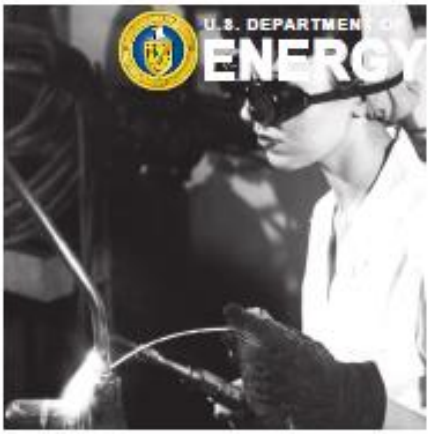
Former Worker Medical Screening Program

ANNUAL REPORT 2016

CELEBRATING 20 YEARS

1996 - 2016



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Abbreviations Used in This Report

ACOEM	*American College of Occupational and Environmental Medicine*
AEC	*Atomic Energy Commission*
AFL-CIO	*American Federation of Labor and Congress of Industrial Organizations*
AU	*DOE Office of Environment, Health, Safety and Security*
BAECP	*Burlington Atomic Energy Commission Plant*
BeLPT	*Beryllium Lymphocyte Proliferation Test*
BTMed	*Building Trades National Medical Screening Program*
CHSi	*Comprehensive Health Services, Inc.*
CMIO	*Chief Medical Informatics Officer*
COPD	*Chronic Obstructive Pulmonary Disease*
CPWR	*CPWR – The Center for Construction Research and Training*
CT	*Computed Tomography*
CXR	*Chest X-ray*
DOE	*U.S. Department of Energy*
DOL	*U.S. Department of Labor*
EEOICP	*Energy Employees Occupational Illness Compensation Program*
EEOICPA	*Energy Employees Occupational Illness Compensation Program Act*
ELCD	*Early Lung Cancer Detection*
FMPC	*Feed Materials Production Center*
FWP	*Former Worker Medical Screening Program or Former Worker Program*
FY	*Fiscal Year*
GDP	*Gaseous Diffusion Plant*
HIPAA	*Health Insurance Portability and Accountability Act*
HSW	*Health, Safety and Environment Department*
IAAP	*Iowa Army Ammunition Plant*
INL	*Idaho National Laboratory*
JHBSPH	*Johns Hopkins Bloomberg School of Public Health*
JHU	*Johns Hopkins University*

JOTG	*Joint Outreach Task Group*
K-25	*Oak Ridge K-25 Gaseous Diffusion Plant*
LANL	*Los Alamos National Laboratory*
LDCT	*Low-Dose Computed Tomography*
NIOSH	*National Institute for Occupational Safety and Health*
NNSS	*Nevada National Security Site (formerly known as Nevada Test Site)*
NSSP	*National Supplemental Screening Program*
ORAU	*Oak Ridge Associated Universities*
ORNL	*Oak Ridge National Laboratory*
PFT	*Pulmonary Function Test*
PHI	*Protected Health Information*
PII	*Personally Identifiable Information*
SERT	*Secure Electronic Records Transfer*
SNL	*Sandia National Laboratories*
UNM	*University of New Mexico*
USW	*United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union*
UTHSCT	*University of Texas Health Science Center at Tyler*
WHPP	*Worker Health Protection Program*
Y-12	*Y-12 National Security Complex*

Foreword

The National Defense Authorization Act for Fiscal Year 1993 called for the U.S. Department of Energy (DOE) to provide ongoing medical evaluations, at no cost, to all former DOE Federal, contractor, and subcontractor workers. Medical screening examinations are designed to check for adverse health effects related to occupational exposures and are conducted by dedicated occupational medical experts from consortia of universities, unions, and commercial organizations with expertise in administering medical programs.

This year marks 20 years of service to the former DOE workforce, providing a total of 128,589 exams. Most workers examined have been found to be healthy; however, those with medical findings have been referred for medical followup or referred to the U.S. Department of Labor-administered Energy Employees Occupational Illness Compensation Program, which compensates current or former DOE employees for occupational illnesses.

While we have made great strides throughout the past 20 years in identifying, locating, and offering medical screening services to our former workers, there are still many who have not been served, so this effort continues to be a high priority. Because many occupational-related diseases have long latency periods and, therefore, may not appear for many years, periodic re-screening efforts are crucial to detecting these conditions.

The Former Worker Medical Screening Program is an important program within the DOE Office of Environment, Health, Safety and Security (AU), and it has received strong commitment and support from the Department. AU views this program as a moral commitment to repay the debt that the country owes the former workers for their service. DOE is committed to the safety and health of our workforce – past, present, and future – and will continue to be a staunch advocate for this important program.

Matthew B. Moury
Associate Under Secretary for
Environment, Health, Safety and Security
Office of Environment, Health, Safety and Security
U.S. Department of Energy

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Executive Summary

The U.S. Department of Energy's (DOE) Former Worker Medical Screening Program, or Former Worker Program (FWP), directly benefits former DOE workers by: (1) identifying signs or symptoms of work-related health conditions at an early stage when they are more treatable; and (2) improving workers' understanding of health risks they may face due to possible exposures during their prior employment with DOE. The medical screening exam offered through the program uses a customized medical screening protocol that was developed by a team of independent physicians specializing in occupational medicine.

This Annual Report presents an overview of the structure and accomplishments of the FWP. The FWP was mandated by the U.S. Congress as part of Section 3162 of the National Defense Authorization Act for Fiscal Year (FY) 1993 (Public Law 102-484). Program activities began in 1996, and for 20 years, the FWP has provided a valuable service to the DOE former workforce. The FWP provides ongoing medical screening examinations, at no cost, to all interested and eligible former DOE Federal, contractor, and subcontractor workers from all DOE sites, as well as former workers from its predecessor Agencies (the Manhattan Engineer District, the Atomic Energy Commission, and the Energy Research and Development Administration). In FY 2016, the FWP continued to successfully fulfill its congressional mandate of delivering medical screening services to all interested and eligible former workers.

During the first two decades of FWP, we have examined 86,252 DOE workers, provided a total of 128,589 examinations, and screened 14,840 DOE workers for early detection of lung cancer.

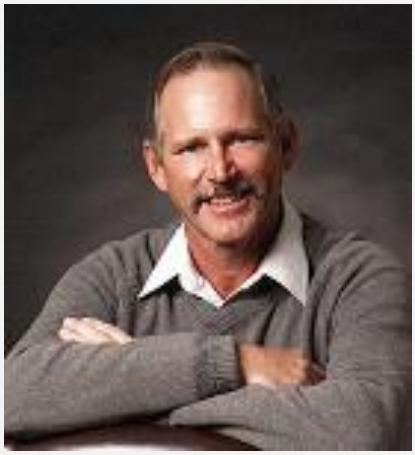
The program activities undertaken included the following:

1. **Outreach.**
   - In FY 2016, the FWP reached out to 306,648 potential participants.
2. **Ongoing Medical Screening.**
   - In FY 2016, 3,400 initial medical examinations and 5,568 re-screen medical exams were conducted.
   - In FY 2016, 3,487 participants were screened for occupational lung cancer with low-dose helical computed tomography (CT), and a total of 3,700 CT scans were performed; this includes baseline, followup, and annual scans.
3. **Communicate Results.**
   - Exam results are provided to participants in a letter. When appropriate, the FWP physicians include causation language in the results letters when a condition is possibly work related. The inclusion of causation language can be helpful for participants who decide to file a claim under the Energy Employees Occupational Illness Compensation Program Act, a program administered by the U.S. Department of Labor.

4. Protect Personally Identifiable Information and Protected Health Information.

- All medical information that is collected as part of this program is treated as confidential and is used only as allowed by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act.

A description of the organizations conducting the medical screening exams and biographies of each of the Principal Investigators is provided in Appendix A.



"I'd like to thank everyone involved that made this exam possible, start to finish. You've shown you care. Job well done!"

– Clark Mann, Ironworkers Local 17 former Extrusion Plant worker (Reactive Metals Inc.)

1.0 Program Overview

This Annual Report presents an overview of the structure and accomplishments of the U.S. Department of Energy's (DOE) Former Worker Medical Screening Program or Former Worker Program (FWP). This report provides the Fiscal Year (FY) 2016 updates, as well as cumulative program results, 1997-2016. The FWP is a congressionally mandated program that is responsible for providing medical screening exams, at no cost, to all interested and eligible former DOE Federal, contractor, and subcontractor workers from all DOE sites and its predecessor Agencies (the Manhattan Engineer District, the Atomic Energy Commission (AEC), and the Energy Research and Development Administration) who may have been exposed to hazardous substances. The medical screening exams offered by the FWP are designed to check for potential adverse health effects related to occupational exposures, including but not limited to radiation, beryllium, asbestos, lasers, silica, welding fumes, lead, cadmium, chromium, solvents, and noise. This year marks 20 years of service to our former workforce.

The program was established following the issuance of the National Defense Authorization Act for FY 1993 (Public Law 102-484), which called for DOE to:

National Defense Authorization Act for FY 1993:

"… establish and carry out a program for the identification and on-going medical evaluation of its… former employees who are subject to significant health risks as a result of the exposure of such employees to hazardous or radioactive substances during such employment."

Since the inception of the FWP, DOE has made great strides in addressing the occupational health legacy of its activities, including nuclear weapons design and production. The FWP, managed by the DOE's Office of Environment, Health, Safety and Security (AU), uses independent occupational health experts from universities, labor unions, and commercial organizations to administer the medical screening program. Using these third-party providers ensures that medical evaluation services are objective and credible. Their dedication to the DOE workforce over the past 20 years has resulted in high-quality services; and the level of satisfaction expressed by participants, 98.6 percent on surveys, speaks to the skill and professionalism of the organizations administering the program for AU.

As of September 2016, a total of 128,589 medical exams have been provided to 86,252 former workers through the FWP, this includes initial and re-screen exams.

The FWP consists of four regional projects located near major DOE sites, as well as two nationwide projects.

The regional FWP projects include:

- Pantex Former Worker Medical Surveillance Program, conducted by Drexel University School of Public Health in conjunction with the University of Texas Health Science Center at Tyler and West Texas A&M University

- Medical Exam Program for Former Workers at Los Alamos and Sandia (New Mexico) National Laboratories, conducted by Johns Hopkins Bloomberg School of Public Health in conjunction with the University of New Mexico
- Worker Health Protection Program (WHPP), conducted jointly by Queens College of the City University of New York, United Steelworkers, the Atomic Trades and Labor Council in Oak Ridge, and the former Fernald Atomic Trades and Labor Council
- Former Burlington AEC Plant and Ames Laboratory Workers Medical Screening Program, conducted by The University of Iowa College of Public Health

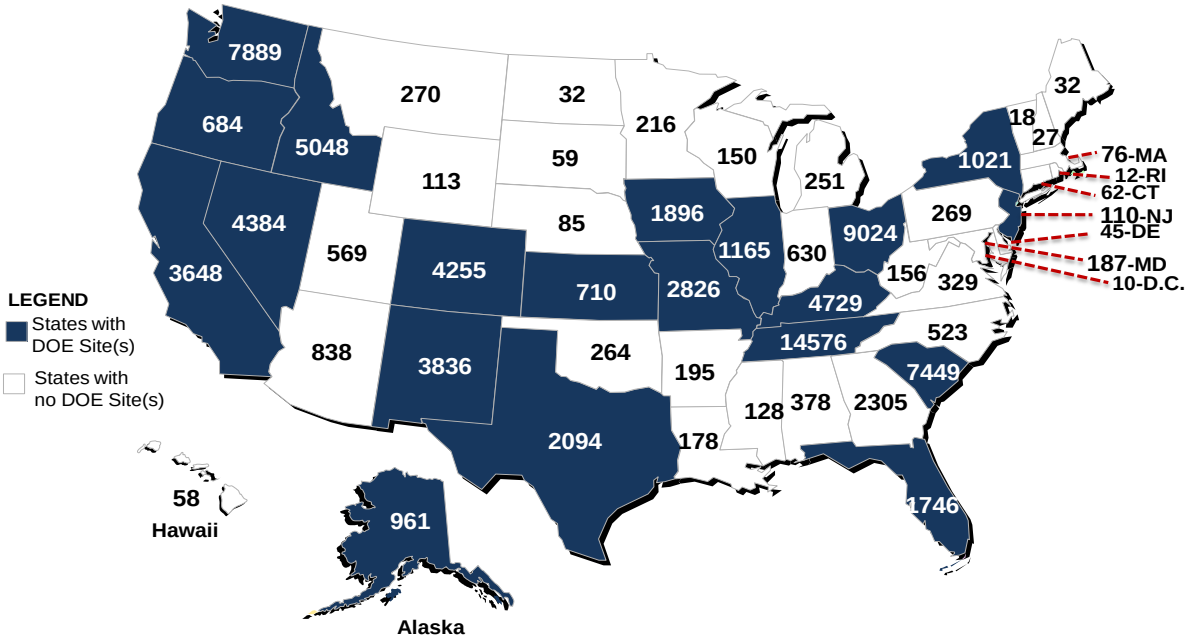
The nationwide FWP projects include:

- National Supplemental Screening Program (NSSP), conducted by Oak Ridge Associated Universities (ORAU) in conjunction with Axion Health, Comprehensive Health Services, National Jewish Health, and the University of Colorado Denver
- Building Trades National Medical Screening Program (BTMed), conducted by CPWR – The Center for Construction Research and Training (CPWR) in conjunction with Duke University Medical Center, Stoneturn Consultants, the University of Cincinnati, and Zenith-American Solutions

A listing of DOE sites and the organizations conducting medical screening exams for former workers is provided on the FWP Website (http://energy.gov/ehss/downloads/former-worker-program-summary-services)[1]. Individual FWP project descriptions are provided in Appendix A of this report.

Medical screenings are provided at clinics in communities near DOE sites, as well as through a large network of health clinics nationwide, thus allowing services to be provided near most workers' residences. This network of clinics has allowed the FWP to provide medical screening exams in all 50 States and several international locations (see Figure 1).

[1] Links to referenced documents have been included for the reader's convenience, but the reader is alerted that links may change when newer versions of the cited documents are posted on the Website.



ALABAMA	378	FLORIDA	1746	MAINE	32	NEW HAMPSHIRE	27	RHODE ISLAND	12	WISCONSIN	150	*NORWAY*	*1*
ALASKA	961	GEORGIA	2305	MARYLAND	187	NEW JERSEY	110	SOUTH CAROLINA	7449	WYOMING	113	*UNITED ARAB*	
ARIZONA	838	HAWAII	58	MASSACHUSETTS	76	NEW MEXICO	3836	SOUTH DAKOTA	59			*EMIRATES*	*1*
ARKANSAS	195	IDAHO	5048	MICHIGAN	251	NEW YORK	1021	TENNESSEE	14576	*NOT DISPLAYED:*		*MILITARY PACIFIC*	*2*
CALIFORNIA	3648	ILLINOIS	1165	MINNESOTA	216	NORTH CAROLINA	523	TEXAS	2094	*PUERTO RICO*	*2*		
COLORADO	4255	INDIANA	630	MISSISSIPPI	128	NORTH DAKOTA	32	UTAH	569	*PHILIPPINES*	*1*		
CONNECTICUT	62	IOWA	1896	MISSOURI	2826	OHIO	9024	VERMONT	18	*VIRGIN ISLANDS*	*1*		
DELAWARE	45	KANSAS	710	MONTANA	270	OKLAHOMA	264	VIRGINIA	329	*CANADA*	*8*		
DISTRICT OF COLUMBIA	10	KENTUCKY	4729	NEBRASKA	85	OREGON	684	WASHINGTON	7889	*GREECE*	*1*		
		LOUISIANA	178	NEVADA	4384	PENNSYLVANIA	269	WEST VIRGINIA	156	*IRELAND*	*2*		

Figure 1. Participants Screened by State of Residence (through September 2016)

The FWP directly benefits former DOE workers by: (1) identifying signs or symptoms of work-related health conditions at an early stage when they are more treatable; and (2) improving workers' understanding of health risks they may face due to possible exposures during their prior employment with DOE.

Additional information on the FWP, how it is managed and administered by DOE, and descriptions of the medical exam components can be found on the FWP Website (http://energy.gov/ehss/services/worker-health-and-safety/former-worker-medical-screening-program).

Gaylon Hanson, WHPP Local Coordinator, presenting program information at the Pocatello, ID JOTG Meetings in June 2016

Reflections on 20 Years of the FWP by a Former INL Worker and Local Outreach Coordinator

Gaylon Hanson
Worker Health Protection Program
Idaho Falls, ID

Shortly after the initiation of the Former Worker Program (FWP), the Oil, Chemical and Atomic Workers were given the task of completing a needs assessment in order to substantiate starting a medical screening program for former workers of the Idaho National Laboratory (INL). As a former worker, I joined with other former workers, industrial hygienists and health and safety professionals to conduct focus groups, risk mapping, and a review of DOE records to accomplish this task. This process had already taken place in Oak Ridge, Tennessee, Paducah, Kentucky, and Portsmouth, Ohio, which helped guide the process. We met with other current and former INL workers to conduct the focus groups and risk mapping, and using their expertise, we successfully painted the picture of the past and justified the need for medical screening at INL.

To date, over 4,200 former INL workers have participated in the Worker Health Protection Program medical screening. Many of our participants have had work-related conditions identified during their exams, while others have reassurance that their health has not been impacted by their work. Over the past few years, the introduction of low-dose CT scan for the early detection of lung cancer has complemented the traditional screening program and benefited workers at high-risk for lung cancer.

One of my duties as a local coordinator is to speak with former workers to alert them of their eligibility for the program. When I speak with them, many say this is the first time anyone has contacted them since they left employment at the INL. From my observations, working with hazardous substances has taken a huge toll on former workers. The road to 2017 has been a long and hard uphill battle for many workers participating in medical screening who have found out they have illnesses related to their work exposures.

I want to thank the legislators who all support the FWP. Without them the program would never have materialized, and the continued impact of this program cannot be taken lightly. I feel this program has given the Department of Energy a boost in positive perception because of their caring for prior workers, and the FWP has played an important part in the quality of life for former nuclear workers. As a former worker myself, I am appreciative of the support that the Department of Energy has given us. In closing, I would like to sincerely thank everyone connected with this program who ensure the ongoing care of the former DOE workforce.

2.0 Program Implementation

Program implementation focuses primarily on four specific activities, which are:

1. **Outreach:** Identify the potential pool of former DOE workers and notify them of FWP medical screening services.
2. **Ongoing Medical Screening:** Provide medical screening exams that are designed to check for health conditions related to occupational exposures in former workers who choose to participate in the program, including a re-screen exam every 3 years.
   a. **Conventional Medical Screening Program**
   b. **Early Lung Cancer Detection Program**
3. **Communicate Results:** Provide medical screening exam results to participants, as well as information concerning any conditions that may require followup medical care with their personal physicians or specialists, and provide information regarding possible compensation for work-related illnesses.
4. **Protect Personally Identifiable Information (PII)/Protected Health Information (PHI):** Protect the confidentiality and privacy of participants.

1. Outreach:

Identify the potential pool of former DOE workers and notify them of FWP medical screening services.

Johnny Ballinger and Vicky DeForrest manning the BTMed outreach table.

Since the inception of the FWP, DOE realized there would be challenges in locating workers to participate in the medical screening program; there is no centralized database of former DOE workers. In addition, many workers were employed intermittently by subcontractors, and these companies typically did not leave a copy of employee records with the prime contractor when their job was completed. Thus, the availability of rosters varies greatly by site.

Rosters are lists of names of former DOE workers, along with other identifying information, that may be available from employers or DOE. AU

Greg Lewis, DOE Office Director, speaking at the Iowa JOTG meeting.

works closely with DOE Headquarters program offices to obtain rosters of former workers from site contractors and field and site offices. In FY 2016, the FWP received new or updated rosters from nine sites. Invitations are sent by the FWP projects to individuals using the last known address. When addresses are found to be outdated or inaccurate, supplemental outreach methods are used by FWP projects; these include address-update services, such as credit bureaus, or Internal Revenue Service mailing services. The organizations administering the FWP periodically check the list of workers' names against the National Death Index to ensure that letters of invitation are not sent to individuals who are deceased.

The rosters of former workers are transmitted electronically to the FWP projects through the Secure Electronic Records Transfer (SERT) system. The SERT system, hosted by DOE, was originally designed to assist DOE, the U.S. Department of Labor (DOL), and the National Institute for Occupational Safety and Health (NIOSH) with the secure electronic transmission of records for claims filed under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA). The system was expanded in FY 2015 to include a separate FWP module to facilitate the safe transfer of rosters from the worksite to the FWP project that provides screening examinations.

All of the FWP projects use multiple outreach methods to notify eligible former DOE workers about the availability of FWP services and to increase the visibility of the program in communities surrounding DOE sites. In FY 2016, the FWPs participated in 442 outreach events and assisted DOL with 17 of its events. Program information is also provided in exit packets for workers separating from a site, and hyperlinks are provided on retiree and DOE site webpages. To further increase awareness of the FWP, AU recently sent out a Department-wide message to inform current workers of the availability of medical screening for former DOE workers and to make current workers aware of their eligibility to participate in the program once they have retired/separated from DOE.

In FY 2009, the Joint Outreach Task Group (JOTG) was established to enhance communication and coordination. The JOTG includes representatives from DOE, DOL, NIOSH, DOL's Office of the Ombudsman for EEOICPA, the Ombudsman to NIOSH for EEOICPA Part B, and the DOE-funded FWP projects. The goal is to coordinate outreach efforts between the Agencies involved in the FWP and the EEOICPA. To meet this goal, the JOTG holds town hall meetings in and near the communities of DOE sites. This partnership among different government Agencies promotes transparency and open government. In FY 2016, 12 meetings were held in, or near, the communities of 6 DOE sites. To date, meetings have been held in, or near, the communities of 32 DOE sites.

The mission of the Department, as well as its predecessor Agencies, undertaken for over 70 years, includes nuclear weapons design and production and other activities that may have exposed its workers to toxic substances. To locate these workers, the FWP projects continued to conduct aggressive outreach efforts in FY

2016. As of September 30, 2016, FWP projects have attempted to contact over 1,400,000 potential FWP participants who may have been involved in these activities and who may have developed work-related illnesses as a result of their exposure to hazardous materials. In FY 2016, over 306,000 potential participants were contacted. Those who are interested and eligible have either completed their medical screening examinations or are in the process of being scheduled for an exam. Despite the aggressive outreach efforts, there are many reasons why former workers may not wish to participate in the FWP, including: they believe they are in good health, they are simply not interested in screening, or they may be deceased. Additional information regarding outreach can be found on the FWP Website (http://energy.gov/ehss/outreach-former-worker-medical-screening-program-fwp).

"Everyone involved in my NSSP screening was very helpful, friendly, informative, and professional. I thank you for the opportunity to have this examination."

- Former Los Alamos worker

2. Medical Screening: Provide medical screening exams that are designed to check for health conditions related to occupational exposures in former workers who choose to participate in the program, including a re-screen exam every 3 years.

a. Conventional Medical Screening Program

A participant undergoing spirometry testing.

Medical screening is used to identify diseases or precursor conditions at an early stage of development, often before signs and symptoms occur, and to refer individuals with suspicious findings to their personal physician or a specialist for further testing, diagnosis, and treatment. The FWP is not intended to serve as a substitute for routine medical exams received through an individual's personal physician; however, the program provides some general health screening services at minimal cost to DOE.

The medical screening exam offered by the FWP evaluates a former employee's health as it relates to the individual's potential occupational exposure to hazardous agents. The FWP uses a customized medical screening protocol that was developed by a team of independent physicians specializing in occupational medicine. The protocol is periodically updated as necessary or at least every 2 years based on new research findings within the scientific/medical community. The health conditions targeted in the medical screening exams include chronic lung diseases, lung cancer, beryllium-related disorders, hearing loss, and damage to other selected major organs that may be associated with occupational exposures. A listing of exposures and medical examinations offered through the FWP is available in the medical protocol posted on the FWP Website (http://energy.gov/ehss/downloads/former-worker-program-medical-protocol).

Before participating in the medical screening program, former workers must complete a medical history questionnaire and an occupational history questionnaire, either on their own or via an interviewer-

conducted session. The interviews are conducted by the local outreach coordinators employed by the FWP projects who, in many cases, are former workers with knowledge of DOE sites and exposures.

The initial medical screening examination includes a physical examination and may consist of the following based on the individual's occupational exposure history:

- Chest x-ray with B reading (interpretation for occupational lung disease)
- Spirometry (breathing test)
- Low-dose chest CT scan
- Beryllium Lymphocyte Proliferation Test (BeLPT)
- Blood chemistry test
- Urinalysis
- Audiometry (hearing test).

Participation in the FWP is completely voluntary, and participants can refuse any portion of the medical screening examination.

Due to the latency period (the time between the onset of exposure and the diagnosis of the disease) of occupational-related diseases, the FWP also offers re-screen examinations 3 years after the initial medical screening and every 3 years thereafter. The re-screening improves the detection of occupational disease, which may not show signs or symptoms for decades after exposure. It should also be noted that certain medical exams may be recommended only during the initial screening exam and excluded from the re-screen exam. For example, audiometry (hearing test) is not offered on the re-screen exam since occupational hearing loss would typically be detected during the initial screening exam.

In addition to its core function of identifying conditions that may have been related to workplace exposures, the program provides some general health screening services. Participants are screened for some common non-occupational health conditions, such as diabetes (blood sugar), coronary artery disease (cholesterol), cardiovascular disease/hypertension (blood pressure), obesity, and chronic kidney dysfunction (serum creatinine levels).

Incidental health findings may occur during the medical exam. An incidental finding, or unanticipated abnormal finding, is information discovered during routine medical exams that, in some cases, ends up saving lives. Examples of incidental findings as a result of certain components of the medical exam include:

- Chest x-ray: pneumonia, abdominal aortic aneurysm
- Audiogram (hearing test): age-related hearing changes
- Complete blood count: anemia
- Physical exam: non-cancerous skin conditions.

The results of general health screening tests, as well as findings during examinations, can be of great benefit to a participant. Many of the conditions that fall into this category can be treated by the participant's personal physician and can significantly improve longevity and quality of life. DOE and the FWP projects

are committed to ensuring that the overall well-being of our former workers is evaluated within the program.

In FY 2016, 3,400 initial exams and 5,568 re-screen exams were conducted. As of September 30, 2016, a total of 128,589 medical exams have been conducted through the FWP, comprising 86,252 initial screening exams and 42,337 re-screen exams. A breakdown of the number of initial and re-screen exams for the past several years is presented below (Figure 2).

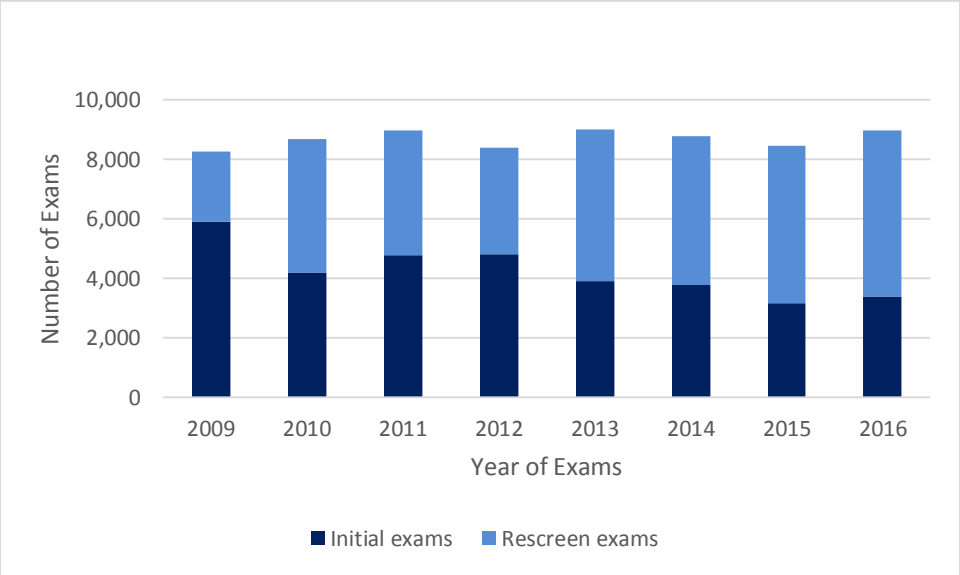


Figure 2. Initial and Re-Screen Exams by Year (2009 – 2016)

A breakdown of the number of initial and re-screen exams by DOE site is presented in Appendix B. A detailed description of the components of the medical screening exams can be found on the FWP Website (http://energy.gov/ehss/conventional-medical-screening-program). The medical findings by DOE site can be found in Appendix C.

"I want to express my most sincere thanks for the FWP office and staff at the University of Iowa College of Public Health. They were very helpful in answering questions and guidance through the paperwork required to properly process claims. Many of us would be hard pressed to do this without their help. I don't know how, or if, we could get through it at all without them. I cannot put into words how important this office is to people such as myself."

- Former Iowa Army Ammunition Plant worker

b. Early Lung Cancer Detection Program

Since 2000, DOE has made screening with low-dose helical CT scans available because many former workers are at risk for occupational lung cancer as a result of their work for DOE. Occupational hazards, such as asbestos, ionizing radiation, silica, beryllium, and diesel exhaust, may cause or contribute to the

disease. Through the FWP, DOE initiated the Early Lung Cancer Detection (ELCD) program to detect lung cancers at an earlier, more treatable stage. In FY 2016, 3,487 participants were screened and a total of 3,700 CT scans were performed; this includes baseline, followup, and annual scans. Since 2000, the FWP's ELCD program has screened a total of 14,840 participants and provided 48,794 CT scans. To date, 180 lung cancers have been detected through this vital component of FWP medical screening.

A participant undergoing CT scanning for early lung cancer detection.

The projects currently participating in the ELCD program include:

- WHPP, administered by Queens College of the City University of New York and the United Steelworkers, along with their partners;
- BTMed, conducted by CPWR in conjunction with their partners; and
- NSSP, administered by ORAU and its partners.

Other FWP projects are either exploring how to incorporate CT scanning into their current protocols or in the planning phases for initiating this component.

More indepth information regarding the ELCD program, including low-dose CT scans, can be found on the FWP Website (http://energy.gov/ehss/early-lung-cancer-detection-program).

"Lung cancer was diagnosed after a CT scan and I had surgery three months later. They removed my right lower lobe where the nodule with cancer was located. I had cancer, Stage I, very small and it had not spread. To date, I'm cancer free. Thank you for providing this service."

- Former INL worker

3. Communicate Results: Provide medical screening exam results to participants, as well as information concerning any conditions that may require followup medical care with their personal physicians or specialists, and offer information regarding possible compensation for work-related illnesses.

Occupational medicine physicians review the results from the medical screening exams, along with the completed medical and occupational exposure history questionnaires, to determine whether any abnormal findings exist and whether the findings may have been caused by a work-related exposure. Participants requiring urgent medical attention for an abnormal test result are contacted immediately by phone or mail, informed of the finding, and provided recommendations for further evaluation and treatment by their personal physicians or a specialist. Urgent findings are also documented in a letter to the participant that is sent by overnight mail.

Participants are provided with a summary of all the findings from their medical screening exam in a results letter several weeks after their examination, along with any necessary followup recommendations. Although

the primary focus of the results letter is to provide a summary of any possible occupational-related findings and followup recommendations for those findings, the letter also includes a summary of non-occupational findings discovered during the screening. The results letter also includes general health advice for workers, such as recommendations for smoking cessation. Individuals who have any abnormal medical findings are referred to their personal physicians or a specialist for followup care. While the FWP projects offer medical screening exams, followup medical evaluation and treatment are not within the scope of the FWP.

When appropriate, the FWP physicians who write the results letters include language regarding the possible work-relatedness of a condition, especially if the condition is known to be a potential occupational disease. The inclusion of this language, known as "causation" language, can be helpful for participants considering whether to file a claim under EEOICPA, which is administered by DOL. Moreover, participants are provided contact information for DOL EEOICPA Resource Centers in the results letters, as well as other State and Federal workers' compensation programs when appropriate.

While participation in the medical screening program is not required for filing an EEOICPA compensation claim, the medical results may be useful in supporting a claim by offering former DOE workers with detailed information about the possible relationship between their condition and their occupational exposure at a DOE site. In addition, FWP project staff, many of whom are former DOE workers, are able to assist participants by providing useful site and exposure information to include in their claims packages.

"Several items were identified during my examination that lead to lifestyle and medical treatment changes. The program has provided assurances that my health appears to not have been affected by my participation in the nuclear industry."

- Former INL worker

4. Protect PII/PHI: Protect the confidentiality and privacy of participants.

The confidentiality and privacy rights of former workers are not only a legal requirement, they are crucial to establishing and maintaining credibility with the former worker community. All medical information that is collected as part of this program is treated as confidential and is used only as allowed by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act (HIPAA). All FWP activities are conducted with the approval of the Institutional Review Boards, or Human Subjects Committees, of DOE and involved organizations. All individuals sign an informed consent and HIPAA authorization prior to participation. In addition, all program staff are required to take annual privacy awareness training, and all FWP projects have security procedures in place for the safe transmittal and storage of PII.

"It is a wonderful program. The program discovered hemochromatosis a few years back, and I am receiving treatment now. My physician could not diagnose what I had, but WHPP did. Excellent program."

- Former Paducah Gaseous Diffusion Plant worker

3.0 Program Findings

A summary of medical examinations performed to date is presented in Tables 1-4 below. Only new abnormal findings on re-screen exams are reported. Suspected work-related findings have been primarily lung-related conditions (e.g., asbestosis and/or silicosis, beryllium sensitization, and lung cancer) and hearing loss.

Table 1. Chest X-ray Findings on Initial and Re-screen Exams (through September 2016)

Screening Exam	Workers Screened	Asbestos-related Lung Disease[2]	Silicosis[3]	Other Dust-related Disease[4]	Lung Nodules, Nodes, or Lesions[5]
Initial	78,894	9,390 (11.9%)	185 (0.2%)	1,141 (1.4%)	2,982 (3.8%)
Re-screen	26,290	1,882 (7.2%)	22 (0.1%)	308 (1.2%)	1,138 (4.3%)

Table 2. Spirometry Findings on Initial and Re-screen Exams (through September 2016)

Screening Exam	Workers Screened	Obstructive Airways Dysfunction Detected[6]
Initial	77,000	15,067 (19.4%)
Re-screen	26,462	3,945 (14.9%)

[2] Asbestos-related diseases include asbestosis of the lungs and asbestos-related pleural plaques, caused by breathing in asbestos fibers.
[3] Silicosis is a lung disease caused by breathing in silica dust.
[4] Mixed dust pneumoconiosis or pneumoconiosis, not otherwise specified.
[5] The presence of non-trivial parenchymal lung nodules, enlarged lymph nodes in the chest, or other lung or pleural abnormality that requires medical followup as suggested by the chest x-ray B-reader or the local radiologist.
[6] Obstructive airways dysfunction includes chronic obstructive pulmonary disease, which is a progressive lung disease caused by long-term exposure to lung irritants, such as cigarette smoke, air pollution, chemical fumes, or dust. Obstructive airways dysfunction also includes asthma, which is a chronic inflammatory disease of the bronchial tubes, or airways, that causes swelling and narrowing of the airways. It is believed to be caused by a combination of environmental and genetic factors.

Table 3. Results of BeLPTs on Initial and Re-screen Exams (through September 2016)

Screening Exam	Workers Screened	1 Abnormal[7]	2 Abnormal	1 Abnormal and 1+ Borderline
Initial	70,711	874 (1.2%)	708 (1.0%)	243 (0.3%)
Re-screen	21,800	178 (0.8%)	182 (0.8%)	83 (0.4%)

Table 4. Audiometry Findings on Initial Exam (through September 2016)

Workers Screened	Noise-induced Hearing Loss
69,698	41,209 (59.1%)

The results from the ELCD programs are summarized in Tables 5 and 6 below. The detected lung cancers have been staged – indicated by a descriptor (usually numbers I to IV) representing how much the cancer has spread. CT screening has led to cancers being detected at an early stage when treatment is more likely to be effective and has proved to be better for early detection and preventing deaths than conventional chest x-rays.

Table 5. Stage of Lung Cancers Detected by WHPP, BTMed, and NSSP ELCD Program, 2000-September 30, 2016

Site of ELCD Program	Number of Participants Screened	Number of Lung Cancers Detected	Number of Detected Lung Cancers That Were Staged	Number (%) of Early (Carcinoma In Situ, Stage I or II Non-Small Cell or Limited Small Cell) Cancers Detected[8]
FMPC (Construction Workers)	162	1	1	1 (100%)
FMPC (Production Workers)	456	3	3	2 (67%)
Hanford (Construction Workers)	307	7	7	6 (86%)

[7] Individuals with one abnormal BeLPT are encouraged to file a claim with the DOL EEOICPA. Beryllium sensitization is diagnosed by an occupational medicine physician based on abnormal BeLPT results.

[8] The stage of lung cancer is described using the TNM classification system according to the American Joint Committee of Cancer (AJCC Cancer Staging Manual. 7th Edition, 2010). The TNM Staging System is based on the extent of the tumor (T), the extent of spread to the lymph nodes (N), and the presence of metastasis (M). Staging is based on pathology status, or clinical status if pathology status is not available.

Site of ELCD Program	Number of Participants Screened	Number of Lung Cancers Detected	Number of Detected Lung Cancers That Were Staged	Number (%) of Early (Carcinoma In Situ, Stage I or II Non-Small Cell or Limited Small Cell) Cancers Detected[8]
INL (Production Workers)	656	8	7	3 (43%)
K-25 (Production Workers)	2,864	32	31	24 (77%)
Mound Plant (Production Workers)	611	5	5	4 (80%)
NNSS (All Workers)	666	5	4	2 (50%)
ORNL (Production Workers)	1,262	14	13	6 (46%)
Oak Ridge Reservation (Construction Workers)	453	12	11	6 (55%)
Miscellaneous Sites (All Workers)	123	5	4	4 (100%)
Paducah (Production Workers)	2,012	22	21	17 (81%)
Portsmouth (Production Workers)	2,265	23	21	16 (76%)
Rocky Flats (Production Workers)	95	1	1	1 (100%)
Savannah River Site (Construction Workers)	211	2	1	1 (100%)
Y-12 (Production Workers)	2,697	40	39	28 (72%)
Total	**14,840**	**180**	**169**	**121 (72%)**

The ELCD programs have also detected other diseases of importance (see Table 6).

Table 6. Other Diseases Found on CT Scan by WHPP, BTMed, and NSSP

Condition	Number Detected
Appendiceal cancer	1
Breast cancer	1
Kidney cancer	11
Liver cancer	1
Lymphoma	7

Condition	Number Detected
Thyroid cancer	5
Aortic aneurysm	56
Heart aneurysm	5
Hemangiopericytoma	1
Splenic aneurysm	2
Pneumonia	84
Thymoma	6
Metastatic Melanoma	1
Mesothelioma	1

Reflections on 20 years of the FWP

Kim Cranford, RN
Nurse Manager, BTMed

I've lived in Knoxville my whole life and have had two immediate family members work construction jobs for DOE at Oak Ridge, so I am no stranger to the hazards that the workers at Oak Ridge face. Knowing that we need to look out for DOE construction workers like those in my family, it has been wonderful to see the BTMed program expand from its small-scale beginnings to a nationwide network of care for workers today.

I started to work for BTMed in November of 1998 part time while also working at Baptist Hospital of East Tennessee and Parkwest Medical Center. Even after going full time with BTMed, it took me a while to leave the hospitals, as I really enjoyed working directly with the patients and seeing how care was delivered for those with a wide range of health issues. I feel this allowed me to expand my experience and knowledge, which has helped me grow alongside the BTMed program. Back then, the program only served Oak Ridge, Hanford, and Savannah River. As the program now serves workers from around the country, who worked in a diverse set of environments from Amchitka Island in Alaska to Brookhaven National Lab in New York, our program's medical staff and knowledge have also grown to address the needs of all these workers.

I love my job with BTMed and value the opportunity to get to talk with workers and review their medical results with them. I think BTMed is a great program and provides a wonderful service to former DOE construction workers, and judging by our excellent approval rating, the workers agree. BTMed's Early Lung Cancer Screening Program has been especially rewarding to be a part of. While only being around for a handful of years, our CT Scans have already found 29 lung cancers. The majority of those were discovered very early (stage 1) so that prognosis for these are excellent. In other words, this program has already saved lives. The CT scans are able to find cancers and other medical conditions that would otherwise go unnoticed and would likely have resulted in a very different outcome if left untreated. We currently offer CT scans in four states and hope to expand this service to other sites in the future.

When workers express their appreciation for the program and say that the program likely saved their lives, that makes working here so much more rewarding. It feels like almost every day we get a call from a worker talking about how thankful they are for the program, how they are certain they would never have found out about their illness otherwise, and how screenings like ours are needed for all those diseases where

symptoms are delayed or hard to notice. It's even better when the program discovers something like high blood pressure or a cardiovascular issue, and then when the worker returns for a re-screen three years later, these conditions have improved as they are receiving treatment for those conditions and have made changes that reflect positively in their screening.

But most of all, it feels the best knowing that workers from 28 sites across the country have access to this program now, when earlier on we were only able to support them from a handful. DOE construction workers everywhere, whether they worked at a massive complex or a small facility, deserve someone looking out for their health.

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4.0 Summary

Through the FWP, the Department continues to demonstrate its steadfast commitment to its workforce. The FWP provides an objective, high-quality, targeted medical screening program for occupational diseases among DOE former workers using third-party medical experts. DOE has made great advances in addressing the occupational health legacy of more than 70 years of nuclear weapons design and production, as well as other activities that may have exposed its workers to toxic substances. The exams offered by the FWP can provide important information on health conditions, which if caught early, may be treated with improved health outcomes. Participants who are found not to have work-related conditions during their exams receive the benefit of this reassurance.

While the Department strives to improve upon past successes, the program is not without its challenges. AU staff meet on a regular basis with FWP members to seek their input on how best to improve implementation of the program and to ensure that the most appropriate medical tests are offered to our former workers. Also, the FWPs routinely monitor participant satisfaction with program elements, including medical clinic staff, wait time, and locations. Clinics that perform poorly are removed from the program. Another challenge is recruiting and encouraging former worker participation in the screening program. While we continuously conduct outreach activities, including local meetings and mailings, we are always looking for new forums to engage with workers in order to increase participation rates.

In FY 2017, the Department, through the FWP, will continue to meet its obligation to its former workers by providing medical screening examinations to all those who are interested and eligible across the country. The FWP projects will continue to expand CT scanning for early lung cancer detection to other worker populations. In addition, DOE will maintain the program elements and practices that account for the program's high degree of success while building on lessons learned to continually improve program implementation.

Reflections on 20 years of the FWP

Lew Pepper and Sandie Medina,
Worker Health Protection Program
Queens, NY, and Las Vegas, NV

Prior to the initiation of the Former Worker Program, there had never been a clinical or research program available for the workforce of the Nevada Test Site (NTS). In 1996, Boston University's School of Public Health (BUSPH) collaborated with the Southern Nevada Building and Construction Trades Council to conduct an exposure assessment and initiate the medical screening program at the NTS facility, which was at the center of the DOE's nuclear weapons program. While the other sites within the DOE complex partook in the research, development, and production of nuclear devices, the NTS was in charge of testing them. And test they did. Between 1951 and 1992, over 800 nuclear devices were tested; approximately 100 were atmospheric tests, and over 800 were tested underground in tunnels, shafts, and drilled down holes.

The screening program, which has now evaluated over 4,700 former NTS workers, was initially conducted through a collaboration of Boston University School of Public Health, the Occupational Medicine Program of the University of California at San Francisco, and the University of Nevada School of Medicine Department of

Family and Community Medicine. In the early years of the program, screenings were conducted by physicians and staff from the three institutions, who traveled to Nevada quarterly to evaluate participants for effects from the major hazards at NTS, including silica dust, diesel exhaust fumes, noise, asbestos, and beryllium.

In 2011, the program moved from Boston University to Queens College and joined with the Worker Health Protection Program (WHPP). Presently, screenings are conducted solely by the Department of Family and Community Medicine at the University of Nevada. One of our early objectives in the program, in addition to providing medical screening for the former workers, was to provide training and education in occupational medicine for the faculty and residents at the Family Medicine program. We were confident that the University of Nevada program could conduct a high quality screening program which would incorporate many of the lessons learned in our several years of training residents and faculty.

2017 will be an exciting and engaging year for the NTS screening program. The longstanding focus of the program has been on the nuclear testing workforce. Over the years, especially as testing stopped in 1992, fewer and fewer new program participants worked during the testing era. In light of the change in the work experience of newer program participants along with the change in the NTS and DOE mission, we have initiated an updating of our 20-year-old site exposure characterization. We hope to complete this activity during the first part of 2017 and update and modify many of the elements of the screening program, including the hazard-based screening tests.

Appendix A: Individual Project Descriptions

The U.S. Department of Energy (DOE) Former Worker Program (FWP) projects are briefly described below.

Building Trades National Medical Screening Program (BTMed)

Who we are:

BTMed is administered by CPWR – The Center for Construction Research and Training (CPWR), the health and safety research center of North America's Building Trades Unions, in partnership with Stoneturn Consultants, Duke University Medical Center, University of Cincinnati, and Zenith-American Solutions.

Our mission:

The mission of BTMed has been and continues to be that all of the more than 600,000 construction workers who have worked on DOE sites *"deserve to have someone looking out for their health."* Staying true to this mission has earned BTMed a 98% satisfaction rating from the workers they serve.

What we do:

BTMed identifies construction workers who have been employed on DOE sites and screens them for occupational illnesses. In addition to conventional medical screening services, BTMed also offers low-dose, computed tomography (CT) scans. Over 34,000 medical screenings and 3,000 low-dose CT scans have been delivered through a network of 200 specially credentialed clinics across the country.

BTMed serves workers from 28 DOE sites.

Medical Findings:

- 18 percent demonstrated abnormal chest x-ray (CXR) findings.
- 40 percent demonstrated abnormal pulmonary function test (PFT) findings.
- 64 percent demonstrated hearing loss.
- 1.5 percent had at least one abnormal beryllium lymphocyte proliferation test (BeLPT).
- 12 stage one lung cancers have been identified in 1,260 participants examined with low-dose CT.

BTMed and Research:

BTMed maintains a research function which uses the medical screening data to identify safety and health risks and make recommendations about ways to improve worker protection. The data are also used to make improvements in the delivery of medical services and in strengthening occupational medical recommendations. Most recently, a study was published on how pleural plaques identified on chest x-rays independently contributes to both the probability of developing Chronic Obstructive Pulmonary Disease and also the severity of the disease. This is the first study produced using longitudinal data to establish this as a causal relationship.

Contact BTMed

Toll-free number: 1-800-866-9663/1-888-464-0009

Website: www.btmed.org

Facebook: https://www.facebook.com/BTMed/

Laura S. Welch, MD

Medical Director, BTMed

CPWR

lwelch@cpwr.com

Dr. Welch, second from right, meets with staff from the Seattle Cancer Care Alliance to discuss low-dose CT scans.

Dr. Laura Welch serves as the Medical Director for CPWR, a research and development institute affiliated with the Building and Construction Trades Department of the American Federation of Labor and Congress of Industrial Organizations (AFL-CIO). She is a lecturer at George Washington University's Department of Environmental and Occupational Health. She previously held full-time faculty positions at the Albert Einstein, Yale University, and George Washington University Schools of Medicine.

She serves as a consultant to many Federal Agencies, including the Occupational Safety and Health Administration, National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention, and National Institutes of Health, and has many leadership roles in the American Public Health Association and Association of Occupational and Environmental Clinics. Dr. Welch provides occupational medicine expertise to the AFL-CIO, having worked with several union-management committees on health and safety issues. Her extensive work experience has led her to author over 100 peer-reviewed publications, abstracts, and technical reports.

As CPWR's Medical Director, Dr. Welch manages two national medical screening programs for construction workers. She is the principal investigator for the Early Lung Cancer Detection Program for construction workers, which is part of BTMed. She is also responsible for a nationwide screening program for sheet metal workers. She received her medical degree from the State University of New York at Stony Brook.

Knut Ringen, DrPH, MHA, MPH
Principal Investigator, BTMed
CPWR
knutringen@msn.com

With more than 40 years of experience in public health administration, Dr. Knut Ringen can be considered one of the founders of the field of occupational high risk management. Due to his intensive studies of issues within one of the most high-risk industries in the world, he is an expert in construction safety and health. In 1996, he used this experience to establish the first medical screening program for former DOE construction workers, which evolved into the BTMed. The BTMed program, which serves construction workers from 28 DOE sites across the country, has delivered in excess of 30,000 screenings to date.

In 1979, Dr. Ringen launched three projects to demonstrate that medical screenings among workers known to have been exposed to work-related health hazards could identify occupational illnesses and could help these workers secure their rights and prevent a premature death. When growing evidence from scientific studies and concerns expressed by workers suggested that DOE working conditions were hazardous, Dr. Ringen advocated for a special focus on construction workers, as these workers were usually employed by subcontractors and were more likely to be assigned to the most hazardous duties. Using the data collected from these medical screenings, Dr. Ringen and others could show how effective this model of medical screening and assistance was and why it should be applied to construction workers on DOE sites. This scientific analysis helped encourage Congress to enact legislation in 1993 that forms the basis for DOE's FWP.

BTMed has saved lives, helped workers and their families with compensation, and demonstrated to DOE that construction workers need better safety and health protections. It is well appreciated by the participants.

BTMed is administered by CPWR (cpwr.com), a 501(c 3) non-profit research institution, which serves as the research arm of Building and Construction Trades Department, AFL-CIO.

Dr. Ringen was the first executive director of CPWR and currently is its senior science advisor. He has directed other non-profit health organizations and has worked at the National Academy of Sciences and the National Cancer Institute. Among many honors, he is a fellow of the European Academy of Sciences and the Collegium Ramazzini, the international society of scholars in environmental and occupational health. He has a Master's in Hospital Administration from the Medical College of Virginia (now a part of Virginia Commonwealth University) and PhD and Master's degrees in Public Health from Johns Hopkins University (JHU).

The Pantex Former Worker Medical Surveillance Program

Who we are:

- Primary: Drexel University School of Public Health; PI: Arthur L. Frank, MD, PhD.
- Outreach: Department of Occupational Health Sciences, University of Texas Health Science Center at Tyler, Texas; Co-PI: C. David Rowlett, MD, MS.
- Clinical Services: Hillside Family Clinic, Amarillo, Texas; Clinician: Angela Phillips, DNP, APRN, FNP-BC affiliated with West Texas A&M University.

What we do:

- The Pantex Former Worker Medical Surveillance Program offers former Pantex Plant employees and contract workers the opportunity to obtain an independent, objective assessment of their health in relation to their workplace exposures by a health care provider experienced in occupational medicine.
- Participants are scheduled for an appointment at a time convenient for them at the Hillside Family Clinic in Amarillo. Former workers that live outside the Amarillo area are referred to the National Supplemental Screening Program.
- Each participant completes an occupational exposure history, as well as past medical history, prior to having their medical screening examination.
- The initial screening exam may include some or all of the following tests: physical exam, chest x-ray with ILO B-read, spirometry, BeLPT, blood chemistry tests, and urinalysis.
- Former workers who participate in the program receive results of their clinical exam and medical tests in a personalized "results letter" from a board certified occupational medicine physician along with any necessary follow-up recommendations.
- The screening process is an opportunity for former workers to receive additional wellness information and support for lifestyle changes to improve their health and quality of life.
- Each participant is offered the opportunity to return for a "re-screening" exam every 3 years. The re-screening exam is focused on previous findings and any new health developments with all laboratory testing repeated as appropriate.
- Workers are assisted with claims made through the Department of Labor program, as appropriate.

What we have found: 1034 participants

- CXRs: 6 percent had findings consistent with work-related lung disease
- CXRs: 5 percent had suspicious lung nodules or lesions
- PFTs: 42.6 percent had findings consistent with obstructive disease
- BeLPTs: 1.3 percent had at least one abnormal BeLPT
- Our Participation Surveys continue to show 99 percent satisfaction with the program

Toll-free number: 1-888-378-8939

"I received a very satisfactory examination at the Hillside Family Health Clinic in Amarillo, TX. The nurse practitioner was thorough, and I was not rushed through at all. All of my questions were answered carefully. The other nurse who administered some routine tests also was not rushed and seemed professional as well. The facility was clean and well organized, and I stayed in the waiting room less than five minutes. Everyone I met at this clinic was courteous and professional and I would not hesitate to recommend this clinic. I also recommend the Pantex Former Worker Program to all of my former colleagues who I meet around town."

- Craig K. Woods, former Pantex worker

The Pantex Former Worker Medical Surveillance Program was featured at *Emerging Issues in Occupational & Environmental Health* at the University of Texas Health Science Center at Tyler, Texas on June 17, 2016, in a presentation titled "Surveillance at Pantex: Ten Years and Counting" by Angela Phillips, DNP, APRN, FNP-BC.

Dr. Arthur Frank, far right, received the prestigious Ramazinni Award for his distinguished record of occupational health and safety research, as well as his advocacy and service in the promotion of better occupational safety and health in developing countries and in the international fight to ban the use of asbestos. During the annual Ramazzini Days in Carpi, Italy, the Mayor of Carpi confers the Ramazzini Award on scientists deemed by the Collegium Ramazzini to have made outstanding contributions to furthering the aims of Bernardino Ramazzini in safeguarding public health.

The Pantex Former Worker Medical Surveillance Program

THE PANTEX FORMER WORKER MEDICAL SURVEILLANCE PROGRAM
Conducted by the Drexel University School of Public Health

Arthur L. Frank MD, PhD

Dr. Frank is a Professor of Public Health at the Drexel University School of Public Health in Philadelphia. He is also Chair Emeritus of the Department of Environmental and Occupational Health. He holds faculty positions as Professor of Medicine and as Professor of Civil, Architectural, and Environmental Engineering. His medical degree is from the Mount Sinai School of Medicine (1972), and his PhD in Biomedical Sciences is from the Mount Sinai campus of the City University of New York (1977). He worked at Mount Sinai with Dr. Irving Selikoff and, since his days as a medical student, has been continuously engaged in research regarding the health effects of asbestos. His professional interests involve exposure to other dusts and to carcinogens in general. He has also worked in the area of agricultural safety and health. Dr. Frank has taught at Mount Sinai, the University of Kentucky, and in the University of Texas system before joining the faculty at Drexel. He is boarded in both internal medicine and occupational medicine and has served as an advisor to such organizations as the National Institute for Occupational Safety and Health, the Occupational Safety and Health Administration, the Environmental Protection Agency, and the Centers for Disease Control and Prevention. He has been a consultant to companies and unions. He has done work internationally, including in China, India, and Mongolia. He has published some 200 publications, many related to asbestos, and served many publications as an editor and reviewer.

The Pantex Former Worker Medical Surveillance Program

THE PANTEX FORMER WORKER MEDICAL SURVEILLANCE PROGRAM
Conducted by the Drexel University School of Public Health

C. David Rowlett, MD, MS, FACOEM

Dr. Rowlett joined the Department of Occupational Health Sciences at UTHSCT as an Associate Professor in 2010 and began working with the Pantex former worker program in 2014. In addition, he serves as medical director of both employee health and of the occupational health clinic at UTHSCT. He also serves as part-time medical director for Eastman Chemical Company. Prior to UTHSCT, Dr. Rowlett was first a designated physician and then the site occupational medical director at the Pantex Plant, Amarillo, Texas, from 2003-2009. Dr. Rowlett received an MS in Chemical Engineering from Texas Tech University, Lubbock, Texas, in 1977, after which he served on active duty as a research engineer for the U.S. Army. After 4 years on active duty, he entered industry in 1981 as a process engineer and technical superintendent. After 3 years in industry, he returned to Texas Tech where he received his MD in 1987. He completed an MS in Preventive Medicine in 1989 and an occupational medicine residency in 1990 at The University of Iowa, Iowa City, Iowa. He returned to industry with Exxon Company USA, serving as medical director of the Baytown refinery, Baytown, Texas, 1990-1993. Following this, Dr. Rowlett spent a decade in multispecialty group practice, first with Scott & White Clinic, Temple, Texas (1993-1999) and then with the Covenant Medical Group, Lubbock, Texas (1999-2003) before joining Pantex.

While at Scott & White, Dr. Rowlett served as an assistant professor at Texas A&M University with appointments in the College of Medicine, Nuclear and Safety Engineering/Industrial Hygiene, and the NSF Ergonomics Center. During this time, Dr. Rowlett became a member of the American College of Occupational and Environmental Medicine's (ACOEM) Practice Guidelines committee where he served for almost a decade. He was a contributing editor and a chapter lead for the second addition of the "Guidelines." His presentations and publications span the fields of industrial hygiene, toxicology, engineering, safety and surety, as well as evidence-based practice of medicine. He is board certified in occupational medicine and a fellow of ACOEM.

Espanola program office and medical clinic.

Medical Exam Program for Former Workers from Los Alamos National Laboratory and Sandia (New Mexico) National Laboratories

Who we are:

- Johns Hopkins Bloomberg School of Public Health (JHBSPH)
- University of New Mexico (UNM)

What we do:

- Provide medical screening exams to all interested former workers from Los Alamos National Laboratory (LANL) and Sandia National Laboratories (SNL).
- The JHBSPH Medical Exam Program is one of several unique programs within the DOE FWP. Examinations are done in Espanola, New Mexico, and Albuquerque, New Mexico, by occupational health professionals from JHBSPH and UNM.
- Examination sessions are scheduled over a 2-day or 3-day period two to three times per year. Physicians, health care providers, and occupational health professionals travel from Baltimore, Maryland; Espanola, New Mexico; and Albuquerque, New Mexico, to the examination site to conduct physical examinations.
- During examination sessions, former workers have the opportunity to meet with the program occupational medicine physician to discuss their examination results and to ask questions.
- Each participant has a detailed exposure and medical history interview prior to their initial examination and a short medical history interview before their re-examination. These interviews are conducted by a former worker from LANL.
- The program staff assists former workers with workers' compensation claims and, when appropriate, writes letters in support of claims for Federal compensation for former workers from both sites.
- The project has completed 4,236 examinations of former workers since the program began in 2000. Of these exams, 3,549 were new exams, and 687 were re-examinations of former LANL workers for past exposures to asbestos, beryllium, and radiation, and SNL former workers for past exposure to asbestos, beryllium, radiation, and silica.
- On exit surveys, over 97 percent of program participants stated that they were satisfied with their overall evaluation, and 97 percent would recommend the program to other former workers.
- The program works with the Joint Outreach Task Group to develop outreach strategies to recruit former workers who are eligible for the medical screening program and the Energy Employees Occupational Illness Compensation Program Act.
- Over the past year, we were unable to participate in Department of Labor Town Hall Meetings in Albuquerque, New Mexico, but we sent brochures for both programs to the Espanola Resource Center for the Town Hall Meetings.
- We participated in the Cold War Patriots Town Hall Meeting in Espanola, NM, where we discussed the program and recruited program participants. A program team member participated in the Day of Remembrance at Los Alamos.

What we have found:

- CXRs: 13.0 percent have findings consistent with work-related lung disease;
- PFTs: 2.0 percent demonstrated findings consistent with obstructive disease;
- BeLPTs: 3.3 percent had at least one abnormal BeLPT; and
- Audiometry: 55 percent demonstrated hearing loss for normal speech tones.

Toll-free number: 1-877-500-8615

Website: http://www.jhsph.edu/lanlfw/

Maureen Cadorette, PhD, COHN-S

Dr. Cadorette has been a nurse for over 40 years. She graduated from Nursing School in 1972 and completed a Bachelor's degree in nursing in 1992. She has a Master's in Public Health (1994) and a PhD in Occupational and Environmental Health (2005) from JHU. She has worked in many areas of nursing, but Orthopedics was her longest stint, and she was at one time certified in Orthopedic Health Nursing. Today, she is a Certified Occupational Health Nurse. She has worked at JHU as a staff member and an Assistant Scientist since 1997, and she has worked in Occupational Health for 20 years. She is on the Faculty of the Education and Research Center at JHBSPH. They are funded by the National Institute for Occupational Safety and Health, and they educate occupational health professionals. She has been with the FWP since 1997 as a project coordinator and now as a Co-Principal Investigator. She manages the day-to-day activities of the program and works with their staff in New Mexico to keep the program working smoothly.

Brian S. Schwartz, MD, MS

Dr. Schwartz is a Professor in the Department of Environmental Health Sciences in the JHBSPH. He is jointly appointed in the Department of Epidemiology in the School of Public Health and in the Department of Medicine in the School of Medicine. He joined the faculty at Johns Hopkins as an Assistant Professor in 1990 and was promoted to Professor in 2001. He served as Director of the Division of Occupational and Environmental Health from 1996 to 2006 and as Director of the Occupational and Environmental Medicine Residency from 1993 to 1998, for which he is currently Co-director. He is a board-certified specialist in internal medicine and occupational and environmental medicine. Dr. Schwartz has been evaluating patients concerned about occupational and environmental diseases since 1990 in the Johns Hopkins Center for Occupational and Environmental Health. He also has an active research program on how metals, solvents, other chemicals, industrial processes, and environmental and community conditions can affect health. Dr. Schwartz has been the leader or co-leader of the FWP at LANL and SNL since 2000. The two programs take a unique approach in that program health care providers perform all the examinations themselves. The two programs have completed over 4,000 examinations of former workers.

National Supplemental Screening Program

Who we are:

The National Supplemental Screening Program (NSSP) is managed by Oak Ridge Associated Universities (ORAU) with a team from:

- National Jewish Health,
- University of Colorado Denver, Center for Worker Health and Environment, Colorado School of Public Health,
- Comprehensive Health Services, Inc., and
- Axion Health, Inc.

What we do:

- The NSSP provides medical screening examinations to former Department of Energy (DOE) workers from eight primary DOE sites:
  - Argonne National Laboratory,
  - Fermi National Accelerator Laboratory,
  - Hanford,
  - Kansas City Plant,
  - Princeton Plasma Physics Laboratory,
  - Pinellas,
  - Rocky Flats, and
  - Savannah River Site
  - and former workers from 51 additional DOE Sites including:
    - referrals (production, construction and building trades) from the other Former Worker Programs (FWPs) whose participants may live outside of their respective medical screening coverage areas, and
    - DOE sites where no DOE FWP has been assigned.
- The NSSP provides the opportunity for participants to receive a re-screening medical examination every 3 years.
- The NSSP provides DOE former workers exposure-based medical screening examinations and also provides screening tests and procedures to identify medical conditions that are non-occupational in origin. As a consequence, former workers have the opportunity to receive wellness information and support for lifestyle changes to improve their health and quality of life.
- The NSSP provides DOE former workers with assistance in regards to filing Energy Employees Occupational Illness Compensation Program (EEOICP) benefit claims with the Department of Labor (DOL).
- In FY 2013, the NSSP began a Low-Dose Computed Tomography (LDCT) Pilot Program to detect lung cancer at an early stage, as well as work-related lung diseases and other medical conditions, in 98 NSSP participant volunteers who lived in the greater Denver metropolitan area. The NSSP LDCT Pilot Program is based on the National Comprehensive Cancer Network's Clinical Practice Guidelines. LDCTs and radiology evaluations are performed at National Jewish Health, Denver, Colorado.
- In FY 2016, the NSSP LDCT Pilot Program completed the third year annual LDCTs for 76 NSSP participants representing the Rocky Flats Plant, Kansas City Plant, Idaho National Laboratory, and the Nevada National Security Site. One case of lung cancer (Stage 1) was diagnosed, and referred for additional consultation/follow-up.

- During FY 2017, the NSSP will provide third year annual LDCTs to the remainder of the Pilot Program participants.
- In FY 2017, the NSSP will begin providing the hemoglobin A1c as a component for all medical screening examinations. The hemoglobin A1c provides information about a person's average levels of blood glucose over the past 3 months and is the primary test used for diabetes management and diabetes research. The results from the A1c will significantly improve the ability to provide medical follow-up recommendations.
- More than 99 percent of the responding NSSP participants were satisfied with their experience in the NSSP.

What the NSSP has provided:

- Initial medical screening examinations for 15,970 former DOE workers representing 59 DOE sites and re-screening examinations for 2,662 former workers.
- CXRs (with B-Read interpretation):
  - 12.5 percent had findings consistent with asbestos lung disease
  - 4.0 percent had suspicious lung nodules or lesions identified
  - 0.2 percent had lung cancer diagnosed
- PFTs:
  - 23.4 percent had findings consistent with restrictive lung disease
  - 16.0 percent had findings consistent with obstructive lung disease
- BeLPTs: 3.0 percent had at least one abnormal BeLPT
- Audiometry: 42.7 percent demonstrated noise-induced hearing loss for normal speech tones
- LDCT Scans:
  - 98 - NSSP participants competed an initial LDCT
  - 1 - diagnosed lung cancer (Stage 1)
  - 12 - participants with nodules suspicious for lung cancer
  - 9 - participants with indeterminate nodules
  - 16 - participants with non-cancerous findings that require follow-up

NSSP Toll-free number:

1-866-812-6703

NSSP Website:

http://www.orau.org/nssp

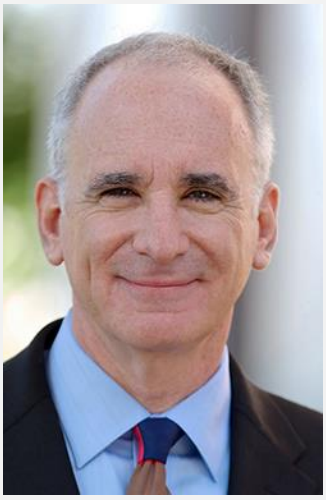
Donna L. Cragle, PhD

Dr. Cragle is the Senior Vice President and Director, Health, Energy and Environment, at ORAU. She has been involved with research of occupational hazards in DOE facilities for 35 years. The primary focus of her research has been in the area of occupational epidemiology, with particular interest in radiation and beryllium exposures. She has worked on numerous international projects, including an international committee to assess the body of data related to human health effects related to nickel exposure. She also worked on a data preservation effort for an international radiation epidemiology project involving health effects of radiation exposure. Dr. Cragle has also been involved in decision making related to maintenance of the large worker databases. She has extensive experience with large-scale studies involving data from multiple worker populations. She has assisted outside researchers in their access to worker data and worked collaboratively with these researchers to facilitate their understanding of the data. Dr. Cragle's knowledge of occupational epidemiology has resulted in teaching opportunities both nationally and internationally. Her publications have provided significant contributions to the occupational epidemiology literature. Dr. Cragle received her Bachelor of Arts degree in biological sciences from Indiana University and her Masters of Science in human genetics from Virginia Commonwealth University. Dr. Cragle received her PhD in environmental epidemiology from the University of North Carolina-Chapel Hill.

John R. McInerney, MD

Dr. McInerney is a physician with ORAU, manager of the ORAU Arvada Office, and is the Co-Principal Investigator of the NSSP and the NSSP LDCT Pilot Program. Dr. McInerney coordinates the NSSP evaluation tests and procedures and participant education and results notification with the occupational physicians and radiologists at the University of Colorado Denver and National Jewish Health. He is residency-trained and board-certified in Emergency Medicine and Occupational Medicine and practiced in the Emergency Departments of major hospitals in Detroit, Chicago, Minneapolis, and Denver. Dr. McInerney served 3 years as a commissioned officer in the Indian Health Service providing medical and urgent care to the Hopis and Navajos at a remote hospital in northeastern Arizona. Dr. McInerney owned and operated a medical care facility in Golden, Colorado, for 15 years that provided emergency, general, and occupational medical services to the surrounding community. He served as an elected Golden, Colorado, city councilman for 8 years and was the Colorado School of Mines team physician for 25 years. Prior to accepting the position with ORAU, he worked as a physician at the DOE Rocky Flats Plant for 10 years, the last 7 of which he was the DOE Rocky Flats Site Occupational Medical Director. Dr. McInerney has also served as an advisor on DOE health-related committees and continues his interaction with the DOE Site Occupational Medicine Directors regarding NSSP former DOE worker findings.

Lee S. Newman, MD, MA, FCCP, FACOEM



Dr. Newman is Professor of Environmental and Occupational Health in the Colorado School of Public Health, University of Colorado Denver. He is Director of the Center for Worker Health and Environment, Director of the NIOSH-supported Mountain and Plains Education and Research Center, and is Chief Medical Informatics Officer (CMIO) of Axion Health, Inc. Dr. Newman is also a Professor of Medicine in the Division of Allergy and Clinical Immunology and Division of Pulmonary Sciences and Critical Care Medicine in the School of Medicine at the University of Colorado Denver, Anschutz Medical Campus. Dr. Newman serves as the Co-Principal Investigator of the NSSP. In his role as founder and CMIO of Axion Health, Dr. Newman led the team in the development of the highly secure software system that has been used by the NSSP since 2005 to efficiently conduct former energy worker exams throughout the country. He has also served as an advisor to many Federal Agencies, including the DOE, the Department of Labor Energy Employees Occupational Illness Compensation Program Act, the National Institutes of Health, the Food and Drug Administration, the Environmental Protection Agency, and the Centers for Disease Control and Prevention. Dr. Newman is board certified in internal medicine and pulmonary medicine and is an internationally renowned expert on occupational and environmental lung disorders. Dr. Newman is recognized for his contributions to our understanding of how beryllium affects the immune system. As the former Chief of the Division of Environmental and Occupational Health at National Jewish Health, he pioneered the use of the Beryllium Lymphocyte Proliferation Test and was instrumental in bringing this test into routine use for both clinical diagnosis and screening of beryllium-exposed workers leading to the current clinical definition of beryllium sensitization and Chronic Beryllium Disease. Dr. Newman received his Bachelor of Arts degree in psychology from Amherst College and his Masters of Arts degree in social psychology from Cornell University Graduate School of Arts and Sciences. He earned his MD from Vanderbilt University School of Medicine, completed internship and residency in Internal Medicine at Emory University School of Medicine, and pulmonary fellowship at the University of Colorado Denver/National Jewish Health.

Worker Health Protection Program (WHPP)

Who we are:

Bruce Lawson, WHPP local coordinator at K-25, assists a former worker at an outreach event.

The WHPP is administered by the Barry Commoner Center for Health and the Environment at Queens College of the City University of New York, in conjunction with the United Steelworkers, the Atomic Trades and Labor Council in Oak Ridge, and the Fernald Medical Screening Program. Screening is conducted through partnerships with medical groups located within local DOE communities, including the University of Tennessee Graduate School of Medicine in Knoxville, TN, and the University of Nevada School of Medicine in Las Vegas, NV.

WHPP offers examinations at 14 DOE sites in 8 states. WHPP pioneered the use of low-dose CT scanning for the early detection of lung cancer among former DOE workers beginning in 2000.

WHPP employs a small network of former and current DOE workers as "local coordinators" to conduct outreach and assist with program operations in the DOE communities where medical screening occurs. Activities of local coordinators include conducting outreach at community events, scheduling and assisting with program registration, answering medical screening questions, liaising with local site offices and worker groups, advising on the development of program materials, and providing appropriate guidance regarding the EEOICPA claims process. Local coordinators have been an essential component in the recruitment of more than 32,000 DOE workers who have participated in over 56,000 total examinations through WHPP.

What we do:

The consortium utilizes expert occupational medicine physicians and support staff to provide independent medical screening to workers who are at risk of illnesses related to their DOE work. In addition to the standard FWP medical screening, WHPP administers the Early Lung Cancer Detection (ELCD) program, which offers low-dose CT scans at nine DOE sites.

WHPP provides both FWP medical screening and the ELCD Program to workers from:

- Idaho National Laboratory (Idaho)
- Paducah Gaseous Diffusion Plant (GDP) (Kentucky)
- Nevada Test Site, now called the Nevada National Security Site (Nevada)
- Fernald (Ohio)
- Mound (Ohio)

- Portsmouth GDP (Ohio)
- K-25 GDP (Tennessee)
- Oak Ridge National Laboratory (Tennessee)
- Y-12 National Security Complex (Tennessee)

Standard FWP medical screenings only are provided to workers from:

- Lawrence Berkeley National Laboratory (California)
- Lawrence Livermore National Laboratory (California)
- Sandia National Laboratories (California)
- Waste Isolation Pilot Plant (New Mexico)
- Brookhaven National Laboratory (New York)

What we have found:

FWP medical screening

- CXRs (N=53,999 CXRs): 8.0 percent of 26,532 participants* who had at least one CXR demonstrated findings consistent with work-related lung disease (includes CXR abnormalities in the following categories: asbestosis without pleural disease, asbestosis with pleural disease, asbestos-related pleural disease, silicosis, mixed dust pneumoconiosis, and pneumoconiosis, not otherwise specified)
- PFTs (N=54,995 tests): 24.5 percent of 31,736 participants who had at least one set of PFTs demonstrated findings consistent with obstructive lung disease (includes PFT abnormalities in the following categories: obstructive pattern and mixed obstructive and restrictive pattern)
- BeLPTs (N= 44,568 tests): 3.6 percent of 28,211 participants who had at least one BeLPT had at least one abnormal BeLPT result.
- Audiometry (N=29,199 tests): 59.9 percent of 25,431 participants* who received at least one audiogram demonstrated occupational hearing loss.

(*Does not include the Nevada Test Site)

ELCD Program

- 152 ELCD program participants have been diagnosed with primary lung cancer.
- 103 of the 144 (72 percent) individuals whose lung cancers have been staged to date, had an early stage lung cancer (carcinoma in situ, Stage I or Stage II non-small cell cancer or limited small cell cancer) at the time of diagnosis.
- Lung cancer was detected in 1 of 89 DOE workers tested (N=13,487).

Toll-free number: 1-888-241-1199

Website: http://worker-health.org

Facebook: www.facebook.com/WorkerHealthProtectionProgramwhpp

Steven Markowitz, MD, DrPH

Steven Markowitz, MD, DrPH, an occupational medicine physician and epidemiologist, directs the Barry Commoner Center for Health and the Environment at Queens College, City University of New York. He is Adjunct Professor of Preventive Medicine at Mount Sinai School of Medicine. He received his undergraduate education at Yale University, his medical degree and doctorate in epidemiology from Columbia University, and completed residencies in internal medicine at Montefiore Hospital and in occupational medicine at Mt. Sinai School of Medicine.

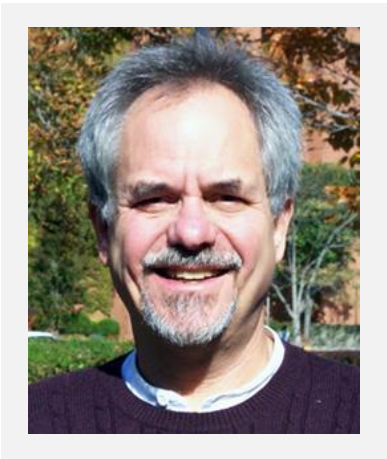
In 1996, Dr. Markowitz worked with the DOE, other physicians, and labor unions to establish the DOE FWP. Under these auspices since 1997, Dr. Markowitz has co-directed *WHPP*, a national medical screening program for former DOE nuclear weapons workers at 14 DOE sites in 8 States. Program collaborators include the United Steelworkers and the Oak Ridge and Fernald Atomic Trades & Labor Councils.

Dr. Markowitz has conducted research in the areas of occupational cancer, asbestos-related diseases, immigrant occupational health and surveillance of occupational injuries and illnesses, publishing approximately 100 journal articles and book chapters. Earlier in his career, Dr. Markowitz directed the occupational medicine residency at Mount Sinai School of Medicine and initiated a NIH-funded training for medical students and a Fogarty Center-funded international occupational health fellowship in Mexico, Brazil, and Chile. For more than a decade, he has worked with community groups in New York City to address immigrant occupational health, providing medical screening in 2002 for Latino day laborers who worked near Ground Zero, documenting health and safety problems of immigrant restaurant workers in New York City, and training and equipping 500 Latino day laborers to perform Hurricane Sandy cleanup work.

Dr. Markowitz is Editor-in-Chief, *American Journal of Industrial Medicine* and Associate Editor of a major textbook, *Environmental and Occupational Medicine (4th edition)* (2007). He currently serves as Chair of the Advisory Board on Toxic Substances and Worker Health for Part E of the Energy Employees Occupational Illness Compensation Program Act. He also serves on the Board of Scientific Counselors of the National Toxicology Program and on the National Institute for Occupational Safety and Health, Scientific and Technical Advisory Board of the World Trade Center Health Program. He has served as a consultant to the World Health Organization and the Pan American Health Organization. He founded and directed the World Trade Center Clinical Center of Excellence based in Queens.

Founded in 1966, the Barry Commoner Center for Health and the Environment is an environmental and occupational health institute at Queens College, City University of New York, the nation's largest public university. The Center addresses real world problems, involves affected communities, and seeks to find achievable solutions.

Dr. Lewis Pepper, MD, MPH



Dr. Pepper came to WHPP at Queens College in 2011 after 20 years at the Boston University School of Public Health. Since coming to Queens College, he has served as the Associate Medical Director of the WHPP. Dr. Pepper has been interested in beryllium-related health effects. He has co-authored a paper examining beryllium exposure at the Nevada Test Site, and most recently was a member of the American Thoracic Society's *Ad Hoc Committee on Beryllium Sensitivity and Chronic Beryllium Disease* assisting in their June 2014 Statement on Beryllium Disease.

Dr. Pepper was the Principal Investigator of the National Institute for Occupational Safety and Health-funded studies of lead exposure among bridge construction workers and the health impacts of workplace reorganization and downsizing at DOE. The latter study involved almost 6,000 employees at five DOE facilities.

Currently, Dr. Pepper is an Adjunct faculty member of the Hunter School of Public Health of the City University of New York.

James Frederick

Jim Frederick is the Assistant Director of the Health, Safety & Environment Department (HSE) of the United Steel, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial and Service Workers International Union (USW). Jim has been with the USW since 1994, working at the Pittsburgh headquarters. Jim is a member of USW local union 9305. He has a Bachelor's degree in environmental health from Purdue University and a Master's degree in environmental health and safety management from Rochester Institute of Technology.

The USW is the largest industrial union in North America and has 850,000 members in the U.S., Canada, and the Caribbean. It represents workers employed in the metals, rubber, chemicals, paper, energy, government, and service sectors.

The USW HSE Department's primary task is to assist the union's membership through their local unions in protecting their health and safety and maintaining environmental health for the communities in which our members and their neighbors live. The USW HSE Department is comprised of 27 full-time staff and more than 300 local union trainers and activists working part-time for the USW HSE Department on an ongoing basis.

Jim's work for the USW includes:

- providing health, safety, and environmental assistance to the membership;
- coordinating workplace health and safety audits, as well as fatality and catastrophic incident investigations at USW-represented facilities;
- facilitating health, safety, and environmental negotiations with various USW employers;
- providing a range of training programs to local union health and safety activists, employers, and others;
- working with government representatives and other organizations to improve workplace health, safety, and environmental protections;
- providing oversight of health, safety, and environment conferences for the members of the union; and
- serving as the principal investigator on cooperative grant programs for the USW's Tony Mazzocchi Center for Health, Safety, and Environmental Education.

Former Burlington Atomic Energy Commission Plant (BAECP) and Ames Laboratory Workers Medical Screening Program

Who we are:

The University of Iowa College of Public Health

What we do:

The University of Iowa College of Public Health administers medical screenings to former workers from two DOE facilities in Iowa: the BAECP/Line 1/Division B at the Iowa Army Ammunition Plant (IAAP) in West Burlington, Iowa, operational between 1949 and mid-1975, and the Ames Laboratory on the campus of Iowa State University in Ames, Iowa, established in the early 1940s.

Approximately 7,000 workers were employed in the manufacture and disassembly of nuclear weapons at the BAECP with an estimated 5,684 still living; 7 percent of those do not live in Iowa and are being referred to the NSSP for screenings. Medical screenings for BAECP workers began in 2002. As of September 30, 2016, a total of 1,386 former workers have been screened with 809 receiving a 3-year repeat screening, 487 a 6-year, 212 a 9-year, 66 a 12-year, and 1 15-year repeat screening.

In the early 1940s, the Ames Laboratory developed the process for purifying uranium metal for nuclear reaction purposes for the Manhattan Project. Overall, the Laboratory produced over 2 million pounds (1,000 tons) of high-purity uranium for the nuclear weapons industry. The Ames Laboratory presently conducts a broad range of applied chemical and physical research.

Over 13,000 employees worked at the Ames Laboratory, and 10,516 of those workers are still living and have known addresses; 72 percent do not live in Iowa and are being referred to NSSP for screenings. Medical screenings for former Ames Laboratory workers began in 2006. As of September 30, 2016, a total of 1,987 former workers have been screened with 912 receiving a 3-year repeat screening, 406 a 6-year, and 63 a 9-year repeat screening.

What we have found:

- CXRs: 479 (16 percent) former workers demonstrated findings suspicious for work-related lung disease (total screened n=3,080).

- PFTs: 332 (11 percent) former workers demonstrated findings consistent with obstructive lung disease; 853 (27 percent) had findings consistent with restrictive lung disease; and 205 (7 percent) had findings consistent with mixed obstructive/restrictive pattern (total screened n=3,148).

- BeLPTs: 103 (3 percent) former workers had at least one abnormal BeLPT (total screened n=3,203).

- Uncontrolled Hypertension Detected: 569 (25 percent) former workers were hypertensive; 20 (0.9 percent) had urgent/severe hypertension (blood pressure >180/110); and 3 (0.1 percent) had emergent hypertension (blood pressure >220/140), total screened n=2,244.

- Uncontrolled Diabetes Mellitus Detected: 178 (6 percent) former workers had hyperglycemia (non-fasting glucose ≥ 200mg/dL), total screened n=3,168. 121 (10 percent) former workers indicated fair control of their diabetes (hemoglobin A1c 7.1-9.0), and 27 (2 percent) had poor control (A1c ≥ 9.1), total screened n=1,170.

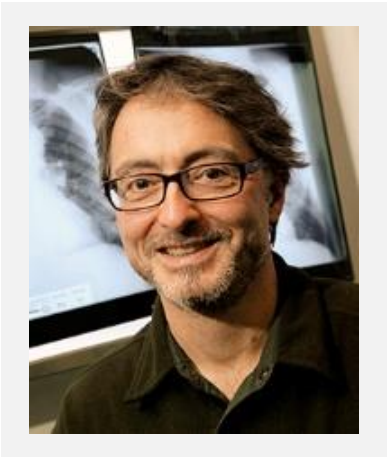
- Cancers: 149 (4 percent) former workers have been newly diagnosed with a cancer since having their screening, with the greatest number of newly diagnosed cancers being skin cancer (43 cases) followed by lung cancer (30 cases), total screened n=3,373.

- Sarcoid lung disease: 5 of the BAECP former workers and 11 of the Ames Laboratory former workers were found to have a history of pulmonary sarcoidosis.

Toll-free number: 1-866-282-5818

Website: www.iowafwp.org

Laurence Fuortes, MD, MS



Laurence Fuortes, MD, MS, is a Professor of Occupational and Environmental Health and Internal Medicine at The University of Iowa. He is an occupational medicine physician with over 30 years of clinical experience and has directed the University Employee Health Clinic for 25 years. Dr. Fuortes teaches courses in environmental toxicology and international health and mentors graduate students, medical students, and occupational medicine residents in the Pulmonary Division Outpatient Clinic at the University Hospitals.

He has been the Principal Investigator of the FWP at The University of Iowa College of Public Health since its inception in 2000, which provides screenings to the two DOE sites in Iowa: IAAP and Ames Laboratory. In addition to evaluating the former workers at the medical screening, Dr. Fuortes provides thorough assistance with recommendations for follow-up care and conducts Energy Employees Occupational Illness Compensation Program impairment evaluations for former DOE workers. His personalized attention has been greatly appreciated by the workers and was recognized in receiving The University of Iowa Brody Service Award. Dr. Fuortes has also directed studies of the health effects of Department of Defense conventional weapons workers from the IAAP.

With over 90 peer-reviewed publications, Dr. Fuortes has been an investigator on numerous occupational and environmental public health programs, many with major service components, such as pesticide toxicology in agricultural workers, traumatic head and spinal cord injury epidemiology, and health services delivery to Iowa migrant farm workers. Dr. Fuortes also served as an Internist with the Indian Health Service and an Epidemic Intelligence Service Officer and has been involved with extensive global occupational health initiatives as well, including serving as a World Health Organization/Fulbright Lecturer in Costa Rica and a Senior Fulbright Scholar in South Africa and Armenia, as well as directing Fogarty international research-training programs.

Marek Mikulski, MD, PhD, MPH

Dr. Mikulski is an Adjunct Assistant Professor and Research Scientist in Occupational and Environmental Health at The University of Iowa. He received his PhD and MPH degrees from the University of Iowa and MD from the Medical University of Lodz, Poland. Dr. Mikulski is an occupational epidemiologist with over 18 years of research experience, including studies of health effects of exposures in nuclear and conventional munitions production, adverse birth outcomes from use of pesticides, and effects of age on assessment of pulmonary function. His research interests include a broad area of work-related lung disease, with specific interest in epidemiology and novel, computer-based methods used in diagnosing lung disease. Dr. Mikulski has published extensively and delivered presentations in these areas both at national and international meetings. He has also been an investigator on several occupational health/occupational medicine studies and projects, including those on the training programs in Europe where he served on the Board of the European Association of Schools of Occupational Medicine.

Dr. Mikulski has been a Co-Principal Investigator on the Iowa Former Worker Program since 2008 and has been actively involved in studies of health effects of Iowa Department of Defense conventional munitions workers. Dr. Mikulski is also a liaison with Department of Labor, Department of Energy, and congressional representation from the State of Iowa for issues relating to exposure profile and verification of employment for Energy Employees Occupational Illness Compensation Program (EEOICP).

Appendix B: Exams Conducted through the Former Worker Program

Table 7. Number of Former Workers Screened and Re-screened by U.S. Department of Energy Site (through September 2016)

State	Sites	Initial Screenings	Re-screens
AK	Amchitka Island Test Site	1,425	672
CA	Lawrence Berkeley National Laboratory	465	220
CA	Lawrence Livermore National Laboratory	2,040	1,209
CA	Sandia National Laboratories, CA	182	89
CO	Rocky Flats Plant (Construction Workers)	861	443
CO	Rocky Flats Plant (Production Workers)	3,829	1,082
FL	Pinellas (Production Workers)	661	210
IA	Ames Laboratory	1,987	1,381
IA	Iowa Army Ammunition Plant	1,386	1,575
ID	Idaho National Laboratory (Construction Workers)	1,189	427
ID	Idaho National Laboratory (Production Workers)	4,954	3,640
IL	Argonne National Laboratory	634	77
IL	Fermi National Accelerator Laboratory	165	20
KY	Paducah GDP (Construction Workers)	1,025	490
KY	Paducah GDP (Production Workers)	3,498	2,549
MO	Kansas City Plant (Construction Workers)	761	291
MO	Kansas City Plant (Production Workers)	2,626	511
NM	Los Alamos National Laboratory	3,137	577
NM	Sandia National Laboratories, NM	403	48
NV	Nevada National Security Site	5,067	2,859
NY	Brookhaven National Laboratory (Construction Workers)	608	309
NY	Brookhaven National Laboratory (Production Workers)	481	67
OH	Feed Materials Production Center (Construction Workers)	2,313	1,399
OH	Feed Materials Production Center	1,339	878

State	Sites	Initial Screenings	Re-screens
	(Production Workers)		
OH	Mound Plant (Construction Workers)	431	179
OH	Mound Plant (Production Workers)	1,642	1,205
OH	Portsmouth GDP (Construction Workers)	1,186	635
OH	Portsmouth GDP (Production Workers)	3,768	3,135
SC	Savannah River Site (Construction Workers)	4,785	2,068
SC	Savannah River Site (Production Workers)	5,728	257
TN	Oak Ridge K-25 (K-25) (Production Workers)	4,794	4,054
TN	Oak Ridge National Laboratory (ORNL) (Production Workers)	2,241	1,671
TN	Oak Ridge Reservation[9] (Construction Workers)	3,600	1,694
TN	Y-12 National Security Complex (Y-12) (Production Workers)	4,101	2,946
TX	Pantex Plant	1,406	528
WA	Hanford Site (Construction Workers)	4,087	1,596
WA	Hanford Site (Production Workers)	5,579	811
	Other Sites[10] (Construction Workers)	1,506	520
	Other Sites[11] (Production Workers)	362	15
	Grand Total	**86,252**	**42,337**

[9] Includes K-25, ORNL, and Y-12
[10] Sites where the number of individuals screened by the Building Trades National Medical Screening Program to date is less than 100.
[11] Sites where the number of individuals screened by the National Supplemental Screening Program or the Worker Health Protection Program to date is less than 100.

Appendix C: Exam Results

More indepth information regarding the exam components offered through the program can be found on the Former Worker Program Website (http://energy.gov/ehss/conventional-medical-screening-program). Medical findings by the U.S. Department of Energy (DOE) site/worker population are provided below.

Table 8 illustrates chest x-ray findings on initial exams to date, and Table 9 provides findings on re-screens.

Table 8. Chest X-ray Findings on Initial Screening (through September 2016)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
AK	Amchitka Island Test Site	1,111	159 (14.3%)	1 (0.1%)	0 (0.0%)	61 (5.5%)
CA	Lawrence Berkeley National Laboratory	446	9 (2.0%)	0 (0.0%)	4 (0.9%)	25 (5.6%)
CA	Lawrence Livermore National Laboratory	2,001	49 (2.4%)	0 (0.0%)	10 (0.5%)	140 (7.0%)
CA	Sandia National Laboratories, CA	179	2 (1.1%)	0 (0.0%)	1 (0.6%)	12 (6.7%)
CO	Rocky Flats Plant (Construction Workers)	769	233 (30.3%)	7 (0.9%)	13 (1.7%)	31 (4.0%)
CO	Rocky Flats Plant (Production Workers)	3,395	791 (23.3%)	4 (0.1%)	48 (1.4%)	106 (3.1%)
FL	Pinellas (Production Workers)	641	56 (8.7%)	5 (0.8%)	16 (2.5%)	31 (4.8%)
IA	Ames Laboratory	1,914	71 (3.7%)	1 (0.1%)	63 (3.3%)	56 (2.9%)
IA	Iowa Army Ammunition Plant	1,283	125 (9.7%)	0 (0.0%)	66 (5.1%)	32 (2.5%)
ID	Idaho National Laboratory (Construction Workers)	978	113 (11.6%)	0 (0.0%)	2 (0.2%)	30 (3.1%)
ID	Idaho National Laboratory (Production Workers)	4,882	376 (7.7%)	1 (0.0%)	23 (0.5%)	150 (3.1%)
IL	Argonne National Laboratory	579	66 (11.4%)	0 (0.0%)	17 (2.9%)	18 (3.1%)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
IL	Fermi National Accelerator Laboratory	154	14 (9.1%)	0(0.0%)	5 (3.2%)	5 (3.2%)
KY	Paducah Gaseous Diffusion Plant (GDP) (Construction Workers)	945	158 (16.7%)	7 (0.7%)	12 (1.3%)	49 (5.2%)
KY	Paducah GDP (Production Workers)	3,472	228 (6.6%)	10 (0.3%)	20 (0.6%)	127 (3.7%)
MO	Kansas City Plant (Construction Workers)	669	94 (14.1%)	0 (0.0%)	1 (0.1%)	35 (5.2%)
MO	Kansas City Plant (Production Workers)	2,569	294 (11.4%)	2 (0.1%)	66 (2.6%)	97 (3.8%)
NM	Los Alamos National Laboratory	2,950	215 (7.3%)	0 (0.0%)	98 (3.3%)	52 (1.8%)
NM	Sandia National Laboratories, NM	386	25 (6.5%)	1 (0.3%)	16 (4.1%)	5 (1.3%)
NV	Nevada National Security Site	4,881	531 (10.9%)	38 (0.8%)	89 (1.8%)	399 (8.2%)
NY	Brookhaven National Laboratory (Construction Workers)	488	90 (18.4%)	0 (0.0%)	0 (0.0%)	9 (1.8%)
NY	Brookhaven National Laboratory (Production Workers)	444	24 (5.4%)	0 (0.0%)	5 (1.1%)	19 (4.3%)
OH	Feed Materials Production Center (Construction Workers)	2,049	230 (11.2%)	5 (0.2%)	0 (0.0%)	33 (1.6%)
OH	Feed Materials Production Center (Production Workers)	1,292	56 (4.3%)	0 (0.0%)	12 (0.9%)	54 (4.2%)
OH	Mound Plant (Construction Workers)	361	66 (18.3%)	0 (0.0%)	3 (0.8%)	7 (1.9%)
OH	Mound Plant (Production Workers)	1,609	87 (5.4%)	1 (0.1%)	1 (0.1%)	61 (3.8%)
OH	Portsmouth GDP (Construction Workers)	1,055	193 (18.3%)	3 (0.3%)	3 (0.3%)	40 (3.8%)
OH	Portsmouth GDP (Production Workers)	3,742	246 (6.6%)	5 (0.1%)	18 (0.5%)	109 (2.9%)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
SC	Savannah River Site (Construction Workers)	4,244	423 (10.0%)	4 (0.1%)	1 (0.0%)	153 (3.6%)
SC	Savannah River Site (Production Workers)	4,045	1,021 (25.2%)	56 (1.4%)	369 (9.1%)	58 (1.4%)
TN	Oak Ridge K-25 (K-25) (Production Workers)	4,704	316 (6.7%)	5 (0.1%)	13 (0.3%)	98 (2.1%)
TN	Oak Ridge National Laboratory (ORNL) (Production Workers)	2,189	125 (5.7%)	1 (0.0%)	1 (0.0%)	79 (3.6%)
TN	Oak Ridge Reservation[12] (Construction Workers)	3,038	521 (17.1%)	6 (0.2%)	6 (0.2%)	119 (3.9%)
TN	Y-12 National Security Complex (Y-12) (Production Workers)	4,029	239 (5.9%)	6 (0.1%)	11 (0.3%)	163 (4.0%)
TX	Pantex Plant	1,376	69 (5.0%)	1 (0.1%)	10 (0.7%)	47 (3.4%)
WA	Hanford Site (Construction Workers)	3,396	843 (24.8%)	3 (0.1%)	2 (0.1%)	182 (5.4%)
WA	Hanford Site (Production Workers)	5,054	1,009 (20.0%)	4 (0.1%)	97 (1.9%)	250 (4.9%)
	Other Sites[13] (Construction Workers)	1,236	184 (14.9%)	5 (0.4%)	0 (0.0%)	28 (2.3%)
	Other Sites[14] (Production Workers)	339	39 (11.5)	3 (0.9%)	19 (5.6%)	12 (3.5%)
	Grand Total	**78,894**	**9,390 (11.9%)**	**185 (0.2%)**	**1,141 (1.4%)**	**2,982 (3.8%)**

[12] Includes K-25, ORNL, and Y-12.
[13] Sites where the number of individuals screened by the Building Trades National Medical Screening Program (BTMed) to date is less than 100.
[14] Sites where the number of individuals screened by the National Supplemental Screening Program (NSSP) to date is less than 100.

Table 9. Chest X-ray Findings on Re-screening (through September 2016)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
AK	Amchitka Island Test Site	425	32 (7.5%)	1 (0.2%)	0 (0.0%)	19 (4.5%)
CA	Lawrence Berkeley National Laboratory	106	3 (2.8%)	0 (0.0%)	1 (0.9%)	12 (11.3%)
CA	Lawrence Livermore National Laboratory	617	4 (0.6%)	0 (0.0%)	2 (0.3%)	70 (11.3%)
CA	Sandia National Laboratories, CA	44	0 (0.0%)	0 (0.0%)	0 (0.0%)	7 (15.9%)
CO	Rocky Flats Plant (Construction Workers)	295	14 (4.7%)	0 (0.0%)	2 (0.7%)	4 (1.4%)
CO	Rocky Flats Plant (Production Workers)	938	236 (25.2%)	4 (0.4%)	27 (2.9%)	26 (2.8%)
FL	Pinellas (Production Workers)	173	18 (10.4%)	1 (0.6%)	10 (5.8%)	1 (0.6%)
IA	Ames Laboratory	864	38 (4.4%)	0 (0.0%)	37 (4.3%)	16 (1.9%)
IA	Iowa Army Ammunition Plant	523	46 (8.8%)	0 (0.0%)	64 (12.2%)	17 (3.3%)
ID	Idaho National Laboratory (Construction Workers)	310	31 (10.0%)	0 (0.0%)	0 (0.0%)	8 (2.6%)
ID	Idaho National Laboratory (Production Workers)	1,903	90 (4.7%)	0 (0.0%)	5 (0.3%)	38 (2.0%)
IL	Argonne National Laboratory	62	2 (3.2%)	0 (0.0%)	3 (4.8%)	2 (3.2%)
IL	Fermi National Accelerator Laboratory	10	0 (0.0%)	0 (0.0%)	2 (20.0%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	347	38 (11.0%)	0 (0.0%)	1 (0.3%)	23 (6.6%)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
KY	Paducah GDP (Production Workers)	1,636	65 (4.0%)	1 (0.1%)	0 (0.0%)	75 (4.6%)
MO	Kansas City Plant (Construction Workers)	208	19 (9.1%)	0 (0.0%)	0 (0.0%)	4 (1.9%)
MO	Kansas City Plant (Production Workers)	463	32 (6.9%)	0 (0.0%)	24 (5.2%)	10 (2.2%)
NM	Los Alamos National Laboratory	522	73 (14.0%)	0 (0.0%)	22 (4.2%)	2 (0.4%)
NM	Sandia National Laboratories, NM	47	8 (17.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
NV	Nevada National Security Site	1,549	108 (7.0%)	9 (0.6%)	54 (3.5%)	201 (13.0%)
NY	Brookhaven National Laboratory (Construction Workers)	218	13 (6.0%)	0 (0.0%)	0 (0.0%)	4 (1.8%)
NY	Brookhaven National Laboratory (Production Workers)	57	3 (5.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
OH	Feed Materials Production Center (Construction Workers)	876	65 (7.4%)	1 (0.1%)	0 (0.0%)	6 (0.7%)
OH	Feed Materials Production Center (Production Workers)	523	11 (2.1%)	0 (0.0%)	3 (0.6%)	17 (3.3%)
OH	Mound Plant (Construction Workers)	122	15 (12.3%)	0 (0.0%)	1 (0.8%)	2 (1.6%)
OH	Mound Plant (Production Workers)	666	21 (3.2%)	0 (0.0%)	0 (0.0%)	26 (3.9%)
OH	Portsmouth GDP (Construction Workers)	446	65 (14.6%)	0 (0.0%)	0 (0.0%)	7 (1.6%)
OH	Portsmouth GDP (Production Workers)	1,788	95 (5.3%)	2 (0.1%)	6 (0.3%)	86 (4.8%)

State	Sites	Workers Screened	Asbestos-related Lung Disease	Silicosis	Other Dust-related Disease	Lung Nodules, Nodes, or Lesions
SC	Savannah River Site (Construction Workers)	1,379	128 (9.3%)	1 (0.1%)	0 (0.0%)	64 (4.6%)
SC	Savannah River Site (Production Workers)	247	21 (8.5%)	0 (0.0%)	13 (5.3%)	5 (2.0%)
TN	K-25 (Production Workers)	2,255	98 (4.3%)	1 (0.0%)	4 (0.2%)	91 (4.0%)
TN	ORNL (Production Workers)	1,065	41 (3.8%)	0 (0.0%)	3 (0.3%)	51 (4.8%)
TN	Oak Ridge Reservation[15] (Construction Workers)	1,185	132 (11.1%)	0 (0.0%)	0 (0.0%)	43 (3.6%)
TN	Y-12 (Production Workers)	1,858	85 (4.6%)	1 (0.1%)	3 (0.2%)	104 (5.6%)
TX	Pantex Plant	372	11 (3.0%)	0 (0.0%)	0 (0.0%)	13 (3.5%)
WA	Hanford Site (Construction Workers)	1,094	112 (10.2%)	0 (0.0%)	1 (0.1%)	52 (4.8%)
WA	Hanford Site (Production Workers)	681	86 (12.6%)	0 (0.0%)	20 (2.9%)	25 (3.7%)
	Other Sites[16] (Construction Workers)	405	20 (4.9%)	0 (0.0%)	0 (0.0%)	7 (1.7%)
	Other Sites[17] (Production Workers)	11	3 (27.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Grand Total	**26,290**	**1,882 (7.2%)**	**22 (0.1%)**	**308 (1.2%)**	**1,138 (4.3%)**

[15] Includes K-25, ORNL, and Y-12.
[16] Sites where the number of individuals screened by BTMed to date is less than 100.
[17] Sites where the number of individuals screened by NSSP to date is less than 100.

Table 10 illustrates spirometry (breathing test) findings to date on initial exams, and Table 11 provides findings on re-screening.

Table 10. Spirometry Findings on Initial Screening (through September 2016)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
AK	Amchitka Island Test Site	1107	172 (15.5%)
CA	Lawrence Berkeley National Laboratory	453	47 (10.4%)
CA	Lawrence Livermore National Laboratory	2,001	243 (12.1%)
CA	Sandia National Laboratories, CA	178	16 (9.0%)
CO	Rocky Flats Plant (Construction Workers)	761	203 (26.7%)
CO	Rocky Flats Plant (Production Workers)	3,710	856 (23.1%)
FL	Pinellas (Production Workers)	634	173 (27.3%)
IA	Ames Laboratory	1,946	217 (11.2%)
IA	Iowa Army Ammunition Plant	1,311	261 (19.9%)
ID	Idaho National Laboratory (Construction Workers)	958	231 (24.1%)
ID	Idaho National Laboratory (Production Workers)	4,879	874 (17.9%)
IL	Argonne National Laboratory	591	61 (10.3%)
IL	Fermi National Accelerator Laboratory	153	12 (7.8%)
KY	Paducah GDP (Construction Workers)	929	230 (24.8%)
KY	Paducah GDP (Production Workers)	3,445	518 (15.0%)
MO	Kansas City Plant (Construction Workers)	655	149 (22.7%)
MO	Kansas City Plant (Production Workers)	2,532	559 (22.1%)
NM	Los Alamos National Laboratory	2,070	123 (5.9%)
NM	Sandia National Laboratories, NM	352	30 (8.5%)
NV	Nevada National Security Site	4,948	1,534 (31.0%)
NY	Brookhaven National Laboratory (Construction Workers)	511	66 (12.9%)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
NY	Brookhaven National Laboratory (Production Workers)	477	64 (13.4%)
OH	Feed Materials Production Center (Construction Workers)	1,998	388 (19.4%)
OH	Feed Materials Production Center (Production Workers)	1,286	175 (13.6%)
OH	Mound Plant (Construction Workers)	362	83 (22.9%)
OH	Mound Plant (Production Workers)	1,572	358 (22.8%)
OH	Portsmouth GDP (Construction Workers)	1,048	250 (23.9%)
OH	Portsmouth GDP (Production Workers)	3,732	777 (20.8%)
SC	Savannah River Site (Construction Workers)	4,194	715 (17.0%)
SC	Savannah River Site (Production Workers)	3,382	377 (11.1%)
TN	K-25 (Production Workers)	4,661	959 (20.6%)
TN	ORNL (Production Workers)	2,184	429 (19.6%)
TN	Oak Ridge Reservation[18] (Construction Workers)	3,005	559 (18.6%)
TN	Y-12 (Production Workers)	4,007	847 (21.1%)
TX	Pantex Plant	1,373	452 (32.9%)
WA	Hanford Site (Construction Workers)	3,381	814 (24.1%)
WA	Hanford Site (Production Workers)	5,343	956 (17.9%)
	Other Sites[19] (Construction Workers)	1,229	226 (18.4%)
	Other Sites[20] (Production Workers)	342	63 (18.4%)
	Grand Total	**77,700**	**15,067 (19.4%)**

[18] Includes K-25, ORNL, and Y-12.
[19] Sites where the number of individuals screened by BTMed to date is less than 100.
[20] Sites where the number of individuals screened by NSSP to date is less than 100.

Table 11. Spirometry Findings on Re-screening (through September 2016)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
AK	Amchitka Island Test Site	415	37 (8.9%)
CA	Lawrence Berkeley National Laboratory	116	12 (10.3%)
CA	Lawrence Livermore National Laboratory	624	37 (5.9%)
CA	Sandia National Laboratories, CA	49	2 (4.1%)
CO	Rocky Flats Plant (Construction Workers)	297	13 (4.4%)
CO	Rocky Flats Plant (Production Workers)	938	122 (13.0%)
FL	Pinellas (Production Workers)	175	30 (17.1%)
IA	Ames Laboratory	888	89 (10.0%)
IA	Iowa Army Ammunition Plant	484	186 (38.4%)
ID	Idaho National Laboratory (Construction Workers)	301	16 (5.3%)
ID	Idaho National Laboratory (Production Workers)	2,003	503 (25.1%)
IL	Argonne National Laboratory	64	1 (1.6%)
IL	Fermi National Accelerator Laboratory	9	2 (22.2%)
KY	Paducah GDP (Construction Workers)	342	20 (5.8%)
KY	Paducah GDP (Production Workers)	1,619	242 (14.9%)
MO	Kansas City Plant (Construction Workers)	200	5 (2.5%)
MO	Kansas City Plant (Production Workers)	449	46 (10.2%)
NM	Los Alamos National Laboratory	448	28 (6.3%)
NM	Sandia National Laboratories, NM	44	0 (0.0%)
NV	Nevada National Security Site	1,724	589 (34.2%)
NY	Brookhaven National Laboratory (Construction Workers)	227	3 (1.3%)
NY	Brookhaven National Laboratory (Production Workers)	65	8 (12.3%)
OH	Feed Materials Production Center (Construction Workers)	839	33 (3.9%)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
OH	Feed Materials Production Center (Production Workers)	527	57 (10.8%)
OH	Mound Plant (Construction Workers)	118	4 (3.4%)
OH	Mound Plant (Production Workers)	732	97 (13.3%)
OH	Portsmouth GDP (Construction Workers)	434	29 (6.7%)
OH	Portsmouth GDP (Production Workers)	1,792	415 (23.2%)
SC	Savannah River Site (Construction Workers)	1,343	65 (4.8%)
SC	Savannah River Site (Production Workers)	237	10 (4.2%)
TN	K-25 (Production Workers)	2,311	384 (16.6%)
TN	ORNL (Production Workers)	1,082	173 (16.0%)
TN	Oak Ridge Reservation[21] (Construction Workers)	1,162	103 (8.9%)
TN	Y-12 (Production Workers)	1,887	327 (17.3%)
TX	Pantex Plant	363	31 (8.5%)
WA	Hanford Site (Construction Workers)	1,065	81 (7.6%)
WA	Hanford Site (Production Workers)	670	124 (18.5)
	Other Sites[22] (Construction Workers)	407	18 (4.4%)
	Other Sites[23] (Production Workers)	12	3 (25.0%)
	Grand Total	**26,462**	**3,945 (14.9%)**

[21] Includes K-25, ORNL, and Y-12.
[22] Sites where the number of individuals screened by BTMed to date is less than 100.
[23] Sites where the number of individuals screened by NSSP to date is less than 100.

Table 12 illustrates beryllium testing findings on initial exams to date, and Table 13 provides findings on re-screens.

Table 12. Results of Beryllium Lymphocyte Proliferation Tests (BeLPT) by DOE Site on Initial Screening (through September 2016)

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
AK	Amchitka Island Test Site	93	2 (2.2%)	0 (0.0%)	0 (0.0%)
CA	Lawrence Berkeley National Laboratory	190	2 (1.1%)	6 (3.2%)	0 (0.0%)
CA	Lawrence Livermore National Laboratory	1,287	12 (0.9%)	29 (2.3%)	8 (0.6%)
CA	Sandia National Laboratories, CA	114	1 (0.9%)	3 (2.6%)	1 (0.9%)
CO	Rocky Flats Plant (Construction Workers)	773	4 (0.5%)	4 (0.5%)	0 (0.0%)
CO	Rocky Flats Plant (Production Workers)	2,389	20 (0.8%)	13 (0.5%)	13 (0.5%)
FL	Pinellas (Production Workers)	634	8 (1.3%)	22 (3.5%)	3 (0.5%)
IA	Ames Laboratory	1,945	28 (1.4%)	22 (1.1%)	6 (0.3%)
IA	Iowa Army Ammunition Plant	1,379	19 (1.4%)	12 (0.9%)	8 (0.6%)
ID	Idaho National Laboratory (Construction Workers)	949	14 (1.5%)	5 (0.5%)	6 (0.6%)
ID	Idaho National Laboratory (Production Workers)	4,533	36 (0.8%)	31 (0.7%)	14 (0.3%)
IL	Argonne National Laboratory	304	5 (1.6%)	2 (0.7%)	1 (0.3%)
IL	Fermi National Accelerator Laboratory	106	2 (1.9%)	1 (0.9%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	944	16 (1.7%)	8 (0.8%)	1 (0.1%)
KY	Paducah GDP (Production Workers)	2,973	38 (1.3%)	18 (0.6%)	7 (0.2%)

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
MO	Kansas City Plant (Construction Workers)	659	3 (0.5%)	12 (1.8%)	3 (0.5%)
MO	Kansas City Plant (Production Workers)	2,501	36 (1.4%)	23 (0.9%)	10 (0.4%)
NM	Los Alamos National Laboratory	2,947	43 (1.5%)	35 (1.2%)	22 (0.7%)
NM	Sandia National Laboratories, NM	381	11 (2.9%)	3 (0.8%)	3 (0.8%)
NV	Nevada National Security Site	3,169	35 (1.1%)	26 (0.8%)	12 (0.4%)
NY	Brookhaven National Laboratory (Construction Workers)	497	5 (1.0%)	23 (4.6%)	0 (0.0%)
NY	Brookhaven National Laboratory (Production Workers)	470	5 (1.1%)	18 (3.8%)	7 (1.5%)
OH	Feed Materials Production Center (Construction Workers)	2,018	8 (0.4%)	13 (0.6%)	3 (0.1%)
OH	Feed Materials Production Center (Production Workers)	1,129	7 (0.6%)	6 (0.5%)	2 (0.2%)
OH	Mound Plant (Construction Workers)	360	0 (0.0%)	2 (0.6%)	0 (0.0%)
OH	Mound Plant (Production Workers)	1,575	22 (1.4%)	14 (0.9%)	4 (0.3%)
OH	Portsmouth GDP (Construction Workers)	1,049	15 (1.4%)	2 (0.2%)	1 (0.1%)
OH	Portsmouth GDP (Production Workers)	3,317	22 (0.7%)	11 (0.3%)	4 (0.1%)
SC	Savannah River Site (Construction Workers)	4,242	31 (0.7%)	38 (0.9%)	12 (0.3%)
SC	Savannah River Site (Production Workers)	2,998	61 (2.0%)	22 (0.7%)	7 (0.2%)
TN	K-25 (Production Workers)	4,705	94 (2.0%)	89 (1.9%)	23 (0.5%)
TN	ORNL (Production Workers)	2,170	21 (1.0%)	30 (1.4%)	12 (0.6%)

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
TN	Oak Ridge Reservation[24] (Construction Workers)	3,314	25 (0.8%)	24 (0.7%)	11 (0.3%)
TN	Y-12 (Production Workers)	4,031	58 (1.4%)	66 (1.6%)	12 (0.3%)
TX	Pantex Plant	1,360	12 (0.9%)	3 (0.2%)	1 (0.1%)
WA	Hanford Site (Construction Workers)	3,396	39 (1.1%)	31 (0.9%)	7 (0.2%)
WA	Hanford Site (Production Workers)	4,783	108 (2.3%)	36 (0.8%)	18 (0.4%)
	Other Sites[25] (Construction)	819	3 (0.4%)	3 (0.4%)	1 (0.1%)
	Other Sites[26] (Production)	208	3 (1.4%)	2 (1.0%)	0 (0.0%)
	Grand Total	**70,711**	**874 (1.2%)**	**708 (1.0%)**	**243 (0.3%)**

Table 13. Results of Beryllium Lymphocyte Proliferation Tests (BeLPT) by DOE Site on Re-screening (through September 2016)

State	Sites	Workers Screened	1 Abnormal[27]	2 Abnormal[28]	1 Abnormal and 1+ Borderline
AK	Amchitka Island Test Site	22	0 (0.0%)	0 (0.0%)	0 (0.0%)
CA	Lawrence Berkeley National Laboratory	40	1 (2.5%)	0 (0.0%)	0 (0.0%)

[24] Includes K-25, ORNL, and Y-12.
[25] Sites where the number of individuals screened by BTMed to date is less than 100.
[26] Sites where the number of individuals screened by NSSP to date is less than 100.
[27] May include individuals who did not receive a BeLPT at the time of their initial screening or who had a normal result on their initial screening and a single abnormal result on the re-screening.
[28] May include individuals who did not receive a BeLPT at the time of their initial screening, had a normal result on the initial screening, or had a single abnormal or borderline result on their initial screening that was confirmed on their re-screening.

State	Sites	Workers Screened	1 Abnormal[27]	2 Abnormal[28]	1 Abnormal and 1+ Borderline
CA	Lawrence Livermore National Laboratory	457	5 (1.1%)	3 (0.7%)	0 (0.0%)
CA	Sandia National Laboratories, CA	35	2 (5.7%)	0 (0.0%)	0 (0.0%)
CO	Rocky Flats Plant (Construction Workers)	210	1 (0.5%)	0 (0.0%)	0 (0.0%)
CO	Rocky Flats Plant (Production Workers)	677	4 (0.6%)	2 (0.3%)	1 (0.1%)
FL	Pinellas (Production Workers)	167	2 (1.2%)	0 (0.0%)	1 (0.6%)
IA	Ames Laboratory	880	5 (0.6%)	4 (0.5%)	1 (0.1%)
IA	Iowa Army Ammunition Plant	786	12 (1.5%)	4 (0.5%)	4 (0.5%)
ID	Idaho National Laboratory (Construction Workers)	228	2 (0.9%)	0 (0.0%)	0 (0.0%)
ID	Idaho National Laboratory (Production Workers)	1,649	8 (0.5%)	15 (0.9%)	9 (0.5%)
IL	Argonne National Laboratory	46	1 (2.2%)	0 (0.0%)	0 (0.0%)
IL	Fermi National Accelerator Laboratory	10	0 (0.0%)	0 (0.0%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	278	0 (0.0%)	2 (0.7%)	0 (0.0%)
KY	Paducah GDP (Production Workers)	1,451	7 (0.5%)	6 (0.4%)	9 (0.6%)
MO	Kansas City Plant (Construction Workers)	200	5 (2.5%)	1 (0.5%)	0 (0.0%)
MO	Kansas City Plant (Production Workers)	449	1 (0.2%)	2 (0.4%)	1 (0.2%)
NM	Los Alamos National Laboratory	490	6 (1.2%)	1 (0.2%)	0 (0.0%)
NM	Sandia National Laboratories, NM	45	2 (4.4%)	0 (0.0%)	1 (2.2%)

State	Sites	Workers Screened	1 Abnormal[27]	2 Abnormal[28]	1 Abnormal and 1+ Borderline
NV	Nevada National Security Site	1,287	11 (0.9%)	9 (0.7%)	3 (0.2%)
NY	Brookhaven National Laboratory (Construction Workers)	211	7 (3.3%)	2 (0.9%)	1 (0.5%)
NY	Brookhaven National Laboratory (Production Workers)	60	0 (0.0%)	1 (1.7%)	0 (0.0%)
OH	Feed Materials Production Center (Construction Workers)	572	4 (0.7%)	0 (0.0%)	0 (0.0%)
OH	Feed Materials Production Center (Production Workers)	428	1 (0.2%)	5 (1.2%)	2 (0.5%)
OH	Mound Plant (Construction Workers)	89	0 (0.0%)	0 (0.0%)	0 (0.0%)
OH	Mound Plant (Production Workers)	562	1 (0.2%)	10 (1.8%)	5 (0.9%)
OH	Portsmouth GDP (Construction Workers)	345	1 (0.3%)	0 (0.0%)	0 (0.0%)
OH	Portsmouth GDP (Production Workers)	1,665	8 (0.5%)	8 (0.5%)	5 (0.3%)
SC	Savannah River Site (Construction Workers)	1,067	13 (1.2%)	3 (0.3%)	2 (0.2%)
SC	Savannah River Site (Production Workers)	239	0 (0.0%)	1 (0.4%)	1 (0.4%)
TN	K-25 (Production Workers)	2,066	28 (1.4%)	30 (1.5%)	13 (0.6%)
TN	ORNL (Production Workers)	766	5 (0.7%)	22 (2.9%)	7 (0.9%)
TN	Oak Ridge Reservation[29] (Construction Workers)	1,138	8 (0.7%)	7 (0.6%)	3 (0.3%)
TN	Y-12 (Production Workers)	1,390	12 (0.9%)	34 (2.4%)	11 (0.8%)

[29] Includes K-25, ORNL, and Y-12.

State	Sites	Workers Screened	1 Abnormal[27]	2 Abnormal[28]	1 Abnormal and 1+ Borderline
TX	Pantex Plant[30]	203	2 (1.0%)	5 (2.5%)	0 (0.0%)
WA	Hanford Site (Construction Workers)	790	6(0.8%)	4 (0.5%)	0 (0.0%)
WA	Hanford Site (Production Workers)	609	5 (0.8%)	0 (0.0%)	2 (0.3%)
	Other Sites[31] (Construction Workers)	182	2 (1.1%)	1 (0.5%)	1 (0.5%)
	Other Sites[32] (Production Workers)	11	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Grand Total	**21,800**	**178 (0.8%)**	**182 (0.8%)**	**83 (0.4%)**

Table 14 illustrates audiometry (hearing test) findings on initial exams to date.

Table 14. Audiometry Findings on Initial Screening (through September 2016)

State	Sites	Workers Screened	Noise Induced Hearing Loss (NIHL)
AK	Amchitka Island Test Site	1,128	751 (66.6%)
CA	Lawrence Berkeley National Laboratory	248	96 (38.7%)
CA	Lawrence Livermore National Laboratory	1,106	457 (41.3%)
CA	Sandia National Laboratories, CA	89	40 (44.9%)
CO	Rocky Flats Plant (Construction Workers)	742	488 (65.8%)
CO	Rocky Flats Plant (Production Workers)	3,649	2,177 (59.7%)
FL	Pinellas (Production Workers)	631	246 (39.0%)

[30] The site-specific project does not offer repeat BeLPTs. However, workers referred to the NSSP are provided repeat BeLPTs.
[31] Sites where the number of individuals screened by BTMed to date is less than 100.
[32] Sites where the number of individuals screened by NSSP to date is less than 100.

State	Sites	Workers Screened	Noise Induced Hearing Loss (NIHL)
IA	Ames Laboratory[33]	190	54 (28.4%)
IA	Iowa Army Ammunition Plant[34]	105	86 (81.9%)
ID	Idaho National Laboratory (Construction Workers)	917	602 (65.6%)
ID	Idaho National Laboratory (Production Workers)	4,683	2,546 (54.4%)
IL	Argonne National Laboratory	607	222 (36.6%)
IL	Fermi National Accelerator Laboratory	161	63 (39.1%)
KY	Paducah GDP (Construction Workers)	885	676 (76.4%)
KY	Paducah GDP (Production Workers)	3,394	1,907 (56.2%)
MO	Kansas City Plant (Construction Workers)	633	369 (58.3%)
MO	Kansas City Plant (Production Workers)	2,519	1,180 (46.8%)
NM	Los Alamos National Laboratory	2,674	1,579 (59.1%)
NM	Sandia National Laboratories, NM	334	189 (56.6%)
NV	Nevada National Security Site	4,336	3,282 (75.7%)
NY	Brookhaven National Laboratory (Construction Workers)	519	339 (65.3%)
NY	Brookhaven National Laboratory (Production Workers)	466	282 (60.5%)
OH	Feed Materials Production Center (Construction Workers)	1,998	1,014 (50.8%)
OH	Feed Materials Production Center (Production Workers)	1,289	447 (34.7%)
OH	Mound Plant (Construction Workers)	348	223 (64.1%)

[33] The site-specific project does not offer audiograms. However, workers referred to the NSSP are provided audiograms.
[34] The site-specific project does not offer audiograms. However, workers referred to the NSSP are provided audiograms.

State	Sites	Workers Screened	Noise Induced Hearing Loss (NIHL)
OH	Mound Plant (Production Workers)	1,567	803 (51.2%)
OH	Portsmouth GDP (Construction Workers)	1,081	778 (72.0%)
OH	Portsmouth GDP (Production Workers)	3,643	1,895 (52.0%)
SC	Savannah River Site (Construction Workers)	4,333	2,555 (59.0%)
SC	Savannah River Site (Production Workers)	3,407	1,968 (57.8%)
TN	K-25 (Production Workers)	4,316	2,782 (64.5)
TN	ORNL (Production Workers)	2,177	1,365 (62.7%)
TN	Oak Ridge Reservation[35] (Construction Workers)	2,948	2,075 (70.4%)
TN	Y-12 (Production Workers)	3,994	2,761 (69.1%)
TX	Pantex Plant[36]	96	40 (41.7%)
WA	Hanford Site (Construction Workers)	2,662	1,855 (69.7%)
WA	Hanford Site (Production Workers)	4,477	2,219 (49.6%)
	Other Sites[37] (Construction Workers)	1,008	631 (62.6%)
	Other Sites[38] (Production Workers)	338	167 (49.4%)
	Grand Total	**69,698**	**41,209 (59.1%)**

[35] Includes K-25, ORNL, and Y-12.
[36] The site-specific project does not offer audiograms. However, workers referred to the NSSP are provided audiograms.
[37] Sites where the number of individuals screened by BTMed to date is less than 100.
[38] Sites where the number of individuals screened by NSSP to date is less than 100.

Appendix D: Resources

U.S. Department of Energy (DOE) Former Worker Medical Screening Program (FWP) Website
http://energy.gov/ehss/services/worker-health-and-safety/former-worker-medical-screening-program

FWP Medical Protocol
http://energy.gov/ehss/downloads/former-worker-program-medical-protocol

FWP Summary of Services
http://energy.gov/ehss/downloads/former-worker-program-summary-services

A Basic Overview of the FWP (Brochure)
http://energy.gov/ehss/downloads/former-worker-medical-screening-program-brochure

DOE Chronic Beryllium Disease Awareness Website
https://ehss.energy.gov/HealthSafety/fwsp/advocacy/cbd/

Building Trades National Medical Screening Program
http://www.btmed.org/default.cfm
1-800-866-9663

FWP for Burlington Atomic Energy Commission Plant (otherwise known as the Iowa Army Ammunition Plant) and Ames Laboratory
http://www.iowafwp.org
1-866-282-5818

Medical Exam Program for Los Alamos National Laboratory Former Workers
http://www.jhsph.edu/LANLFW/index.html
1-877-500-8615

National Supplemental Screening Program
http://www.orau.org/nssp/
1-866-812-6703

Pantex FWP
1-888-378-8939

Worker Health Protection Program
http://www.worker-health.org/
1-888-241-1199
1-877-771-7977 (for former Nevada National Security Site workers)

Medical Facilities with Experience Evaluating Chronic Beryllium Disease
http://energy.gov/ehss/downloads/former-workers-medical-facilities-experience-evaluating-chronic-beryllium-disease

DOE Human Subjects Protection Program
http://science.energy.gov/ber/human-subjects/

A Basic Overview of the Energy Employees Occupational Illness Compensation Program (EEOICP) (Brochure)
http://energy.gov/ehss/downloads/basic-overview-energy-employees-occupational-illness-compensation-program

U.S. Department of Labor (DOL) Division of Energy Employees Occupational Illness Compensation
http://www.dol.gov/owcp/energy/index.htm

DOL Resource Centers
http://www.dol.gov/owcp/energy/regs/compliance/ResourceMeetings/ResourceCenters.htm

National Institute for Occupational Safety and Health (NIOSH) Dose Reconstruction
http://www.cdc.gov/niosh/ocas/ocasdose.html

DOL Office of the Ombudsman for the EEOICP
http://www.dol.gov/eeombd/