



ORAU TEAM Dose Reconstruction Project for NIOSH

Oak Ridge Associated Universities | Dade Moeller | MJW Technical Services

Page 1 of 16

DOE Review Release 03/23/2016

Guidance on Assigning Occupational X-Ray Dose Under EEOICPA for X-Rays Administered Off Site

ORAUT-OTIB-0079 Rev. 01
Effective Date: 03/18/2016
Supersedes: Revision 00

Subject Expert(s): Elyse M. Thomas

Document Owner Approval: Signature on File Approval Date: 03/16/2016
Elyse M. Thomas, Document Owner

Concurrence: Signature on File Concurrence Date: 03/15/2016
John M. Byrne, Objective 1 Manager

Concurrence: Signature on File Concurrence Date: 03/17/2016
Edward F. Maher, Objective 3 Manager

Concurrence: Vickie S. Short Signature on File for Concurrence Date: 03/15/2016
Kate Kimpan, Project Director

Approval: Signature on File Approval Date: 03/18/2016
James W. Neton, Associate Director for Science

FOR DOCUMENTS MARKED AS A TOTAL REWRITE, REVISION, OR PAGE CHANGE, REPLACE THE PRIOR REVISION AND DISCARD / DESTROY ALL COPIES OF THE PRIOR REVISION.

New Total Rewrite Revision Page Change

PUBLICATION RECORD

EFFECTIVE DATE	REVISION NUMBER	DESCRIPTION
01/03/2011	00	New technical information bulletin to implement new DCAS guidance based on recent NIOSH interpretation of EEOICPA statute language. Incorporates formal internal and NIOSH review comments. Training required: As determined by the Objective Manager. Initiated by Elyse M. Thomas.
03/18/2016	01	Incorporates new information, references, and updated list of facilities that had X-rays performed off the site. Three sites moved from Table 1 (off-site) to Table 2 (on-site), resulting in the addition of X-ray dose (Hanford, Portsmouth, and Extrusion Plant (from 1996-2006)). Incorporates formal internal review comments. No review comments were received as a result of formal NIOSH review. Constitutes a total rewrite of the document. Training required: As determined by the Objective Manager. Initiated by Elyse M. Thomas.

TABLE OF CONTENTS

<u>SECTION</u>	<u>TITLE</u>	<u>PAGE</u>
Acronyms and Abbreviations		4
1.0 Introduction		5
2.0 Guidance		5
3.0 Discussion		5
References		12

LIST OF TABLES

<u>TABLE</u>	<u>TITLE</u>	<u>PAGE</u>
3-1	Sites with known occurrences of occupational X-rays administered at locations other than the covered facility	6
3-2	Covered facilities that administered occupational X-rays on site, or for which no evidence exists that X-rays were taken off site	8

ACRONYMS AND ABBREVIATIONS

AEC	U.S. Atomic Energy Commission
AWE	Atomic Weapons Employers
CTW	construction trade workers
DCAS	Division of Compensation Analysis and Support
DOE	U.S. Department of Energy
EEOICPA	Energy Employees Occupational Illness Compensation Program Act of 2000
kVp	peak kilovoltage
mA	milliampere
NIOSH	National Institute for Occupational Safety and Health
NUMEC	Nuclear Materials and Equipment Corporation
ORAU	Oak Ridge Associated Universities
SEC	Special Exposure Cohort
SRDB Ref ID	Site Research Database Reference Identification (number)
TIB	technical information bulletin
U.S.C.	United States Code
§	section or sections

1.0 INTRODUCTION

Technical information bulletins (TIBs) are not official determinations made by the National Institute for Occupational Safety and Health (NIOSH) but are rather general working documents that provide historical background information and guidance to assist in the preparation of dose reconstructions at particular sites or categories of sites. They will be revised in the event additional relevant information is obtained about the affected site(s). TIBs may be used to assist NIOSH staff in the completion of individual dose reconstructions.

In this document, the word “facility” is used as a general term for an area, building, or group of buildings that served a specific purpose at a site. It does not necessarily connote an “atomic weapons employer facility” or a “Department of Energy (DOE) facility” as defined in the Energy Employees Occupational Illness Compensation Program Act of 2000 [42 U.S.C. § 7384l(5) and (12)].

The Energy Employees Occupational Illness Compensation Program Act of 2000 (EEOICPA) requires the assignment of external dose from medical X-ray examinations that were performed for occupational health screening and were required as a condition of employment. Many DOE and Atomic Weapons Employer (AWE) sites had their own medical clinics and equipment to perform medical X-ray screening of their workers. At some sites, however, and sometimes dependent on the timeframe, the sites contracted with private physicians, clinics, or local community hospitals to provide this service to workers.

The NIOSH interpretation of the EEOICPA statute affects how X-ray dose should be assigned when the X-rays were taken at a site or location that is not defined under the statute as a covered facility. This includes the scenario in which X-rays were taken at offsite locations, such as private physicians’ offices, clinics, or local community hospitals. The NIOSH interpretation is that the statute defines covered radiation as the radiation received by a covered employee at a covered facility during a covered period (NIOSH 2010). Except in limited circumstances concerning residual radiation, only radiation that the employee received while at a covered facility can be included in dose reconstruction. Any site profile stating or suggesting that offsite medical screening doses should be included will be revised to be consistent with this NIOSH interpretation.

2.0 GUIDANCE

If it is known that occupational medical X-ray dose was received at a location other than a covered facility (i.e., an offsite physician’s office, clinic, or local community hospital), it shall not be included in dose reconstruction. If there is doubt about where the X-ray exposure was received, dose reconstructors should assume that the dose was received at a covered facility.

3.0 DISCUSSION

Whether X-ray exposure was received at a covered facility is often discovered in the research process during the review and analysis of historical documentation and claim file records from a particular covered site. This information is then included in the site profile and/or SEC Evaluation Report for that site. Table 3-1 is a list of sites for which historical information about X-rays administered to energy employees at offsite, non-covered facilities has been found. Table 3-1 lists those sites along with appropriate periods of applicability.

When historical documentation does not provide the needed information about where the occupational X-rays might have been taken, the energy employee claim file records might contain evidence that some X-rays were taken off site. For example, X-ray request forms might contain a private physician’s, clinic’s, or hospital’s letterhead. This is not always adequate evidence that the X-rays were taken offsite, because many sites contracted with private radiologists for radiological

interpretation of the X-rays, even if the X-rays were obtained on the covered site, and the radiologist's report might be on the office or clinic letterhead. Dose reconstructors should not include the dose from X-rays when it is clear from the claim file records that they were taken off-site at a non-covered facility. When it is not clear where the X-rays were taken, dose reconstructors should include the dose. Dose reconstructors should consult the Project Principal Medical Dosimetrist if questions arise.

When neither historical documentation nor claim file records provide the needed information about where the occupational X-rays might have been taken, dose reconstructors should assume that any occupational medical X-ray exposure occurred at the covered facility where the energy employee worked.

Table 3-1. Sites with known occurrences of occupational X-rays administered at locations other than the covered facility.

Covered facility	Noncovered (offsite) location	Applicable periods for X-rays at noncovered facilities	Reference
Albany Research Center	Corvallis Clinic or private physicians' offices in Albany, OR.	All	Unknown 1986a, 1986b
Aliquippa Forge	"The X-rays were taken by Dr. W. T. Rice of Rochester, Pa. ...but the X-ray films are retained in his office" (Tabershaw 1949a, p. 3).	All	ORAUT 2015a, p. 23; Tabershaw 1949a
Allied Chemical	"All new hires are given a pre-employment physical at the doctor's office which includes a careful medical history, general health assessment by the physician and a chest X-ray..." (Freeman 1975, p. 178).	All	ORAUT 2014a, p. 20; Freeman 1975
Ames Laboratory	"The X-ray equipment for occupational medical examinations of Ames Laboratory staff members was located at the Iowa State Student Health Center/College Hospital..." (ORAUT 2012a, p. 24).	All	ORAUT 2012a; Voss 1957
Baker Brothers	"Dr. Norwood made arrangements for chest X-rays...at the Robin Wood Hospital in Toledo..."	All	Nickson 1943, p. 2
Battelle Columbus	"The Battelle claim records indicate that the chest fluoroscopy examinations were performed in a private physician's office." (ORAUT 2010a, p. 17).	All chest fluoroscopy	ORAUT 2010a, 2010b
Battelle Columbus	"X-rays and blood counts are done at the University Hospital which is only a short distance from the Institute." "...x-rays were performed on site in Health Services from the late 1950s to the early 1980s for Battelle staff that required them. Prior to this time period, the x-rays were provided at a physician's office."	1943–1956	Tabershaw 1949b, p. 3; Amstein 2008, p.4
Extrusion Plant	"Laboratory work, i.e. urinalyses, blood tests, and X-rays, is done at the local hospital, Ashtabula General." (Hibbitts and Pryor 1970, p. 8). Based on information in the claim file records, it appears that X-rays were taken off site at Ashtabula General Hospital through 1980. It is assumed that X-rays were taken on site from 1981 to 2006, when the site was decommissioned.	Before 1981 and after 2006	Hibbitts and Pryor 1970; Jelinek 1971; Johnson 1976
Grand Junction	Warren Bush "said the company doctor was Dr. Raso, who had an x-ray unit in his office in Grand Junction."	1947–1961 and 1970–2002	Stoller undated, p. 9
Kansas City Plant	"In 1997, medical X-ray services were outsourced;..." (ORAUT 2006a, p. 14).	After 1996	ORAUT 2006a; Todd 2004, p. 3
Kellex/Pierpont	"It is understood that the only examination that will not be performed by Kellex personnel is the chest radiograph."	All	Beckerley 1948, p. 3

Covered facility	Noncovered (offsite) location	Applicable periods for X-rays at noncovered facilities	Reference
Lawrence Berkeley National Laboratory	<p>"In the early years before about 1964, workers had their physical exams (including X-rays) in their private physicians' offices ..." (ORAUT 2010d, p. 22).</p> <p>"Doses for 1991 to 1995 are for the Picker machine, and for 1996 to the present ... employees have been sent off-site for X-rays ..." (ORAUT 2010d, p. 23).</p>	Before 1964 and after 1995	ORAUT 2010d; Parker 1963; Grondona 2010
Linde Ceramics	"Linde X-rays were performed off-site at a non-covered commercial facility." (ORAUT 2015b, p. 69).	All	ORAUT 2015b; Author unknown 1948; Linde 1950; Holmes 1944; Van Horn 1943
Mallinckrodt	"The annual chest x-rays and presumably the pelvic x-rays were taken at the Barnes Hospital (the Washington University School of Medicine) ... and the x-ray records remained the property of the hospital ..." (ORAUT 2010e, p. 108).	All	ORAUT 2010e, p. 108; Quigley 1950; Mason 1955, pp. 2, 14
Metallurgical Laboratory	"At first the dispensary facilities of Billings Hospital were used but after July 1944 Drexel House was used for this purpose"	Before July 1944	Author unknown 1946, p. 27
Nevada Test Site	"Chest X-rays before 1960 were taken off the site at noncovered contractor facilities, probably physicians' offices in Las Vegas" (ORAUT 2012c, p. 8).	1951–1959 (all)	ORAUT 2012c
Nevada Test Site	"During [1986-1995], workers continued to receive pre-employment physicals at contracted noncovered facilities in Las Vegas... These contractors might also have provided the periodic and termination chest X-rays if the worker was in Las Vegas" (ORAUT 2012c, p. 11).	1986–1995 pre-employment X-rays	ORAUT 2012c; DeMarre 2012;
Nevada Test Site	"NTS sold and removed its X-ray equipment in 1996. After this date, all radiographic services were contracted out to a variety of offsite, noncovered facilities in Las Vegas ..." (ORAUT 2012c, p. 11).	1996–present (all)	ORAUT 2012c; DeMarre 2012; Moon 2012
Nuclear Materials and Equipment Corporation	"NUMEC apparently did not have its own medical X-ray department during AEC operational years and the medical X-rays for NUMEC employees appear to have been performed at a local clinic or hospital" (ORAUT 2012b, p. 34).	All	ORAUT 2012b; Author unknown 1978; Cain 1964; Wieland 1981; Quigley 1972
Sandia National Laboratories	"...the Sandia Base Army Hospital and the Kirtland Air Force Base Dispensary are not part of the EEOICPA covered facilities as they are outside the boundaries of DOE facilities"	X-rays taken at the Sandia Base Hospital or the Kirtland Air Force Base Dispensary	Anders 2015, p. 2
Simonds Saw and Steel	"Simonds X-rays were performed off site at a noncovered commercial facility" (ORAUT 2014c, p. 22).	All	ORAUT 2014c; Tabershaw 1948
Stanford Linear Accelerator Center	X-rays on Be workers performed at the Palo Alto Clinic.	All	ORAUT 2007d, p. 20; Pinder 1965
University of Rochester	X-rays taken at Strong Memorial Hospital.	All	Dowdy 1947, p.2
Ventron Corporation	Some X-rays taken at the Beverly Hospital.	Some	Todd 1945, p. 17
West Valley	"Chest X-rays for West Valley workers have always been performed at an offsite location" (ORAUT 2007b, p. 52)	All	ORAUT 2007b, 2010c, 2010g

Table 3-2 lists the covered facilities where it is known that occupational medical X-rays were taken on site or at another covered facility, according to historical documentation. Table 3-2 also lists sites that might have had occupational medical X-rays taken at an offsite location, but for which this cannot be demonstrated with certainty at present. Dose reconstructors should, therefore, include X-ray dose in dose reconstructions for the sites listed in Table 3-2, unless there is evidence in the claim file records that the X-rays were taken at a noncovered facility.

Table 3-2. Covered facilities that administered occupational X-rays on site, or for which no historical evidence exists that X-rays were taken off site.

Covered facility	Notes	Reference
Albuquerque Operations Office	All years covered	None
Allied Chemical and Dye	All years covered	None
Amchitka	"A 100 kVp -200 mA X-ray machine and associated film processing equipment is provided [at a special building in the Huskey Camp Area]."	Eberline 1973, p. 33.
Argonne National Laboratory – East	"...the status of the employee's health and ability to work through the use of X-ray, biochemical, hematological, and metabolic facilities which will be available at the Site D dispensary."	Hasterlik 1949, p. 4.
Baker-Perkins Company	All years covered	None
Battelle Columbus ^a	1957–2000 for King Ave, and 1957-present for West Jefferson.	NIOSH 2012, p. 4
Bethlehem Steel Corporation	All years covered	None
Bliss and Laughlin Steel Company	All years covered	None
Blockson Chemical Company	All years covered	None
Bridgeport Brass	All years covered	None
Brookhaven National Laboratory	All years covered	None
Canoga Avenue Facility	All years covered	None
Carborundum Company	All years covered	None
Chapman Valve	All years covered	None
Clarksville Modification Center	All years covered	None
Clinton Engineer Works	All years covered	None
Combustion Engineering	All years covered	None
Connecticut Aircraft Nuclear Engine Laboratory	All years covered	None
Dayton Project (Units I, III, and IV)	All years covered	None
De Soto Avenue Facility	All years covered	None
Dow Chemical Company	All years covered	None
Dow Chemical Company (Madison Site)	All years covered	None
Downey Facility	All years covered	None
DuPont Deepwater Works	All years covered	None
Electro Metallurgical	All years covered	None
Extrusion Plant ^a	1981–2006 covered	ORAUT 2007a
Fernald	"It is possible that some of the X-ray examinations were performed off the [Fernald] site at local area hospitals, but there does not seem to be a fixed pattern, and no clear evidence exists in relation to when or for whom this might have occurred."	ORAUT 2014b, p. 9
General Atomics	"A former GA nurse recalled that chest X-rays were required for beryllium workers and stated the X-ray examinations were conducted at La Jolla Radiology." No historical documentation found to support this statement.	ORAUT 2008a, p. 47

Covered facility	Notes	Reference
General Electric Company (Ohio)	All years covered	None
General Steel	All years covered	None
Grand Junction ^a	1962–1969 covered	Stoller undated, p. 10
Kansas City Plant ^a	Before 1997 covered	ORAUT 2006a, p. 15; Todd 2004, p. 3
Hanford	X-rays taken at Kadlec Hospital from 1944-1956 are now to be included in dose reconstruction, as the AEC owned Kadlec during this time.	Travis 1956
Harshaw	“Continue to use the services of the Radiological Clinic or its equivalent, but all X-rays should be obtained from them and kept in a locked fireproof cabinet in the dispensary” (Belmore 1948, p. 123), or the “X-ray laboratory in Cleveland” (Tabershaw 1950).	Belmore 1948; Tabershaw 1950
Hood Building	All years covered	None
Hooker Electrochemical	All years covered	None
Horizons, Inc.	All years covered	None
Huntington Pilot Plant	All years covered	None
Idaho National Laboratory and Argonne National Laboratory-West	“Offsite facilities might have been contracted to perform the examinations.”	ORAUT 2009, p. 9
Iowa Army Ammunition Plant	All years covered	NIOSH 2011, p. 6-7.
Joslyn Manufacturing and Supply Company	All years covered	None
K-25 Plant	All years covered	None
Lake Ontario Ordnance Works	All years covered	None
Lawrence Berkeley National Laboratory ^a	1964–1995 covered	ORAUT 2010d, pp. 22–23; Parker 1963; Grondona 2010
Lawrence Livermore National Laboratory	All years covered	None
Los Alamos National Laboratory	All years covered	None
Medina Modification Center	Some records indicate the X-rays might have been taken offsite at the Minter X-ray Clinic.	Claim file records
Metallurgical Laboratory ^a	July 1944 and later covered	Author unknown 1946
Metals and Controls	All years covered	None
Mound Plant	All years covered	None
Nevada Test Site ^a	1960–1985, 1986–1995 other than pre-employment X-rays covered	ORAUT 2012c, pp. 8–11; DeMarre 2012; Moon, 2012
Norton Company	All years covered	None
Nuclear Metals, Inc.	All years covered	None
Oak Ridge National Laboratory	All years covered	None
Pacific Northwest National Laboratory	Same as Hanford from 1965 onward.	ORAUT 2007c, p. 6
Pacific Proving Ground	“The dose reconstructor should use the occupational medical dose TBD related to the participant’s employer and associated DOE site to determine X-ray dose.”	ORAUT 2006b, pp. 10–11
Paducah Gaseous Diffusion Plant	All years covered	None
Pantex Plant	All years covered	None
Pinellas Plant	All years covered	None
Piqua Organic Moderated Reactor	All years covered	None
Portsmouth Gaseous Diffusion Plant	All years covered	None
Revere Copper and Brass	All years covered	None

Covered facility	Notes	Reference
Rocky Flats Plant	All years covered	None
S-50 Plant	All years covered	None
SAM Laboratories, Columbia University	All years covered	None
Sandia National Laboratories ^a	X-rays are assumed to have been taken on site except those marked Sandia Base Hospital and/or Kirtland Air Force Base Dispensary.	Anders 2015
Sandia National Laboratories, Livermore	"The X-ray machine equipment was removed from the site in approximately 1990 ..." (ORAUT 2014d, p. 22) After 1990, X-rays were performed at Lawrence Livermore National Laboratory, a covered facility.	ORAUT 2014d; McDowell-Boyer 2006
Santa Susana Field Laboratory (Area IV)	"By 1998, all radiographic examinations were subcontracted to West Hills Hospital in West Hills, California" (ORAUT 2008b, p. 11). No historical documentation found to support this statement.	ORAUT 2008b, pp. 11, 14
Savannah River Site	All years covered	None
Spencer Chemical Company/Jayhawk Works	All years covered	None
St. Louis Airport Storage Site	All years covered	None
Standard Oil Company of New Jersey	All years covered	None
Superior Steel	All years covered	None
Tennessee Valley Authority	All years covered	None
Texas City Chemicals	All years covered	None
Titanium Alloy Manufacturing Company	All years covered	None
Tyson Valley Powder Farm	All years covered	None
United Nuclear Corporation	All years covered	None
Ventron Corporation ^a	Some X-rays taken at the Beverly Hospital.	Todd 1945, p. 17; NIOSH 2012, pp. 34–35.
Vitro Manufacturing	All years covered	None
W. R. Grace (Tennessee)	All years covered	None
Wah Chang	All years covered	None
Weldon Spring Plant	All years covered	None
Westinghouse Atomic Power Development Plant	All years covered	None
Westinghouse Electric Corporation (New Jersey)	All years covered	None
Winchester Engineering and Analytical Center	All years covered	None
Y-12 Plant	All years covered	None

a. See also Table 3-1.

Dose reconstructions are also performed for sites which may not be listed here. In reconstructing doses for these claims, dose reconstructors should use any available historical documentation or evidence in claim file records to assign X-ray dose in accordance with the guidance in this TIB. Where historical documentation of offsite X-ray doses has not been found, and energy employee medical records are not provided, dose reconstructors should generally assume that occupational medical X-ray exposure occurred on site at the covered facility where the energy employee worked.

X-ray dose assignment for construction trade workers (CTWs) should be the same as for other energy employees described in this TIB. In other words, dose reconstructors should assume that CTWs had X-rays taken on site at the covered facility where they worked, unless evidence shows that these X-rays were taken off site at a noncovered facility.

The guidance in this TIB supersedes previous guidance on the issue of assignment of X-ray dose at covered facilities that might be found in the following documents or in site profiles issued before this TIB:

- Revision 04 of ORAUT-OTIB-0006, *Dose Reconstruction from Occupational Medical X-Ray Procedures* (ORAUT 2011);
- Revision 02 of ORAUT-OTIB-0052, *Parameters to Consider When Processing Claims for Construction Trade Workers* (ORAUT 2014e);
- Revision 01 of ORAUT-PROC-0006, *External Dose Reconstruction* (ORAUT 2006c); and
- Revision 03 of ORAUT-PROC-0061, *Occupational Medical X-Ray Dose Reconstruction for DOE Sites* (ORAUT 2010f).

REFERENCES

- Amstein, T., 2008, "Battelle Response to Questions about X-Ray Screening Program," letter to B. Irvine (Stoller Corporation/Source One Management), Battelle Columbus Environment, Safety, Health, and Quality, Columbus, Ohio, July 1. [SRDB Ref ID: 47125]
- Anders, K., 2015, "Re: question about covered facilities," e-mail to T. A. Gilbertson (NIOSH), Office of Workers' Compensation Programs, U.S. Department of Labor, Washington, D.C., May 18. [SRDB Ref ID: 143891]
- Author unknown, 1946, *Manhattan District History Book I – General, Volume 7 - Medical Program*, December 31. [SRDB Ref ID: 40434]
- Author unknown, 1948, "The State Insurance Fund," summary of testimony and proceedings at hearing, Held in Buffalo, New York, July 2. [SRDB Ref ID: 16316, p. 15]
- Author unknown, 1986a, "Medical File of [name redacted]." [SRDB Ref ID: 120268]
- Author unknown, 1986b, "Medical File of [name redacted]." [SRDB Ref ID: 120270]
- Author unknown, 1978, collection of personnel and medical records – claimant [name redacted]. [SRDB Ref ID: 27768, p. 189].
- Beckerley, J. G., 1948, "Medical Monitoring Program," letter to G. White, Jr. (The Kellex Corporation), U.S. Atomic Energy Commission, New York Operations Office, New York, New York, October 26. [SRDB Ref ID: 11094]
- Belmore, F. M., 1948, "Clinical and Medical Program," letter to S. S. Parks (Harshaw Chemical Company), U.S. Atomic Energy Commission, New York Operations Office, New York, New York, October 29. [SRDB Ref ID: 10641, p. 122]
- Cain, F. Jr., 1964, "Duties of the Nurse," memorandum to R. Westerman, Nuclear Materials and Equipment Corporation, Pittsburgh, Pennsylvania, April 16. [SRDB Ref ID: 27750, p. 37]
- DeMarre, M., 2012, "RE: Additional X-Ray Related Questions (NTS) Related to Request (NTS FY12-001)," e-mail to D. G. Morris (Oak Ridge Associated Universities Team), National Security Technologies, Las Vegas, Nevada, March 14. [SRDB Ref ID: 112248]
- Dowdy, A. H., 1947, "Stereo Mini Chest Plates for Atomic Energy Project Personnel," memorandum to Dr. G. M. Suter, U.S. Atomic Energy Commission, April 21. [SRDB Ref ID: 30707]
- Eberline (Eberline Instrument Company), 1973, *Project Cannikin On-Site Radiological Safety and Medical Services Final Report*, NVO-0294-6, Santa Fe, New Mexico, August. [SRDB Ref ID: 25131]
- Freeman, E. J., 1975, "Occupational Health Aspects of a Fluoride Volatility Process," *Conference on Occupational Health Aspects of Uranium, Held at Stouffer's National Center Inn, Arlington, Virginia, April 28–30, 1975*, ERDA-93, U.S. Energy Research and Development Administration, Washington, D.C. [SRDB Ref ID: 4613, p. 178]
- Grondona, C. E., 2010, "Re: question about LBNL X-ray equipment," e-mail to E. M. Thomas (Oak Ridge Associated Universities Team), Lawrence Berkeley National Laboratory, Berkeley, California, May 2. [SRDB Ref ID: 81017]

- Hasterlik, R. J., 1949, "Health Program as it Relates to the Individual Employee and the Laboratory," letter to Dr. H. Lisco, Argonne National Laboratory, Argonne, Illinois, April 25. [SRDB Ref ID: 18912, p. 3]
- Hibbitts, H. W., and W. A. Pryor, 1970, *Health and Nuclear Safety Appraisal Reactive Metals Inc. Extrusion Plant*, U.S. Atomic Energy Commission, Oak Ridge Operations Office, Oak Ridge, Tennessee, May. [SRDB Ref ID: 26445, p. 3]
- Holmes, A. R. 1944, untitled memorandum to S. P. Murphy, Linde Air Products Company, Linde Ceramics Plant, Tonawanda, New York, January 26. [SRDB Ref ID: 12382, p. 5]
- Jelinek, T. M., 1971, *Health And Nuclear Safety Appraisal, RMI Company, Extrusion Plant*, U.S. Atomic Energy Commission, Oak Ridge Office, Oak Ridge, Tennessee, August. [SRDB Ref ID: 25372, p. 8]
- Johnson, W. A., 1976, *Annual Health Protection, Nuclear Criticality and Transportation Safety Appraisal of RMI Company*, U.S. Energy Research and Development Administration, Oak Ridge Office, Oak Ridge, Tennessee, April. [SRDB Ref ID: 25372, p. 28]
- Linde (Linde Air Products Company), 1950, collection of health and personal records and clinical chronologies, Linde Ceramics Plant, Tonawanda, New York. [SRDB Ref ID: 11156, pp. 30, 43, 50]
- Mason, M. G., 1955, *Mallinckrodt Chemical Works Health Program Policies, Status, and Summary*, February 21. [SRDB Ref ID: 4338, p. 23,35]
- McDowell-Boyer, L., 2006, *Notes from Visit to SNL/CA on 4/12/06*, ALARA Environmental Analysis, Pleasanton, California. [SRDB Ref ID: 23574]
- Moon, J. C., 2012, "Request X-Ray Surveillance/Testing Information (NTS)" e-mail to M. DeMarre, National Security Technologies, Las Vegas, Nevada, March 15. [SRDB Ref ID: 112245]
- Nickson, J. J., 1943, untitled letter to C. E. Daniels, University of Chicago, Metallurgical Laboratory, Chicago, Illinois, June 29. [SRDB Ref ID: 11581]
- NIOSH (National Institute for Occupational Safety and Health), 2010, *Radiation Exposures Covered for Dose Reconstructions under Part B of the Energy Employees Occupational Illness Compensation Program Act*, DCAS-IG-003, Rev. 01, Division of Compensation Analysis and Support, Cincinnati, OH, October 5.
- NIOSH (National Institute for Occupational Safety and Health), 2011, *Technical Basis Document for Atomic Energy Operations at the Iowa Army Ammunition Plant (IAAP)*, DCAS-TKBS-0001, Rev. 01, Division of Compensation Analysis and Support, Cincinnati, OH, October 20.
- NIOSH (National Institute for Occupational Safety and Health), 2012, *SEC Petition Evaluation Report SEC-ER-00198*, August 14, p. 34-35.
- NIOSH (National Institute for Occupational Safety and Health), 2012, *SEC Petition Evaluation Report SEC-ER-00208*, November 19, p. 4.
- ORAUT (Oak Ridge Associated Universities Team), 2006a, *Site Profile for the Kansas City Plant*, ORAUT-TKBS-0031, Rev. 00 PC-1, Oak Ridge, Tennessee, January 6.

- ORAUT (Oak Ridge Associated Universities Team), 2006b, *Summary Site Profile for the Pacific Proving Ground*, ORAUT-TKBS-0052, Rev. 00, Oak Ridge, Tennessee, August 30.
- ORAUT (Oak Ridge Associated Universities Team), 2006c, *External Dose Reconstruction*, ORAUT-PROC-0006, Rev. 01, Oak Ridge, Tennessee, June 5.
- ORAUT (Oak Ridge Associated Universities Team), 2007a, *Summary of Extrusion Plant Site Information for Dose Reconstruction*, ORAUT-TKBS-0056, Rev. 00, Oak Ridge, Tennessee, April 26.
- ORAUT (Oak Ridge Associated Universities Team), 2007b, *Site Profile for the West Valley Demonstration Project*, ORAUT-TKBS-0057, Rev. 00 PC-1, Oak Ridge, Tennessee, August 17.
- ORAUT (Oak Ridge Associated Universities Team), 2007c, *Pacific Northwest National Laboratory – Occupational Medical Dose*, ORAUT-TKBS-0027-3, Rev. 01, Oak Ridge, Tennessee, June 18.
- ORAUT (Oak Ridge Associated Universities Team), 2007d, *Site Profile for the Stanford Linear Accelerator Center*, ORAUT-TKBS-0051, Rev. 01, Oak Ridge, Tennessee, August 17.
- ORAUT (Oak Ridge Associated Universities Team), 2008a, *Site Profile for General Atomics*, ORAUT-TKBS-0045, Rev. 00, Oak Ridge, Tennessee, September 26.
- ORAUT (Oak Ridge Associated Universities Team), 2008b, *Area IV of the Santa Susana Field Laboratory, the Canoga Avenue Facility (Vanowen Building), the Downey Facility, and the De Soto Avenue Facility (sometimes referred to as Energy Technology Engineering Center [ETEC] or Atomics International) – Occupational Medical Dose*, ORAUT-TKBS-0038-3, Rev. 02, Oak Ridge, Tennessee, October 31.
- ORAUT (Oak Ridge Associated Universities Team), 2009, *Idaho National Laboratory and Argonne National Laboratory-West – Occupational Medical Dose*, ORAUT-TKBS-0007-3, Rev. 02, Oak Ridge, Tennessee, December 21.
- ORAUT (Oak Ridge Associated Universities Team), 2010a, *Site Profile for Battelle Memorial Institute, King Avenue and West Jefferson Sites, Columbus, Ohio*, ORAUT-TKBS-0058, Rev. 00, Oak Ridge, Tennessee, March 26.
- ORAUT (Oak Ridge Associated Universities Team), 2010b, untitled memorandum to File, Oak Ridge, Tennessee, December 3. [SRDB Ref ID: 90744]
- ORAUT (Oak Ridge Associated Universities Team), 2010c, “Excerpts from Claim File Records of West Valley Workers,” memorandum to file, Oak Ridge, Tennessee, December 10. [SRDB Ref ID: 90920]
- ORAUT (Oak Ridge Associated Universities Team), 2010d, *Site Profile for the Lawrence Berkeley National Laboratory*, ORAUT-TKBS-0049, Rev. 02, Oak Ridge, Tennessee, May 10.
- ORAUT (Oak Ridge Associated Universities Team), 2010e, *Basis for Development of an Exposure Matrix for the Mallinckrodt Chemical Company St. Louis Downtown Site and the St. Louis Airport Site, St. Louis, Missouri*, ORAUT-TKBS-0005, Rev. 03, Oak Ridge, Tennessee, November 22.

- ORAUT (Oak Ridge Associated Universities Team), 2010f, *Occupational Medical X-Ray Dose Reconstruction for DOE Sites*, ORAUT-PROC-0061, Rev. 03, Oak Ridge, Tennessee, March 3.
- ORAUT (Oak Ridge Associated Universities Team), 2010g, "Location of Occupational Medical X-rays for West Valley Workers," documented communication with West Valley Environmental Services employee, Oak Ridge, Tennessee, December 13. [SRDB Ref ID: 90938]
- ORAUT (Oak Ridge Associated Universities Team), 2011, *Dose Reconstruction from Occupational Medical X-Ray Procedures*, ORAUT-OTIB-0006, Rev. 04, Oak Ridge, Tennessee, June 20.
- ORAUT (Oak Ridge Associated Universities Team), 2012a, *Site Profile for Ames Laboratory*, ORAUT-TKBS-0055, Rev. 03, Oak Ridge, Tennessee, January 3.
- ORAUT (Oak Ridge Associated Universities Team), 2012b, *Site Profile for Nuclear Materials and Equipment Corporation, Apollo and Parks Township, Pennsylvania*, ORAUT-TKBS-0041, Rev. 02, Oak Ridge, Tennessee, November 26.
- ORAUT (Oak Ridge Associated Universities Team), 2012c, *Nevada Test Site – Occupational Medical Dose*, ORAUT-TKBS-0008-3, Rev. 02, Oak Ridge, Tennessee, November 26.
- ORAUT (Oak Ridge Associated Universities Team), 2014a, *Site Profile for Allied Chemical Corporation Plant*, ORAUT-TKBS-0044, Rev. 02, Oak Ridge, Tennessee, May 5.
- ORAUT (Oak Ridge Associated Universities Team), 2014b, *Fernald Environmental Management Project – Occupational Medical Dose*, ORAUT-TKBS-0017-3, Rev. 01, Oak Ridge, Tennessee, January 2.
- ORAUT (Oak Ridge Associated Universities Team), 2014c, *Site Profile for Simonds Saw and Steel*, ORAUT-TKBS-0032, Rev. 02, Oak Ridge, Tennessee, October 21.
- ORAUT (Oak Ridge Associated Universities Team), 2014d, *Summary Site Profile for Sandia National Laboratories in Livermore, California*, ORAUT-TKBS-0053, Rev. 01, Oak Ridge, Tennessee, April 28.
- ORAUT (Oak Ridge Associated Universities Team), 2014e, *Parameters to Consider When Processing Claims for Construction Trade Workers*, ORAUT-OTIB-0052, Rev. 02, Oak Ridge, Tennessee, July 24.
- ORAUT (Oak Ridge Associated Universities Team), 2015a, *Basis for the Development of an Exposure Matrix for Aliquippa Forge, Pennsylvania, Period of Operation: January 1, 1947 through February 28, 1950*, ORAUT-TKBS-0021, Rev. 02, Oak Ridge, Tennessee, November 16.
- ORAUT (Oak Ridge Associated Universities Team), 2015b, *An Exposure Matrix for Linde Ceramics Plant (including Tonawanda Laboratory)*, ORAUT-TKBS-0025, Rev. 04, Oak Ridge, Tennessee, May 8.
- Parker, H. G., 1963, "Medical Program," memorandum to R. Connell, October 11. [SRDB Ref ID: 72126, p. 4]
- Pinder, F., 1965, "Blanket order, Palo Alto Medical Clinic," memorandum to D. Littlefield, Palo Alto, California, June 29. [SRDB Ref ID: 23251]

- Quigley, J. A., 1950, "Visit to Mallinckrodt Chemical Works - May 24-25, 1950," memorandum to Files, U.S. Atomic Energy Commission, New York Operations Office, June 6. [SRDB Ref ID: 3967, p. 3]
- Quigley, J. A., 1972, untitled letter to C. C. Booth, National Lead Company of Ohio, Cincinnati, Ohio, April 18. [SRDB Ref ID: 42281]
- Stoller (S. M. Stoller Corporation), undated, *U.S. Department of Energy, Grand Junction Office, Site X-Ray History*, Grand Junction, Colorado. [SRDB Ref ID: 3325, p. 9]
- Tabershaw, I. R., 1948, untitled letter to B. S. Wolf (U.S. Atomic Energy Commission), Liberty Mutual Company, New York, New York, December 15. [SRDB Ref ID: 11226, p. 5]
- Tabershaw, I. R., 1949a, "Vulcan Crucible Steel Co., Aliquippa, PA," memorandum to B.S. Wolf (U.S. Atomic Energy Commission), March 29. [SRDB Ref ID: 12998]
- Tabershaw, I. R., 1949b, "Battelle Memorial Institute," memorandum to File, June 10. [SRDB Ref ID: 8953, p. 3]
- Tabershaw, I. R., 1950, "Visit to Harshaw Chemical Company - January 14, 1950," memorandum to Files, January 24. [SRDB Ref ID: 45244]
- Todd, B. P., 1945, untitled letter to J. W. Howland (Office of the Medical Section), Beverly Hospital, Beverly, Massachusetts, July 27. [SRDB Ref ID: 10265, p. 17]
- Todd, M., 2004, "Questions for KCP Technical Basis Document," letter to J. Fix (Oak Ridge Associated Universities Team), August 19. [SRDB Ref ID: 14706]
- Travis, J. E., 1956, *Bill of Sale, Kadlec Methodist Hospital*, U.S. Atomic Energy Commission, Hanford Operations Office, Richland, Washington, September 10. [SRDB Ref ID: 148429]
- Van Horn, E. L., 1943, untitled letter to T. J. Coleman (Linde Air Products Company), U.S. Engineer Office, Kenmore, New York, September 4. [SRDB Ref ID: 12382, p. 20]
- Voss, M. D., 1957, untitled letter to P. Van Bommel and J. Bacon (McFarland Clinic), Ames Laboratory, Ames, Iowa, February 8. [SRDB Ref ID: 25846]
- Wieland, W. F., 1981, "FY-82 Cost Reduction Program," memorandum to R. V. Carlson, Babcock & Wilcox, Apollo, Pennsylvania, January 28. [SRDB Ref ID: 27858, p. 62]