

Hanford

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Data from the Hanford site comprises the second largest population in the Health and Mortality Study. Data are relatively complete for the entire period of plant operations. Currently (thru 1975) data for some 38,000 employees are on file. The types of data available for this population follows:

Employee Work History

Employee Relatives (parents and siblings)

Identified Siblings - from SSA

A-Controls from SSA

Film Badge - External Radiation

Internal Radiation - Urinalysis, Invivo, and Internal  
Deposition

Death Notice from SSA

Death Certificate Data - Causes and Dates

Employee Work History

Data on file covers individuals hired by the various operating contractors from start-up in 1943 thru 1975 numbering some 37,000 employees. There are an additional 2,900+ individuals classed as non-starts on this file. The employee roster has increased by about 8,000 employees since the original file was created in 1967.

Employee Relatives

This file contains employee identification data, name and relationship of parents, and name of siblings. This file contains the source information submitted to SSA when requesting the SSNO of siblings. The parents' name is required by SSA for positive identification of the siblings. This type data is not available for a small percentage of the employees and for none of the "NON-STARTS".

REPOSITORY DOE-FORRESTAL  
COLLECTION MARKEY FILES  
BOX No. 4 of 6  
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### Identified Siblings

When SSA positively identifies a sibling as belonging to a specific employee, the SSNO of the individual is recorded along with the sibling's name, sex, race and date-of-birth. The information is furnished in punched card form. Experience to-date shows less than sixty percent of the siblings submitted to SSA are positively identified. There were some 64,000 siblings submitted to SSA originally of which 28,000 were identified. Of these 28,000 about 5,580 were either duplicates or were, themselves, employees also.

### A-Controls

SSA has provided one, and sometimes two, matched controls for each employee and siblings submitted to them in 1974. Since the operation was performed, it has been found that the same person was used more than once when selecting the requested A and B control populations. Consequently, only one set of controls is usable which is now referred to as the A-Control group.

### Film Badge

The external radiation file contains data from start-up in 1943 thru 1975 as measured by the film badge system. However, about 30 percent of the population was never monitored for radiation because the nature of the work or physical location precluded any exposure potential. The data is recorded in terms of annual amount of skin and whole body (penetrating) exposure in centi-rem units.

### Internal Radiation

The internal radiation file consisting of 315,000 records include urinalysis, internal deposition, and IN-VIVO (body counter) data. Roughly 21,000 of the 37,000 employees have one or more records of

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some description on this file. The remaining employees were never monitored for internal radiation due to the nature and/or location of the work assignment. A majority of the records in this file are urinalysis sampling data. IN-VIVO data is the second and internal deposition records the smallest in volume.

Death Notice from SSA

The SSA has provided notice of death for some 14,000 Hanford employees, siblings, NON-STARTS, and A-Controls.

Death Certificate Data, Cause and Date

Cause of death has been received for roughly 97 percent of the known Hanford employee deaths. This type data is still being received, resulting from the most recent requests to the states. Hanford employees were reprocessed through the Social Security Administration in an extension of the update of deaths to provide a longer period of observation. These death cards identify place and date of death and name of deceased were transmitted to Oak Ridge.

Oak Ridge Data Files

The Oak Ridge data comprises the largest volume, the most numerous record types, and largest size population of any of the sites included in the study. The 112,000+ employees in this population is roughly one-fifth of all known operating contractor personnel to date.

Three distinctly different type of operations are carried on at the facilities in Oak Ridge. Each type operation is physical, separated by several miles, and each is operated very much as if administered by different companies, which was true at the start-up in 1943, but all are now managed by Union Carbide Corporation. The fact each plant site began operations under different management probably accounts for the diverse nature of record-keeping procedures and has contributed substantially to the cost of retrieving historic records.

Each plant site was designated by a code name during construction and design, which is still used for the Y-12 site. The K-25 site is now named Oak Ridge Gaseous Diffusion Plant (ORGDP) and the X-10 plant is now more commonly designated the Oak Ridge National Laboratory (ORNL). The original code names will be used to refer to the data files pertaining to each facility.

During the 33 years the Oak Ridge facilities have existed, a mass of data have accumulated, in hard copy form, relating to employee identification, exposure to radiation or toxic materials, and work environment. Only since 1960 has any significant volume of data been in a form suitable to automated equipment.

The types of data files in the repository pertaining to the Oak Ridge population follows:

- Employee Work History
- Employee Relatives - Parents and siblings
- Identified Siblings - From SSA
- Film Badge - External Radiation
- Internal Radiation - Urinalysis
- Internal Radiation - In-Vivo
- Death Notice - From SSA
- Death Certificate Data - Causes and dates
- Environmental Air - Radioactive
- Environmental Air - Toxic Materials
- Radiation Survey Data - X-10 Site
- Manhattan Engineering District Roster
- Other Data

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### Employee Work History

The employee roster of more than 112,000 individuals was manually recorded for former employees from a multitude of sources to derive the present file. The primary data source was old pay records, supplemented by medical records. Pay records were used because it was determined these records, though limited in some respects, provided the most accurate trail of work assignments. The more detailed personnel records of terminated employees were not available as a result of a program for systematic destruction of this type record. Virtually all personnel type records have been destroyed for employees terminating prior to 1950. Unfortunately, about two-thirds of all Oak Ridge employees are in this category.

Extensive efforts and costs have been expended validating and correcting this file. During the process, the records of over 30,000 individuals have had some alteration made including correcting transcription errors. The task of ferreting out errors of omission has been a most troublesome one. Considering the fact that there are some 700,000 records in this file, one can understand the problems involved.

The work history file is designed to identify the employee and provide a history of work and/or job assignments. The data is complete for everyone employed in 1950 or later, which is verified by cross-checks against the K-25 medical roster, Y-12 personnel card index, and the X-10 roster of employees maintained by the Health Physics Department. Some 1,200 employees, all of whom were hired prior to 1950, were added to the roster as a result of these cross-checks.

As a result of the search for deaths by the SSA, some 2,300 employees were found to have furnished incorrect social security numbers. All sources in Oak Ridge have been exhausted in an attempt to

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correct the numbers but all to no avail. Additionally, there are some 3,000 individuals on file for whom the sex, race, and/or date-of-birth are missing. It is expected many of these will be found during FY77. Others remaining can be obtained through the Social Security Administration after some negotiation.

Roughly, 95 percent of the Oak Ridge employee work history records are complete as they now exist. About one percent cannot be completed using all available information, and about three percent are presently being reviewed.

#### Employee Relatives

This file contains records identifying mother, father, and siblings of the same sex for roughly one-third of the Oak Ridge population. This type of information was extracted from the personnel security questionnaire which was put into use, beginning in 1946. About 60,000 employees had come and gone before the form came into use. Therefore, siblings of the early employees were not obtained. Funding problems forced the cancellation of the PSQ data collection in FY75. In total, about 65,000 siblings are included on the current file.

#### Identified Sibling

Approximately 55 percent of the sibling names submitted to the Social Security Administration were identified and the social security number supplied. There are 32,000 individuals in the current file. The majority of these are associated with employees hired after 1950, many of whom are presently on the employee rolls.

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Film Badge Data

Film badge data and external radiation exposure is routinely collected for all present Oak Ridge employees. The practice has been in existence only since 1974. Prior to that, each facility, singularly, determined the policy followed within ERDA guidelines.

At X-10, all employees have been monitored for radiation since 1955. Prior to that, only employees expected to reach, or exceed, the ERDA minimum guideline were put on the program. Roughly, 75 percent of the X-10 employees have been monitored during part or all of their employment. The average lifetime dose is higher for X-10 employees than either Y-12 or K-25 employees.

The program at Y-12 began in 1950 with a very small population at risk, with only the "risk group" being monitored. The practice continued until 1961, when a policy was established to monitor all employees. Excluding Tennessee Eastman employees, roughly 60 percent of the Y-12 population, numbering about 16,000 individuals, have been monitored. There was no monitoring program prior to 1950.

The K-25 plant procedure from 1945 through 1974 called for routine monitoring only for those employees who worked or entered areas where the potential existed to receive exposures equal to, or exceeding, the ERDA minimum guideline. During the 1944-1947 period, when employment was at the peak, less than 500 individuals were monitored. In total, there are film badge records for 10,000+ from

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among the 40,000 individuals who have been employed at K-25. The current procedure calls for all employees to be monitored.

It is important to note that less than 35 percent of the total Oak Ridge population has been monitored for external radiation. The low percent is due primarily to the fact that a large percent of the employees were hired and terminated before the monitoring program became established.

#### Internal Radiation - Urinalysis

Data has been routinely collected from a select group of individuals from 1950 to-date at each facility. The K-25 program began with a small group in 1948-1949. The X-10 program covers a range of isotopes, while the K-25 and Y-12 programs involves alpha emitters, primarily U-235 or thorium, as a result of the type of plant operations.

All files are relatively complete through 1975 with only a few names in the X-10 data remaining to be verified which involve mainly differences in spelling.

#### Internal Radiation - In-Vivo

The internal exposure data, as measured for the whole body counting technique, has been routinely collected for K-25 and Y-12 employees only since 1963. The X-10 program has existed since 1962. The volume of data is small when compared to exposure files. This file is complete for all Oak Ridge facilities through 1976.

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Death Notice From SSA

The file of deaths, as determined by the Social Security Administration, contains some 18,000 employees and approximately 4,500 siblings. The percent of known deaths is about 16 percent for employees hired in 1943 and 1944. Lesser percents, as expected, are deceased among workers hired in later years.

The search for deaths was completed in 1975 for cohorts hired through 1973. The last request for death certificates for approximately 4,600 Oak Ridge employees and siblings went out to the states in early 1977. To date, a majority of the states have responded and the coding of death cause is in progress for this group.

There are approximately 1,100 deaths, for whom the state listed by the Social Security Administration as the place of death, cannot locate a death certificate.

These were sent to the Social Security Administration for additional information and returned because no additional information was available. There will be additional ones added to this list as the states respond to the latest request. None of these deaths were sent to the Veterans Administration, as was done for the Hanford problem cases.

Death Certificate Files

There are presently on tape in Oak Ridge, copies of a tape supplied by the University of Pittsburgh that contains the cause of death for 14,400 individuals which included siblings. There are additional

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deaths in the process of being coded, which are yet to be added to the Oak Ridge data files.

During the past 1976 and 1977, the death certificates pertaining to the Oak Ridge employee population have been independently searched, and coded by the Oak Ridge Associated Universities and placed in their files. This also applies to the recent up-date, reprocessing of the Oak Ridge employee population through Social Security. It is estimated that there may be as many as 4,000 death certificates or more, with their corresponding codes were not transmitted to the computer system at the University of Pittsburgh or computer system at Oak Ridge facilities used by University of Pittsburgh.

Environmental Air (Radioactive)

Routine sampling of areas where radioactive materials are handled has been an established procedure at Y-12 since 1950. Procedures have been established to associate air data and employees on broad general terms. Testing the procedures involved a one percent sampling of employees in three departments.

At X-10 there is no established procedure to record air sample results in computer readable form. A program exists to routinely sample certain areas within the plant, but the data is recorded in continuous graph form only.

At K-25, a very limited amount of data exists. Due to the nature of the work performed, the possibility of a release of radioactive

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material to the air is remote, with the exception of some experimental laboratories and related processes.

Data from the Y-12 facility is added to the files annually and is current through 1976. The K-25 data must be manually transcribed and is recorded for all years. The data was available up through 1973.

#### Radiation Survey Data

The ORNL log book data covers the years 1943-1971. The log book data covered work areas and/or items surveyed, radiation status, pertinent narrative, persons involved, etc.

The ORNL radiation work permits covers the years 1943-1971. These permits were required for experiments and operations requiring health physics monitoring.

Both the log book and work permit data were replaced in 1971 by the survey data sheets which consolidated the information.

#### Manhattan Engineering District Roster

The Manhattan Engineering District (MED), the predecessor to the Atomic Energy Commission, maintained files containing rosters of individuals employed by the various contractors performing work in the nuclear industry. Records of individuals employed in Oak Ridge were pulled from the MED files, keypunched and put onto magnetic

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tape. The original intent was to use this file to establish a roster of employees of contractors working in Oak Ridge.

Upon cross-checking this file to the medical and payroll files maintained by Union Carbide, it was found the reliability of the MED was seriously questionable. Therefore, the MED files were abandoned as the primary source for the roster.

The files have been used occasionally to validate the Oak Ridge roster but, for the most part, this file has limited value to the future of the study.

Mallinckrodt

The data for Mallinckrodt Chemical Works at St. Louis and Weldon Springs covers the period from 1943 to 1966. The number of employees in this population is small numbering some 3,800 individuals. Data files pertaining to this population include the following:

- Employee Work History
- Relative Files
- Identified Sibling
- Film Badge (external exposure)
- Urinalysis (internal exposure)
- Medical Log Book
- Breath Radon
- Death Notice from SSA
- Death Certificate Data

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Employee Work History

This file identifies the employee roster for this population. The relative information and history of work assignments have been combined onto the same tape reel. Validation of the employee roster was underway at the time of \_\_\_\_\_ demise.

The employee roster is known to contain some individuals who were not employed and did not get involved in the operations of the plant wherein they could have been exposed to radiation. These individuals became involved only because a portion of their time was charged to the AEC project in an administrative capacity.

Identified Siblings

The Social Security Administration has identified some 1,800 siblings of MCW employees.

Film Badge

The external exposure to radiation as measured by film badges covers the period 1948 thru close-down. Data for the period 1943-1947 is contained in summary form prepared by the University of Rochester who performed the analysis of MCW film during that period.

Urinalysis

Internal exposures cover the period 1948 thru 1966 for both the Main plant and Weldon Springs employees.

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Medical Log Book

Records of employees visiting the MCW medical unit for exit medical exam are recorded in a set of books referred to as the Medical Log Books. There are four volumes in the set, each identifiable with a specific group from among the MCW population. The usefulness of this data is limited to use in determining who are Main Plant employees and who are Weldon Spring employees.

Breath Radon

This file contains a very large number of records collected over a short period. Most data precedes the year 1950. The relative importance of this file to the study is yet to be determined.

Death Notice

The SSA has recently provided the notice of death for MCW employees and siblings. As yet, there have not been any attempts made to determine how many deaths the employees and/or siblings have suffered. A majority of states have responded, but the number of certificates received to-date is not known.

National Lead of Ohio (NLO) - Fernald, Ohio

Data from the NLO facility covers the period from start-up thru 1975. Additions to the existing files are supplied annually by arrangements with Mr. R.C. Heatherton. Following is a list of data files for NLO in the Oak Ridge repository:

Employee Work History

Employee Film Badge (external radiation)

Employee Urinalysis (internal radiation)

Employee Relative (Mother, Father, and Siblings)

Identified Siblings - Sibs for whom the SSA  
found a SSNO

Cause of Death - (procurement in process)

Non-Starts - Individuals cleared but did not  
work

Employee Work History

This file is the master roster containing some 6,300 individuals. During the validation process it was determined that over 1,100 of these individuals did not actually commence work, but should be considered "Non-starts" in that they were cleared but did not report for work.

Film Badge

Film badge data is on-hand thru 1975. Data for years 1971-1975 received most recently is in a different format from that previously received and has not, as yet, been standardized.

Urinalysis

Data measuring internal exposure is on-hand from start-up through 1975. All data has been reformatted to a standard format.

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Relative Information

Mother and Father are identified on this file along with siblings of the same sex as the employees. NLO did not submit data for years 1969 thru 1975 along with the other employee data, consequently, the relative information is incomplete for this period.

Identified Sibling

There are 4,600 siblings' records on file for whom the SSA was able to locate a social security number. These siblings are associated with those employees hired prior to 1-1-69.

Death Notices from SSA

One search for deaths among the employees and siblings has been performed by the SSA. The most recent data, received in December 1976, has been processed and requests for death certificates mailed in 1977.

Death Certificates - Dates and Cause

The acquisition of death causes from the states is in process with a majority of the states having responded as of July 1, 1977.

Non-Starts

During the validation phase some 1,100 individuals on file recorded as employees were positively identified as not having reported for work. These have been coded as Non-starts but the basic data retained, including death information.

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Work-In-Process

Two lists have been provided to Mr. Heatherton containing information related to job histories to be used to classify job types as to degree of exposure to radiation and the various toxic chemicals associated with the plant operation. The NLO population will, upon completion of this task, be grouped into high risk, low risk, and no risk groups for each toxic material. This task is scheduled for completion by September 30, 1977.

SAM Laboratories

There exists a file containing personnel and work history type data for a relatively small number of individuals who worked at Columbia University on the pilot process which preceded the gaseous diffusion process. The relative importance of these individuals to the total study is yet to be determined. There is no additional information on file in Oak Ridge for this population relating to exposures.

Los Alamos

All 22 reels of microfilm, 22 boxes of microfiche and computer listing of employees were sent to Los Alamos in August 1976.

The project abstracted and coded the microfilm and microfiche data pertaining to approximately 34,000 employees, and converted the data to computer format and transmitted the computer tape and all data to Los Alamos.

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