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DATA BASE ON THE ENVIRONMENTAL ASPECTS OF THE TRANSURANICS

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Information centers have become an integral part of scientific research needs. Founded in January 1972, the Data Base on Environmental Aspects of Transuranics continues under the direction of Paul B. Dunaway, Acting Director of the Bioenvironmental Sciences Division of the Nevada Operations Office, to offer an effective, easy-to-use link between the researcher and the relevant literature.

Literature on transuranics is now so large and so diverse that keeping abreast of even a single, well-defined speciality has become cumbersome and time-consuming for individual scientists. Literature within the scope of the Data Base on the Environmental Aspects of the Transuranics comes from many disciplines and from worldwide sources. More than one-sixth of the references in the data base are from countries other than the United States. Several indexes to foreign and translated literature are systematically searched, for example, Plutonium-Dokumentation from the Kernforschungszentrum, Karlsruhe, German Federal Republic, and Translations from the Scientific Literature from the National Science Foundation. Documents are selected for the data base because they meet a criterion of potential value to current research and management.

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The information is distilled from the documents with the specific needs of the researcher in mind, such as numeric results, new methods, or instrumentation. The major areas of evaluation are: (1) biological and medical studies on the effects of the transuranics, particularly as these elements relate to health considerations in man; (2) biological and ecological availability, turnover, and food chain dynamics; (3) analysis of environmental materials; (4) environmental transport mechanisms, including resuspension; (5) waste disposal as related to environmental concerns; (6) monitoring; and (7) regulations and standards for environmental levels.

Indexed and abstracted references are entered into and are retrievable from a dynamic, computerized information file (or data base) that is easily modified to reflect changing research needs. Annotated references are indexed to allow easy access for retrieving references to documents of interest to the user. Our goal is to furnish the users all the references related to their specific query and few that are unrelated. This is done by liberal use of subject categories and keyterms. The studies on man and animals are divided into the subject categories of medical and biological aspects. Table 1 lists those aspects that are considered important when the document is analyzed. These data are sought for in the article, included in the abstracts, and indexed with keyterms. This checklist is one of the ways the Data Base on the Environmental Aspects of the Transuranics strives to give users a reference to every paper in their subject area.

The subjects of plutonium and neoplasms are used as an example of how the data base is indexed. To narrow the search, neoplasms are noted as being either malignant or benign. Choosing malignant neoplasms, keyterms such as adenocarcinomas, lymphosarcomas, fibrosarcomas, and osteosarcomas could be used to find a specific disease. It is possible to be even more specific, for example, separating out articles with the animal tested, dose,

TABLE 1

ENVIRONMENTAL ASPECTS OF THE TRANSURANICS

CHECKLIST FOR INDEXING

1) TYPE STUDY

Clinical
Field
Laboratory
Theoretical

2) ORGANISM

Common name - variety, group, wild, etc.
Scientific name
Age, size, developmental stage, sex
Larger group (animals, plants, mammals, primates, microorganisms)

3) MATERIAL

Form - Chemical - Compound
Physical - Particle size, aerosol
Nuclide

4) METHOD

Administration route
Dose
Number of injections
Observations
Tissues
Excretion

5) WHERE

If data are place specific

6) WHEN

If data are time (date) specific

7) EFFECTS

Where
What kind - pathological designations (acute, chronic)

8) ECOSYSTEM

Terrestrial
Freshwater
Marine
Estuary

intake route, isotope, chemical form, or those containing a mathematical model. Table 2 is an example of the numbers of references on man and animals as well as the number of references on neoplasms. Radium is not within the scope of the data base unless the element appears in a document with uranium or a transuranic element.

We of the Data Base on the Environmental Aspects of the Transuranics have been working closely with staff of the Comparative Animal Research Laboratory (The University of Tennessee and U.S. Energy Research and Development Administration) to develop a single, common data base containing tabulated data on plutonium in mammals in conjunction with the abstracted and indexed references. The extracted data from approximately 1400 documents were separated into defined fields for tabular display by the Comparative Animal Research Laboratory mammalian research staff and were designed to merge with the bibliographic information on plutonium in mammals from this data base to avoid duplication of effort. The tabular data system has the advantage of supplying detailed retrievals; for example, it is possible to retrieve only those studies on fetal uptake of Pu 239 in the +4 citrate form given to rats by intraperitoneal injection in doses greater than 1 microcurie but not exceeding 7 microcuries. The collaborative file of the Comparative Animal Research Laboratory and the Data Base on the Environmental Aspects of the Transuranics can be searched by the tabular data fields (number of animals, age of animals, intake time intervals, etc.) as well as or in combination with the bibliographic data (author, title, publication description, and publication date) or by descriptors. This tabular data base on plutonium in mammals will soon be available for searches from the Data Base on the Environmental Aspects of the Transuranics and will also be published by the Comparative Animal Research Laboratory as a handbook of tabular data.

The Data Base on the Environmental Aspects of the Transuranics is part

TABLE 2

ENVIRONMENTAL ASPECTS OF THE TRANSURANICS

*NUMBER OF REFERENCES TO PLUTONIUM AND OTHER TRANSURANICS IN MAN AND ANIMALS AND NUMBER OF REFERENCES ON TRANSURANICS AND NEOPLASMS**

TOTAL NUMBER OF REFERENCES, SEPTEMBER 1, 1975 - 4,300

Number of References in Biological Systems on U and transuranics = 1579

of these Pu 239 = 654
Pu 238 = 127
Ra 226 = 100

Number of References in Man on U and transuranics = 626

of these Pu 239 = 184
Pu 238 = 49
Ra 226 = 33
Autopsy = 21

Number of References on Neoplasms = 273

Benign Neoplasms = 65
Malignant Neoplasms = 217
of these Osteosarcomas = 95
Lyphosarcomas = 12
Fibrosarcomas = 6

*Each reference may be indexed on several subjects

of the Ecological Sciences Information Center, which is one of the component centers of the Information Center Complex (ICC) at the Oak Ridge National Laboratory. Other centers in the ICC are concerned with energy, life sciences and human health, environmental impact, trace contaminants, land use and planning, and ecosystem modeling and analysis. The staff of the Data Base on the Environmental Aspects of the Transuranics also work with staff of other computerized data bases including the Technical Information Center, where literature from the U.S. Energy Research and Development Administration and international literature on nuclear science are broadly indexed and abstracted, and the Nuclear Safety information Center, where technical information involving the licensing of nuclear facilities and operational data relating to their safe operation are analyzed.

Abstracts in the Data Base on the Environmental Aspects of the Transuranics come from the original documents, most of which are available at the information center to on-site users. The scientific staff that analyze documents for the data base have advanced degrees in branches of science which overlap with the areas of research covered (physiology, radiobiology, biochemistry, medicine, and pharmacology). Additional expertise is utilized from researchers who use the data base, such as Nevada Applied Ecology Group contractors and Oak Ridge National Laboratory staff. These users help us to serve them better by (1) explaining their needs, (2) alerting the data base to new documents as well as to historic documents that may have been declassified and never referenced in secondary sources or may be classified, and (3) serving as a resource to answer other users' questions.

Bibliographies which are arranged by subject and indexed by author, title, keyterms, publication description, taxonomic name of the organism studied, and geographic location of field research are published periodically. Specific searches on the Data Base on the Environmental Aspects of the

Transuranics tailored to the researchers needs are available without charge to ERDA staff and unfunded students. These bibliographies and specific searches of the data file can be obtained by writing Helen Pfuderer, Building 2029, P.O. Box X, Oak Ridge National Laboratory, Oak Ridge, Tennessee 37830, or by telephoning (615) 483-8611, Ext. 3-6524 or FTS (615) 483-6524.