U.S. DEPARTMENT OF ENERGY

Former Worker Medical Screening Program Report









2019

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Foreword

This report presents an overview of the structure and accomplishments of the U.S. Department of Energy (DOE or Department) Former Worker Medical Screening Program or Former Worker Program (FWP or Program) for fiscal year 2019.

Mandated by Congress, the FWP, provides medical screening exams, at no cost, to all eligible and interested former Federal, contractor, and subcontractor workers who may have been exposed to hazardous substances or conditions while working at a DOE site or a covered DOE related-contractor site. The program also serves former workers from DOE's predecessor agencies.

The FWP is managed by the DOE Office of Health and Safety within the Office of Environment, Health, Safety and Security and is comprised of a consortia of universities, labor unions, and commercial organizations that provide the medical exams throughout the country. The Program ensures exam results and causation language are provided to participants for use in follow-up medical care with their physicians or specialists; and that participants identified with adverse health effects are referred to the U.S. Department of Labor Energy Employees Occupational Illness Compensation Program for potential compensation.

Since 1997, the FWP has provided over 154,000 medical exams to over 94,000 former workers, significantly contributing to the health and well-being of these workers as demonstrated in the testimonials included throughout this report.

This report provides updates and cumulative program statistics and results from fiscal year 1997 through 2019. Descriptions of the FWP projects used to provide the medical screenings and key personnel for those projects are also provided.

The FWP receives strong support from Congress and the Department demonstrating the Nation's commitment to the safety and health of the DOE workforce – past, present, and future – and through the dedication and support of our employees and the organizations that provide the exams to the former workers, we will continue 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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Abbreviations Used in This Report

ACOEM	*American College of Occupational and Environmental Medicine*
AFL-CIO	*American Federation of Labor and Congress of Industrial Organizations*
AU	*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*
CHS	*Comprehensive Health Services*
CMIO	*Chief Medical Informatics Officer*
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*
FWP	*Former Worker Medical Screening Program or Former Worker Program*
FY	*Fiscal Year*
GDP	*Gaseous Diffusion Plant*
HIPAA	*Health Insurance Portability and Accountability Act*
IAAP	*Iowa Army Ammunition Plant*
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*
NDAA	*National Defense Authorization Act*

NIOSH	*National Institute for Occupational Safety and Health*
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*
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*

"On behalf of my dad, Mom and I wanted to thank you for arranging to see him for the medical screening. We always appreciate all that you have done for Dad and for so many others."

- Spouse and Daughter of Iowa Army Ammunition Plant former worker

"Your staff's screening was valuable to my life in 2011 as it showed that I was anemic, which prompted me to take further action. Thank you for this program!"

- Ames Laboratory former worker

"I want to thank you for all the former workers you have given medical screenings to and have informed them about the DOL benefits."

- Widow of Ames Laboratory former worker

"BTMed is a good program and should keep on being a program for the building trades."

-Sidney Cox, Carpenter, Former Idaho National Lab Worker BTMed Participant

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Executive Summary

The mission of the Department of Energy (DOE or Department), as well as its predecessor agencies, undertaken for over 70 years, includes nuclear weapons design and production, environmental cleanup from the Cold War nuclear mission, and other activities that may have exposed its workers to toxic substances and hazardous conditions. As a result, Former Worker Medical Screening Program or Former Worker Program (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). The program's activities began in 1996, and medical screening examinations began in 1997.

The FWP directly benefits former DOE workers by identifying signs or symptoms of work-related health conditions at an early stage when they are more treatable and improving workers' understanding of health risks they may have faced due to possible exposures during their employment with DOE. A team of independent physicians specializing in occupational medicine developed the customized medical screening protocol to ensure an objective evaluation of the health of the workers.

This report provides an overview of the structure and accomplishments of the DOE's FWP for FY 2019. The report also provides statistics and cumulative program data from FY 1997 thru FY 2019. In FY 2019, the FWP successfully fulfilled its congressional mandate of delivering medical screening services to all participating eligible former workers by:

- Conducting aggressive outreach using direct mailings and attending events near DOE communities, which resulted in 573 outreach events and assistance to the U.S. Department of Labor (DOL) with 10 of its outreach events.

- Providing 2,524 initial medical examinations and 5,771 re-screen medical exams. Also, by screening 3,617 participants using low-dose helical computed tomography (CT); which includes baseline, follow-up, and annual scans to detect for occupational lung cancer.

- Communicating results to participants in an exam results letter. The FWP physicians include causation language, when a condition is possibly work related. This language can be helpful to participants who decide to file a claim under the Energy Employees Occupational Illness Compensation Program Act (EEOICPA), a program administered by the DOL.

- Protecting participants' information as required by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act.

Descriptions of the organizations that conduct the medical screening exams and the biographies of Principal Investigator are provided in Appendix A.

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1.0 Program Overview

This report presents an overview of the structure and accomplishments of the U.S. Department of Energy's (DOE or Department) Former Worker Medical Screening Program or Former Worker Program (FWP) for fiscal year (FY) 2019, as well as cumulative program results from FY 1997-2019.

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 who may have been exposed to hazardous substances or conditions while working at a DOE site or a covered DOE-related contractor site. The program also serves former workers from DOE's predecessor Agencies (the Manhattan Engineer District, the Atomic Energy Commission, and the Energy Research and Development Administration).

The FWP designed the medical screening exams to check for potential adverse health effects related to occupational exposures, including but not limited to radiation, beryllium, asbestos, silica, welding fumes, lead, cadmium, chromium, solvents, and noise.

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:

> *"… 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 from nuclear weapons design and production, as well as other activities that may have exposed its workers to toxic substances or hazardous conditions.

The FWP, managed by the DOE Office of Health and Safety within the 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 23 years has resulted in high-quality services; and the level of satisfaction expressed by participants, 97.8 percent on surveys, speaks to the skill and professionalism of the organizations administering the program for AU.

Participants identified with adverse medical conditions are provided information to be used for follow-up medical care with their personal physicians or specialists and are referred to the U.S. Department of Labor (DOL) for potential compensation through the Energy Employees Occupational Illness Compensation Program Act (EEOICPA).

Since 1997, a total of 154,145 medical exams (initial and re-screen exams) have been provided to 94,331 former workers through the FWP. Since 2000, the FWP has screened 15,529 participants for occupational lung cancer with low-dose helical computed tomography (CT), and completed 59,782 low-dose CT scans; these include baseline, follow-up, and annual scans.

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

The regional FWP projects include the:

- Pantex Former Worker Medical Surveillance Program, conducted by Drexel University Dornsife School of Public Health in conjunction with the University of Texas Health Science Center at Tyler
- 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 Atomic Energy Commission Plant and Ames Laboratory Workers Medical Screening Program, conducted by The University of Iowa College of Public Health

The nationwide FWP projects include the:

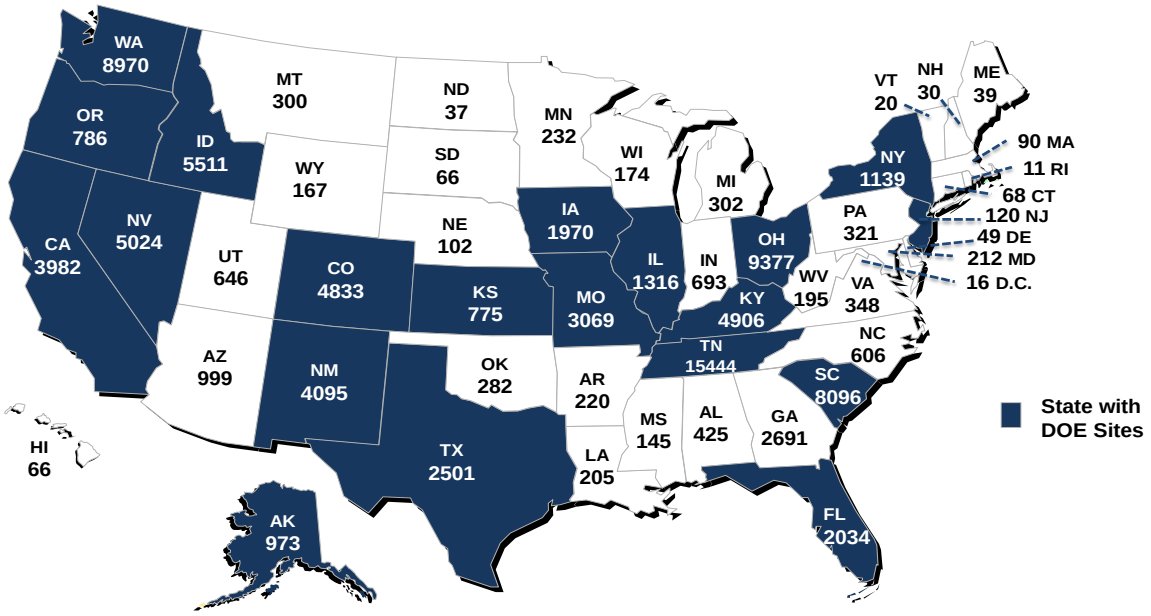
- National Supplemental Screening Program (NSSP), conducted by Oak Ridge Associated Universities (ORAU) in conjunction with Axion Health, Comprehensive Health Services, National Jewish Health, and the University of Colorado Denver
- Building Trades National Medical Screening Program (BTMed), conducted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

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

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 (see Figure 1).

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

Figure 1. Participants Screened by State of Residence (1997 – September 2019)



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 have faced due to possible exposures during their prior employment with DOE.

Additional information on the FWP, how it is managed 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).

David Todd, Former Kansas City Plant worker, BTMED

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2.0 Program Implementation

Program implementation focuses primarily on four specific activities: outreach, medical screenings, communications, and protection of participants' privacy:

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

Mooch Calloway and Andrew Breiten, Fernald Local Coordinators at the 2019 National Day of Remembrance

Since the inception of the FWP, DOE realized there would be challenges in locating workers to participate in the medical screening program as there is no centralized database of former DOE workers. In addition, subcontractors employed many workers intermittently, 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, or lists of names of former DOE workers, along with other identifying information, such as last known address, that may be available from employers or DOE. AU works closely with DOE Headquarters program offices to obtain rosters of former workers from site contractors and field/site offices. The FWP projects send invitations to individuals using the last known address. When addresses are outdated or inaccurate, the FWP projects use address-update services to obtain current contact information. 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.

All of the FWP projects use multiple outreach methods to notify eligible former DOE workers about the availability of FWP services. The primary method of outreach is direct mailings to former workers inviting them to participate in the program. The FWP projects also conduct outreach events at DOE sites or in the communities near DOE facilities. In FY 2019, the FWP participated in 573 outreach events and assisted the DOL with 10 of its outreach events. Workers also receive exit packets with program information when separating from a site, and the hyperlinks on retiree/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.

Vicky DeForrest, BTMed nurse, attends an outreach event in Oak Ridge.

Jeanne Cisco, Portsmouth Local Coordinator and Gaylon Hanson, INL Local Coordinator United Steelworkers Health and Safety Conference

To locate workers, the FWP projects continued to conduct aggressive outreach efforts in FY 2019. 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 that they believe they are in good health, they are simply not interested in screening, or they may harbor a mistrust of a government program. Additional information regarding outreach is on the FWP Website (http://energy.gov/ehss/outreach-former-worker-medical-screening-program-fwp).

2. Medical Screening:

Provide medical screening exams designed to check for adverse 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

Medical screenings can identify diseases or precursor conditions at an early stage of development, often before signs and symptoms occur. Clinics can refer individuals with suspicious findings to their personal physician or a specialist for further testing, diagnosis, and treatment. The FWP is not 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 and conditions. A team of independent physicians, specializing in occupational medicine, customized the medical screening program. This 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 list 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).

Craig K. Woods, a participant with Pantex FWP, receives a spirometry test.

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. In many cases, the interviewers are former workers with knowledge of DOE sites and the type of exposures at the sites.

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) (to detect beryllium sensitization)
- Blood chemistry test
- Urinalysis
- Audiometry (hearing test)

Participation in the FWP is 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. Certain medical exams may be recommended only during the initial screening exam and excluded from the re-screen exam.

In addition to identifying conditions that may have been related to workplace exposures, the program also 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).

The results of general health screening tests, as well as findings during examinations can be of great benefit to the participants. The participant's personal physician can treat many of the conditions that fall into this category, significantly improving 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 2019, the FWP conducted 2,524 initial exams and 5,771 re-screen exams. Since 1997, a total of 154,145 medical exams have been conducted through the FWP, comprising 94,331 initial screening exams and 59,814 re-screen exams. A breakdown of the number of initial and re-screen exams conducted through FWPs for the past several years is provided in Figure 2.

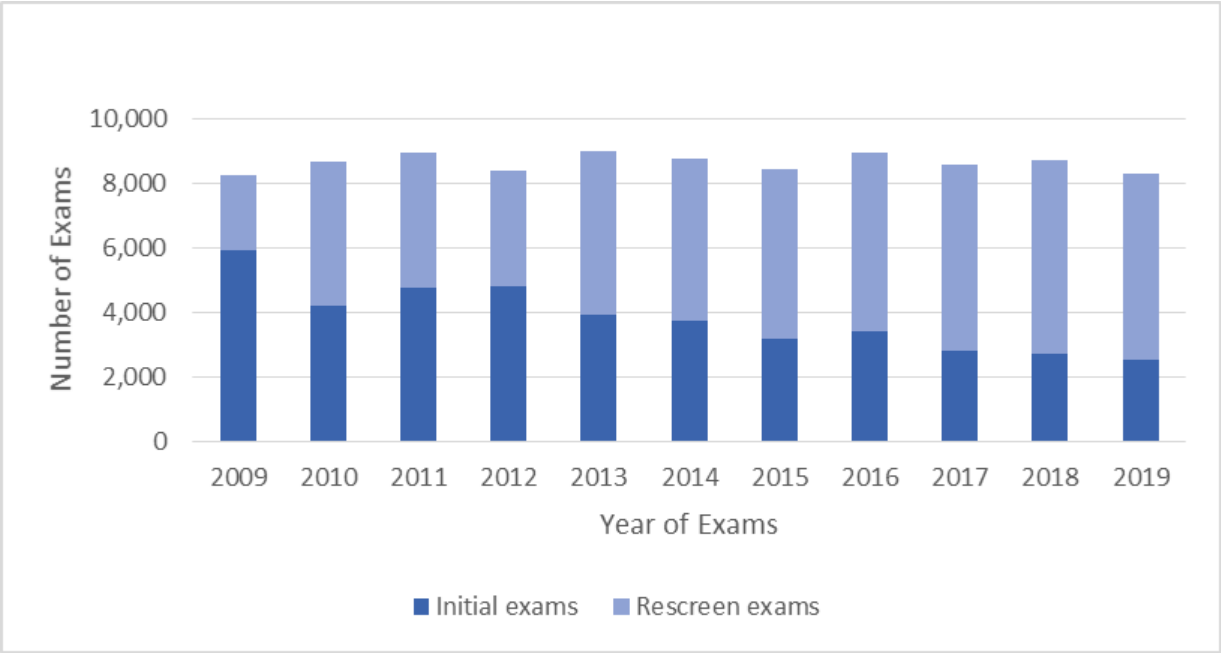

Figure 2. Initial and Re-Screen Exams by FY

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

b. Early Lung Cancer Detection Program

Since 2000, DOE has made screening for lung cancer with low-dose helical CT scans available because many former workers may be at risk for occupational lung cancer because 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.

ELCD participants are offered initial/baseline, follow-up, and annual scans. If an individual's initial/baseline scan shows one or more nodules that are not highly suspicious for cancer, they are offered a follow-up scan at 3 or 6 months to determine if there have been any changes to the nodule(s).

If a nodule is suspicious for lung cancer, the participant is referred to a specialist for diagnostic evaluation. Ongoing annual repeat low-dose CT scans are offered if an individual's initial/baseline scan is normal. This is to determine if new nodules are present or if there are changes in previously detected nodules, which may indicate that lung cancer is present.

In FY 2019, 3,393 participants were provided a low-dose CT scan, of which 200 were new participants receiving a baseline screen. In addition, 3,417 were participants receiving either a follow-up or annual low-dose CT scan. A total of 3,617 low-dose CT scans were performed; this includes baseline, follow-up, and annual scans. Since 2000, the FWP's ELCD program has screened 15,529 eligible participants and provided 59,782 low-dose CT scans. To date, 224 lung cancers have been detected through this vital component of FWP medical screening.

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
- The University of Iowa.

Other FWP projects are exploring how to incorporate CT scanning into their current protocols.

More in-depth information regarding the ELCD program, including low-dose CT scans, is on the FWP Website (http://energy.gov/ehss/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 follow-up 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, 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, both occupational related and non-occupational related, from their medical screening exam in a results letter several weeks after their examination, along with any necessary follow-up recommendations. The results letter also includes general health advice for workers, such as recommendations for smoking cessation. While the FWP projects offer medical screening exams, follow-up 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, FWP provides participants with 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.

4. Protect Personally Identifiable (PII) and Protected Health Information (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 FWP is confidential and used only as allowed by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act (HIPAA). FWP conducts all activities 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/PHI.

"I would like to share what I feel is a **Life Saving** experience. I was a former pipe fitter and other assigned duties as a salary worker at the Feed Materials Production Center, better known as the Fernald Site. I now participate in the Worker Health Protection Program that monitors my health condition with very comprehensive physicals and CT scans for the early detection of lung cancer. In 2019, the CT scan detected an abnormality that could have been a life and death situation. This program saved my life and for that, I will be eternally grateful!"

- Spouse and Daughter of Iowa Army Ammunition Plant former worker

"Thank you for the unexpectedly excellent insights of the medical screening. On each of the subsequent visits, I have always felt the quality of the screening was high and the people involved in the program were caring. I recommend that Lab workers have their screening regularly, as such a visit can perhaps uncover hidden issues for you, and if not, you have reassurance that all is as it should be."

- Mary Adamson, Former Lawrence Livermore

"Several years ago, I went the through the Worker Health Protection Program's Early Lung Cancer Detection Program and received a low-dose CT scan.

While my lungs were clear, in the process, the CT scan actually found I had an aortic aneurysm. If it wasn't for this program, I never would have known about this condition and I could have dropped. My condition is now being closely monitored by my doctor. I am very thankful I participated in this program."

- Joe, Retired Portsmouth, GDP worker

"I'm glad that there is a program for former workers and I advi[illegible]rmer workers to enroll. The program is important as not all physicians even know what beryllium is."

- Anonymous Former NNSS Worker

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3.0 Program Findings

A summary of medical examinations performed through FWP from FY 1997 to FY 2019 is in Tables 1-4. Only new abnormal findings on re-screen exams are reported (i.e., abnormal results found on initial exams are not counted again in the re-screen results). 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 (1997 through September 2019)

Screening Exam	Workers Screened	Asbestos related Lung Disease[2]	Silicosis[3]	Other Dust related Disease[4]	Lung Nodules, Nodes, or Lesions[5]
Initial	86,491	9,780 (11.3%)	173 (0.2%)	1,252 (1.4%)	2,801 (3.2%)
Re-screen	32,345	2,603 (8.0%)	27 (0.1%)	441 (1.4%)	1,276 (3.9%)

Table 2. Spirometry Findings on Initial and Re-screen Exams (1997 through September 2019)

Screening Exam	Workers Screened	Obstructive Airways Dysfunction Detected[6]
Initial	85,174	13,447 (15.8%)
Re-screen	32,538	3,331 (10.2%)

[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 (1997 through September 2019)

Screening Exam	Workers Screened	1 Abnormal[7]	2 Abnormal	1 Abnormal and 1+ Borderline
Initial	77,562	913 (1.2%)	759 (1.0%)	259 (0.3%)
Re-screen	25,630	222 (0.9%)	216 (0.8%)	122 (0.5%)

Table 4. Audiometry Findings on Initial Exam (1997 through September 2019)[8]

Workers Screened	Noise induced Hearing Loss
76,939	40,957 (53.2%)

The results from low-dose CT screening through the FWP ELCD program from 2000 through September 2019 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. Low-dose 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 lung cancer detection and preventing deaths than conventional chest x-rays.

Table 5. Stage of Lung Cancers Detected by WHPP, BTMed, and NSSP ELCD Program (2000 through September 30, 2019)[9]

Site of ELCD Program	Number of Participants Screened	Number of Lung Cancers Detected	Number of Detected Lung Cancers That Were Staged	Number (%) of Early Cancers Detected[10] (Carcinoma In Situ, Stage I or II Non Small Cell, or Limited Small Cell)
Feed Materials Production Center (Construction Workers)	202	3	3	3 (100%)

[7] Individuals with one abnormal BeLPT are encouraged to file a claim with the DOL EEOICPA. An occupational medicine physician will diagnoses beryllium sensitization based on the BeLPT results.

[8] Audiometry is offered only on the initial exam since occupational hearing loss would typically be detected during the initial screen exam of retired workers.

[9] Findings include results from baseline, follow-up, and annual scans.

[10] The TNM classification system describes the stage of lung cancer defined by 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 Cancers Detected[10] (Carcinoma In Situ, Stage I or II Non Small Cell, or Limited Small Cell)
Feed Materials Production Center (Production Workers)	461	5	4	3 (75%)
Hanford (Construction Workers)	360	8	8	7 (88%)
Idaho National Laboratory (Production Workers)	717	10	9	6 (67%)
K-25 (Production Workers)	2,882	40	40	31 (78%)
Mound Plant (Production Workers)	618	7	6	5 (83%)
Nevada National Security Site (All Workers)	738	8	7	3 (42.9%)
ORNL (Production Workers)	1,290	17	16	8 (50%)
Oak Ridge Reservation (Construction Workers)	522	16	16	9 (56%)
Miscellaneous Sites (All Workers)	301	7	7	7 (100%)
Paducah (Production Workers)	2,027	26	25	19 (76%)
Portsmouth (Production Workers)	2,275	28	26	21 (81%)
Rocky Flats (Production Workers)	98	1	1	1 (100%)
Savannah River Site (Construction Workers)	272	4	4	3 (75%)
Y-12 (Production Workers)	2,766	44	41	30 (73%)
Total	**15,529**	**224**	**213**	**156 (73%)**

The ELCD program has also detected other diseases of importance (see Table 6).

Table 6. Other Diseases Found on CT Scan by ELCD Programs (2000 through September 30, 2019)

Condition	Number Detected
Aortic aneurysm	86
Appendiceal cancer	3
Breast cancer	1
Heart aneurysm	7
Hemangiopericytoma	1
Kidney cancer	14
Liver cancer	5
Lymphoma	10
Mesothelioma	3
Metastatic cancer (primary site other than lung)	8
Metastatic cancer (primary site unknown)	7
Pneumonia	112
Splenic aneurysm	4
Thymoma	12
Thyroid cancer	5

"I worked at K25 for about 28 years. This program really helped me. They found I had asbestosis and helped to identify a cancer...For all the workers who were exposed, this program is very important."

- Ronnie Wallace, Former K-25 GDP Worker

"I was with a coworker and heard information on TV commercials regarding Pantex workers. I was about to retire with 43 years and 7 months experience with the Pantex plant and the President of the Union mentioned the Pantex Former Worker Program. Decided to call in and setup a screening. The screening was setup in a very convenient and timely manner. I was seen immediately upon arriving at the clinic and the clinic was a comfortable, relaxed setting. The staff was knowledgeable and explained the cons[illegible]s and examination process. T[illegible]e very, very polite, the exam was v[illegible]ugh, and I never felt rushed. Test[illegible]erformed immediately, in one ar[illegible]nto next, they were waiting for me to [illegible] received a letter expla[illegible]s. My overall experience was ex[illegible] would recommend this progra[illegible]

- Arturis I. Spencer Amarillo, Texas

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4.0 Summary

Through the FWP, the Department continues to demonstrate a 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. 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 to improve implementation of the program and ensure that the most appropriate medical tests are offered. Also, the FWP routinely monitors participant satisfaction with program elements, including medical clinic staff, wait times, and locations. Clinics that perform poorly are removed from the program. Another challenge is recruiting and encouraging former workers to participate in the screening program. While the FWP continuously conducts outreach activities, including attending local meetings and preparing mailings, the FWP is always looking for new ways to increase participation rates.

In FY 2019, the Department, through the FWP, continued to meet its obligation to its former workers by providing medical screening examinations to all eligible individuals. The FWP projects continued to expand CT scanning for early lung cancer detection to other interested and eligible worker populations. In addition, DOE continued to maintain the program elements and practices that contribute to the program's success while building on lessons learned.

Mark Parson, Cement Finisher, BTMed

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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

Who we are:

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

What we do:

BTMed offers independent medical screenings to former DOE construction workers to assess for occupational illnesses. BTMed also operates an Early Lung Cancer Detection Program (ELCD) that uses the latest and most advanced low-dose computed tomography (CT) scans. The ELCD program is designed to detect lung cancers at an early stage while they can be treated effectively. More than 40,000 medical screenings and 6,400 low-dose CT scans have been delivered using a national network of providers.

BTMed Covered Sites

What we have found:

FWP medical screening

- Chest x-rays (N=22,779 participants receiving at least one CXR): 19.2 percent of 22,779 participants demonstrated findings consistent with work-related lung disease.
- Pulmonary function tests (N=22,440 participants receiving at least one PFT): 22.6 percent of 22,440 participants demonstrated findings consistent with obstructive disease.
- Beryllium Lymphocyte Proliferation Tests (BeLPT) (N=21,589 participants receiving at least one BeLPT): 2.2 percent of 21,589 participants had at least one abnormal BeLPT.
- Audiometry (N=20,927 participants receiving at least one audiogram): 64.6 percent of 20,927 participants demonstrated hearing loss for normal speech tones.

ELCD Program

- Lung cancer was detected in 39 of 1,644 DOE workers tested.
- 31 of the 39 (79 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.

BTMed and Research:

- BTMed maintains a research function which uses the medical screening data for three purposes:
  - To improve the services we deliver to our participants, make improvements in the delivery of occupational medical services and strengthen occupational medical recommendations.
  - To identify work-related health risks and make recommendations about ways to improve worker protection within the DOE facilities.
  - To identify unmet or poorly met general health needs and find ways to improve health care delivery.
- BTMed has completed and published 16 studies in the scientific literature. Most recently, a study was completed to investigate if construction workers employed at DOE sites are at significant risk for diseases associated with occupational exposures, our researchers compared the mortality experience of 24,086 BTMed participants to that of the U.S. population. The study found that DOE workers have a significantly increased risk for occupational illnesses over all time periods. Mortality was elevated for all causes: asbestosis; all cancers, including those of the bronchus, hematopoietic, lung and lymphatic systems, and the trachea; chronic obstructive pulmonary disease; mesothelioma; transportation injuries; and other injuries, particularly those caused by accidental poisoning, a possible effect of the opioid epidemic. Except for the rise in accidental poisoning, mortality patterns were similar to those previously reported. Continued medical surveillance is important for this population. The full paper is available on www.btmed.org.

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

Web site: www.btmed.org

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

BTMed Medical Team:

Marianne Cloeren, MD, MPH

Dr. Cloeren has decades of experience managing teams of clinicians, serving as Medical Director for a variety of private and government programs. Work experience includes interacting with remote nurse case managers, managing quality assurance and audits, and delivering effective and well-reasoned case reviews in a Federal program; she has written or overseen the production of tens of thousands of such reviews. Dr. Cloeren serves as the primary medical director for BTMed.

Stella Hines, MD, MSPH

Dr. Hines is board-certified in Occupational Medicine, Pulmonary Medicine, Critical Care Medicine, and Internal Medicine. Her research and work experience includes respiratory protection, pulmonary function testing, and surveillance for exposure to beryllium, asbestos, and other pulmonary toxins.

Joanna Gaitens, MSN, MPH, PhD

Dr. Gaitens is a doctorally prepared nurse researcher who applies her PhD in Public Health/Occupational and Environmental Health to the management of long-term medical surveillance programs following individuals with toxic occupational exposures.

Melissa McDiarmid, MD, MPH

Dr. McDiarmid is a clinical toxicologist who is board-certified in Internal Medicine and Occupational Medicine; she heads the University of Maryland Division of Occupational and Environmental Medicine. A seasoned clinician and researcher, she is an expert in medical surveillance programs and cancer related to occupational exposures.

Knut Ringen, DrPH, MHA, MPH

Principal Investigator, BTMed

With With more than 40 years of experience in public health administration, Dr. Knut Ringen is 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 Building Trades National Medical Screening Program (BTMed.org). The BTMed program, which serves construction workers from 35 DOE sites across the country, has delivered in excess of 40,000 screenings to date. Since 2013 it added a special focus of early lung cancer detection for a subset of BTMed participants who have a very high risk.

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 Former Worker Medical Screening Program.

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 – The Center for Construction Research and Training (cpwr.com), a 501(c)(3) non-profit research institution, which serves as the research arm of North America's Building Trades Unions (nabtu.org).

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 in Hospital Administration from the Medical College of Virginia (now a part of Virginia Commonwealth University) and a Doctor of Public Health from Johns Hopkins University.

The Pantex Former Worker Medical Surveillance Program

Conducted by The Dornsife School of Public Health at Drexel University

DREXEL UNIVERSITY
Dornsife
School of Public Health

Who we are:

- Primary: The Dornsife School of Public Health at Drexel University; PI: Arthur L. Frank, MD, PhD.
- Outreach: Department of Occupational and Environmental Health Sciences, University of Texas Health Science Center at Tyler, Texas; Co-PI: C. David Rowlett, MD, MS.
- Clinical Services: Amarillo Medical Specialist, LLP, 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 a clinic in Amarillo. Former workers that live outside the Amarillo area are referred to the NSSP.
- Each participant completes an occupational exposure history, as well as past medical history, prior to having their medical screening examination.
- The initial screening exam includes offering all of the following tests: physical exam, chest x-ray with ILO B-read, spirometry, Beryllium Lymphocyte Proliferation Test (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 three 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 DOL program, as appropriate.

What we have found:

- CXRs: 5.52% of 1251 participants demonstrated findings consistent with work-related lung disease
- CXRs: 4.96% of 1251 participants demonstrated findings consistent with suspicious lung nodules or lesions
- Pulmonary function tests (PFTs): 41.33% of 1251 participants demonstrated findings consistent with obstructive disease
- BeLPTs: 1.36% of 1251 participants had at least one abnormal BeLPT
- Audiometry: N/A
- Our Participation Surveys continue to show 99.1% satisfaction with the program

Toll-free number: 1-888-378-8939
Amarillo number: 1-806-378-8939

Arthur L. Frank MD, PhD

Principal Investigator

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 also 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 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 NIOSH, OSHA, the EPA, and the CDC. 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.

C. David Rowlett, MD, MS, FACOEM

Co-Principal Investigator

Dr. Rowlett joined the Department of Occupational Health Sciences at the University of Texas Health Science Center at Tyler (UTHSCT) as an Associate Professor in 2010 and began working with the Pantex former worker program in 2014. Prior to UTHSCT, Dr. Rowlett was first a designated physician and then the site occupational medical director (SOMD) at the Pantex plant, Amarillo TX, from 2003-2009. Dr. Rowlett received an MS in Chemical Engineering from Texas Tech University, Lubbock TX, in 1977 after which he served on active duty as a research engineer for the US Army. After four years on active duty, he entered industry in 1981 as a process engineer and technical superintendent. After three 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, IA. He returned to industry with Exxon Company USA serving as medical director of the Baytown refinery, Baytown TX, 1990-1993. Following this, Dr. Rowlett spent a decade in multispecialty group practice, first with Scott & White Clinic, Temple TX (1993-1999) and then with the Covenant Medical Group, Lubbock TX (1999-2003) before joining Pantex.

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 the American College of Occupational and Environmental Medicine (FACOEM).

Angela Phillips, DNP, APRN, FNP-BC

Clinical Services

Dr. Phillips is an Associate Professor in the College of Nursing and Health Sciences at West Texas A&M University (WTAMU). She received an ADN from McLennan Community College in 1989, a BSN from the University of Texas at Arlington in 1992, a MSN from Texas A&M University, Corpus Christi and certified Family Nurse Practitioner (FNP) in 1999, and Doctor of Nursing Practice (DNP) in 2009 from University of Texas at Houston. She has been employed at WTAMU since 2003.

Dr. Phillips is the Director of the FNP program and teaches Advanced Health Assessment, Primary Health Care courses, Capstone Practicum for FNP, and Research Synthesis.

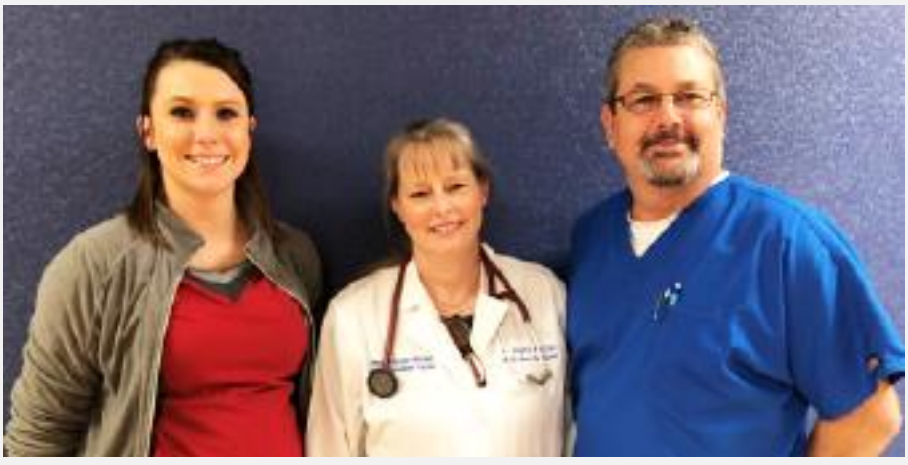
Dr. Phillips is involved in the Nursing Health and Wellness Clinic on campus at WTAMU. She is a member of National Organization of Nurse Practitioner Faculty, Sigma Theta Tau International Honor Society of Nursing, American Academy of Nurse Practitioners, Texas Nurse Practitioners, and Panhandle Nurse Practitioner Association. She is on numerous health-related boards and is currently providing care for patients at Amarillo Medical Services and Heal the City free clinic within the city of Amarillo.

Dr. Phillips has been involved in Pantex Former Worker Medical Surveillance Program since 2005. She has published an article and given presentations related to this research.

Amarillo Medical Specialists, LLP

Clinical Location

Jenna Powell, Angela Phillips, Ken Phillips



Espanola program office and medical clinic.

Medical Exam Program for Former Workers from Los Alamos 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 – Albuquerque (SNL).
- The JHBSPH Medical Exam Program is one of several unique programs within the Department of Energy Former Workers Program. Examinations are done in New Mexico in Espanola and Albuquerque, by occupational health professionals from JHBSPH and UNM. We offer initial examinations and re-examinations every three years.
- Examination sessions are scheduled over a 2 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 each 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 4,569 examinations of former workers since the program began in 2000. Of these exams, 3,807 were new exams, and 762 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 (JOTG) 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 (EEOICPA). The JOTG has representatives from NIOSH, DOE, the Former Workers Programs, DOL Office of Workers Compensation, DOL Ombudsman's Office, NIOSH Ombudsman's Office, and the DOL Resource Centers.
- When we are unable to attend DOL meetings in the NM area we send brochures for both programs to the Espanola Resource Center for these meetings.

- We participated in the Cold War Patriots Town Hall Meetings in Espanola, NM and Santa Fe where we discussed the program and recruited program participants.

What we have found:

- CXRs: N= 3,478 had at least 1 chest x-ray and 9.43 percent demonstrated findings consistent with work-related lung disease;
- PFTs: N = 2,552 had at least 1 PFT and 6.0 percent demonstrated findings consistent with obstructive disease;
- BeLPTs: N = 3,445 had at least 1 BeLPT and 3.3 percent had at least one abnormal BeLPT; and
- Audiometry: N= 3,155 had at least 1 audiometry and 59.0 percent demonstrated hearing loss for normal speech tones.

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

Web site: 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). ORAU provides innovative scientific and technical solutions for the Department of Energy (DOE) and other federal agencies to advance national priorities in science, health, education, and national security. ORAU accomplishes the needs of the NSSP by integrating unique specialized teams of experts and connecting former DOE workers to the right people and resources in their area for medical screening examinations.

The NSSP team of experts includes the:

National Jewish Health is an academic medical research facility specializing in respiratory, cardiac, immune, and allergic disorders. National Jewish Health provides the NSSP with medical examinations, beryllium lymphocyte proliferation tests, and chest x-ray b-read services.

University of Colorado School of Public Health Center for Health, Work & Environment provides the NSSP with medical examination results letter preparation, operational oversight, and periodic evaluation of the DOE/NSSP medical protocol.

Comprehensive Health Services (CHS) is a leading provider of medical management solutions and has one of the country's largest nationwide clinic networks. CHS provides the NSSP with participant scheduling and medical examination services at more than 2,500 facilities around the country. With staff physician oversight, CHS medical readiness teams respond to employers' health care needs. CHS scalable exam and surveillance programs provide dynamic, proven, and robust solutions for national and international workplace health.

Axion Health provides the NSSP with ReadySet®, a cloud-based employee health management system to increase compliance, employee engagement, and organizational efficiency. ReadySet® is currently used by many prestigious U.S. health systems, integrating employee/occupational health and medical surveillance. The system is HIPAA, NIST, and SOC2 compliant; easy to learn; and quick to implement. ReadySet® is a secure solution covering over a million individuals.

What we do:

- The NSSP is the newest of the DOE Former Worker Programs. It began operation in 2005 and provides medical screening examinations to DOE former workers from eight primary DOE sites:
    - Argonne National Laboratory
    - Fermi National Accelerator Laboratory
    - Hanford
    - Kansas City Plant
    - Princeton Plasma Physics Laboratory
    - Pinellas
    - Rocky Flats
    - Savannah River Site
    - The NSSP also screens former workers from 73 additional DOE sites, including:
        - referrals from site-specific Former Worker Programs (FWPs) when eligible former workers live outside of those programs' respective medical screening coverage areas and
        - DOE sites for which no other FWP has been established or assigned.
- The NSSP provides DOE former workers with exposure-based medical screening examinations designed to identify medical conditions that are both occupational and non-occupational in origin. As a result, 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 participants with the opportunity to receive a "rescreening" examination every three years.
- The NSSP provides DOE former workers with information and assistance in filing Energy Employee Occupational Illness Compensation Program (EEOICP) benefit claims with the Department of Labor (DOL).
- In FY2017, the NSSP began providing the hemoglobin A1c test as a component of all medical screening examinations. The hemoglobin A1c provides information about a person's average blood glucose level over the 3 months prior to the exam and is the primary test used for diabetes diagnosis, management, and research. Having results from the A1c test has significantly improved our ability to provide valuable medical follow-up recommendations.
- Over the program's 15-year existence, more than 99% of responding participants have been satisfied with their experience in the NSSP.

What we have found:

Chest X rays (with B Read interpretation): N 18,102	
5.5%	had findings consistent with asbestosis without pleural disease
1.0%	had findings consistent with asbestosis with pleural disease
4.9%	had findings consistent with asbestos-related pleural disease
0.2%	had findings consistent with silicosis
0.0%	had findings consistent with mixed dust pneumoconiosis
3.4%	had findings consistent with pneumoconiosis, not otherwise specified

Pulmonary Function Tests: N=18,032	
21.9%	had findings consistent with restrictive lung disease
13.5%	had findings consistent with obstructive lung disease
3.0%	had findings consistent with mixed pattern lung disease

BeLPTs: N=16,750	
2.7%	had at least one abnormal BeLPT

Audiometry: N=16,177	
42.9%	demonstrated noise-induced hearing loss for normal speech tones
2.3%	w/ supplemental definition of occupational noise-induced hearing loss

Hemoglobin A1c: N=5,382	
54.0%	Normal (A1c value < 5.7)
30.5%	Prediabetes (A1c value 5.7 - 6.4)
15.6%	Diabetes (A1c value 6.5 or greater)

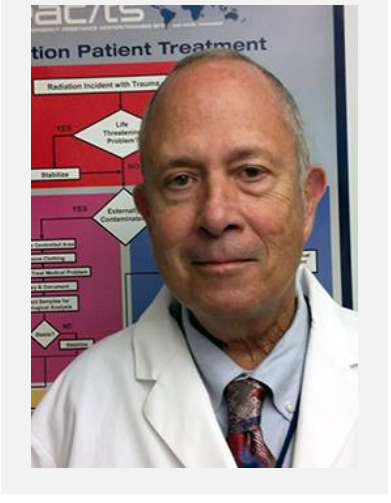
Toll-free number: 1-866-812-6703

Web site: http://www.orau.org/nssp

Donna L. Cragle, PhD

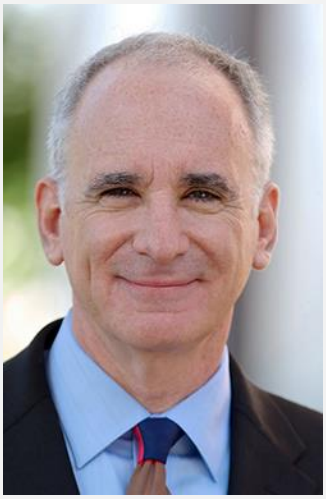
Dr. Cragle stepped down as the Senior Vice President and Director of Health, Energy, and Radiation Management at Oak Ridge Associated Universities (ORAU) in the fall of 2019, but she has retained her role as a Co-Principal Investigator of the National Supplemental Screening Program (NSSP). She has been involved with research of occupational hazards in Department of Energy (DOE) facilities for more than 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 Ph.D. in environmental epidemiology from the University of North Carolina-Chapel Hill.

John R. McInerney, MD



Dr. McInerney is a physician with Oak Ridge Associated Universities (ORAU), manager of the ORAU Arvada Office, and is the Co-Principal Investigator of the National Supplemental Screening Program (NSSP). Dr. McInerney coordinates the NSSP evaluation tests and procedures, 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 three 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 eight 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 Department of Energy (DOE) Rocky Flats Plant for 10 years, the last seven 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 Center for Health, Work and Environment, Colorado School of Public Health, University of Colorado Denver. In September, 2019 he was named a University of Colorado Distinguished Professor, reflecting his many accomplishments. He is Director of the Center for Worker Health and Environment, Director of the National Institute for Occupational Safety and Health-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's Anschutz Medical Campus. Dr. Newman serves as the Co-Principal Investigator of the National Supplemental Screening Program (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 DOL Energy Employee Occupational Illness Compensation Program (EEOICP), 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 (BeLPT) 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.

Worker Health Protection Program (WHPP)

Who we are:

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 local clinics and medical schools in or near local DOE communities, including the University of Tennessee Graduate School of Medicine in Knoxville, TN and the University of Nevada, Las Vegas, School of Medicine. WHPP initiated medical screening in 1998 and currently provides FWP examinations at 14 DOE sites in eight 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 referral guidance to claimants regarding EEOICP and state workers' compensation claims. Local coordinators have been an essential component in the recruitment of more than 34,000 DOE workers who have participated in over 68,500 total examinations through WHPP.

What we do:

The consortium utilizes expert occupational medicine physicians and administrative staff to provide independent medical screening to assess for occupational illness, as well as selected non-occupational conditions common among former DOE workers. In addition to the standard FWP medical screening, WHPP administers the Early Lung Cancer Detection (ELCD) Program, which offers low-dose CT scans at twelve DOE sites.

WHPP provides both standard FWP medical screening and early lung cancer screening 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 Plant (Ohio)
- Portsmouth GDP (Ohio)
- K-25 GDP (Tennessee)
- Oak Ridge National Laboratory (Tennessee)
- Y-12 National Security Complex (Tennessee)
- Lawrence Berkeley National Laboratory (California)
- Lawrence Livermore National Laboratory (California)
- Sandia National Laboratory (California)

Standard FWP medical screenings only are provided to workers from:

- Waste Isolation Pilot Plant (New Mexico)
- Brookhaven National Laboratory (New York)

What we have found:

FWP medical screening

- Chest X-Rays (CXRs) (N=33,847 participants receiving at least one CXR): 8.5 percent demonstrated findings consistent with work-related lung diseases constituted by the pneumoconioses (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).
- Pulmonary Function Tests (N=33,094 participants receiving at least one PFT): 16.7 percent demonstrated findings consistent with obstructive lung disease (includes PFT abnormalities consisting of obstructive pattern and mixed pattern combined).
- Beryllium Lymphocyte Proliferation Tests (BeLPTs) (N=31,051 participants receiving at least one BeLPT): 3.6 percent had at least one abnormal BeLPT (total percentage of BeLPT abnormals – 1, 2 or 1 and 1+ borderlines).
- Audiometry (N=32,043 participants receiving at least one audiogram): 48.4 percent demonstrated occupational hearing loss.

ELCD Program

- 185 ELCD Program participants have been diagnosed with primary lung cancer from 2000 to the present.
- 126 of the 175 (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 approximately 75 DOE workers cumulatively tested since 2000 (N=13,805).

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

Web site: 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.

Ashlee Fitch, OHST

Ashlee Fitch stepped down as the Principle Investigator for the USW for the Worker Health Protection Program in 2019, she will remain Principle Investigator on other federal training grants the USW receives. As a health and safety advocate, Ms. Fitch works to provide technical assistance to the local unions of the USW and coordinate health and safety training across the United States. Ms. Fitch also serves as Board Member at Large for the Beryllium Health and Safety Committee, which focuses on education on occupational exposure to beryllium and the prevention of beryllium-induced conditions and illnesses.

Prior to joining the USW, Ms. Fitch worked in a rolled aluminum plant and served as a union representative on the labor-management health and safety committee. She has a Bachelor of Science degree in Natural Resource and Environmental Economics and a Master of Science degree in Safety Management, both from the University of West Virginia and is a Certified Safety Professional through the Board of Certified Safety Professionals.

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 1942.

Nearly 11,000 workers were employed in the manufacture and disassembly of nuclear weapons at the BAECP with an estimated 2,696 still living and have known addresses; 38 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, 2019, a total of 1,429 former workers have been screened with 852 receiving a 3-year repeat screening, 535 a 6-year, 343 a 9-year, 151 a 12-year, and 40 a 15-year repeat screening.

Over 14,000 employees worked at the Ames Laboratory conducting materials science and applied chemical and physical research, and 11,276 of those workers are still living and have known addresses; 70 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, 2019, a total of 2,187 former workers have been screened with 1,110 receiving a 3-year repeat screening, 670 a 6-year, 297 a 9-year repeat screening, and 41 a 12-year repeat screening.

What we have found:

FWP medical screening

- Chest x-rays (N=2,073 participants receiving at least one CXR): 15 percent of 2,073 participants demonstrated findings consistent with work-related lung disease.
- Pulmonary function tests (N=2,175 participants receiving at least one PFT): 21 percent of 2,175 participants demonstrated findings consistent with obstructive disease.
- Beryllium Lymphocyte Proliferation Tests (BeLPT) (N=2,263 participants receiving at least one BeLPT): 3 percent of 2,263 participants had at least one abnormal BeLPT

Early Lung Cancer Detection (ELCD) Program

- No ELCD program participants have been diagnosed with primary lung cancer.
- Lung cancer was detected in 0 of 13 DOE workers tested.

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

Web site: www.iowafwp.org

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 19 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 the Principal Investigator on the Iowa Former Worker Program since 2018 and was the Co-Principal Investigator beginning in 2008. He has also 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 (1997 through September 2019)

State	Sites	Initial Screenings	Re screens
AK	Amchitka Island Test Site	1,448	835
CA	Lawrence Berkeley National Laboratory	510	300
CA	Lawrence Livermore National Laboratory	2,250	1,707
CA	Sandia National Laboratories, CA	193	124
CO	Rocky Flats Plant (Construction Workers)	1,023	727
CO	Rocky Flats Plant (Production Workers)	4,366	1,797
FL	Pinellas (Production Workers)	779	285
IA	Ames Laboratory	2,187	2,118
IA	Iowa Army Ammunition Plant	1,429	1,921
ID	Idaho National Laboratory (Construction Workers)	1,368	612
ID	Idaho National Laboratory (Production Workers)	5,387	4,990
IL	Argonne National Laboratory	815	236
IL	Fermi National Accelerator Laboratory	196	22
KY	Paducah GDP (Construction Workers)	1,113	649
KY	Paducah GDP (Production Workers)	3,611	3,564
MO	Kansas City Plant (Construction Workers)	856	422
MO	Kansas City Plant (Production Workers)	2,814	831
NM	Los Alamos National Laboratory	3,369	701
NM	Sandia National Laboratories, NM	438	61
NV	Nevada National Security Site	5,754	3,781
NY	Brookhaven National Laboratory (Construction Workers)	623	349
NY	Brookhaven National Laboratory (Production Workers)	581	148
OH	Feed Materials Production Center (Construction Workers)	2,431	1,913
OH	Feed Materials Production Center	1,391	1,257

State	Sites	Initial Screenings	Re screens
	(Production Workers)		
OH	Mound Plant (Construction Workers)	478	267
OH	Mound Plant (Production Workers)	1,704	1,617
OH	Portsmouth GDP (Construction Workers)	1,269	808
OH	Portsmouth GDP (Production Workers)	3,901	4,151
SC	Savannah River Site (Construction Workers)	5,419	2,793
SC	Savannah River Site (Production Workers)	6,265	664
TN	Oak Ridge K-25 (K-25) (Production Workers)	4,905	5,531
TN	Oak Ridge National Laboratory (ORNL) (Production Workers)	2,476	2,661
TN	Oak Ridge Reservation[11] (Construction Workers)	3,900	2,189
TN	Y-12 National Security Complex (Y-12) (Production Workers)	4,472	4,775
TX	Pantex Plant	1,733	770
WA	Hanford Site (Construction Workers)	4,567	2,224
WA	Hanford Site (Production Workers)	6,245	1,236
	Other Sites[12] (Construction Workers)	1,598	727
	Other Sites[13] (Production Workers)	467	51
	Grand Total	**94,331**	**59,814**

[11] Includes K-25, ORNL, and Y-12
[12] Sites where the number of individuals screened by the Building Trades National Medical Screening Program to date is less than 100.
[13] 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 in-depth 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 DOE site/worker population are provided below.

Table 8. Chest X-ray Findings on Initial Screening (1997 through September 2019)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
AK	Amchitka Island Test Site	1,131	162 (14.3%)	1 (0.1%)	0 (0.0%)	62 (5.5%)
CA	Lawrence Berkeley National Laboratory	478	7 (1.5%)	0 (0.0%)	3 (0.6%)	7 (1.5%)
CA	Lawrence Livermore National Laboratory	2,175	58 (2.7%)	1 (0.0%)	9 (0.4%)	42 (2.0%)
CA	Sandia National Laboratories, CA	187	2 (1.1%)	0 (0.0%)	0 (0.0%)	2 (1.1%)
CO	Rocky Flats Plant (Construction Workers)	914	253 (27.7%)	7 (0.8%)	15 (1.6%)	35 (3.8%)
CO	Rocky Flats Plant (Production Workers)	3,910	839 (21.5%)	4 (0.1%)	69 (1.8%)	119 (3.0%)
FL	Pinellas (Production Workers)	757	68 (9.0%)	5 (0.7%)	25 (3.3%)	32 (4.2%)
IA	Ames Laboratory	2,104	80 (3.8%)	1 (0.0%)	64 (3.0%)	60 (2.9%)
IA	Iowa Army Ammunition Plant	1,323	126 (9.5%)	0 (0.0%)	69 (5.2%)	34 (2.6%)
ID	Idaho National Laboratory (Construction Workers)	1,148	124 (10.8%)	0 (0.0%)	2 (0.2%)	33 (2.9%)
ID	Idaho National Laboratory (Production Workers)	5,306	402 (7.6%)	1 (0.0%)	25 (0.5%)	159 (3.0%)
IL	Argonne National Laboratory	738	86 (11.7%)	1 (0.1%)	28 (3.8%)	25 (3.4%)
IL	Fermi National Accelerator Laboratory	181	17 (9.4%)	0 (0.0%)	7 (3.9%)	5 (2.8%)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
KY	Paducah Gaseous Diffusion Plant (GDP) (Construction Workers)	1,017	161 (15.8%)	7 (0.7%)	12 (1.2%)	58 (5.7%)
KY	Paducah GDP (Production Workers)	3,577	233 (6.5%)	9 (0.3%)	20 (0.6%)	129 (3.6%)
MO	Kansas City Plant (Construction Workers)	764	101 (13.2%)	0 (0.0%)	1 (0.1%)	35 (4.6%)
MO	Kansas City Plant (Production Workers)	2,759	314 (11.4%)	2 (0.1%)	72 (2.6%)	103 (3.7%)
NM	Los Alamos National Laboratory	3,166	218 (6.8%)	0 (0.0%)	100 (3.1%)	52 (0.0%)
NM	Sandia National Laboratories, NM	420	23 (5.5%)	1 (0.2%)	15 (3.6%)	3 (0.7%)
NV	Nevada National Security Site	5,525	352 (6.4%)	21 (0.4%)	53 (1.0%)	144 (2.6%)
NY	Brookhaven National Laboratory (Construction Workers)	503	91 (18.1%)	0 (0.0%)	0 (0.0%)	9 (1.8%)
NY	Brookhaven National Laboratory (Production Workers)	536	34 (6.3%)	1 (0.2%)	5 (0.9%)	23 (4.3%)
OH	Feed Materials Production Center (Construction Workers)	2,159	236 (10.9%)	5 (0.2%)	0 (0.0%)	34 (1.6%)
OH	Feed Materials Production Center (Production Workers)	1,336	60 (4.5%)	0 (0.0%)	13 (1.0%)	55 (4.1%)
OH	Mound Plant (Construction Workers)	392	71 (18.1%)	0 (0.0%)	3 (0.8%)	7 (1.8%)
OH	Mound Plant (Production Workers)	1,666	106 (6.4%)	2 (0.1%)	1 (0.1%)	63 (3.8%)
OH	Portsmouth GDP (Construction Workers)	1,122	199 (17.7%)	3 (0.3%)	3 (0.3%)	50 (4.5%)
OH	Portsmouth GDP (Production Workers)	3,870	254 (6.6%)	5 (0.1%)	16 (0.4%)	115 (3.0%)
SC	Savannah River Site (Construction Workers)	4,817	448 (9.3%)	4 (0.1%)	3 (0.1%)	186 (3.9%)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
SC	Savannah River Site (Production Workers)	4,575	1,118 (24.4%)	60 (1.3%)	401 (8.8%)	65 (1.4%)
TN	Oak Ridge K-25 (K-25) (Production Workers)	4,815	323 (6.7%)	5 (0.1%)	12 (0.2%)	102 (2.1%)
TN	Oak Ridge National Laboratory (ORNL) (Production Workers)	2,415	120 (5.0%)	1 (0.0%)	2 (0.1%)	86 (3.6%)
TN	Oak Ridge Reservation[14] (Construction Workers)	3,332	532 (16.0%)	6 (0.2%)	6 (0.2%)	134 (4.0%)
TN	Y-12 National Security Complex (Y-12) (Production Workers)	4,383	245 (5.6%)	4 (0.1%)	13 (0.3%)	174 (4.0%)
TX	Pantex Plant	1,699	89 (5.2%)	1 (0.1%)	16 (0.9%)	56 (3.3%)
WA	Hanford Site (Construction Workers)	3,853	882 (22.9%)	3 (0.1%)	3 (0.1%)	192 (5.0%)
WA	Hanford Site (Production Workers)	5,682	1,100 (19.4%)	4 (0.1%)	139 (2.4%)	270 (4.8%)
	Other Sites[15] (Construction Workers)	1,316	192 (14.6%)	5 (0.4%)	0 (0.0%)	29 (2.2%)
	Other Sites[16] (Production Workers)	440	54 (12.3%)	3 (0.7%)	27 (6.1%)	12 (2.7%)
	Grand Total	**86,491**	**9,780 (11.3%)**	**173 (0.2%)**	**1,252 (1.4%)**	**2,801 (3.2%)**

[14] Includes K-25, ORNL, and Y-12.
[15] Sites where the number of individuals screened by the Building Trades National Medical Screening Program (BTMed) to date is less than 100.
[16] 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 (1997 through September 2019)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
AK	Amchitka Island Test Site	471	41 (8.7%)	2 (0.4%)	0 (0.0%)	26 (5.5%)
CA	Lawrence Berkeley National Laboratory	113	4 (3.5%)	0 (0.0%)	1 (0.9%)	4 (3.5%)
CA	Lawrence Livermore National Laboratory	729	17 (2.3%)	1 (0.1%)	4 (0.5%)	15 (2.1%)
CA	Sandia National Laboratories, CA	54	2 (3.7%)	0 (0.0%)	0 (0.0%)	4 (7.4%)
CO	Rocky Flats Plant (Construction Workers)	380	22 (5.8%)	0 (0.0%)	2 (0.5%)	8 (2.1%)
CO	Rocky Flats Plant (Production Workers)	1,394	304 (21.8%)	5 (0.4%)	52 (3.7%)	38 (2.7%)
FL	Pinellas (Production Workers)	215	36 (16.7%)	1 (0.5%)	16 (7.4%)	1 (0.5%)
IA	Ames Laboratory	1,056	77 (7.3%)	2 (0.2%)	79 (7.5%)	23 (2.2%)
IA	Iowa Army Ammunition Plant	563	62 (11.0%)	0 (0.0%)	67 (11.9%)	17 (3.0%)
ID	Idaho National Laboratory (Construction Workers)	381	39 (10.2%)	0 (0.0%)	0 (0.0%)	14 (3.7%)
ID	Idaho National Laboratory (Production Workers)	2,170	129 (5.9%)	0 (0.0%)	4 (0.2%)	57 (2.6%)
IL	Argonne National Laboratory	195	24 (12.3%)	2 (1.0%)	17 (8.7%)	2 (1.0%)
IL	Fermi National Accelerator Laboratory	18	1 (5.6%)	0 (0.0%)	3 (16.7%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	397	40 (10.1%)	0 (0.0%)	1 (0.3%)	28 (7.1%)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
KY	Paducah GDP (Production Workers)	1,857	87 (4.7%)	1 (0.1%)	0 (0.0%)	98 (5.3%)
MO	Kansas City Plant (Construction Workers)	260	21 (8.1%)	0 (0.0%)	0 (0.0%)	7 (2.7%)
MO	Kansas City Plant (Production Workers)	693	92 (13.3%)	1 (0.2%)	49 (7.1%)	16 (2.3%)
NM	Los Alamos National Laboratory	593	74 (12.5%)	0 (0.0%)	23 (3.9%)	0 (0.0%)
NM	Sandia National Laboratories, NM	52	12 (23.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
NV	Nevada National Security Site	1,857	123 (6.6%)	3 (0.2%)	9 (0.5%)	122 (6.6%)
NY	Brookhaven National Laboratory (Construction Workers)	226	18 (8.0%)	0 (0.0%)	0 (0.0%)	4 (1.8%)
NY	Brookhaven National Laboratory (Production Workers)	107	5 (4.7%)	0 (0.0%)	1 (0.9%)	1 (0.9%)
OH	Feed Materials Production Center (Construction Workers)	1,049	88 (8.4%)	1 (0.1%)	0 (0.0%)	7 (0.7%)
OH	Feed Materials Production Center (Production Workers)	616	17 (2.8%)	0 (0.0%)	5 (0.8%)	26 (4.2%)
OH	Mound Plant (Construction Workers)	152	19 (12.5%)	0 (0.0%)	1 (0.7%)	2 (1.3%)
OH	Mound Plant (Production Workers)	789	29 (3.7%)	0 (0.0%)	2 (0.3%)	41 (5.2%)
OH	Portsmouth GDP (Construction Workers)	499	75 (15.0%)	0 (0.0%)	0 (0.0%)	7 (1.8%)
OH	Portsmouth GDP (Production Workers)	1,947	128 (6.6%)	1 (0.1%)	4 (0.2%)	118 (6.1%)

State	Sites	Workers Screened	Asbestos related Lung Disease	Silicosis	Other Dust related Disease	Lung Nodules, Nodes, or Lesions
SC	Savannah River Site (Construction Workers)	1,691	160 (9.5%)	1 (0.1%)	1 (0.1%)	77 (4.6%)
SC	Savannah River Site (Production Workers)	574	101 (17.6%)	1 (0.2%)	35 (6.1%)	12 (2.1%)
TN	K-25 (Production Workers)	2,552	138 (5.4%)	2 (0.1%)	5 (0.2%)	116 (4.5%)
TN	ORNL (Production Workers)	1,408	46 (3.3%)	0 (0.0%)	5 (0.4%)	63 (4.5%)
TN	Oak Ridge Reservation[17] (Construction Workers)	1,374	140 (10.2%)	0 (0.0%)	0 (0.0%)	56 (4.1%)
TN	Y-12 (Production Workers)	2,497	112 (4.5%)	1 (0.0%)	5 (0.2%)	132 (5.3%)
TX	Pantex Plant	477	12 (2.5%)	0 (0.0%)	1 (0.2%)	17 (3.6%)
WA	Hanford Site (Construction Workers)	1,376	138 (10.0%)	0 (0.0%)	1 (0.1%)	66 (4.8%)
WA	Hanford Site (Production Workers)	1,046	137 (13.1%)	1 (0.1%)	47 (4.5%)	39 (3.7%)
	Other Sites[18] (Construction Workers)	475	27 (5.7%)	1 (0.2%)	0 (0.0%)	9 (1.9%)
	Other Sites[19] (Production Workers)	42	6 (14.3%)	0 (0.0%)	1 (2.4%)	1 (2.4%)
	Grand Total	**32,345**	**2,603 (8.0%)**	**27 (0.1%)**	**441 (1.4%)**	**1,276 (3.9%)**

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

Table 10. Spirometry Findings on Initial Screening (1997 through September 2019)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
AK	Amchitka Island Test Site	1,127	177 (15.7%)
CA	Lawrence Berkeley National Laboratory	494	49 (9.9%)
CA	Lawrence Livermore National Laboratory	2,206	263 (11.9%)
CA	Sandia National Laboratories, CA	188	16 (8.5%)
CO	Rocky Flats Plant (Construction Workers)	903	221 (24.5%)
CO	Rocky Flats Plant (Production Workers)	4,227	921 (21.8%)
FL	Pinellas (Production Workers)	746	185 (24.8%)
IA	Ames Laboratory	2,142	230 (10.7%)
IA	Iowa Army Ammunition Plant	1,354	271 (20.0%)
ID	Idaho National Laboratory (Construction Workers)	1,125	245 (21.8%)
ID	Idaho National Laboratory (Production Workers)	5,309	641 (12.1%)
IL	Argonne National Laboratory	752	71 (9.4%)
IL	Fermi National Accelerator Laboratory	177	12 (6.8%)
KY	Paducah GDP (Construction Workers)	999	239 (23.9%)
KY	Paducah GDP (Production Workers)	3,558	375 (10.5%)
MO	Kansas City Plant (Construction Workers)	750	157 (20.9%)
MO	Kansas City Plant (Production Workers)	2,718	576 (21.2%)
NM	Los Alamos National Laboratory	2,276	130 (5.7%)
NM	Sandia National Laboratories, NM	379	31 (8.2%)
NV	Nevada National Security Site	5,569	963 (17.3%)
NY	Brookhaven National Laboratory (Construction Workers)	526	68 (12.9%)
NY	Brookhaven National Laboratory (Production Workers)	575	32 (5.6%)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
OH	Feed Materials Production Center (Construction Workers)	2,092	400 (19.1%)
OH	Feed Materials Production Center (Production Workers)	1,335	151 (11.3%)
OH	Mound Plant (Construction Workers)	389	83 (21.3%)
OH	Mound Plant (Production Workers)	1,629	218 (13.4%)
OH	Portsmouth GDP (Construction Workers)	1,112	258 (23.2%)
OH	Portsmouth GDP (Production Workers)	3,862	498 (12.9%)
SC	Savannah River Site (Construction Workers)	4,727	782 (16.5%)
SC	Savannah River Site (Production Workers)	3,909	426 (10.9%)
TN	K-25 (Production Workers)	4,765	641 (13.5%)
TN	ORNL (Production Workers)	2,342	241 (10.3%)
TN	Oak Ridge Reservation[20] (Construction Workers)	3,286	601 (18.3%)
TN	Y-12 (Production Workers)	4,371	525 (12.0%)
TX	Pantex Plant	1,696	531 (31.3%)
WA	Hanford Site (Construction Workers)	3,827	879 (23.0%)
WA	Hanford Site (Production Workers)	5,984	1,033 (17.3%)
	Other Sites[21] (Construction Workers)	1,286	232 (18.0%)
	Other Sites[22] (Production Workers)	441	72 (16.3%)
	Grand Total	**85,174**	**13,447 (15.8%)**

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

Table 11. Spirometry Findings on Re-screening (1997 through September 2019)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
AK	Amchitka Island Test Site	460	39 (8.5%)
CA	Lawrence Berkeley National Laboratory	123	14 (11.4%)
CA	Lawrence Livermore National Laboratory	751	62 (8.3%)
CA	Sandia National Laboratories, CA	60	5 (8.3%)
CO	Rocky Flats Plant (Construction Workers)	379	15 (4.0%)
CO	Rocky Flats Plant (Production Workers)	1,389	167 (12.0%)
FL	Pinellas (Production Workers)	219	34 (15.5%)
IA	Ames Laboratory	1,073	132 (12.3%)
IA	Iowa Army Ammunition Plant	524	226 (43.1%)
ID	Idaho National Laboratory (Construction Workers)	371	21 (5.7%)
ID	Idaho National Laboratory (Production Workers)	2,307	325 (14.1%)
IL	Argonne National Laboratory	196	7 (3.6%)
IL	Fermi National Accelerator Laboratory	18	1 (5.6%)
KY	Paducah GDP (Construction Workers)	389	22 (5.7%)
KY	Paducah GDP (Production Workers)	1,850	171 (9.2%)
MO	Kansas City Plant (Construction Workers)	252	9 (3.6%)
MO	Kansas City Plant (Production Workers)	682	61 (8.9%)
NM	Los Alamos National Laboratory	512	31 (6.1%)
NM	Sandia National Laboratories, NM	48	1 (2.1%)
NV	Nevada National Security Site	2,046	326 (15.9%)
NY	Brookhaven National Laboratory (Construction Workers)	234	3 (1.3%)
NY	Brookhaven National Laboratory (Production Workers)	120	7 (5.8%)
OH	Feed Materials Production Center (Construction Workers)	991	44 (4.4%)

State	Sites	Workers Screened	Obstructive Airways Dysfunction Detected
OH	Feed Materials Production Center (Production Workers)	619	48 (7.8%)
OH	Mound Plant (Construction Workers)	144	4 (2.8%)
OH	Mound Plant (Production Workers)	857	68 (7.9%)
OH	Portsmouth GDP (Construction Workers)	488	31 (6.4%)
OH	Portsmouth GDP (Production Workers)	1,955	264 (13.5%)
SC	Savannah River Site (Construction Workers)	1,642	86 (5.2%)
SC	Savannah River Site (Production Workers)	562	46 (8.2%)
TN	K-25 (Production Workers)	2,600	253 (9.7%)
TN	ORNL (Production Workers)	1,430	107 (7.5%)
TN	Oak Ridge Reservation[23] (Construction Workers)	1,351	112 (8.3%)
TN	Y-12 (Production Workers)	2,544	273 (10.7%)
TX	Pantex Plant	467	43 (9.2%)
WA	Hanford Site (Construction Workers)	1,335	95 (7.1%)
WA	Hanford Site (Production Workers)	1,035	146 (14.1%)
	Other Sites[24] (Construction Workers)	473	27 (5.7%)
	Other Sites[25] (Production Workers)	42	5 (11.9%)
	Grand Total	**32,538**	**3,331 (10.2%)**

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

Table 12. Results of Initial Screening Beryllium Lymphocyte Proliferation Tests (BeLPT) (1997 through September 2019)

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
AK	Amchitka Island Test Site	106	2 (1.9%)	1 (0.9%)	1 (0.9%)
CA	Lawrence Berkeley National Laboratory	211	2 (0.9%)	8 (7.0%)	0 (0.0%)
CA	Lawrence Livermore National Laboratory	1,447	13 (0.9%)	29 (2.0%)	8 (0.6%)
CA	Sandia National Laboratories, CA	122	2 (1.6%)	3 (2.5%)	1 (0.8%)
CO	Rocky Flats Plant (Construction Workers)	914	6 (0.7%)	4 (0.4%)	0 (0.0%)
CO	Rocky Flats Plant (Production Workers)	2,912	25 (0.9%)	13 (0.4%)	13 (0.4%)
FL	Pinellas (Production Workers)	747	11 (1.5%)	23 (3.1%)	3 (0.4%)
IA	Ames Laboratory	2,129	28 (1.3%)	23 (1.1%)	6 (0.3%)
IA	Iowa Army Ammunition Plant	1,422	19 (1.3%)	12 (0.8%)	8 (0.6%)
ID	Idaho National Laboratory (Construction Workers)	1,120	14 (1.3%)	6 (0.5%)	7 (0.6%)
ID	Idaho National Laboratory (Production Workers)	4,925	36 (0.7%)	32 (0.6%)	14 (0.3%)
IL	Argonne National Laboratory	379	7 (1.8%)	2 (0.5%)	2 (0.5%)
IL	Fermi National Accelerator Laboratory	125	2 (1.6%)	2 (1.6%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	1,015	16 (1.6%)	8 (0.8%)	1 (0.1%)
KY	Paducah GDP (Production Workers)	3,087	37 (1.2%)	19 (0.6%)	7 (0.2%)
MO	Kansas City Plant (Construction Workers)	754	7 (0.9%)	12 (1.6%)	3 (0.4%)
MO	Kansas City Plant (Production Workers)	2,678	40 (1.5%)	24 (0.9%)	10 (0.4%)

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
NM	Los Alamos National Laboratory	3,140	41 (1.3%)	34 (1.1%)	22 (0.7%)
NM	Sandia National Laboratories, NM	411	12 (2.9%)	4 (1.0%)	3 (0.7%)
NV	Nevada National Security Site	3,236	27 (0.8%)	30 (0.9%)	11 (0.3%)
NY	Brookhaven National Laboratory (Construction Workers)	512	5 (1.0%)	24 (4.7%)	0 (0.0%)
NY	Brookhaven National Laboratory (Production Workers)	568	5 (0.9%)	22 (3.9%)	7 (1.2%)
OH	Feed Materials Production Center (Construction Workers)	2,130	8 (0.4%)	13 (0.6%)	4 (0.2%)
OH	Feed Materials Production Center (Production Workers)	1,178	7 (0.6%)	6 (0.5%)	2 (0.2%)
OH	Mound Plant (Construction Workers)	390	0 (0.0%)	2 (0.5%)	0 (0.0%)
OH	Mound Plant (Production Workers)	1,635	21 (1.3%)	15 (0.9%)	5 (0.3%)
OH	Portsmouth GDP (Construction Workers)	1,116	16 (1.4%)	3 (0.3%)	1 (0.1%)
OH	Portsmouth GDP (Production Workers)	3,454	21 (0.6%)	11 (0.3%)	4 (0.1%)
SC	Savannah River Site (Construction Workers)	4,807	33 (0.7%)	42 (0.9%)	13 (0.3%)
SC	Savannah River Site (Production Workers)	3,526	71 (2.0%)	26 (0.7%)	10 (0.3%)
TN	K-25 (Production Workers)	4,813	90 (1.9%)	90 (1.9%)	24 (0.5%)
TN	ORNL (Production Workers)	2,402	21 (0.9%)	31 (1.3%)	14 (0.6%)
TN	Oak Ridge Reservation[26] (Construction Workers)	3,612	28 (0.8%)	25 (0.7%)	11 (0.3%)

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

State	Sites	Workers Screened	1 Abnormal	2 Abnormal	1 Abnormal and 1+ Borderline
TN	Y-12 (Production Workers)	4,396	60 (1.4%)	70 (1.6%)	14 (0.3%)
TX	Pantex Plant	1,675	14 (0.8%)	7 (0.4%)	1 (0.1%)
WA	Hanford Site (Construction Workers)	3,857	43 (1.1%)	36 (0.9%)	10 (0.3%)
WA	Hanford Site (Production Workers)	5,438	117 (2.2%)	41 (0.8%)	18 (0.3%)
	Other Sites[27] (Construction)	897	3 (0.3%)	3 (0.3%)	1 (0.1%)
	Other Sites[28] (Production)	276	3 (1.1%)	3 (1.1%)	0 (0.0%)
	Grand Total	**77,562**	**913 (1.2%)**	**759 (1.0%)**	**259 (0.3%)**

Table 13. Results of Re-screening Beryllium Lymphocyte Proliferation Tests (BeLPT) (1997 through September 2019)

State	Sites	Workers Screened	1 Abnormal[29]	2 Abnormal[30]	1 Abnormal and 1+ Borderline
AK	Amchitka Island Test Site	23	0 (0.0%)	0 (0.0%)	0 (0.0%)
CA	Lawrence Berkeley National Laboratory	43	0 (0.0%)	1 (2.3%)	1 (2.3%)
CA	Lawrence Livermore National Laboratory	568	5 (0.9%)	4 (0.7%)	1 (0.2%)

[27] Sites where the number of individuals screened by BTMed to date is less than 100.
[28] Sites where the number of individuals screened by NSSP to date is less than 100.
[29] 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.
[30] 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[29]	2 Abnormal[30]	1 Abnormal and 1+ Borderline
CA	Sandia National Laboratories, CA	41	2 (4.9%)	0 (0.0%)	0 (0.0%)
CO	Rocky Flats Plant (Construction Workers)	218	1 (0.5%)	0 (0.0%)	0 (0.0%)
CO	Rocky Flats Plant (Production Workers)	1,119	4 (0.4%)	2 (0.2%)	1 (0.1%)
FL	Pinellas (Production Workers)	209	2 (1.0%)	1 (0.5%)	2 (1.0%)
IA	Ames Laboratory	973	8 (0.8%)	4 (0.4%)	1 (0.1%)
IA	Iowa Army Ammunition Plant	791	12 (1.5%)	4 (0.5%)	4 (0.5%)
ID	Idaho National Laboratory (Construction Workers)	235	2 (0.9%)	0 (0.0%)	0 (0.0%)
ID	Idaho National Laboratory (Production Workers)	1,802	10 (0.6%)	16 (0.9%)	12 (0.7%)
IL	Argonne National Laboratory	115	2 (1.7%)	0 (0.0%)	0 (0.0%)
IL	Fermi National Accelerator Laboratory	18	0 (0.0%)	0 (0.0%)	0 (0.0%)
KY	Paducah GDP (Construction Workers)	291	0 (0.0%)	2 (0.7%)	0 (0.0%)
KY	Paducah GDP (Production Workers)	1,606	12 (0.7%)	6 (0.4%)	12 (0.7%)
MO	Kansas City Plant (Construction Workers)	249	8 (3.2%)	1 (0.4%)	1 (0.4%)
MO	Kansas City Plant (Production Workers)	676	1 (0.1%)	3 (0.4%)	1 (0.1%)
NM	Los Alamos National Laboratory	549	7 (1.3%)	1 (0.2%)	0 (0.0%)
NM	Sandia National Laboratories, NM	48	2 (4.2%)	0 (0.0%)	1 (2.1%)
NV	Nevada National Security Site	1,392	21 (1.5%)	12 (0.9%)	10 (0.7%)

State	Sites	Workers Screened	1 Abnormal[29]	2 Abnormal[30]	1 Abnormal and 1+ Borderline
NY	Brookhaven National Laboratory (Construction Workers)	219	7 (3.2%)	2 (0.9%)	1 (0.5%)
NY	Brookhaven National Laboratory (Production Workers)	106	0 (0.0%)	2 (1.9%)	0 (0.0%)
OH	Feed Materials Production Center (Construction Workers)	585	4 (0.7%)	0 (0.0%)	0 (0.0%)
OH	Feed Materials Production Center (Production Workers)	479	1 (0.2%)	5 (1.0%)	2 (0.4%)
OH	Mound Plant (Construction Workers)	92	0 (0.0%)	0 (0.0%)	0 (0.0%)
OH	Mound Plant (Production Workers)	591	1 (0.2%)	11 (1.9%)	7 (1.2%)
OH	Portsmouth GDP (Construction Workers)	357	1 (0.3%)	0 (0.0%)	0 (0.0%)
OH	Portsmouth GDP (Production Workers)	1,773	8 (0.5%)	8 (0.5%)	6 (0.3%)
SC	Savannah River Site (Construction Workers)	1,188	15 (1.3%)	4 (0.3%)	3 (0.3%)
SC	Savannah River Site (Production Workers)	563	1 (0.2%)	3 (0.5%)	2 (0.4%)
TN	K-25 (Production Workers)	2,276	28 (1.2%)	38 (1.7%)	21 (0.9%)
TN	ORNL (Production Workers)	1,006	6 (0.4%)	29 (2.2%)	7 (0.5%)
TN	Oak Ridge Reservation[31] (Construction Workers)	1,334	11 (0.8%)	7 (0.5%)	3 (0.2%)
TN	Y-12 (Production Workers)	1,826	17 (0.9%)	39 (2.1%)	19 (1.0%)
TX	Pantex Plant[32]	231	2 (0.9%)	5 (2.2%)	0 (0.0%)

[31] Includes K-25, ORNL, and Y-12.
[32] The site-specific project does not offer repeat BeLPTs. However, workers referred to the NSSP are provided repeat BeLPTs.

State	Sites	Workers Screened	1 Abnormal[29]	2 Abnormal[30]	1 Abnormal and 1+ Borderline
WA	Hanford Site (Construction Workers)	850	10 (1.2%)	4 (0.5%)	0 (0.0%)
WA	Hanford Site (Production Workers)	960	9 (0.9%)	1 (0.1%)	2 (0.2%)
	Other Sites[33] (Construction Workers)	198	2 (1.0%)	1 (0.5%)	1 (0.5%)
	Other Sites[34] (Production Workers)	25	0 (0.0%)	0 (0.0%)	0 (0.0%)
	Grand Total	**25,630**	**222 (0.9%)**	**216 (0.8%)**	**122 (0.5%)**

Table 14. Audiometry Findings on Initial Screening (1997 through September 2019)

State	Sites	Workers Screened	Noise Induced Hearing Loss (NIHL)
AK	Amchitka Island Test Site	1,156	771 (66.7%)
CA	Lawrence Berkeley National Laboratory	291	103 (35.4%)
CA	Lawrence Livermore National Laboratory	1,299	532 (41.0%)
CA	Sandia National Laboratories, CA	100	45 (45.0%)
CO	Rocky Flats Plant (Construction Workers)	894	581 (65.0%)
CO	Rocky Flats Plant (Production Workers)	4,160	2,428 (58.3%)
FL	Pinellas (Production Workers)	745	286 (38.4%)
IA	Ames Laboratory[35]	209	62 (29.7%)
IA	Iowa Army Ammunition Plant[36]	108	89 (82.4%)

[33] Sites where the number of individuals screened by BTMed to date is less than 100.
[34] Sites where the number of individuals screened by NSSP to date is less than 100.
[35] The site-specific project does not offer audiograms. However, workers referred to the NSSP are provided audiograms.
[36] 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)
ID	Idaho National Laboratory (Construction Workers)	1,077	711 (66.1%)
ID	Idaho National Laboratory (Production Workers)	5,106	2,236 (43.8%)
IL	Argonne National Laboratory	781	274 (35.1%)
IL	Fermi National Accelerator Laboratory	190	75 (39.5%)
KY	Paducah GDP (Construction Workers)	956	731 (76.5%)
KY	Paducah GDP (Production Workers)	3,510	1,445 (41.2%)
MO	Kansas City Plant (Construction Workers)	728	430 (59.1%)
MO	Kansas City Plant (Production Workers)	2,707	1,266 (46.8%)
NM	Los Alamos National Laboratory	2,880	1,685 (58.5%)
NM	Sandia National Laboratories, NM	364	209 (57.4%)
NV	Nevada National Security Site	5,056	2,836 (56.1%)
NY	Brookhaven National Laboratory (Construction Workers)	535	347 (65.9%)
NY	Brookhaven National Laboratory (Production Workers)	566	284 (50.2%)
OH	Feed Materials Production Center (Construction Workers)	2,126	1,088 (51.2%)
OH	Feed Materials Production Center (Production Workers)	1,334	327 (24.5%)
OH	Mound Plant (Construction Workers)	378	239 (63.2%)
OH	Mound Plant (Production Workers)	1,621	661 (40.8%)
OH	Portsmouth GDP (Construction Workers)	1,150	826 (71.8%)
OH	Portsmouth GDP (Production Workers)	3,771	1,519 (40.3%)
SC	Savannah River Site (Construction Workers)	4,926	2,942 (59.7%)
SC	Savannah River Site (Production Workers)	3,932	2,196 (55.8%)

State	Sites	Workers Screened	Noise Induced Hearing Loss (NIHL)
TN	K-25 (Production Workers)	4,421	2,244 (50.8%)
TN	ORNL (Production Workers)	2,409	1,154 (47.9%)
TN	Oak Ridge Reservation[37] (Construction Workers)	3,241	2,270 (70.0%)
TN	Y-12 (Production Workers)	4,352	2,427 (55.8%)
TX	Pantex Plant[38]	121	52 (43.0%)
WA	Hanford Site (Construction Workers)	3,073	2,141 (69.7%)
WA	Hanford Site (Production Workers)	5,135	2,540 (49.5%)
	Other Sites[39] (Construction Workers)	1,089	687 (63.1%)
	Other Sites[40] (Production Workers)	442	218 (49.3%)
	Grand Total	**76,939**	**40,957 (53.2%)**

[37] Includes K-25, ORNL, and Y-12.
[38] The site-specific project does not offer audiograms. However, workers referred to the NSSP are provided audiograms.
[39] Sites where the number of individuals screened by BTMed to date is less than 100.
[40] 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/