0000+1	8.0004+4 YRS.
N,N'P	27-CO-59	GROUND	9	9/05/76	-9.5300+0	1.0500+1	2.0000+1	STABLE
N,N'A	26-FE-56	GROUND	10	9/05/76	-6.3000+0	9.7500+0	2.0000+1	STABLE
N,P	27-CO-60	GROUND	20	9/05/76	-2.0400+0	2.0740+0	2.0000+1	5.2607+0 YRS.
N,D	27-CO-60	5.8600-2	19	9/05/76	-2.0986+0	2.1336+0	2.0000+1	1.0500+1 MIN.
N,A	27-CO-59	GROUND	9	9/15/76	-7.3100+0	7.4300+0	2.0000+1	STABLE
N,G	26-FE-57	GROUND	17	9/05/76	1.3500+0	2.5000+0	2.0000+1	STABLE
	28-NI-61	GROUND	110	8/31/76	7.8200+0	1.0000-10	2.0000+1	STABLE

ATOMIC MASS = 6.0930+ 1
28-NI-61
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	28-NI-60	GROUND	11	9/05/76	-7.8200+0	7.9500+0	2.0000+1	STABLE
N,N'P	27-CO-60	GROUND	7	9/05/76	-9.8600+0	1.2500+1	2.0000+1	5.2607+0 YRS.
N,N'P	27-CO-60	5.8600-2	7	9/05/76	-9.9186+0	1.2560+1	2.0000+1	1.0500+1 MIN.
N,N'A	26-FE-57	GROUND	18	9/05/76	-6.4700+0	1.0500+1	2.0000+1	STABLE
N,P	27-CO-61	GROUND	22	9/05/76	-5.2000-0	2.2500+0	2.0000+1	1.6500+0 HRS.
N,A	26-FE-58	GROUND		9/05/76	3.9700+0	1.5000-0	2.0000+1	STABLE
N,G	28-NI-62	GROUND	110	9/02/76	1.0600+1	1.0000-10	2.0000+1	STABLE

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ATOMIC MASS = 6.1930+ 1
28-NI-62
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL		POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	28-NI-61	GROUND		9	9/05/76	-1.0600+ 1	1.0770+ 1	2.0000+ 1	STABLE	
N,N'P	27-CO-61	GROUND		6	9/05/76	-1.1120+ 1	1.3000+ 1	2.0000+ 1	1.6500+ 0	HRS.
N,N'A	26-FE-58	GROUND		8	9/05/76	-7.0200+ 0	1.1750+ 1	2.0000+ 1	STABLE	
N,P	27-CO-62	GROUND		13	9/05/76	-4.4400+ 0	6.5000+ 0	2.0000+ 1	1.5000+ 0	MIN.
	27-CO-62	2.5000-	2	13	9/05/76	-4.4650+ 0	6.5250+ 0	2.0000+ 1	1.3910+ 1	MIN.
N,A	26-FE-59	GROUND		14	9/05/76	-4.4000- 1	5.5000+ 0	2.0000+ 1	4.4595+ 1	DAYS
N,G	28-NI-63	GROUND		110	9/02/76	6.8400+ 0	1.0000-10	2.0000+ 1	9.1990+ 1	YRS.

ATOMIC MASS = 6.2930+ 1
28-NI-63
GROUND STATE
HALF-LIFE = 9.1990+ 1 YRS.

REACTION	PRODUCT	LEVEL		POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	28-NI-62	GROUND		12	9/05/76	-6.8400+ 0	6.9500+ 0	2.0000+ 1	STABLE	
N,3N	28-NI-61	GROUND		3	9/05/76	-1.7430+ 1	1.7710+ 1	2.0000+ 1	STABLE	
N,N'P	27-CO-62	GROUND		5	9/05/76	-1.1280+ 1	1.4500+ 1	2.0000+ 1	1.5000+ 0	MIN.
N,N'P	27-CO-62	2.5000-	2	7	9/05/76	-1.1305+ 1	1.4525+ 1	2.0000+ 1	1.3910+ 1	MIN.
N,N'A	26-FE-59	GROUND		14	9/05/76	-7.2700+ 0	1.2500+ 1	2.0000+ 1	4.4595+ 1	DAYS
N,P	27-CO-63	GROUND		15	9/05/76	-2.8800+ 0	5.0000+ 0	2.0000+ 1	2.7400+ 1	SEC.
N,A	26-FE-60	GROUND			9/05/76	1.5600+ 0	3.5000+ 0	2.0000+ 1	3.000+ 5	YRS.
N,G	28-NI-64	GROUND		110	9/02/76	9.6600+ 0	1.0000-10	2.9000+ 1	STABLE	

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28-NI-64
ATOMIC MASS = 6.3930+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N.2N	28-NI-63	GROUND	10	9/05/76	-9.6600+ 0	9.8100+ 0	2.0000+ 1	9.1990+ 1 YRS.
N.3N	28-NI-62	GROUND	3	9/05/76	-1.6500+ 1	1.6750+ 1	2.0000+ 1	STABLE
N.N'P	27-CO-63	GROUND	4	9/05/76	-1.2540+ 1	1.5500+ 1	2.0000+ 1	2.7400+ 5 SEC.
N.N'A	26-FE-60	GROUND	6	9/05/76	-8.1000+ 0	1.3500+ 1	2.0000+ 1	3.0004+ 5 YRS.
N.P	27-CO-64	GROUND	11	9/05/76	-6.2100+ 0	8.5600+ 0	2.0000+ 1	4.00n0- 1 SEC.
N.A	26-FE-61	GROUND	12	9/05/76	-2.4300+ 0	7.0000+ 0	2.0000+ 1	6.10 3+ 0 MIN.
N.G	28-NI-65	GROUND	110	9/02/76	6.1000+ 0	1.0000-10	2.0000+ 1	2.5600+ 0 HRS.

28-NI-65
ATOMIC MASS = 6.4930+ 1
GROUND STATE
HALF-LIFE = 2.5600+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N.2N	28-NI-64	GROUND	13	9/05/76	-6.1000+ 0	6.1900+ 0	2.0000+ 1	STABLE
N.3N	28-NI-63	GROUND	3	9/05/76	-1.5760+ 1	1.6000+ 1	2.0000+ 1	9.1990+ 1 YRS.
N.N'P	27-CO-64	GROUND	3	9/05/76	-1.2430+ 1	1.7000+ 1	2.0000+ 1	4.0000- 1 SEC.
N.N'A	26-FE-61	GROUND	5	9/05/76	-7.5700+ 0	1.4500+ 1	2.0000+ 1	6.1000- 1 MIN.
N.P	27-CO-65	GROUND	9	9/06/76	-5.0500- 1	7.5000+ 0	2.0000+ 1	8.0000- 1 SEC.
N.A	26-FE-62	GROUND	15	9/05/76	-1.0000- 1	7.5000+ 0	2.0000+ 1	6.8000+ 1 SEC.
N.G	28-NI-66	GROUND	110	9/02/76	9.0000+ 0	1.0000-10	2.0000+ 1	2.2917+ 0 DAYS

29-CU-62
ATOMIC MASS = 6.1930+ 1
GROUND STATE
HALF-LIFE = 9.8000+ 0 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N.2N	29-CU-61	GROUND	16	8/16/76	-8.8900+ 0	9.0335+ 0	2.0000+ 1	3.319++ 0 HRS.
N.N'P	28-NI-61	GROUND	15	8/17/76	-5.8700+ 0	6.4700+ 0	2.0000+ 1	STABLE
N.N'A	27-CO-58	GROUND	13	8/17/76	-5.3800+ 0	7.8700+ 0	2.0000+ 1	7.1296+ 1 DAYS
N.N'A	27-CO-58	2.4900- 2	13	8/17/76	-5.4050+ 0	7.8900+ 0	2.0000+ 1	9.0000+ 0 HRS.
N.P	28-NI-62	GROUND	58	8/16/76	4.7300+ 0	1.0000-10	2.0000+ 1	STABLE
N.A	27-CO-59	GROUND	59	8/16/76	5.0800+ 0	1.0000-10	2.0000+ 1	STABLE
N.G	29-CU-63	GROUND	112	8/10/76	1.0850+ 1	1.0000-10	2.0000+ 1	STABLE

ATOMIC MASS = 6.2930+ 1
29-CU-63
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	29-CU-62	GROUND	19	8/02/76	-1.0950+ 1	1.1020+ 1	2.0000+ 1	9.8000+ 0 MIN.
N,N'P	28-NI-62	GROUND	26	8/03/76	-6.1200+ 0	7.7500+ 0	2.0000+ 1	STABLE
N,N'A	27-CO-59	GROUND	17	8/03/76	-5.7700+ 0	1.2000+ 1	2.0000+ 1	STABLE
N,P	28-NI-63	GROUND	27	8/02/76	7.2000- 1	1.0100+ 0	2.0000+ 1	9.1990+ 2 YRS.
N,A	27-CO-60	5.8600- 2	25	8/04/76	1.6614+ 0	5.3595+ 0	2.0000+ 1	1.0500+ 1 MIN.
N,A	27-CO-60	GROUND	25	8/04/76	1.7200+ 0	5.3000+ 0	2.0000+ 1	5.2607+ 1 YRS.
N,G	29-CU-64	GROUND	112	7/29/76	7.9200+ 0	1.0000-10	2.0000+ 1	1.2800+ 1 HRS.

ATOMIC MASS = 6.3930+ 1
29-CU-64
GROUND STATE
HALF-LIFE = 1.2800+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	29-CU-63	GROUND	18	8/16/76	-7.9200+ 0	8.0439+ 0	2.0000+ 1	STABLE
N,3N	29-CU-62	GROUND	5	8/16/76	-1.8770+ 1	1.9064+ 1	2.0000+ 1	9.8000+ 0 MIN.
N,N'P	28-NI-63	GROUND	15	8/17/76	-7.2000+ 0	7.8100+ 0	2.0000+ 1	9.1990+ 2 YRS.
N,N'A	27-CO-60	GROUND	10	8/17/76	-6.2000+ 0	1.1500+ 1	2.0000+ 1	5.2607+ 1 YRS.
N,N'A	27-CO-60	5.8600- 2	10	8/17/76	-6.2586+ 0	1.1559+ 1	2.0000+ 1	1.0500+ 1 MIN.
N,P	28-NI-64	GROUND	58	8/16/76	2.4600+ 0	1.0000-10	2.0000+ 1	STABLE
N,A	27-CO-61	GROUND	18	8/16/76	3.1400+ 0	3.9000+ 0	2.0000+ 1	1.6500+ 0 HRS.
N,G	29-CU-65	GROUND	112	8/10/76	9.9100+ 0	1.0000-10	2.0000+ 1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	29-CU-64	GROUND	35	8/03/76	-9.9100+ 0	1.0063+ 1	2.0000+ 1	1.2800+ 1	HRS.
N,3N	29-CU-63	GROUND	9	8/03/76	-1.7820+ 1	1.8094+ 1	2.0000+ 1	STABLE	
N,N'P	28-NI-64	GROUND	25	8/03/76	-7.4500+ 0	8.3000+ 0	2.0000+ 1	STABLE	
N,N'A	27-CO-61	GROUND	15	7/27/76	-6.7700+ 0	1.3250+ 1	2.0000+ 1	1.6500+ 0	HRS.
N,P	28-NI-65	GROUND	22	8/02/76	-1.3500+ 0	2.5000+ 0	2.0000+ 1	2.5600+ 0	HRS.
N,A	27-CO-62	GROUND	25	8/02/76	-9.0000- 2	6.5000+ 0	2.0000+ 1	1.5000+ 0	MIN.
N,A	27-CO-62	2.5000- 2	25	8/02/76	-1.1500- 1	6.5250+ 0	2.0000+ 1	1.3910+ 1	MIN.
N,G	29-CU-66	GROUND	109	7/29/76	7.0700+ 0	1.0000-10	2.0000+ 1	5.1000+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	29-CU-65	GROUND	14	8/16/76	-7.0700+ 0	7.1700+ 0	2.0000+ 1	STABLE	
N,3N	29-CU-64	GROUND	4	8/16/76	-1.6970+ 1	1.7230+ 1	2.0000+ 1	1.2800+ 1	HRS.
N,N'P	28-NI-65	GROUND	10	8/17/76	-8.4200+ 0	1.1000+ 1	2.0000+ 1	2.5600 0	HRS.
N,N'A	27-CO-62	GROUND	7	8/17/76	-7.1500+ 0	1.4500+ 1	2.0000+ 1	1.5000+ 0	MIN.
N,N'A	27-CO-62	2.5000- 2	7	8/17/76	-7.1750+ 0	1.4525+ 1	2.0000+ 1	1.3910+ 1	MIN.
N,P	28-NI-66	GROUND	18	8/16/76	5.8000- 1	3.6000+ 0	2.0000+ 1	2.2917+ 0	DAYS
N,A	27-CO-63	GROUND	10	3/16/76	1.2500+ 0	1.1200+ 1	2.0000+ 1	2.7400+ 1	SEC.
N,G	29-CU-67	GROUND	112	8/10/76	9.1200+ 0	1.0000-10	2.0000+ 1	2.4583+ 0	DAYS

                                                                33-AS-75
                                                     ATOMIC MASS = 7.4922+ 1
                                                             GROUND STATE
                                                                   STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	33-AS-76	GROUND	102	4/19/78	7.3300+ 0	1.0000-10	2.0000+ 1	1.0958+ 0	DAYS

                                                                39-Y -89
                                                     ATOMIC MASS = 8.8906+ 1
                                                             GROUND STATE
                                                                   STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	39-Y -88	GROUND	13	10/02/76	-1.1470+ 1	1.1599+ 0	2.0000+ 1	1.0799+ 2	DAYS
N,N'P	38-SR-88	GROUND	16	10/02/76	-7.0700+ 0	1.2428+ 1	2.0000+ 1	STABLE	
N,P	38-SR-89	GROUND	20	10/02/76	-7.1000- 1	6.2318+ 0	2.0000+ 1	5.1968+ 1	DAYS
N,A	37-RB-86	5.6000- 1	13	10/02/76	1.4000- 1	1.1842+ 1	2.0000+ 1	1.0400+ 0	MIN.
N,G	39-Y -90	GROUND	102	10/02/76	6.8600+ 0	1.0000-10	2.0000+ 1	2.6597+ 0	DAYS

                                                                40-ZR-89
                                                     ATOMIC MASS = 8.8909+ 1
                                                             GROUND STATE
                                             HALF-LIFE = 3.2662+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-88	GROUND	15	8/08/76	-9.3000+ 0	9.4046+ 0	2.0000+ 1	8.5000+ 1	DAYS
N,P	39-Y -89	GROUND	18	8/08/76	3.6200+ 0	2.0313+ 0	2.0000+ 1	STABLE	
N,A	38-SR-86	GROUND	17	8/08/76	5.3000+ 0	7.5425+ 0	2.0000+ 1	STABLE	
N,G	40-ZR-90	GROUND	102	8/08/76	1.1990+ 1	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-90	GROUND	19	8/08/76	-7.1900+ 0	7.2691+ 0	2.0000+ 1	STABLE	
N,3N	40-ZR-89	GROUND	4	8/08/76	-1.9180+ 1	1.9391+ 1	2.0000+ 1	3.2662+ 0	DAYS
N,P	39-Y -91	GROUND	18	8/08/76	-7.6000- 1	6.4260+ 0	2.0000+ 1	5.8796+ 1	DAYS
N,A	38-SR-88	GROUND	17	8/08/76	5.6600+ 0	7.1073+ 0	2.0000+ 1	STABLE	
N,G	40-ZR-92	GROUND	102	8/08/76	8.6400+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-91	GROUND	26	8/08/76	-8.6400+ 0	8.7340+ 0	2.0000+ 1	STABLE	
N,3N	40-ZR-90	GROUND	13	8/08/76	-1.5830+ 1	1.6002+ 1	2.0000+ 1	STABLE	
N,P	39-Y -92	GROUND	18	8/08/76	-2.8400+ 0	8.5117+ 0	2.0000+ 1	3.5306+ 0	HRS.
N,A	38-SR-89	GROUND	16	8/08/76	3.3900+ 0	9.3670+ 0	2.0000+ 1	5.2002+ 1	DAYS
N,G	40-ZR-93	GROUND	102	8/08/76	6.7600+ 0	1.0000-10	2.0000+ 1	1.4999+ 6	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-92	GROUND	24	8/08/76	-6.7600+ 0	6.8328+ 0	2.0000+ 1	STABLE	
N,3N	40-ZR-91	GROUND	14	8/08/76	-1.5400+ 1	1.5566+ 1	2.0000+ 1	STABLE	
N,P	39-Y -93	GROUND	18	8/08/76	-2.1100+ 0	7.7569+ 0	2.0000+ 1	1.0200+ 1	HRS.
N,A	38-SR-90	GROUND	17	8/08/76	4.4400+ 0	8.2710+ 0	2.0000+ 1	2.8101+ 1	YRS.
N,G	40-ZR-94	GROUND	102	8/08/76	8.1900+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-93	GROUND	25	8/08/76	-8.1900+ 0	8.2772+ 0	2.0000+ 1	1.4999+ 6	YRS.
N,3N	40-ZR-92	GROUND	15	8/08/76	-1.4950+ 1	1.5109+ 1	2.0000+ 1	STABLE	
N,P	39-Y -94	GROUND	18	8/08/76	-4.2200+ 0	9.8727+ 0	2.0000+ 1	2.0300+ 1	MIN.
N,A	38-SR-91	GROUND	16	8/08/76	2.0600+ 0	1.0642+ 1	2.0000+ 1	9.5200+ 0	HRS.
N,G	40-ZR-95	GROUND	102	8/08/76	6.4700+ 0	1.0000-10	2.0000+ 1	6.5000+ 1	DAYS

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-94	GROUND	27	8/08/76	-6.4700+ 0	6.5382+ 0	2.0000+ 1	STABLE	
N,3N	40-ZR-93	GROUND	14	8/08/76	-1.4660+ 1	1.4814+ 1	2.0000+ 1	1.4999+ 6	YRS.
N,P	39-Y -95	GROUND	18	8/08/76	-3.6500+ 0	9.2800+ 0	2.0000+ 1	1.0900+ 1	MIN.
N,A	38-SR-92	GROUND	16	8/08/76	2.9100+ 0	9.7493+ 0	2.0000+ 1	2.7100+ 0	HRS.
N,G	40-ZR-96	GROUND	102	8/09/76	7.8400+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	40-ZR-96	GROUND	28	8/08/76	-5.5800+ 0	5.6376+ 0	2.0000+ 1	STABLE	
N,3N	40-ZR-95	GROUND	15	8/08/76	-1.3420+ 1	1.3559+ 1	2.0000+ 1	6.5000+ 1	DAYS
N,A	38-SR-94	GROUND	16	8/08/76	1.4600+ 0	1.1148+ 1	2.0000+ 1	1.2500+ 0	MIN.
N,G	40-ZR-98	GROUND	102	8/08/76	6.4100+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	MIN.

41-NB-91
ATOMIC MASS = 9.0907+1
GROUND STATE
HALF-LIFE = 1.0000+4 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-90	GROUND	15	8/06/76	-1.2040+ 1	1.2172+ 1	2.0000+ 1	1.4600+ 1 HRS.
N,P	40-ZR-91	GROUND	18	8/06/76	2.0400+ 0	3.7740+ 0	2.0000+ 1	STABLE
N,G	41-NB-92	GROUND	102	8/06/76	7.9000+ 0	1.0000-10	2.0000+ 1	3.6000+ 7 YRS.
N,G	41-NB-92	1.3500- 1	102	8/06/76	7.7650+ 0	1.0000-10	2.0000+ 1	1.0160+ 1 DAYS

41-NB-91
ATOMIC MASS = 9.0907+1
LEVEL = 1.0500- 1
HALF-LIFE = 6.2002+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-90	GROUND	15	8/06/76	-1.1940+ 1	1.2071+ 1	2.0000+ 1	1.4600+ 1 HRS.
N,P	40-ZR-91	GROUND	18	8/06/76	2.1400+ 0	3.6729+ 0	2.0000+ 1	STABLE
N,G	41-NB-92	GROUND	102	8/06/76	8.0050+ 0	1.0000-10	2.0000+ 1	3.6000+ 7 YRS.
N,G	41-NB-92	1.3500- 1	102	8/05/76	7.8700+ 0	1.0000-10	2.0000+ 1	1.0160+ 1 DAYS

41-NB-92
ATOMIC MASS = 9.1907+1
GROUND STATE
HALF-LIFE = 3.6000+ 7 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-91	1.0500- 1	16	8/06/76	-8.0000+ 0	8.0870+ 0	2.0000+ 1	6.2002+ 1 DAYS
N,P	40-ZR-92	GROUND	18	8/06/76	2.7900+ 0	2.9987+ 0	2.0000+ 1	STABLE
N,G	41-NB-93	GROUND	102	8/06/76	8.8300+ 0	1.0000-10	2.0000+ 1	STABLE

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	41-NB-91	1.0500- 1	16	8/06/76	-7.8700+ 0	7.9556+ 0	2.0000+ 1	6.2002+ 1	DAYS
N,P	40-ZR-92	GROUND	18	8/06/76	2.9250+ 0	2.8622+ 0	2.0000+ 1	STABLE	
N,G	41-NB-93	GROUND	102	8/06/76	8.9650+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	41-NB-92	GROUND	21	8/06/76	-8.8300+ 0	8.9250+ 0	2.0000+ 1	3.6000+ 7	YRS.
N,2N	41-NB-92	1.3500- 1	21	8/06/76	-8.9650+ 0	9.0615+ 0	2.0000+ 1	1.0160+ 1	DAYS
N,3N	41-NB-91	GROUND	10	8/06/76	-1.6720+ 1	1.6900+ 1	2.0000+ 1	1.0000+ 4	YRS.
N,3N	41-NB-91	1.0500- 1	11	8/06/76	-1.6820+ 1	1.7001+ 1	2.0000+ 1	6.2002+ 1	DAYS
N,P	40-ZR-93	GROUND	18	8/06/76	7.2000- 1	5.0741+ 0	2.0000+ 1	1.4999+ 6	YRS.
N,G	41-NB-94	GROUND	102	8/05/76	7.2300+ 0	1.0000-10	2.0000+ 1	1.9999+ 4	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	41-NB-93	GROUND	24	8/06/76	-7.2300+ 0	7.3070+ 0	2.0000+ 1	STABLE	
N,3N	41-NB-92	1.3500- 1	13	8/06/76	-1.6180+ 1	1.6352+ 1	2.0000+ 1	1.0160+ 1	DAYS
N,P	40-ZR-94	GROUND	18	8/06/76	1.6800+ 0	4.0871+ 0	2.0000+ 1	STABLE	
N,G	41-NB-95	GROUND	102	8/06/76	8.4900+ 0	1.0000-10	2.0000+ 1	3.5000+ 1	DAYS

41-NB-95 ATOMIC MASS = 9.4907+ 2 GROUND STATE
HALF-LIFE = 3.5000+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-94	GROUND	25	8/06/76	-8.4900+ 0	8.5795+ 0	2.0000+ 1	1.9999+ 4 YRS.
N,3N	41-NB-93	GROUND	13	8/06/76	-1.5720+ 1	1.5886+ 1	2.0000+ 1	STABLE
N,P	40-ZR-95	GROUND	18	8/06/76	-3.5000- 1	6.1219+ 0	2.0000+ 1	6.5000+ 1 DAYS
N,G	41-NB-96	GROUND	102	8/06/76	6.8900+ 0	1.0000-10	2.0000+ 1	2.3400+ 1 HRS.

41-NB 96 ATOMIC MASS = 9.5908+ 2 GROUND STATE
HALF-LIFE = 2.3400+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-95	GROUND	25	8/06/76	-6.8900+ 0	6.9619+ 0	2.0000+ 1	3.5000+ 1 DAYS
N,3N	41-NB-94	GROUND	14	8/06/76	-1.5390+ 1	1.5550+ 1	2.0000+ 1	1.9999+ 4 YRS.
N,P	40-ZR-96	GROUND	18	8/06/76	6.0000- 1	5.1455+ 0	2.0000+ 1	STABLE
N,G	41-NB-97	GROUND	102	8/06/76	8.0700+ 0	1.0000-10	2.0000+ 1	1.2000+ 0 HRS.

41-NB-97 ATOMIC MASS = 9.6908+ 2 GROUND STATE
HALF-LIFE = 1.2000+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	41-NB-96	GROUND	26	8/06/76	-8.0700+ 0	8.1533+ 0	2.0000+ 1	2.3400+ 1 HRS.
N,3N	41-NB-95	GROUND	15	8/06/76	-1.4960+ 1	1.5114+ 1	2.0000+ 1	3.5000+ 1 DAYS
N,P	40-ZR-97	GROUND	18	8/06/76	-1.8900+ 0	7.6450+ 0	2.0000+ 1	1.7000+ 1 HRS.
N,G	41-NB-98	GROUND	102	8/06/76	5.9800+ 0	1.0000-10	2.0000+ 1	5.1000+ 1 MIN.

41-NB-98
ATOMIC MASS = 9.7910+ 2
GROUND STATE
HALF-LIFE = 5.1000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	41-NB-97	GROUND	26	8/06/76	-5.9800+ 0	6.0411+ 0	2.0000+ 1	1.2000+ 0	HRS.
N,3N	41-NB-96	GROUND	16	8/06/76	-1.4050+ 1	1.4193+ 1	2.0000+ 1	2.3400+ 1	HRS.
N,P	40-ZR-98	GROUND	18	8/06/76	-1.4600+ 0	7.1943+ 0	2.0000+ 1	1.0000+ 0	MIN.
N,G	41-NB-99	GROUND	102	8/06/76	7.6000+ 0	1.0000-10	2.0000+ 1	1.4000+ 1	SEC.

41-NB-100
ATOMIC MASS = 9.9915+ 2
GROUND STATE
HALF-LIFE = 1.1000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	41-NB-99	GROUND	28	8/06/76	-5.1000+ 0	5.1510+ 0	2.0000+ 1	1.4000+ 1	SEC.
N,3N	41-NB-98	GROUND	18	8/06/76	-1.2800+ 1	1.2928+ 1	2.0000+ 1	5.1000+ 1	MIN.
N,P	40-ZR-100	GROUND	18	8/06/76	-2.9000+ 0	8.5158+ 0	2.0000+ 1	1.0000+ 0	MIN.
N,G	41-NB-101	GROUND	102	8/06/76	7.2000+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	MIN.

42-MO-90
ATOMIC MASS = 8.9914+ 1
GROUND STATE
HALF-LIFE = 5.6694+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-89	GROUND	24	7/15/76	-1.3230+ 1	1.3377+ 1	2.0000+ 1	7.0000+ 0	MIN.
N,G	42-MO-91	GROUND	102	7/08/76	1.0080+ 1	1.0000-10	2.0000+ 1	1.5500+ 1	MIN.

42-MO-91
ATOMIC MASS = 9.0912+1
GROUND STATE
HALF-LIFE = 1.5500+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	42-MO-90	GROUND	34	7/15/76	-1.0080+ 1	1.0191+ 1	2.0000+ 1	5.6694+ 0 HRS.
N,G	42-MO-92	GROUND	102	7/08/76	1.2700+ 1	1.0000-10	2.0000+ 1	STABLE

42-MO-92
ATOMIC MASS = 9.1907+ 1
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	42-MO-91	GROUND	25	7/15/76	-1.2700+ 1	1.2838+ 1	2.0000+ 1	1.5500+ 1 MIN.
N,P	41-NB-92	1.3500-	31	8/04/76	4.3000- 1	5.5643+ 0	2.0000+ 1	1.0160+ 1 DAYS
N,D	41-NB-91	1.0500-	16	8/05/76	-5.2500+ 0	1.1593+ 1	2.0000+ 1	6.2002+ 1 DAYS
N,A	40-ZR-89	GROUND	16	8/05/76	3.6900+ 0	9.7644+ 0	2.0000+ 1	3.2662+ 0 DAYS
N,G	42-MO-93	GROUND	102	7/08/76	8.0700+ 0	1.0000-10	2.0000+ 1	3.5000+ 3 YRS.

42-MO-93
ATOMIC MASS = 9.2907+ 1
GROUND STATE
HALF-LIFE = 3.5000+ 3 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	42-MO-92	GROUND	41	7/15/76	-8.0700+ 0	8.1569+ 0	2.0000+ 1	STABLE
N,P	41-NB-93	GROUND	29	8/04/76	1.1800+ 0	4.7886+ 0	2.0000+ 1	STABLE
N,D	41-NB-92	1.3500-	16	8/05/76	-5.4200+ 0	1.1646+ 1	2.0000+ 1	1.0160+ 1 DAYS
N,A	40-ZR-90	GROUND	16	8/05/76	7.6100+ 0	5.7656+ 0	2.0000+ 1	STABLE
N,G	42-MO-94	GROUND	102	7/08/76	9.6700+ 0	1.0000-10	2.0000+ 1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-92	GROUND	49	7/15/76	-5.6420+ 0	5.7027+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-91	GROUND	7	7/15/76	-1.8342+ 1	1.8539+ 1	2.0000+ 1	1.5500+ 1	MIN.
N,P	41-NB-93	GROUND	28	8/04/76	3.6100+ 0	2.3324+ 0	2.0000+ 1	STABLE	
N,D	41-NB-92	1.3500- 1	16	8/05/76	-2.9920+ 0	9.1915+ 0	2.0000+ 1	1.0160+ 1	DAYS
N,A	40-ZR-90	GROUND	16	8/05/76	1.0040+ 1	3.3095+ 0	2.0000+ 1	STABLE	
N,G	42-MO-94	GROUND	102	7/08/76	1.2098+ 1	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-93	GROUND	10	6/15/76	-9.6700+ 0	9.7700+ 0	2.0000+ 1	3.5000+ 3	YRS.
N,2N	42-MO-93	2.4280+ 0	6	6/15/76	-1.2100+ 1	1.2230+ 1	2.0000+ 1	6.8889+ 0	HRS.
N,3N	42-MO-92	GROUND	3	6/15/76	-1.7740+ 1	1.7930+ 1	2.0000+ 1	STABLE	
N,P	41-NB-94	GROUND	26	8/04/76	-1.2600+ 0	7.2372+ 0	2.0000+ 1	1.9999+ 4	YRS.
N,D	41-NB-93	GROUND	16	8/05/76	-6.2700+ 0	1.2487+ 1	2.0000+ 1	STABLE	
N,A	40-ZR-91	GROUND	16	8/05/76	5.1300+ 0	8.2363+ 0	2.0000+ 1	STABLE	
N,G	42-MO-95	GROUND	102	7/08/76	7.3700+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-94	GROUND	43	7/15/76	-7.3700+ 0	7.4477+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-93	GROUND	11	7/15/76	-1.7050+ 1	1.7230+ 1	2.0000+ 1	3.5000+ 3	YRS.
N,P	41-NB-95	GROUND	25	8/04/76	-1.4000- 1	6.0881+ 0	2.0000+ 1	3.5000+ 1	DAYS
N,D	41-NB-94	GROUND	16	8/05/76	-6.4100+ 0	1.2610+ 1	2.0000+ 1	1.9999+ 4	YRS.
N,A	40-ZR-92	GROUND	16	8/05/76	6.3900+ 0	6.9275+ 0	2.0000+ 1	STABLE	
N,G	42-MO-96	GROUND	102	7/08/76	9.1500+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-95	GROUND	37	7/15/76	-9.1500+ 0	9.2454+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-94	GROUND	13	7/15/76	-1.6530+ 1	1.6702+ 1	2.0000+ 1	STABLE	
N,P	41-NB-96	GROUND	26	8/04/76	-2.4100+ 0	8.3647+ 0	2.0000+ 1	2.3400+ 1	HRS.
N,A	40-ZR-93	GROUND	16	8/05/76	4.0000+ 0	9.3074+ 0	2.0000+ 1	1.4999+ 6	YRS.
N,G	42-MO-97	GROUND	102	7/08/76	6.8200+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-96	GROUND	45	7/15/76	-6.8200+ 0	6.8904+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-95	GROUND	15	7/15/76	-1.5970+ 1	1.6135+ 1	2.0000+ 1	STABLE	
N,P	41-NB-97	GROUND	25	8/04/76	-1.1500+ 0	7.0747+ 0	2.0000+ 1	1.2000+ 0	HRS.
N,A	40-ZR-94	GROUND	16	8/05/76	5.3700+ 0	7.8885+ 0	2.0000+ 1	STABLE	
N,G	42-MO-98	GROUND	102	7/08/76	8.6400+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-97	GROUND	39	7/15/76	-8.6400+ 0	8.7282+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-96	GROUND	17	7/15/76	-1.5460+ 1	1.5618+ 1	2.0000+ 1	STABLE	
N,P	41-NB-98	GROUND	26	8/04/76	-3.8200+ 0	9.7552+ 0	2.0000+ 1	5.1000+ 1	MIN.
N,A	40-ZR-95	GROUND	16	8/05/76	3.1900+ 0	1.0057+ 1	2.0000+ 1	6.5000+ 1	DAYS
N,G	42-MO-99	GROUND	102	7/08/76	5.9200+ 0	1.0000-10	2.0000+ 1	2.7789+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-98	GROUND	48	7/15/76	-5.9200+ 0	5.9799+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-97	GROUND	19	7/15/76	-1.4560+ 1	1.4707+ 1	2.0000+ 1	STABLE	
N,P	41-NB-99	GROUND	27	8/04/76	-2.3000+ 0	8.2031+ 0	2.0000+ 1	1.4000+ 1	SEC.
N,A	40-ZR-96	GROUND	16	8/05/76	5.1200+ 0	8.0731+ 0	2.0000+ 1	STABLE	
N,G	42-MO-100	GROUND	102	7/08/76	8.3000+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-99	GROUND	40	7/15/76	-8.3000+ 0	8.3831+ 0	2.0000+ 1	2.7789+ 0	DAYS
N,3N	42-MO-98	GROUND	21	7/15/76	-1.4220+ 1	1.4362+ 1	2.0000+ 1	STABLE	
N,P	41-NB-100	GROUND	24	8/04/76	-5.2000+ 0	1.1116+ 1	2.0000+ 1	1.1000+ 1	MIN.
N,A	40-ZR-97	GROUND	16	8/05/76	2.3900+ 0	1.0797+ 1	2.0000+ 1	1.7000+ 1	HRS.
N,G	42-MO-101	GROUND	102	7/08/76	5.3900+ 0	1.0000-10	2.0000+ 1	1.4600+ 1	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	42-MO-100	GROUND	50	7/15/76	-5.3900+ 0	5.4434+ 0	2.0000+ 1	STABLE	
N,3N	42-MO-99	GROUND	23	7/15/76	-1.3690+ 1	1.3826+ 1	2.0000+ 1	2.7789+ 0	DAYS
N,P	41-NB-101	GROUND	22	8/04/76	-3.4500+ 0	9.3318+ 0	2.0000+ 1	1.0000+ 0	MIN.
N,A	40-ZR-98	GROUND	16	8/05/76	3.4200+ 0	9.7234+ 0	2.0000+ 1	1.0000+ 0	MIN.
N,G	42-MO-102	GROUND	102	7/08/76	8.0000+ 0	1.0000-10	2.0000+ 1	1.1500+ 1	MIN.

47-AG-106
ATOMIC MASS = 1.0591+ 2
GROUND STATE
HALF-LIFE = 2.4000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-105	GROUND	17	9/10/76	-7.9200+ 0	7.9948+ 0	2.0000+ 1	4.0000+ 1	DAYS
N,3N	47-AG-104	GROUND	6	9/10/76	-1.7760+ 1	1.7928+ 1	2.0000+ 1	1.1167+ 0	HRS.
N,G	47-AG-107	GROUND	102	9/10/76	9.5400+ 0	1.0000-10	2.0000+ 1	STABLE	

47-AG-106
ATOMIC MASS = 1.0591+ 2
LEVEL = 3.0000- 1
HALF-LIFE = 8.4005+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-105	GROUND	17	9/10/76	-7.6200+ 0	7.6919+ 0	2.0000+ 1	4.0000+ 1	DAYS
N,3N	47-AG-104	GROUND	7	9/10/76	-1.7460+ 1	1.7625+ 1	2.0000+ 1	1.1167+ 0	HRS.
N,G	47-AG-107	GROUND	102	9/10/76	9.8400+ 0	1.0000-10	2.0000+ 1	STABLE	

47-AG-107
ATOMIC MASS = 1.0691+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-106	GROUND	7	9/14/73	-9.5400+ 0	9.6300+ 0	2.0000+ 1	2.4000+ 1	MIN.
N,2N	47-AG-106	3.0000- 1	6	9/14/73	-9.8400+ 0	9.9400+ 0	2.0000+ 1	8.4005+ 0	DAYS
N,3N	47-AG-105	GROUND	2	9/14/73	-1.7460+ 1	1.7650+ 1	2.0000+ 1	4.0000+ 1	DAYS
N,P	46-PD-107	GROUND	20	9/14/73	7.5000- 1	4.5000+ 0	2.0000+ 1	6.5000+ 6	YRS.
N,A	45-RH-104	1.2900- 1	5	9/14/73	4.0610+ 0	5.5000+ 0	2.0000+ 1	4.4100+ 0	MIN.
N,G	47-AG-108	1.1000- 1	102	9/10/76	7.1600+ 0	1.0000-10	2.0000+ 1	1.2700+ 2	YRS.
N,G	47-AG-108	GROUND	102	9/10/76	7.2700+ 0	1.0000-10	2.0000+ 1	2.4200+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-107	GROUND	20	9/10/76	-7.2700+ 0	7.3374+ 0	2.0000+ 1	STABLE	
N,3N	47-AG-106	GROUND	9	9/10/76	-1.6810+ 1	1.6956+ 1	2.0000+ 1	2.4000+ 1	MIN.
N,G	47-AG-109	GROUND	102	9/10/76	9.1900+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-107	GROUND	20	9/10/76	-7.1600+ 0	7.2264+ 0	2.0000+ 1	STABLE	
N,3N	47-AG-106	GROUND	9	9/10/76	-1.6700+ 1	1.5855+ 1	2.0000+ 1	2.4000+ 1	MIN.
N,G	47-AG-109	GROUND	102	9/10/76	9.3000+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	47-AG-108	GROUND	21	9/10/76	-9.1900+ 0	9.2744+ 0	2.0000+ 1	2.4200+ 0	MIN.
N,2N	47-AG-108	1.1000- 1	13	9/10/76	-9.3000+ 0	9.3854+ 0	2.0000+ 1	1.2700+ 2	YRS.
N,3N	47-AG-107	GROUND	11	9/10/76	-1.6460+ 1	1.6611+ 1	2.0000+ 1	STABLE	
N,P	46-PD-109	GROUND	16	9/14/73	-3.3000- 1	3.5000+ 0	2.0000+ 1	1.3469+ 1	HRS.
N,A	45-RH-106	GROUND	12	9/14/73	3.2900+ 0	5.5000+ 0	2.0000+ 1	3.0000+ 1	SEC.
N,G	47-AG-110	1.1600- 1	102	9/10/76	6.6940+ 0	1.0000-10	2.0000+ 1	2.5301+ 2	DAYS
N,G	47-AG-110	GROUND	102	9/10/76	6.8100+ 0	1.0000-10	2.0000+ 1	2.4400+ 1	SEC.

47-AG-110
ATOMIC MASS = 1.0991+ 2
GROUND STATE
HALF-LIFE = 2.4400+ 1 SEC.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	47-AG-109	GROUND	22	9/10/76	-6.8100+ 0	6.8720+ 0	2.0000+ 1	STABLE
N,3N	47-AG-108	GROUND	13	9/10/76	-1.6000+ 1	1.6146+ 1	2.0000+ 1	2.4200+ 0 MIN.
N,G	47-AG-111	GROUND	97	9/10/76	8.8400+ 0	1.0000-10	2.0000+ 1	7.5000+ 0 DAYS

47-AG-110
ATOMIC MASS = 1.0991+ 2
LEVEL = 1.1600- 1
HALF-LIFE = 2.5312+ 2 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	47-AG-109	GROUND	23	9/10/76	-6.6940+ 0	6.7509+ 0	2.0000+ 1	STABLE
N,3N	47-AG-108	GROUND	13	9/10/76	-1.5884+ 1	1.602+ 1	2.0000+ 1	2.4200+ 0 MIN.
N,G	47-AG-111	GROUND	98	9/10/76	8.9560+ 0	1.0000-10	2.0000+ 1	7.5000+ 0 DAYS

64-GD-150
ATOMIC MASS = 1.4992+ 2
GROUND STATE
HALF-LIFE = 1.7998+ 6 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	64-GD-149	GROUND	12	11/14/77	-8.7200+ 0	8.7781+ 0	2.0000+ 1	9.2998+ 0 DAYS
N,G	64-GD-151	GROUND	102	11/14/77	6.5300+ 0	1.0000-10	2.0000+ 1	1.2002+ 2 DAYS

64-GD-151
ATOMIC MASS = 1.5092+ 2
GROUND STATE
HALF-LIFE = 1.2002+ 2 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	64-GD-150 GROUND		14	11/14/77	-6.5300+ 0	6.5732+ 0	2.0000+ 1	1.7998+ 6	YRS.
N,G	64-GD-152 GROUND		102	11/14/77	8.6000+ 0	1.0000-10	2.0000+ 1	1.1000+14	YRS.

67-HO-163
ATOMIC MASS = 1.6293+ 2
GROUND STATE
HALF-LIFE = 1.0001+ 3 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-162	1.0000- 1	25	9/16/76	-8.5100+ 0	8.4616+ 0	2.0000+ 1	1.1333+ 0	HRS.
N,3N	67-HO-161 GROUND		14	9/16/76	-1.5280+ 1	1.5374+ 1	2.0000+ 1	2.5600+ 0	HRS.
N,P	66-DY-163 GROUND		13	9/16/76	7.9000- 1	8.1810+ 0	2.0000+ 1	STABLE	
N,G	67-HO-164	1.4000- 1	102	9/16/76	6.5400+ 0	1.0000-10	2.0000+ 1	3.7500+ 1	MIN.
N,G	67-HO-164 GROUND		102	9/16/76	6.6800+ 0	1.0000-10	2.0000+ 1	2.9000+ 1	MIN.

67-HO-164
ATOMIC MASS = 1.6393+ 2
GROUND STATE
HALF-LIFE = 2.9000+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-163 GROUND		27	9/16/76	-6.6800+ 0	6.7207+ 0	2.0000+ 1	1.0001+ 3	YRS.
N,3N	67-HO-162	1.0000- 1	13	9/16/76	-1.5200+ 1	1.5192+ 1	2.0000+ 1	1.1333+ 0	HRS.
N,P	66-DY-164 GROUND		13	9/16/76	1.7600+ 0	7.1897+ 0	2.0000+ 1	STABLE	
N,G	67-HO-165 GROUND		102	9/16/76	7.9900+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-163 GROUND		27	9/16/76	-6.5400+ 0	6.5799+ 0	2.0000+ 1	1.0001+ 3	YRS.
N,3N	67-HO-162 1.0000- 1		13	9/16/76	-1.4960+ 1	1.5051+ 1	2.0000+ 1	1.1333+ 0	HRS.
N,P	66-DY-164 GROUND		13	9/16/76	1.9900+ 0	7.0488+ 0	2.0000+ 1	STABLE	
N,G	67-HO-165 GROUND		102	9/16/76	8.1300+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-164 GROUND		25	9/16/76	-7.9900+ 0	8.0384+ 0	2.0000+ 1	2.9000+ 1	MIN.
N,2N	67-HO-164 1.4000- 1		25	9/16/76	-8.1300+ 0	8.1793+ 0	2.0000+ 1	3.7500+ 1	MIN.
N,3N	67-HO-163 GROUND		15	9/16/76	-1.4670+ 1	1.4759+ 1	2.0000+ 1	1.0001+ 3	YRS.
N,P	66-DY-165 GROUND		13	9/16/76	-5.1000- 1	9.4581+ 0	2.0000+ 1	2.3200+ 0	HRS.
N,G	67-HO-166 9.0000- 3		102	9/16/76	6.2310+ 0	1.0000-10	2.0000+ 1	1.1999+ 3	YRS.
N,G	67-HO-166 GROUND		102	9/16/76	6.2400+ 0	1.0000-10	2.0000+ 1	1.1208+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-165 GROUND		27	9/16/76	-6.2400+ 0	6.2776+ 0	2.0000+ 1	STABLE	
N,3N	67-HO-164 GROUND		16	9/16/76	-1.4240+ 1	1.4326+ 1	2.0000+ 1	2.9000+ 1	MIN.
N,P	66-DY-166 GROUND		13	9/16/76	3.0000- 1	8.6280+ 0	2.0000+ 1	3.3958+ 0	DAYS
N,G	67-HO-167 GROUND		102	9/16/76	7.3300+ 0	1.0000-10	2.0000+ 1	3.1000+ 0	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	67-HO-165	GROUND	27	9/16/76	-6.2310+ 0	6.2686+ 0	2.0000+ 1	STABLE	
N,3N	67-HO-164	GROUND	16	9/16/76	-1.4231+ 1	1.4317+ 1	2.0000+ 1	2.9000+ 1	MIN.
N,P	66-DY-166	GROUND	13	9/16/76	3.0900- 1	8.6190+ 0	2.0000+ 1	3.3958+ 0	DAYS
N,G	67-HO-167	GROUND	102	9/16/76	7.3390+ 0	1.0000-10	2.0000+ 1	3.1000+ 0	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	69-TM-170	GROUND	102	4/20/78	6.5900+ 0	1.0000-10	2.0000+ 1	1.3310+ 2	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	71-LU-172	GROUND	26	3/10/77	-8.1800+ 0	8.2273+ 0	2.0000+ 1	6.7002+ 0	DAYS
N,2N	71-LU-172	4.2000- 2	27	3/10/77	-8.2220+ 0	8.2695+ 0	2.0000+ 1	4.0000+ 0	MIN.
N,3N	71-LU-171	GROUND	12	2/15/77	-1.5100+ 1	1.5187+ 1	2.0000+ 1	8.2396+ 0	DAYS
N,3N	71-LU-171	7.1000- 2	12	2/15/77	-1.5171+ 1	1.5259+ 1	2.0000+ 1	1.3000+ 0	MIN.
N,G	71-LU-174	1.7100- 1	102	3/11/77	6.6190+ 0	1.0000-10	2.0000+ 1	1.5602+ 2	DAYS
N,G	71-LU-174	GROUND	102	3/02/77	6.7900+ 0	1.0000-10	2.0000+ 1	3.5610+ 0	YRS.

71-LU-174
ATOMIC MASS = 1.7394+ 2
GROUND STATE
HALF-LIFE = 3.5610+ 0 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	71-LU-174	1.7100- 1	42	3/08/77	-1.7100- 1	1.7200- 1	2.0000+ 1	1.5602+ 2	DAYS
N,2N	71-LU-173	GROUND	30	2/15/77	-6.7880+ 0	6.8270+ 0	2.0000+ 1	1.3699+ 0	YRS.
N,3N	71-LU-172	GROUND	12	2/15/77	-1.4968+ 1	1.5054+ 1	2.0000+ 1	6.7002+ 0	DAYS
N,3N	71-LU-172	4.2000- 2	12	2/15/77	-1.5010+ 1	1.5096+ 1	2.0000+ 1	4.0000+ 0	MIN.
N,G	71-LU-175	GROUND	102	3/04/77	7.6600+ 0	1.0000-10	2.0000+ 1	STABLE	

71-LU-174
ATOMIC MASS = 1.7394+ 2
LEVEL = 1.7100- 1
HALF-LIFE = 1.5602+ 2 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	71-LU-174	GROUND	65	3/08/77	0.0000+ 0	1.0000-10	2.0000+ 1	3.5610+ 0	YRS.
N,2N	71-LU-173	GROUND	29	2/15/77	-6.6170+ 0	6.6550+ 0	2.0000+ 1	1.3699+ 0	YRS.
N,3N	71-LU-172	GROUND	13	2/15/77	-1.4797+ 1	1.4882+ 1	2.0000+ 1	6.7002+ 0	DAYS
N,3N	71-LU-172	4.2000- 2	13	2/15/77	-1.4839+ 1	1.4924+ 1	2.0000+ 1	4.0000+ 0	MIN.
N,G	71-LU-175	GROUND	102	3/11/77	7.8310+ 0	1.0000-10	2.0000+ 1	STABLE	

71-LU-175
ATOMIC MASS = 1.7494+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	71-LU-174	GROUND	29	2/17/77	-7.6600+ 0	7.7038+ 0	2.0000+ 1	3.5610+ 0	YRS.
N,2N	71-LU-174	1.7100- 1	28	2/16/77	-7.8310+ 0	7.8758+ 0	2.0000+ 1	1.5602+ 2	DAYS
N,3N	71-LU-173	GROUND	8	2/17/77	-1.4450+ 1	1.4533+ 1	2.0000+ 1	1.3699+ 0	YRS.
N,G	71-LU-176	1.2700- 1	102	2/23/77	6.1630+ 0	1.0000-10	2.0000+ 1	3.6989+ 0	HRS.
N,G	71-LU-176	GROUND	102	2/23/77	6.2900+ 0	1.0000-10	2.0000+ 1	2.7001+10	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	71-LU-176	1.2700- 1	29	3/08/77	-1.2700- 1	1.2770- 1	2.0000+ 1	3.6889+ 0	HRS.
N,2N	71-LU-175	GROUND	30	2/17/77	-6.2900+ 0	6.3258+ 0	2.0000+ 1	STABLE	
N,3N	71-LU-174	GROUND	18	2/17/77	-1.3950+ 1	1.4029+ 1	2.0000+ 1	3.5610+ 0	YRS.
N,3N	71-LU-174	1.7100- 1	17	2/17/77	-1.4121+ 1	1.4201+ 1	2.0000+ 1	1.5602+ 2	DAYS
N,G	71-LU-177	9.7000- 1	102	3/07/77	6.1000+ 0	1.0000-10	2.0000+ 1	1.6100+ 2	DAYS
N,G	71-LU-177	GROUND	102	3/07/77	7.0700+ 0	1.0000-10	2.0000+ 1	6.7095+ 0	DAYS

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	71-LU-176	GROUND	37	3/08/77	0.0000+ 0	1.5000- 2	2.0000+ 1	2.7001+10	YRS.
N,2N	71-LU-175	GROUND	31	2/17/77	-6.1630+ 0	6.1980+ 0	2.0000+ 1	STABLE	
N,3N	71-LU-174	GROUND	17	2/17/77	-1.3823+ 1	1.3902+ 1	2.0000+ 1	3.5610+ 0	YRS.
N,3N	71-LU-174	1.7100- 1	17	2/17/77	-1.3994+ 1	1.4074+ 1	2.0000+ 1	1.5602+ 2	DAYS
N,G	71-LU-177	9.7000- 1	102	3/07/77	6.2270+ 0	1.0000-10	2.0000+ 1	1.6100+ 2	DAYS
N,G	71-LU-177	GROUND	102	3/07/77	7.1970+ 0	1.0000-10	2.0000+ 1	6.7095+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	71-LU-176	GROUND	29	2/17/77	-7.0700+ 0	7.1100+ 0	2.0000+ 1	2.7001+10	YRS.
N,2N	71-LU-176	1.2700- 1	27	2/17/77	-7.1970+ 0	7.2377+ 0	2.0000+ 1	3.6889+ 0	HRS.
N,3N	71-LU-175	GROUND	16	2/17/77	-1.3370+ 1	1.3446+ 1	2.0000+ 1	STABLE	
N,G	71-LU-178	2.3000- 1	102	3/03/77	5.6400+ 0	1.0000-10	2.0000+ 1	2.1000+ 1	MIN.
N,G	71-LU-178	GROUND	102	3/02/77	5.8700+ 0	1.0000-10	2.0000+ 1	2.8400+ 1	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	71-LU-176	GROUND	29	2/17/77	-6.1000+ 0	6.1345+ 0	2.0000+ 1	2.7001+10	YRS.
N,2N	71-LU-176	1.2700- 1	27	2/17/77	-6.2270+ 0	6.2622+ 0	2.0000+ 1	3.6889+ 0	HRS.
N,3N	71-LU-175	GROUND	16	2/17/77	-1.2400+ 1	1.2470+ 1	2.0000+ 1	STABLE	
N,G	71-LU-178	2.3000- 1	102	3/03/77	6.6100+ 0	1.0000-10	2.0000+ 1	2.1000+ 1	MIN.
N,G	71-LU-178	GROUND	102	3/02/77	6.8400+ 0	1.0000-10	2.0000+ 1	2.8400+ 1	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	72-HF-178	GROUND	48	8/01/76	-6.1000+ 0	6.1341+ 0	2.0000+ 1	STABLE	
N,3N	72-HF-177	GROUND	23	8/01/76	-1.3730+ 1	1.3807+ 1	2.0000+ 1	STABLE	
N,P	71-LU-179	GROUND	35	8/01/76	-5.7000- 1	1.0043+ 1	2.0000+ 1	4.6000+ 0	HRS.
N,G	72-HF-180	GROUND	102	8/01/76	7.3900+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	72-HF-179	GROUND	43	8/01/76	-7.3900+ 0	7.4311+ 0	2.0000+ 1	STABLE	
N,3N	72-HF-178	GROUND	23	8/01/76	-1.3490+ 1	1.3565+ 1	2.0000+ 1	STABLE	
N,P	71-LU-180	GROUND	28	8/01/76	-2.5200+ 0	1.1989+ 1	2.0000+ 1	2.5000+ 0	MIN.
N,G	72-HF-181	GROUND	102	8/01/76	5.6900+ 0	1.0000-10	2.0000+ 1	4.2500+ 1	DAYS

72-HF-181
ATOMIC MASS = 1.8095+ 2
GROUND STATE
HALF-LIFE = 4.2500+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	72-HF-180	GROUND	49	8/01/76	-5.6900+ 0	5.7214+ 0	2.0000+ 1	STABLE	
N,3N	72-HF-179	GROUND	25	8/01/76	-1.3080+ 1	1.3152+ 1	2.0000+ 1	STABLE	
N,G	72-HF-182	GROUND	102	8/01/76	6.5900+ 0	1.0000-10	2.0000+ 1	8.9992+ 6	YRS.

72-HF-183
ATOMIC MASS = 1.8295+ 2
GROUND STATE
HALF-LIFE = 1.0833+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	72-HF-182	GROUND	50	8/01/76	-5.3900+ 0	5.4195+ 0	2.0000+ 1	8.9992+ 6	YRS.
N,3N	72-HF-181	GROUND	28	8/01/76	-1.1980+ 1	1.2045+ 1	2.0000+ 1	4.2500+ 1	DAYS
N,G	72-HF-184	GROUND	102	8/01/76	5.7900+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	MIN.

73-TA-179
ATOMIC MASS = 1.7895+ 2
GROUND STATE
HALF-LIFE = 1.6438+ 0 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-178	GROUND	42	8/01/76	-7.8900+ 0	7.9341+ 0	2.0000+ 1	2.1000+ 0	HRS.
N,3N	73-TA-177	GROUND	19	8/01/76	-1.4770+ 1	1.4853+ 1	2.0000+ 1	2.3598+ 0	DAYS
N,P	72-HF-179	GROUND	39	8/01/76	9.0000 1	8.6983+ 0	2.0000+ 1	STABLE	
N,G	73-TA-180	2.1200- 1	102	8/01/76	6.3680+ 0	1.0000-10	2.0000+ 1	8.1000+ 0	HRS.
N,G	73-TA-180	GROUND	102	8/01/76	6.5800+ 0	1.0000-10	2.0000+ 1	1.0001+13	YRS.

73-TA-180
ATOMIC MASS = 1.7995+ 2
GROUND STATE
HALF-LIFE = 1.0001+13 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-179 GROUND		46	8/01/76	-6.5800+ 0	6.6166+ 0	2.0000+ 1	1.6438+ 0	YRS.
N,3N	73-TA-178 GROUND		20	8/01/76	-1.4470+ 1	1.4550+ 1	2.0000+ 1	2.1000+ 0	HRS.
N,P	72-HF-180	1.1420+ 0	38	8/01/76	5.6800- 1	9.0170+ 0	2.0000+ 1	5.5000+ 0	HRS.
N,G	73-TA-181 GROUND		102	8/01/76	7.6400+ 0	1.0000-10	2.0000+ 1	STABLE	

73-TA-180
ATOMIC MASS = 1.7995+ 2
LEVEL = 2.1200- 1
HALF-LIFE = 8.1000+ 0 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-179 GROUND		47	8/01/76	-6.3680+ 0	6.4034+ 0	2.0000+ 1	1.6438+ 0	YRS.
N,3N	73-TA-178 GROUND		21	8/01/76	-1.4258+ 1	1.4337+ 1	2.0000+ 1	2.1000+ 0	HRS.
N,P	72-HF-180	1.1420+ 0	39	8/01/76	7.8000- 1	8.8038+ 0	2.0000+ 1	5.5000+ 0	HRS.
N,G	73-TA-181 GROUND		102	8/01/76	7.8520+ 0	1.0000-10	2.0000+ 1	STABLE	

73-TA-181
ATOMIC MASS = 1.8095+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-180 GROUND		43	7/28/76	-7.6300+ 0	7.6722+ 0	2.0000+ 1	1.0001+13	YRS.
N,2N	73-TA-180	2.1200- 1	42	7/31/76	-7.8420+ 0	7.8853+ 0	2.0000+ 1	8.1000+ 0	HRS.
N,3N	73-TA-179 GROUND		21	7/31/76	-1.4220+ 1	1.4299+ 1	2.0000+ 1	1.6438+ 0	YRS.
N,P	72-HF-181 GROUND		5	1/01/72	-2.3900- 1	1.0000+ 1	2.0000+ 1	4.2500+ 1	DAYS
N,G	73-TA-182	5.0300- 1	75	7/31/76	5.5670+ 0	1.0000-10	2.0000+ 1	1.6500+ 1	MIN.
N,G	73-TA-182 GROUND		102	7/28/76	6.0700+ 0	1.0000-10	2.0000+ 1	1.1500+ 2	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-181	GROUND	48	7/13/76	-6.0600+ 0	6.0933+ 0	2.0000+ 1	STABLE	
N,3N	73-TA-180	2.1200- 1	22	7/13/76	-1.3920+ 1	1.3997+ 1	2.0000+ 1	8.1000+ 0	HRS.
N,P	72-HF-182	GROUND	37	7/31/76	2.8000- 1	9.2767+ 0	2.0000+ 1	8.9992+ 6	YRS.
N,G	73-TA-183	GROUND	102	7/31/76	6.9300+ 0	1.0000-10	2.0000+ 1	5.0995+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-181	GROUND	50	7/31/76	-5.5570+ 0	5.5875+ 0	2.0000+ 1	STABLE	
N,3N	73-TA-180	2.1200- 1	24	7/31/76	-1.3417+ 1	1.3491+ 1	2.0000+ 1	8.1000+ 0	HRS.
N,P	72-HF-182	GROUND	39	7/31/76	7.8300- 1	8.7709+ 0	2.0000+ 1	8.9992+ 6	YRS.
N,G	73-TA-183	GROUND	102	7/31/76	7.4330+ 0	1.0000-10	2.0000+ 1	5.0995+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-182	GROUND	45	8/02/76	-6.9300+ 0	6.9679+ 0	2.0000+ 1	1.1500+ 2	DAYS
N,3N	73-TA-181	GROUND	25	8/02/76	-1.2990+ 1	1.3061+ 1	2.0000+ 1	STABLE	
N,P	72-HF-183	GROUND	32	8/02/76	-1.2600+ 0	1.0810+ 1	2.0000+ 1	1.0833+ 0	HRS.
N,G	73-TA-184	GROUND	102	8/02/76	5.4500+ 0	1.0000-10	2.0000+ 1	8.7000+ 0	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-183	GROUND	50	8/02/76	-5.4500+ 0	5.4796+ 0	2.0000+ 1	5.0995+ 0	DAYS
N,3N	73-TA-182	GROUND	27	8/02/76	-1.2380+ 1	1.2447+ 1	2.0000+ 1	1.1500+ 2	DAYS
N,G	73-TA-185	GROUND	102	8/02/76	6.8200+ 0	1.0000-10	2.0000+ 1	5.0000+ 1	MIN.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	73-TA-185	GROUND	51	8/02/76	-5.2600+ 0	5.2883+ 0	2.0000+ 1	5.000C+ 1	MIN.
N,3N	73-TA-184	GROUND	29	8/02/76	-1.2080+ 1	1.2145+ 1	2.0000+ 1	8.7000+ 0	HRS.
N,G	73-TA-187	GROUND	102	8/02/76	6.7100+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -178	GROUND	17	6/05/76	-8.6000+ 0	8.6600+ 0	2.0000+ 1	2.1528+ 1	DAYS
N,3N	74-W -177	GROUND	6	6/05/76	-1.5300+ 1.	1.6000+ 1	2.0000+ 1	2.2500+ 0	HRS.
N,G	74-W -180	GROUND	102	6/02/76	8.6000+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -179	GROUND	17	6/05/76	-8.6000+ 0	8.6600+ 0	2.0000+ 1	3.8000+ 1	MIN.
N,3N	74-W -178	GROUND	6	6/05/76	-1.5370+ 1	1.5450+ 1	2.0000+ 1	2.1528+ 1	DAYS
N,G	74-W -181	GROUND	102	6/02/76	6.6400+ 0	1.0000-10	2.0000+ 1	1.4005+ 2	DAYS

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -180	GROUND	17	6/05/76	-6.6400+ 0	6.6800+ 0	2.0000+ 1	STABLE	
N,3N	74-W -179	GROUND	6	6/05/76	-1.5200+ 1	1.5300+ 1	2.0000+ 1	3.8000+ 1	MIN.
N,G	74-W -182	GROUND	102	6/02/76	8.0500+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -181	GROUND	18	6/02/76	-8.0500+ 0	8.1000+ 0	2.0000+ 1	1.4005+ 2	DAYS
N,3N	74-W -180	GROUND	7	6/02/76	-1.4700+ 1	1.4800+ 1	2.0000+ 1	STABLE	
N,P	73-TA-182	GROUND	27	6/02/76	-1.0220+ 0	1.0280+ 0	2.0000+ 1	1.1505+ 2	DAYS
N,A	72-HF-179	GROUND	29	6/02/76	7.8900+ 0	1.1000+ 1	2.0000+ 1	STABLE	
N,G	74-W -183	GROUND	102	5/30/76	6.1910+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -182	GROUND	18	6/02/76	-6.1900+ 0	6.2500+ 0	2.0000+ 1	STABLE	
N,3N	74-W -181	GROUND	7	6/02/76	-1.4200+ 1	1.4300+ 1	2.0000+ 1	1.4005+ 2	DAYS
N,N'P	73-TA-182	GROUND	30	6/02/76	-7.2100+ 0	1.1750+ 1	2.0000+ 1	1.1505+ 2	DAYS
N,P	73-TA-183	GROUND	24	6/02/76	-2.8600+ 1	1.0000+ 1	2.0000+ 1	5.1042+ 0	DAYS
N,A	72-HF-180	GROUND	26	6/02/76	9.0800+ 0	1.1000+ 1	2.0000+ 1	STABLE	
N,G	74-W -184	GROUND	102	5/30/76	7.4120+ 0	1.0000-10	2.0000+ 1	STABLE	

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -183	GROUND	18	6/02/76	-7.4100+ 0	7.4500+ 0	2.0000+ 1	STABLE	
N,3N	74-W -182	GROUND	7	6/02/76	-1.3600+ 1	1.3700+ 1	2.0000+ 1	STABLE	
N,P	73-TA-184	GROUND	27	6/02/76	-2.2500+ 0	2.2600+ 0	2.0000+ 1	8.7000+ 0	HRS.
N,A	72-HF-181	GROUND	30	6/02/76	7.3700+ 0	1.1000+ 1	2.0000+ 1	4.2477+ 1	DAYS
N,G	74-W -185	GROUND	102	5/30/76	5.7500+ 0	1.0000-10	2.0000+ 1	7.5000+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	74-W -184	GROUND	18	6/06/76	-5.7500+ 0	5.7800+ 0	2.0000+ 1	STABLE
N,3N	74-W -183	GROUND	7	6/06/76	-1.3160+ 1	1.3250+ 1	2.0000+ 1	STABLE
N,G	74-W -186	GROUND	102	6/02/76	7.2000+ 0	1.0000-10	2.0000+ 1	STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -185	GROUND	19	6/02/76	-7.2000+ 0	7.2500+ 0	2.0000+ 1	7.5000+ 1	DAYS
N,3N	74-W -184	GROUND	8	6/02/76	-1.2953+ 1	1.3000+ 1	2.0000+ 1	STABLE	
N,P	73-TA-186	GROUND	23	6/02/76	-3.1200+ 0	1.1400+ 1	2.0000+ 1	1.0000+ 1	MIN.
N,A	72-HF-183	GROUND	29	6/02/76	6.3900+ 0	1.1000+ 1	2.0000+ 1	1.0833+ 0	HRS.
N,G	74-W -187	GROUND	102	5/30/76	5.4670+ 0	1.0000-10	2.0000+ 1	2.3900+ 1	HRS.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -186	GROUND	19	6/06/76	-5.4700+ 0	5.5000+ 0	2.0000+ 1	STABLE	
N,3N	74-W -185	GROUND	8	6/06/76	-1.2670+ 1	1.2750+ 1	2.0000+ 1	7.5000+ 1	DAYS
N,4N	74-W -184	GROUND	2	5/06/76	-1.8420+ 1	1.8550+ 1	2.0000+ 1	STABLE	
N,G	74-W -188	GROUND	102	6/05/76	6.8400+ 0	1.0000-10	2.0000+ 1	6.9005+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	74-W -187	GROUND	19	6/06/76	-6.8400+ 0	6.8800+ 0	2.0000+ 1	2.3900+ 1	HRS.
N,3N	74-W -186	GROUND	8	6/06/76	-1.2300+ 1	1.2400+ 1	2.0000+ 1	STABLE	
N,G	74-W -189	GROUND	102	6/06/76	4.8800+ 0	1.0000-10	2.0000+ 1	1.1500+ 1	MIN.

ATOMIC MASS = 1.8395+ 2
GROUND STATE
HALF-LIFE = 3.7998+ 1 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	75-RE-183	GROUND	24	8/12/76	-6.5000+ 0	6.5353+ 0	2.0000+ 1	7.0995+ 1 DAYS
N,3N	75-RE-182	GROUND	14	8/12/76	-1.5500+ 1	1.5586+ 1	2.0000+ 1	2.6667+ 0 DAYS
N,P	74-W-184	GROUND	17	8/12/76	-1.9900+ 0	7.0930- 0	2.0000+ 1	STABLE
N,G	75-RE-185	GROUND	102	8/12/76	7.5700+ 0	1.0000- 0	2.0000+ 1	STABLE

ATOMIC MASS = 1.8395+ 2
LEVEL = 1.8800- 1
HALF-LIFE = 1.6898+ 2 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	75-RE-183	GROUND	25	8/12/76	-6.3120+ 0	6.3463+ 0	2.0000+ 1	7.0995+ 1 DAYS
N,3N	75-RE-182	GROUND	15	8/12/76	-1.5312+ 1	1.5395+ 1	2.0000+ 1	2.6667+ 0 DAYS
N,P	74-W-184	GROUND	17	8/12/76	2.0080+ 0	7.6940+ 0	2.0000+ 1	STABLE
N,G	75-RE-185	GROUND	102	8/12/76	7.7580+ 0	1.0000- 10	2.0000+ 1	STABLE

ATOMIC MASS = 1.8495+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	75-RE-184	GROUND	27	8/12/76	-7.8100+ 0	7.8522+ 0	2.0000+ 1	3.7998+ 1 DAYS
N,2N	75-RE-184	1.8800- 1	16	8/12/76	-7.9980+ 0	8.0412+ 0	2.0000+ 1	1.6898+ 2 DAYS
N,3N	75-RE-183	GROUND	15	8/12/76	-1.4470+ 1	1.4548+ 1	2.0000+ 1	7.0995+ 1 DAYS
N,P	74-W-185	GROUND	16	8/12/76	3.5000- 1	9.4264+ 0	2.0000+ 1	7.5000+ 0 DAYS
N,G	75-RE-186	GROUND	102	8/12/76	6.1780+ 0	1.0000- 10	2.0000+ 1	3.7500+ 0 DAYS

75-RE-186
ATOMIC MASS = 1.8595+ 2
GROUND STATE
HALF-LIFE = 3.7500+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	75-RE-185	GROUND	29	8/12/76	-6.1900+ 0	6.2132+ 0	2.0000+ 1	STABLE	
N,3N	75-RE-184	GROUND	16	8/12/76	-1.3750+ 1	1.3824+ 1	2.0000+ 1	3.7998+ 1	DAYS
N,3N	75-RE-184	1.8800- 1	16	8/12/76	-1.3910+ 1	1.3824+ 1	2.0000+ 1	1.6898+ 2	DAYS
N,P	74-W -186	GROUND	17	8/12/76	1.3800+ 0	8.3759+ 0	2.0000+ 1	STABLE	
N,G	75-RE-187	GROUND	102	8/12/76	7.3700+ 0	1.0000-10	2.0000+ 1	3.9954+10	YRS.

75-RE-187
ATOMIC MASS = 1.8696+ 2
GROUND STATE
HALF-LIFE = 3.9954+10 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	75-RE-186	GROUND	26	8/12/76	-7.3200+ 0	7.3592+ 0	2.0000+ 1	3.7500+ 0	DAYS
N,3N	75-RE-185	GROUND	17	8/12/76	-1.3560+ 1	1.3633+ 1	2.0000+ 1	STABLE	
N,P	74-W -187	GROUND	16	8/12/76	-5.3000- 1	1.0281+ 1	2.0000+ 1	2.3900+ 1	HRS.
N,G	75-RE-188	1.7200- 1	102	8/12/76	5.7010+ 0	1.0000-10	2.0000+ 1	1.8700+ 1	MIN
N,G	75-RE-188	GROUND	102	8/12/76	5.8730+ 0	1.0000-10	2.0000+ 1	1.6700+ 1	HRS.

75-RE-188
ATOMIC MASS = 1.8796+ 2
GROUND STATE
HALF-LIFE = 1.6700+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	75-RE-187	GROUND	27	8/12/76	-5.8700+ 0	5.9012+ 0	2.0000+ 1	3.9954+10	YRS.
N,3N	75-RE-186	GROUND	16	8/12/76	-1.3270+ 1	1.3341+ 1	2.0000+ 1	3.7500+ 0	DAYS
N,P	74-W -188	GROUND	16	8/12/76	4.3000- 1	9.3015+ 0	2.0000+ 1	6.9005+ 1	DAYS
N,G	75-RE-189	GROUND	102	8/12/76	7.0300+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	DAYS

75-RE-188
ATOMIC MASS = 1.8796+ 2
LEVEL = 1.7200+ 1
HALF-LIFE = 1.8700+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	75-RE-187	GROUND	28	8/12/76	-5.6980+ 0	5.7283+ 0	2.0000+ 1	3.9954+10	YRS.
N,3N	75-RE-186	GROUND	16	8/12/76	-1.3098+ 1	1.3168+ 1	2.0000+ 1	3.7500+ 0	DAYS
N,P	74-W -188	GROUND	16	8/12/76	6.0200- 1	9.1286+ 0	2.0000+ 1	6.9005+ 1	DAYS
N,G	75-RE-189	GROUND	102	8/12/76	7.2020+ 0	1.0000-10	2.0000+ 1	1.0000+ 0	DAYS

77-IR-194
ATOMIC MASS = 1.9396+ 2
GROUND STATE
HALF-LIFE = 1.7389+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	77-IR-193	GROUND	48	8/04/76	-6.0700+ 0	6.1013+ 0	2.0000+ 1	STABLE	
N,3N	77-IR-192	GROUND	22	8/04/76	-1.3980+ 1	1.3952+ 1	2.0000+ 1	7.4201+ 1	DAYS
N,P	76-OS-194	GROUND	30	8/04/76	6.9000- 1	9.2145+ 0	2.0000+ 1	5.9995+ 0	YRS.
N,G	77-IR-195	GROUND	102	8/04/76	7.3100+ 0	1.0000-10	2.0000+ 1	4.2000+ 0	HRS.

78-PT-197
ATOMIC MASS = 1.9697+ 2
GROUND STATE
HALF-LIFE = 1.8000+ 1 HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	78-PT-196	GROUND	49	8/04/76	-5.8500+ 0	5.8797+ 0	2.0000+ 1	STABLE	
N,3N	78-PT-195	GROUND	23	8/04/76	-1.3770+ 1	1.3840+ 1	2.0000+ 1	STABLE	
N,P	77-IR-197	GROUND	31	8/04/76	-1.2300+ 0	1.1221+ 1	2.0000+ 1	7.0000+ 0	MIN.
N,G	78-PT-198	GROUND	102	8/04/76	7.5600+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	79-AU-194	GROUND	102	5/30/76	8.6500+ 0	1.0000-10	2.0000+ 1	1.6458+ 0	DAYS

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	79-AU-193	GROUND	15	6/02/76	-6.7600+ 0	6.8000+ 0	2.0000+ 1	1.6000+ 1	HRS.
N,3N	79-AU-192	GROUND	7	6/02/76	-1.5670+ 1	1.5750+ 1	2.0000+ 1	4 1000+ 0	HRS.
N,G	79-AU-195	GROUND	102	5/30/76	8.3500+ 0	1.0000-10	2.0000+ 1	1.8299+ 2	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	79-AU-194	GROUND	15	6/02/76	-8.3500+ 0	8.3900+ 0	2.0000+ 1	1.6458+ 0	DAYS
N,3N	79-AU-193	GROUND	7	6/02/76	-1.5400+ 1	1.5500+ 1	2.0000+ 1	1.6000+ 1	HRS.
N,G	79-AU-196	GROUND	102	5/30/76	6.6700+ 0	1.0000-10	2.0000+ 1	6.1806+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	79-AU-195 GROUND		16	6/02/76	-6.6700+ 0	6.7000+ 0	2.0000+ 1	1.8241+ 2	DAYS
N,3N	79-AU-194 GROUND		8	6/02/76	-1.5020+ 1	1.5100+ 1	2.0000+ 1	1.6458+ 0	DAYS
N,G	79-AU-197 GROUND		102	5/30/76	8.0800+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	79-AU-195 GROUND		16	6/02/76	-6.0700+ 0	6.1000+ 0	2.0000+ 1	1.8241+ 2	DAYS
N,3N	79-AU-194 GROUND		8	6/02/76	-1.4420+ 1	1.4500+ 1	2.0000+ 1	1.6458+ 0	DAYS
N,G	79-AU-197 GROUND		102	5/30/76	8.6800+ 0	1.0000-10	2.0000+ 1	STABLE	

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	79-AU-196 GROUND		12	6/02/76	-8.0600+ 0	8.1300+ 0	2.0000+ 1	6.1806+ 0	DAYS
N,2N	79-AU-196 5.9550- 1		7	6/02/76	-8.6550+ 0	8.7000+ 0	2.0000+ 1	9.7000+ 0	HRS.
N,3N	79-AU-195 GROUND		5	6/02/76	-1.4750+ 1	1.4826+ 1	2.0000+ 1	1.8241+ 2	DAYS
N,P	78-PT-197 GROUND		12	6/02/76	4.0000- 2	1.0000+ 1	2.0000+ 1	1.8000+ 1	HRS.
N,A	77-IR-194 GROUND		6	6/02/76	7.0300+ 0	7.0000+ 0	2.0000+ 1	1.7389+ 1	HRS.
N,G	79-AU-198 GROUND		102	5/30/76	6.5100+ 0	1.0000-10	2.0000+ 1	2.6979+ 0	DAYS

ATOMIC MASS = 1.9797+2   79-AU-198
GROUND STATE
HALF-LIFE = 2.6979+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	79-AU-197	GROUND	16	6/02/76	-6.5100+ 0	6.5500+ 0	2.0000+ 1	STABLE
N,3N	79-AU-196	GROUND	8	6/02/76	-1.4590+ 1	1.4700+ 1	2.0000+ 1	6.1806+ 0 DAYS
N,G	79-AU-199	GROUND	102	5/30/76	7.5700+ 0	1.0000-10	2.0000+ 1	3.1505+ 0 DAYS

ATOMIC MASS = 1.9897+2   79-AU-199
GROUND STATE
HALF-LIFE = 3.1505+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	79-AU-198	GROUND	17	6/02/76	-7.5700+ 0	7.6100+ 0	2.0000+ 1	2.6968+ 0 DAYS
N,3N	79-AU-197	GROUND	9	6/02/76	-1.4080+ 1	1.4150+ 1	2.0000+ 1	STABLE
N,G	79-AU-200	GROUND	102	5/30/76	6.2800+ 0	1.0000-10	2.0000+ 1	4.8400+ 1 MIN.

ATOMIC MASS = 1.9997+2   79-AU-200
GROUND STATE
HALF-LIFE = 4.8400+ 1 MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	79-AU-199	GROUND	17	6/02/76	-6.2800+ 0	6.3200+ 0	2.0000+ 1	3.1481+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-202	GROUND	14	6/07/76	-6.7900+ 0	6.8500+ 0	2.0000+ 1	3.0001+ 5	YRS.
N,3N	82-PB-201	GROUND	6	6/07/76	-1.5450+ 1	1.5550+ 1	2.0000+ 1	9.4000+ 0	HRS.
N,G	82-PB-204	GROUND	102	6/07/76	8.4000+ 0	1.0000-10	2.0000+ 1	1.4000+17	YRS.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,N'	82-PB-204	2.1860+ 0	40	11/11/77	-2.1860+ 0	2.1967+ 0	2.0000+ 1	1.1150+ 0	HRS.
N,2N	82-PB-203	GROUND	15	6/07/76	-6.4000+ 0	6.4500+ 0	2.0000+ 1	2.1713+ 0	DAYS
N,3N	82-PB-202	GROUND	6	6/07/76	-1.5190+ 1	1.5260+ 1	2.0000+ 1	3.0001+ 5	YRS.
N,G	82-PB-205	GROUND	102	6/06/76	6.7300+ 0	1.0000-10	2.0000+ 1	2.9997+ 7	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-204	GROUND	14	6/07/76	-6.7300+ 0	6.8000+ 0	2.0000+ 1	1.4000+17	YRS.
N,3N	82-PB-203	GROUND	6	6/07/76	-1.5140+ 1	1.5250+ 1	2.0000+ 1	2.1713+ 0	DAYS
N,G	82-PB-206	GROUND	102	6/07/76	8.0800+ 0	1.0000-10	2.0000+ 1	STABLE	

82-PB-206
ATOMIC MASS = 2.0597+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-205	GROUND	15	6/07/76	-8.0800+ 0	8.1200+ 0	2.0000+ 1	2.9997+ 7	YRS.
N,3N	82-PB-204	GROUND	6	6/07/76	-1.4810+ 1	1.4890+ 1	2.0000+ 1	1.4000+17	YRS.
N,G	82-PB-207	GROUND	102	6/07/76	6.7400+ 0	1.0000-10	2.0000+ 1	STABLE	

82-PB-207
ATOMIC MASS = 2.0698+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-206	GROUND	14	6/07/76	-6.7400+ 0	6.7800+ 0	2.0000+ 1	STABLE	
N,3N	82-PB-205	GROUND	6	6/07/76	-1.4820+ 1	1.4900+ 1	2.0000+ 1	2.9997+ 7	YRS.
N,G	82-PB-208	GROUND	102	6/07/76	7.3700+ 0	1.0000-10	2.0000+ 1	STABLE	

82-PB-208
ATOMIC MASS = 2.0798+ 2
GROUND STATE
STABLE

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-207	GROUND	16	6/07/76	-7.3700+ 0	7.4100+ 0	2.0000+ 1	STABLE	
N,3N	82-PB-206	GROUND	7	6/07/76	-1.4110+ 1	1.4180+ 1	2.0000+ 1	STABLE	
N,G	82-PB-209	GROUND	102	6/07/76	3.9400+ 0	1.0000-10	2.0000+ 1	3.3000+ 0	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	82-PB-208 GROUND		18	6/07/76	-3.9400+ 0	3.9600+ 0	2.0000+ 1	STABLE	
N,3N	82-PB-207 GROUND		9	6/07/76	-1.1310+ 1	1.1370+ 1	2.0000+ 1	STABLE	
N,4N	82-PB-206 GROUND		2	6/07/76	-1.8050+ 1	1.8140+ 1	2.0000+ 1	STABLE	
N,G	82-PB-210 GROUND		102	6/07/76	5.1800+ 0	1.0000-10	2.0000+ 1	2.0998+ 1	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,G	90-TH-231 GROUND		102	6/04/76	5.1300+ 0	1.0000-10	2.0000+ 1	1.0625+ 0	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	90-TH-230 GROUND		19	6/04/76	-5.1300+ 0	5.1500+ 0	2.0000+ 1	8.0004+ 4	YRS.
N,3N	90-TH-229 GROUND		11	6/04/76	-1.1910+ 1	1.1970+ 1	2.0000+ 1	7.3408+ 3	YRS.
N,4N	90-TH-228 GROUND		5	6/04/76	-1.7150+ 1	1.7230+ 1	2.0000+ 1	1.9099+ 0	YRS.
N,G	90-TH-232 GROUND		102	5/06/76	6.4300+ 0	1.0000-10	2.0000+ 1	1.4095+10	YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	90-TH-231	GROUND	17	6/04/76	-6.4300+ 0	6.5000+ 0	2.0000+ 1	1.0625+ 0	DAYS
N,3N	90-TH-230	GROUND	8	6/04/76	-1.1560+ 1	1.1610+ 1	2.0000+ 1	8.0004+ 4	YRS.
N,4N	90-TH-229	GROUND	2	6/04/76	-1.8350+ 1	1.8500+ 1	2.0000+ 1	7.3408+ 3	YRS.
N,G	90-TH-233	GROUND	102	6/04/76	4.7900+ 0	1.0000-10	2.0000+ 1	2.2200+ 1	MIN.

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REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	90-TH-232	GROUND	19	6/04/76	-4.7900+ 0	4.8100+ 0	2.0000+ 1	1.4095+10	YRS.
N,3N	90-TH-231	GROUND	14	6/04/76	-1.1220+ 1	1.1270+ 1	2.0000+ 1	1.0625+ 0	DAYS
N,4N	90-TH-230	GROUND	5	6/04 76	-1.6340+ 1	1.6340+ 1	2.0000+ 1	8.0004+ 4	YRS.
N,G	90-TH-234	GROUND	102	5/29/76	6.1800+ 0	1.0000-10	2.0000+ 1	2.4097+ 1	DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	90-TH-233	GROUND	16	6/04/76	-6.1700+ 0	6.2000+ 0	2.0000+ 1	2.2200+ 1	MIN.

92-U -233
ATOMIC MASS = 2.330+ 2
GROUND STATE
HALF-LIFE = 1.5801+ 5 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	92-U -232	GROUND	12	12/28/74	-5.7400+ 0	5.7646+ 0	2.0000+ 1	7.2013+ 1 YRS.
N,3N	92-U -231	GROUND	6	12/28/74	-1.3010+ 1	1.3066+ 1	2.0000+ 1	4.2202+ 0 DAYS
N,G	92-U -234	GROUND	102	7/06/77	6.8400+ 0	1.0000-10	2.0000+ 1	2.4401+ 5 YRS.

92-U -234
ATOMIC MASS = 2.340+ 2
GROUND STATE
HALF-LIFE = 2.4401+ 5 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	92-U -233	GROUND	13	11/15/72	-6.8400+ 0	6.8700+ 0	2.0000+ 1	1.5801+ 5 YRS.
N,3N	92-U -232	GROUND	7	11/15/72	-1.2590+ 1	1.2644+ 1	2.0000+ 1	7.2013+ 1 YRS.
N,G	92-U -235	GROUND	128	4/03/76	5.3100+ 0	1.0000-10	2.0000+ 1	7.0396+ 8 YRS.

92-U -235
ATOMIC MASS = 2.350+ 2
GROUND STATE
HALF-LIFE = 7.0396+ 8 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE
N,2N	92-U -234	GROUND	15	2/02/76	-5.3100+ 0	5.3326+ 0	2.0000+ 1	2.4401+ 5 YRS.
N,3N	92-U -233	GROUND	8	1/27/76	-1.2150+ 1	1.2202+ 1	2.0000+ 1	1.5801+ 5 YRS.
N,4N	92-U -232	GROUND	3	5/04/71	-1.7890+ 1	1.7970+ 1	2.0000+ 1	7.2013+ 1 YRS.
N,G	92-U -236	GROUND	102	7/06/77	6.5500+ 0	1.0000-10	2.0000+ 1	2.3421+ 7 YRS.

92-U -236
ATOMIC MASS = 2.3605+ 2
GROUND STATE
HALF-LIFE = 2.3421+ 7 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	92-U -235 GROUND		14	11/15/72	-6.5500+ 0	6.5800+ 0	2.0000+ 1	7.0396+ 8	YRS.
N,3N	92-U -234 GROUND		8	12/28/74	-1.1850+ 1	1.1900+ 1	2.0000+ 1	2.4401+ 5	YRS.
N,G	92-U -237 GROUND		127	10/27/75	5.1200+ 0	1.0000-10	2.0000+ 1	6.7500+ 0	DAYS

92-U -237
ATOMIC MASS = 2.3705+ 2
GROUND STATE
HALF-LIFE = 6.7500+ 0 DAYS

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	92-U -236 GROUND		11	11/15/72	-5.1200+ 0	5.1416+ 0	2.0000+ 1	2.3421+ 7	YRS.
N,3N	92-U -235 GROUND		7	11/15/72	-1.1670+ 1	1.1720+ 1	2.0000+ 1	7.0396+ 8	YRS.
N,G	92-U -238 GROUND		174	9/27/75	6.1400+ 0	1.0000-10	2.0000+ 1	4.4711+ 9	YRS.

92-U -238
ATOMIC MASS = 2.3805+ 2
GROUND STATE
HALF-LIFE = 4.4711+ 9 YRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	92-U -237 GROUND		15	12/15/71	-6.1400+ 0	6.1658+ 0	2.0000+ 1	6 7500+ 0	DAYS
N,3N	92-U -235 GROUND		10	2/02/76	-1.1270+ 1	1.1317+ 1	2.0000+ 1	2.3421+ 7	YRS.
N,4N	92-U -235 GROUND		4	3/12/71	-1.7810+ 1	1.7885+ 1	2.0000+ 1	7.0396+ 8	YRS.
N,G	92-U -239 GROUND		102	7/06/77	4.8000+ 0	1.0000-10	2.0000+ 1	2.3500+ 1	MIN.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	92-U -238	GROUND	14	11/15/72	-4.8000+ 0	4.8201+ 0	2.0000+ 1	4.4711+ 9	YRS.
N,3N	92-U -237	GROUND	12	11/15/72	-1.0950+ 1	1.0996+ 1	2.0000+ 1	6.7500+ 0	DAYS
N,4N	92-U -236	GROUND	5	11/15/72	-1.6070+ 1	1.6137+ 1	2.0000+ 1	2.3421+ 7	YRS.
N,G	92-U -240	GROUND	211	10/30/75	5.9300+ 0	1.0000-10	2.0000+ 1	1.4100+ 1	HRS.

REACTION	PRODUCT	LEVEL	POINTS	DATE	Q-VALUE	E-MIN	E-MAX	HALF-LIFE	
N,2N	92-U -239	GROUND	13	11/15/72	-5.5300+ 0	5.9600+ 0	2.0000+ 1	2.3500+ 1	MIN.
N,3N	92-U -238	GROUND	10	11/15/72	-1.0740+ 1	1.0785+ 1	2.0000+ 1	4.4711+ 9	YRS.
N,4N	92-U -237	GROUND	5	11/15/72	-1.6880+ 1	1.6950+ 1	2.0000+ 1	6.7500+ 0	DAYS
N,G	92-U -241	GROUND	139	2/27/76	6.0800+ 0	1.0000-10	2.0000+ 1	3.4100+ 0	SEC.

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APPENDIX
SAMPLE LISTING OF THE ACTIVATION CROSS SECTIONS

The listing shows some of the evaluated cross sections for a number of reactions on the ground state of $^{63}Cu_{29}$ for incident neutrons in the energy range from 0.053 to 10.25 MeV. The target, along with its energy level and half-life, are given at the top of the page. Then the various reactions for which cross section data are available are listed (with CLYDE reaction descriptors).[A1] For each reaction the following are given: the date of the evaluation, the reaction modifier, S, denoting activation, the reaction Q-value, the product nucleus (1000 Z + A), the energy level of the product nucleus, and its half-life. Then the tables of cross sections are listed for the incident neutron energies indicated. All energies are in units of MeV and all cross sections are in units of barns. The asterisks denote cross section data originally entered into the library; the other values are obtained by interpolation.

ACTIVATION CROSS-SECTIONS

29-CU-63   GROUND STATE   STABLE

	12 (N,2N)	20 (N,N' P)	26 (N,N' A)	40 (N,P)	45 (N,A)	45 (N,A)	46 (N,GAMMA)
DATE-	80276	80376	80376	80276	80476	80476	72976
S=	5	5	5	5	5	5	5
Q=	-1.0850E+01	-6.1200E+00	-5.7700E+00	7.2000E-01	1.6614E+00	1.7200E+00	7.9200E+00
RESIDUAL=	2.9062E+04	2.8062E+04	2.7059E+04	2.8063E+04	2.7060E+04	2.7060E+04	2.9064E+04
LEVEL=	0.	0.	0.	0.	5.8600E-02	0.	0.
HALF-LIFE=	5.8800E+02	STABLE	STABLE	3.1536E+09	6.3000E+02	1.6590E+08	4.6080E+04

ENERGY

5.3000E-02	0.	0.	0.	0.	0.	0.	3.5691E-02*
6.8500E-02	0.	0.	0.	0.	0.	0.	3.0123E-02*
8.8500E-02	0.	0.	0.	0.	0.	0.	2.6631E-02*
1.1500E-01	0.	0.	0.	0.	0.	0.	2.4857E-02*
1.5000E-01	0.	0.	0.	0.	0.	0.	2.4525E-02*
1.9500E-01	0.	0.	0.	0.	0.	0.	2.4097E-02*
2.5000E-01	0.	0.	0.	0.	0.	0.	2.3717E-02*
3.2000E-01	0.	0.	0.	0.	0.	0.	2.3382E-02*
4.1000E-01	0.	0.	0.	0.	0.	0.	2.2342E-02*
5.3000E-01	0.	0.	0.	0.	0.	0.	1.8739E-02*
6.8500E-01	0.	0.	0.	0.	0.	0.	1.5909E-02*
8.8500E-01	0.	0.	0.	0.	0.	0.	1.3907E-02*
1.0000E+00	0.	0.	0.	0. *	0.	0.	1.2710E-02
1.1500E+00	0.	0.	0.	1.5000E-03	0.	0.	1.1148E-02*
1.5000E+00	0.	0.	0.	5.0000E-03*	0.	0.	8.2402E-03*
1.9500E+00	0.	0.	0.	1.2200E-02	0.	0.	6.4508E-03*
2.0000E+00	0.	0.	0.	1.3000E-02*	0.	0.	6.5775E-03
2.5000E+00	0.	0.	0.	2.8000E-02*	0.	0.	5.6450E-03*
3.0000E+00	0.	0.	0.	4.7000E-02*	0.	0.	5.2477E-03
3.2000E+00	0.	0.	0.	5.3800E-02	0.	0.	5.0888E-03*
3.5000E+00	0.	0.	0.	6.4000E-02*	0.	0.	4.7249E-03
4.0000E+00	0.	0.	0.	7.4500E-02*	0.	0.	4.1185E-03
4.1000E+00	0.	0.	0.	7.6140E-02	0.	0.	3.9972E-03*
4.5000E+00	0.	0.	0.	8.2700E-02*	0.	0.	3.3700E-03
5.0000E+00	0.	0.	0.	8.9100E-02*	0.	0.	2.5861E-03
5.3000E+00	0.	0.	0.	9.2640E-02	0.	0. *	2.1157E-03*
5.3595E+00	0.	0.	0.	9.3342E-02	0. *	6.8425E-05	2.0635E-03
5.5000E+00	0.	0.	0.	9.5200E-02*	3.7000E-04*	2.3000E-04*	1.9403E-03
6.0000E+00	0.	0.	0.	1.0650E-01*	1.8000E-03*	1.1000E-03*	1.5017E-03
6.5000E+00	0.	0.	0.	1.0565E-01	3.6000E-03*	2.2000E-03*	1.0631E-03
6.8500E+00	0.	0.	0.	1.0925E-01	5.1400E-03	3.1100E-03	7.5609E-04*
7.0000E+00	0.	0.	0.	1.1030E-01*	5.8000E-03*	3.5000E-03*	7.0573E-04
7.5000E+00	0.	0.	0.	1.1540E-01	8.2000E-03*	5.0000E-03*	5.3787E-04
7.5000E+00	0.	0. *	0.	1.1770E-01	9.5500E-03	5.8000E-03	4.5393E-04
8.0000E+00	0.	2.6000E-03*	0.	1.2000E-01*	1.0900E-02*	6.6000E-03*	3.7000E-04*
8.5000E+00	0.	8.7000E-03*	0.	1.2375E-01	1.4400E-02*	8.8200E-03*	3.0000E-04
9.0000E+00	0.	1.9000E-02*	0.	1.2750E-01*	1.8300E-02*	1.1200E-02*	2.3000E-04*
9.5000E+00	0.	3.5000E-02*	0.	1.3015E-01	2.1500E-02	1.3200E-02	1.9500E-04*
1.0000E+01	0.	5.6000E-02*	0.	1.3280E-01*	2.4700E-02*	1.5200E-02*	2.1000E-04*
1.0250E+01	0.	6.8500E-02	0.	1.3360E-01*	2.5850E-02	1.5900E-02	2.4500E-04

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