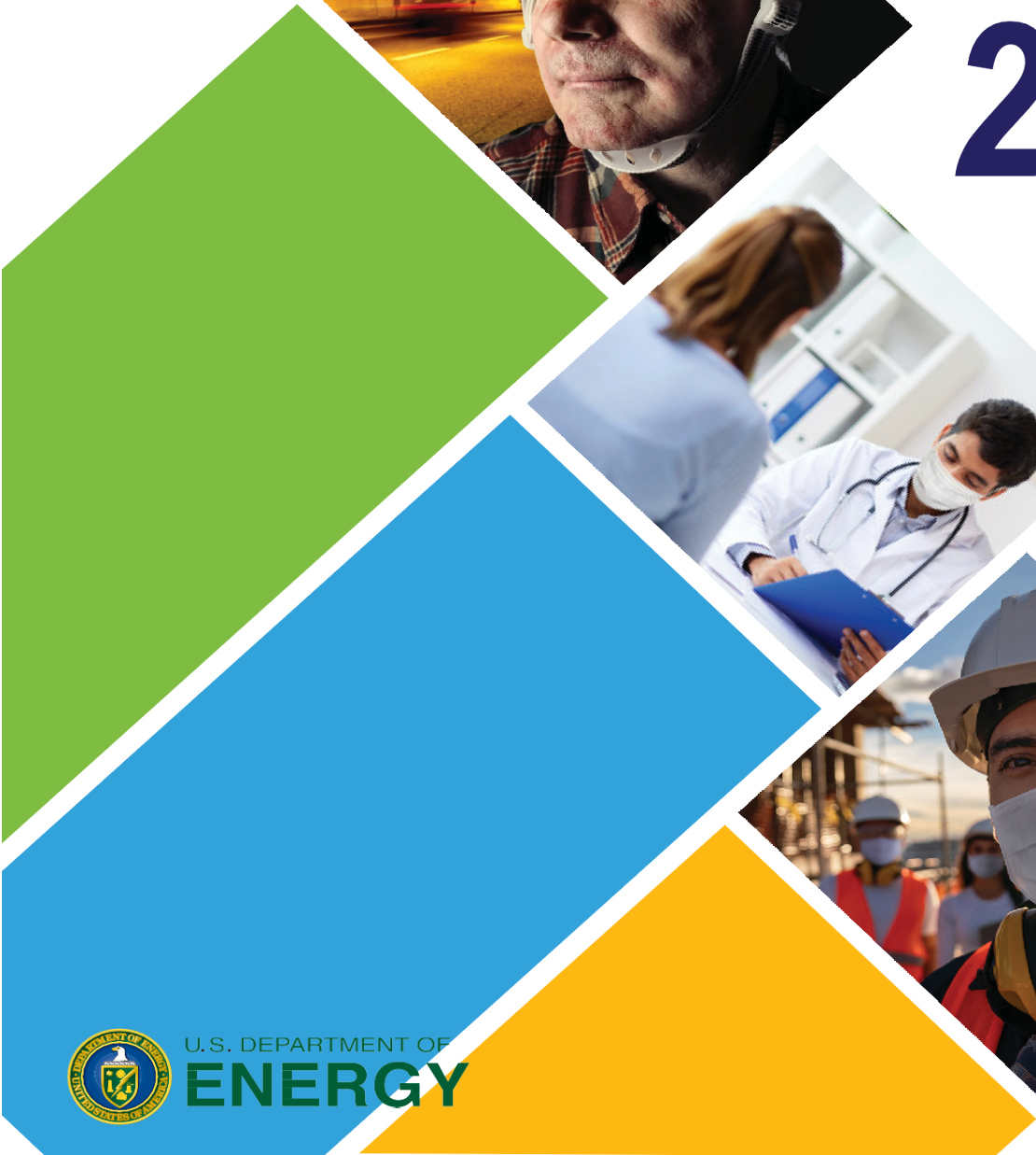


FORMER WORKER MEDICAL SCREENING PROGRAM REPORT

2020



U.S. DEPARTMENT OF
ENERGY



Office of Environment, Health, Safety and Security



U.S. DEPARTMENT OF
ENERGY



Partners:



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Abbreviations / Acronyms Used in This Report

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
CDOEIRB	Central Department of Energy Institutional Review Board
CHS	Comprehensive Health Services
COVID-19	Coronavirus Disease 2019
CPWR	The Center for Construction Research and Training
CT	Computed Tomography
Department	U.S. Department of Energy
DOE	U.S. Department of Energy
DOL	U.S. Department of Labor
EEOICPA	Energy Employees Occupational Illness Compensation Program Act
ELCD	Early Lung Cancer Detection
FMPC	Feed Materials Production Center
FWP	Former Worker Medical Screening Program or Former Worker Program
FY	Fiscal Year
GDP	Gaseous Diffusion Plant
HIPAA	Health Insurance Portability and Accountability Act
JHBSPH	Johns Hopkins Bloomberg School of Public Health
Lab	Laboratory
LANL	Los Alamos National Laboratory
NL	National Laboratory
NSC	National Security Complex/Campus
NSSP	National Supplemental Screening Program
ORAU	Oak Ridge Associated Universities
PI	Principal Investigator
SNL-NM	Sandia National Laboratories – New Mexico
U.S.	United States of America

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

Executive Summary

The mission of the Department of Energy (DOE or Department), and its predecessor agencies, undertaken for close to 80 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, the U.S. Congress mandated the Former Worker Medical Screening Program or Former Worker Program (FWP) as part of Section 3162 of the National Defense Authorization Act for Fiscal Year (FY) 1993 (Public Law 102-484). That act directed the Secretary of Energy to “establish and carry out a program for the identification and on-going medical evaluation of current and former Department of Energy 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.” The program’s activities began in 1996, and medical screening exams began in 1997.

The FWP directly benefits former DOE workers by providing medical screening exams designed to identify signs or symptoms of work-related health conditions at an early stage when they are more treatable; and by improving former 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 purpose, structure, accomplishments and findings of the FWP; and a summary of the FWP response to the COVID-19 pandemic, including the program’s temporary shut-down and restart to ensure the health and safety of the former worker participants, and statistics and cumulative program data from FY 1997 through FY 2020. The appendices provide descriptions of the individual FWP Projects and medical screening exam data by site.

As would be expected, the number of FWP medical screening exams conducted in FY 2020 was far less than in previous years due to the pandemic. Despite the effect of the pandemic on program’s normal operations, the FWP completed the following program activities in FY 2020:

- Responded to the pandemic by temporarily suspending most screenings, then developing and implementing restart protocols.
- Conducted outreach activities using direct mailings and participating in events near DOE communities in person prior to COVID-19 in March 2020 and virtual events thereafter. This resulted in 171 outreach events and assistance to the U.S. Department of Labor (DOL) with 22 of its outreach events.
- Provided 1,301 initial conventional medical screening exams and 2,632 re-screen medical exams.
- Conducted 2,003 baseline, follow-up, and annual low-dose helical computed tomography (CT) scans to assist in the early detection of occupational lung cancer. Low-dose CT scans continued on a reduced scale during the shutdown as these screenings are deemed more urgent than conventional medical screening exams.
- Communicated results to participants via exam results letters and via phone when necessary. The results letters included causation language if a condition was deemed as possibly work-related. This language is helpful to participants who file claims under the Energy Employees Occupational Illness Compensation Program Act administered by the DOL.
- Protected participants’ information as required by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act.

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, and/or other activities that may have exposed its workers to toxic substances and hazardous conditions. Since 1997, the FWP has provided a total of 158,061 conventional medical screening exams (initial and re-screen exams) to 95,632 former workers. Since 2000, through the Early Lung Cancer Detection (ELCD) program, the FWP has screened 15,597 participants for occupational lung cancer with low-dose helical computed tomography (CT) scans, and completed 61,787 baseline, follow-up, and annual low-dose CT scans. The FWP is responsible for identifying thousands of cases of medical conditions ranging from auditory loss to early cancer detection in the former workers who have participated in the program over the past 24 years.

1.0 Program Overview

This report presents an overview of the purpose, structure, accomplishments, and findings of the U.S. Department of Energy (DOE or Department) Former Worker Medical Screening Program or Former Worker Program (FWP) for fiscal year (FY) 2020; and cumulative program results from FY 1997-2020. The report also discusses the effects of the COVID-19 pandemic on the FWP and the efforts of DOE and its service providers to manage the program during this global event.

The FWP was mandated by the U.S. Congress as part of Section 3162 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.”

The program’s activities began in 1996, and medical screening exams began in 1997.

The FWP provides medical screening exams at no cost to all interested and eligible former DOE Federal, contractor, and subcontractor workers who may have been exposed to toxic substances and hazardous conditions while working at a DOE or a covered DOE-related contractor site. The FWP medical screening exams check for potential adverse health effects caused by exposures to radiation, beryllium, asbestos, silica, welding fumes, lead, cadmium, chromium, solvents, noise, and other toxic substances and hazardous conditions. The program also serves former workers from DOE’s predecessor Agencies, i.e., the Manhattan Engineer District, the Atomic Energy Commission, and the Energy Research and Development Administration.

The FWP is overseen by the DOE Office of Health and Safety within the Office of Environment, Health, Safety and Security (AU) and implemented by third-party independent occupational health providers, referred to as FWP Projects, managed by medical experts known as Principal Investigators (PI) and sometimes co-PIs, from universities, labor unions, and commercial organizations. Use of the FWP Projects ensures that the FWP medical evaluation services are objective and credible. The high-quality services, professionalism, and dedication of the FWP Projects to DOE former workers over the past 25 years has resulted in a high level of satisfaction by participants as expressed in outpatient surveys (97.8 percent in FY 2020).

The FWP Projects are comprised of four regional projects located near major DOE sites, and two nationwide projects. The regional FWP Projects are the:

- **Pantex Former Worker Medical Surveillance Program**, administered 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**, administered by Johns Hopkins Bloomberg School of Public Health in conjunction with the University of New Mexico,
- **Worker Health Protection Program (WHPP)**, administered 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, and
- **Former Burlington Atomic Energy Commission Plant and Ames Laboratory Workers Medical Screening Program**, administered by the University of Iowa, College of Public Health.

The nationwide FWP Projects are the:

- **National Supplemental Screening Program (NSSP)**, administered by Oak Ridge Associated Universities (ORAU) in conjunction with Axion Health, Comprehensive Health Services, National Jewish Health, and the University of Colorado Denver, and
- **Building Trades National Medical Screening Program (BTMed)**, administered 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.

Additional information regarding FWP Projects are provided in Appendix A.

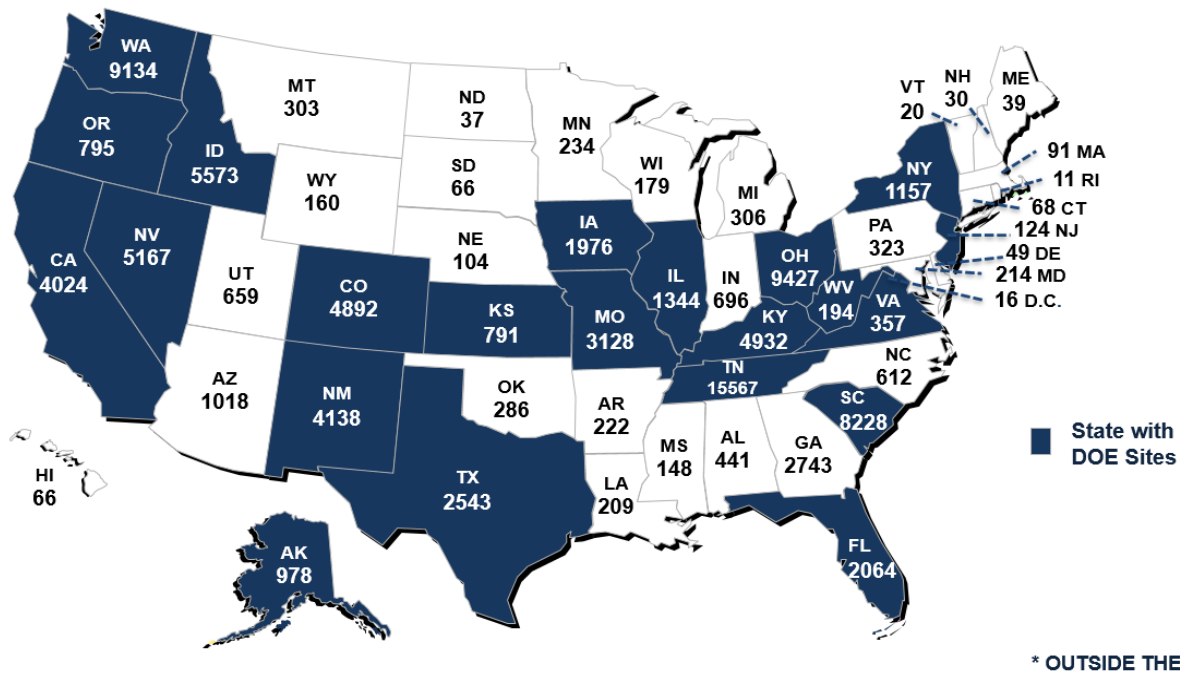
All FWP Projects use multiple outreach methods to notify eligible former DOE workers about the availability of FWP services. The primary method of outreach is direct mailings to former workers inviting them to participate in the program. The FWP Projects also conduct outreach events, e.g., public meetings, health fairs, etc., at DOE sites or in the communities near DOE facilities.

The FWP Projects provide for medical screening exams at clinics in communities near DOE sites, and through a nationwide network of health clinics. This network of clinics allows the FWP Projects to provide medical screening exams close to most workers' residences. Medical screening exams have been conducted in all 50 States and several international locations (see Figure 1). The States which the program screen and where DOE sites are located are shaded blue.

When medical screening exam results identify adverse medical conditions, FWP Projects provide participants information that can be used for follow-up medical care with personal physicians or specialists. When appropriate, the FWP Projects will refer participants to the U.S. Department of Labor (DOL) for potential compensation through the Energy Employees Occupational Illness Compensation Program (EEOICP).

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

Figure 1. FWP Participants by State of Residence (1997 – September 2020)



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, and/or other activities that may have exposed its workers to toxic substances and hazardous conditions. Since 1997, the FWP has provided a total of 158,061 conventional medical screening exams (initial and re-screen exams) to 95,632 former workers. Since 2000, through the Early Lung Cancer Detection (ELCD) program, the FWP has screened 15,597 participants for occupational lung cancer with low-dose helical computed tomography (CT) scans, and completed 61,787 baseline, follow-up, and annual low-dose CT scans.

Additional information on the FWP, can be found at: (<http://energy.gov/ehss/services/worker-health-and-safety/former-worker-medical-screening-program>).

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2.0 COVID-19 Response

Beginning in March 2020, all the FWP Projects postponed medical screening exams (except for urgent ELCD follow-up low-dose CT scans) due to the COVID-19 global pandemic. The FWP Project PIs collectively determined that the risk of continuing conventional medical screening exams outweighed the benefits. The majority of FWP participants are over 65 years old and many have chronic medical conditions that put them at a higher risk of complications if they were to contract COVID-19.

1. Program Suspension and Planning

By the end of March, all the FWP Projects postponed upcoming medical screening exams. The FWP Projects immediately alerted participants due for examinations of the program pause and made wellness calls, sent emails counseling participants, and provided COVID-19 related educational materials. The FWP Projects coordinated with clinics, labs, and radiology facilities to pause future scheduling of medical screening exams, excluding interim low-dose CT scan follow-up appointments and FWP Projects created and implemented methods to send outstanding results to participants.

A large majority of the project staff were under work-from-home orders and the FWP Programs worked diligently to transition to remote work. The FWP Projects also streamlined work processes and documentation, including updates to, and expansion of, digital resources; office phone numbers were ported to cell phones for receiving calls from participants, clinics, or claims requests; and the programs moved to video conferencing and conference calls for various restart committees.

Also, beginning in March 2020, the FWP Project PIs, co-PIs, and coordinators began to hold weekly, then biweekly meetings to coordinate the program response to the pandemic. These collaborative meetings allowed participants to share national and local updates on the FWP Projects' populations in each area around DOE sites and examination facilities. These meetings also ensured consistent communication with DOE FWP management and provided an avenue for the FWP Programs' PIs and coordinators to work together on a plan to restart FWP Projects' screenings under strict safety guidelines. During these meetings, attendees shared resources, plans, and developed materials, including Central Department of Energy Institutional Review Board Institutional Review Board (CDOEIRB)-approved COVID-19-specific consent forms, facility and participant preparedness documents, and checklists.

The FWP Projects developed a screening restart plan and submitted their revised protocols to the CDOEIRB. These updated protocols included items such as:

- Clinical facility health and safety readiness checklists,
- New scheduling call questionnaire (collect COVID-19 related information from participants),
- COVID-19 Immunoglobulin G antibody test (example of consent form below),
- Pre-exam COVID-19 screening protocols,
- Participant safety precaution protocols to be used during medical screening exams,
- FWP staff safety protocol, and
- Exit-interview process protocols.

Figure 2. University of Iowa Consent Form

INFORMED CONSENT
ADDENDUM FOR COVID-19 ANTIBODY BLOOD TEST

What is the COVID-19 antibody blood test?

You are being offered a COVID-19 antibody test as part of the [BAECP / Ames Laboratory] FWP medical screening. This test measures whether you have been exposed to the COVID-19 virus (SARS-CoV-2) and have developed protective proteins (antibodies) against the virus. Sometimes this test shows no antibodies when in fact you do have antibodies. It can also show antibodies when in fact you do not have antibodies. This is a blood test that requires one tube (1/2 teaspoon) of blood, but if you are receiving the standard exam blood tests, no additional blood will be drawn. You are free to accept or not accept this blood test without any effect on the remainder of the FWP medical screening.

What are antibodies?

Antibodies are molecules produced by our body's immune system as a response to either infection or vaccination. For example, after an individual receives an influenza (flu) vaccination, the body produces antibodies against the flu virus, which can help fight off the virus if that individual is subsequently infected. Similarly, if exposed to SARS-CoV-2, most people with a normal immune system will develop an immune response, usually within a few weeks from when symptoms started, and will test 'positive' for antibodies. If your COVID-19 test is positive for antibodies, it may mean that you were infected with SARS-CoV-2, even if you did not show symptoms.

What are the limitations of the COVID-19 antibody blood test?

Because there is still uncertainty about the COVID-19 antibody tests, the test should **NOT** be used to:

- Conclude decisively that an individual has been infected with SARS-CoV-2
- Demonstrate immunity from COVID-19 (We do not have evidence yet that a positive antibody test means complete protection from COVID-19, and we do not know exactly how long antibodies last after infection.)
- Determine ability to safely return to work, travel, or interact with others (A positive antibody test does not always mean that an individual cannot transmit the virus to another vulnerable individual).
- Determine the need for personal protective equipment (A positive antibody test does not mean that an individual should forego wearing a mask within 6 feet of others.)

If you consent to having a COVID-19 antibody test, the results will be included with your medical records and will remain private and confidential.

Please initial next to "Yes" or "No" below, to show whether you agree to have a blood test for COVID-19 antibodies.

Yes, I consent to have a blood test for COVID-19 antibodies.

No, I do not consent to have a blood test for COVID-19 antibodies.

Participant Name (Print or Type)

Participant Signature

The COVID-19 risk varied drastically by state and even by city and county within each state, therefore it was determined that resuming medical screening exams had to be done on a case-by-case basis for each location.

Start-up protocols included three steps to determine if the medical screening exams should proceed:

Step 1: Community Readiness. Are elective medical procedures allowed and are COVID-19 risks acceptable?

The FWP Projects stayed up to date with the COVID-19 case tracking from web resources, such as Harvard Global Health Institute maps, USAFacts, COVID Tracking Project, Johns Hopkins University, Centers for Disease Control and Prevention, STAT, Rt Live and COVID Tracking Project at *The Atlantic*.

Many of the FWP Projects used quantitative data to interpret the rate of new cases, tracking the number of COVID-19 tests and the percentage of positive tests at state and county levels.

Below are examples of metrics the FWPs used to assess community COVID-19 risk:

- incidence and fatality rates were declining for at least 30 days,
- test results were below 5 percent positive for at least 14 days,
- incidence (of reported cases) was less than 25 per 100,000 people as a daily average over the previous 14 days,
- hospital and intensive care unit occupancy was reported below 70 percent (normal is about 60-65 percent), and/or
- hospital beds occupied by COVID-19 patients were less than 20 percent.

The FWP Projects also collected qualitative information such as recommendations about elective medical procedures, judgment about the quality of public health administration, and professional judgment.

Step 2: Provider Readiness. Are procedures in place to prevent COVID-19 infection?

FWP Project staff communicated with each of their clinics/radiology facilities, utilizing a 'Clinic Readiness Questionnaire' (below are examples of WHPP and BTMed questionnaires), which highlighted general clinic readiness, symptom screening (of patients and staff), appointment and waiting area considerations, infection control, and Personal Protective Equipment provisions. FWP Project medical staff assessed questionnaire responses and written protocols (where available) from individual medical providers and followed-up with clinics for any clarifications. Based on these communications, the FWP Projects then determined if appropriate measures were in place to resume screening safely in individual clinics/radiology facilities.

Figure 3. BTMed Provider Readiness Questionnaire

PROVIDER NAME/CONTACT PERSON:	YES/NO	COMMENTS
CT SCANNER LOCATION (hospital or outpatient centers): Name:		
GENERAL INFORMATION		
Have clinical services been restarted?		
Clinic staff screened including temperature checks.		
Patients screened at facility point of entry/ temperature check.		
Staff required to wear masks.		
Patients required to wear masks.		
Masks are provided to patient by clinic, if needed.		
COVID-19 questionnaire administered at check-in.		
No visitors allowed in building.		
Signs or screening at entry and at check-in desk informing patients of protocols/masking.		
Is there a COVID cleaning and disinfection protocol in place? spaces.		
APPOINTMENT RELATED		
Is the waiting area seating configured to allow for social distancing?		
Is there a virtual waiting room available? (Patient waits in car until room is available.)		
Are patients taken directly to exam room so they don't have to wait in waiting room?		
Can provider arrange for grouping of BTMed appointments?		
Facility does not allow walk ins appointments.		
CLINIC SCORE		

Step 3: Participant Readiness. Are COVID-19 risks understood and accepted?

FWP participants were provided with a Risk Acknowledgement script before scheduling an exam. FWP Project staff included information on COVID-19 in scheduling information (example of WHPP information form below). FWP Project staff provided reminder calls and conducted triage for COVID-19 symptoms and exposure using the exposure Questionnaire, Reminder Call script (example of NSSP participant questionnaire below). If the responses indicated suspected COVID-19 infection or exposure, FWP Project staff canceled the appointment and instruct participants to wait to reschedule until at least 14 days after the resolution of symptoms or 14 days after their potential exposure.

Figure 4. WHPP Information Form

WORKER HEALTH PROTECTION PROGRAM IMPORTANT INFORMATION ABOUT COVID-19 & YOUR EXAM

As explained to you at the time of scheduling your WHPP appointment, the COVID-19 virus (SARS-CoV-2) is contagious even in the absence of symptoms. It is spread by person-to-person contact. Based on currently available medical evidence, adults over 65 and people of any age who have serious underlying medical conditions are at a higher risk for severe illness, hospitalizations, and death from COVID-19.

By attending your upcoming scheduled appointment, you are opting to participate in a non-urgent medical screening exam. As with many community-based activities you participate in at this time, you are assuming a small risk that you could become infected with the COVID-19 virus while participating in the WHPP exam. It is important to note, however, that WHPP and its contracted medical providers are monitoring the situation closely and are following current guidelines for minimizing the spread of COVID-19.

WHPP is not authorized to pay for any medical care associated with COVID-19.


Due to the COVID-19 virus, you will only be offered a spirometry (breathing) test as part of this screening if medical guidelines indicate it is safe to do so. However, you will be invited to return to the clinic for this test when it is medically advisable.

For accurate and up-to-date information regarding COVID-19, you can visit the following websites.

- Johns Hopkins Medicine: <https://www.hopkinsmedicine.org/health/conditions-and-diseases/coronavirus>
- The World Health Organization - COVID-19 Advice for the public: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/advice-for-public>
- Centers for Disease Control and Infection - Symptoms of Coronavirus: <https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html>
- Centers for Disease Control and Infection - Coping with Stress: <https://www.cdc.gov/coronavirus/2019-ncov/daily-life-coping/managing-stress-anxiety.html>

If you have any additional questions or would like to postpone or reschedule your appointment until the COVID-19 situation improves, please call WHPP at **1-888-241-1199**.

Figure 5. NSSP Participant Questionnaire



Please review the following list of questions on the day of your exam before arriving at the clinic. If you answer yes to any of these questions, please contact the NSSP at 1-866-812-6703 to reschedule your exam.

1. Have you or anyone living/visiting with you within the last 14 days been in close contact with a confirmed or suspected case of COVID-19? Yes No
2. Have you or anyone living/visiting with you tested positive for COVID-19 or been instructed to self-quarantine in the last 14 days? Yes No
3. Are you experiencing any of the following symptoms (within the last week)?

Fever	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Shortness of breath	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Extreme fatigue	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Muscle aches (myalgia)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Persistent cough	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Loss of taste or smell	<input type="checkbox"/> Yes	<input type="checkbox"/> No
4. If you have had these symptoms, have they gone away in the last 72 hours? Yes No
5. Have you or anyone living/visiting with you experienced any of the above symptoms at any time in the last 14 days? Yes No

2. Program Restart and Monitoring

Once the CDOEIRB and the individual FWP Projects’ institutions approved the restart protocols, medical screening exams were resumed on a very limited scale beginning in early July 2020. The FWP Projects utilized numerous resources and methods for COVID-19 risk assessment in determining when the level of risk is low enough to reopen. These risk assessments varied in geographic scale. For example, COVID-19 trends were reviewed for the entire United States, as well as individual states and counties/local areas. Determining the best risk assessment methods posed challenges since COVID-19 is a new pandemic and the circumstances surrounding the spread of the virus changed unpredictably and quickly. Also, the selection of resources and reconciliation of differences among various statistics was challenging because there were many important characteristics of the data, such as time frame (per day, 7-day or 14-day average, cumulative, percentage, etc.), variety of tests, and metrics (cases, hospitalizations, or deaths).

Each FWP Project began medical screening exams on a site-by-site basis as determined by local COVID-19 statistics. After each medical screening exam, the FWP Projects followed-up with a post-exam survey to assure that medical providers were following safety protocols and that participants were comfortable with the process.

3. Challenges

There were many challenges the FWP Projects faced during the pandemic which impacted how each of the FWP Programs operated. It remains unclear how long or to what degree work-from-home orders will be in place as dictated by states, counties, and/or universities and institutions. Many FWP Projects had to immediately redesign their work process and equip staff for safe, secure, and compliant remote work or adhere to restricted office working conditions.

The FWP Projects faced additional challenges during the shutdown related to managing the continued demand for medical screening exams and incoming requests while being unable to deliver them.

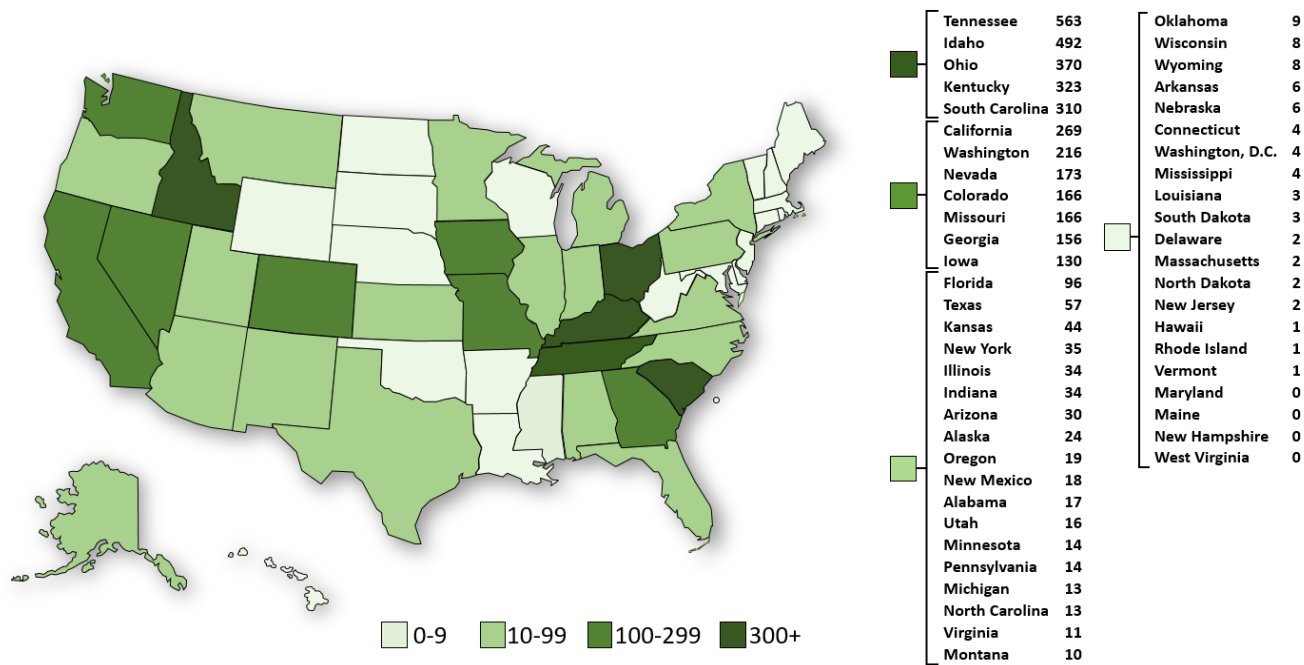
These challenges included:

- Temporary starts: extra work involved in preparing to restart in a specific area, including scheduling appointments, only to halt the process later due to spiking case rates.
- Limited capacity to address backlog of participants after restarting due to clinic restrictions (i.e., reduced appointment volume), permanent clinic closures and unpredictability of community infection rates.
- Inability to restart exams in communities with high rates of disease.
- Acquiring adequate personal protective equipment for clinic staff due to short supply.
- Communicating exam suspension and cancelations to former workers, especially when many services are still available in many communities.
- Tracking and providing information on community resources for COVID-19.

4. Backlog

Due to the suspension of FWP operations as a response to the COVID-19 outbreak, the FWP has amassed a backlog of medical screening exams across the country. Figure 6 illustrates the dispersion of the backlog.

Figure 6. FWP Medical Screening Exams Backlog by State
(March 2020 – December 2020)



Total: 3,899

5. Participant Feedback

As the FWP Projects continued to manage the influx of medical screening exam requests and work on backlogs, the participant response to the handling of pandemic response was primarily positive. There were several comments from participants stating that they understood the delays in medical screening exams. Participants who were brought in for appointments, as allowed by the COVID-19 restart protocols, said that they felt comfortable during the medical screening exams under the new protocols. The FWP Projects will continue to monitor the cases in each region and will resume and pause screenings as needed to keep the participants and clinic staff members safe.

FWP Feedback during COVID:

"I appreciated the staff's efforts to keep the appointment moving along, such as escorting me to the different parts of the exam."

- Rocky Flats Former Worker

"Everything went well. I felt safe and the facility seemed clean. Staff followed COVID-19 protocols."

- Hanford Former Worker

"Impressed with the clinic's implementation of physical distancing practices."

- Anonymous

"I felt comfortable and would recommend that other exams be done there."

- Hanford Former Worker

"I had a CT scan and felt very safe when I was there. Everyone was very nice and social distanced, wore masks, and didn't get close to me. I appreciate that."

- Anonymous

"Appreciation for safety measures and the caution that necessitated delays and shutdown."

- Anonymous

"I was very happy with the exam and comfortable with the COVID preparedness process of the program and the clinic readiness."

- Rocky Flats Former Worker

"The staff was very courteous, efficient, and on time. I was very impressed with the doctor, who spent a lot of time with me."

- Hanford Former Worker

"I want my exam, but I appreciate your caution; keep me on the call-back list."

- Anonymous

"Everyone was being safe. It was a good experience."

- Rocky Flats Former Worker

"Appreciation for continuous availability of Program staff to answer requests for information, assistance with EEOICPA paperwork & DOL requests, and general information."

- Anonymous

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3.0 Program Implementation

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

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



BTMed health coordinator Kathy Rains and former Oak Ridge worker and BTMed participant Ralph Daniels

Since the inception of the FWP, DOE realized there would be challenges in locating workers to participate in the program as there is no centralized database of former DOE workers. When employee rosters, are available from employers or DOE, AU works closely with DOE Headquarters program offices to obtain these rosters from site contractors and field/site offices.

Many subcontractors employed workers intermittently, and these companies typically did not leave a copy of employee records with the prime contractor. Thus, the availability of a list of names of former workers (employee roster) varies greatly by site.

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 FWP Projects also periodically check the list of workers' names against the National Death Index to ensure they do not send letters of invitation to deceased individuals.

All 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, e.g., public meetings, health fairs, etc., at DOE sites or in the communities near DOE facilities. All in-person outreach events took place before the onset of COVID-19; afterwards FWP Projects conducted virtual outreach events. In FY 2020, the FWP Projects participated in 171 outreach events and assisted the DOL with 22 of its outreach events. Workers also receive exit packets with program information and the hyperlinks to retiree/DOE site webpages when separating from a DOE or DOE-related site.



Cold War Patriots Town Hall meeting at the Jubilee Banquet Facility in Knoxville, TN



Burlington Atomic Energy Commission Plant, (BAECP) Former Worker given participant survey

To locate workers, the FWP Projects continued to conduct outreach efforts in FY 2020. Those former workers who are interested and eligible have either completed their medical screening exams, or the FWP Projects will schedule an exam once deemed safe to screen after COVID-19 rates decrease in their area. Despite the 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, they may harbor a mistrust of a government program or they prefer to wait until COVID-19 is under better control.

Additional information regarding outreach is on the FWP Website (<http://energy.gov/ehss/outreach-former-worker-medical-screening-program-fwp>).

2. Medical Screening Exams: 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 re-screen medical exams every 3 years

a. Conventional Medical Screening Exam Program

The FWP offers conventional medical screening exams that evaluate a former employee’s health as it relates to the individual’s potential occupational exposure to toxic substances and hazardous conditions. The initial medical screening exam 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 / Pulmonary Function Test (breathing test),
- Beryllium Lymphocyte Proliferation Test (to detect beryllium sensitization),
- Blood chemistry test,
- Urinalysis, and/or
- Audiometry (hearing test)

A team of independent physicians, specializing in occupational medicine, helped develop the FWP medical screening exam 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 most current update, in FY 2020, included language regarding COVID-19 related testing to the FWP examination protocol. 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>).



Kim and Maria, a participant with BTMed FWP on the first day of BTMed CT scans at National Jewish Hospital in Denver.

Medical screening exams 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 that are beneficial to workers.

Before participating in the medical screening exam 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.

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

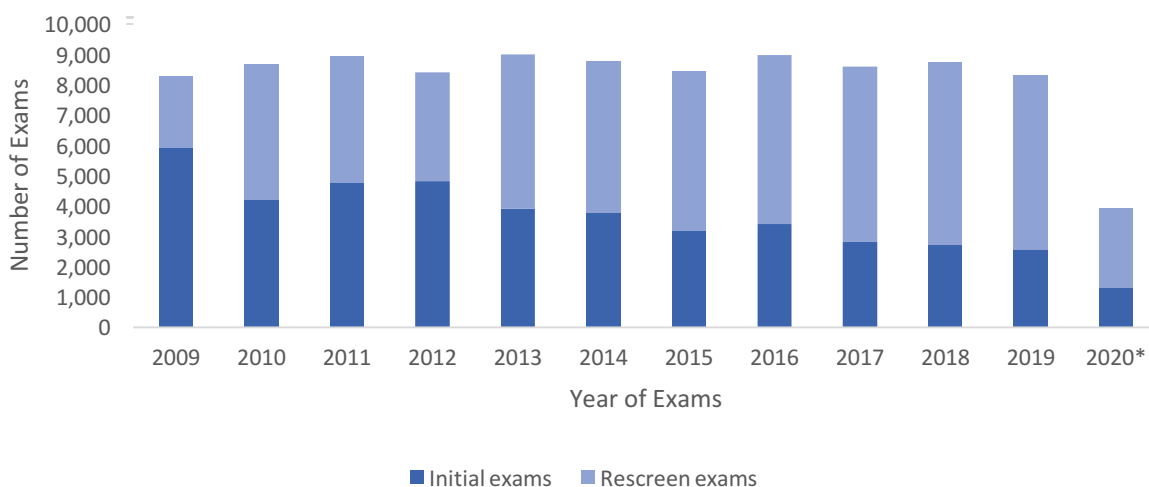
Due to the latency period (the time between the onset of exposure and the diagnosis of the disease) of occupational-related diseases, the FWP offers re-screen medical exams every 3 years after the initial medical screening exam. Rescreening medical exams improve the detection of occupational diseases, so it is essential that rescreening resume as soon as it is safe to do so. 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 FWP also provides some general health screening services. Screenings include 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, and 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.

In FY 2020, the FWP conducted 1,301 initial and 2,632 re-screening medical exams. Since 1997, the FWP has conducted a total of 158,061 medical screening exams, comprised of 95,632 initial and 62,429 re-screening medical exams. Figure 7 provides a breakdown of the number of initial and re-screening exams conducted through FWP Projects for the past several years. As expected, due to the shut down in response to the COVID-19 pandemic, the FWP did not conduct as many medical screening exams in FY 2020 as in previous years. It is also expected that the number of medical screening exams to be down in FY 2021 due to the increased spread of the virus at the end of FY 2020 and the FWP Projects having to pause screenings again.

Figure 7. Conventional Medical Screening Exams Conducted



* Due to the COVID-19 program shut down.

A cumulative summary of FWP conventional medical screening exam findings from FY 1997-2020 is provided in Section 4 of this report. Appendix B contains the number of initial and re-screen exams conducted, by DOE site. The medical findings, listed by DOE site, are in Appendix C. A more detailed description of the components of the conventional medical screening exams is on the FWP Website (<http://energy.gov/ehss/conventional-medical-screening-program>).

b. Early Lung Cancer Detection Program (ELCD)

In 2000, the FWP initiated the ELCD program to detect lung cancers at an earlier, more treatable stage using low-dose CT scans. Low-dose CT scans have proven to be better than conventional chest x-ray for the early detection of cancers when treatment is more likely to be effective at preventing death.

DOE made low-dose CT scans available to many former workers who may be at risk for occupational lung cancer because of their work for DOE. Occupational hazards, such as exposure to asbestos, ionizing radiation, silica, beryllium, and diesel exhaust, may cause or contribute to the disease. Low-dose CT scans detect abnormal cells before they can develop into cancer and find cancer at its earliest stages before it has spread.



ELCD participants are offered initial/baseline, follow-up, and annual low-dose CT scans.

If an individual's initial/baseline scan shows one or more nodules that are not highly suspicious for cancer, they were offered a follow-up scan at 3 or 6 months to determine if there have been any changes. If a nodule is suspicious for lung cancer, the participant is referred to a specialist for diagnostic evaluation.

Ongoing annual 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. The ELCD program is making every effort to maintain to this timeline of screening, however due to the pandemic, some screening may be delayed.

The FWP Projects currently participating in the ELCD program include WHPP, BTMed, and the University of Iowa. Other FWP Projects are exploring how to incorporate low-dose CT scans into their current protocols.

The FWP Projects continued low-dose CT scans during the pandemic because lung cancer is easiest to treat at its earliest stages. It was even more important to continue the follow-up low-dose CT scans because they are performed in response to the identification of a suspicious nodule or some other medical finding that necessitates a follow-up appointment. In FY 2020, 1,871 FWP participants received at least one low-dose CT scan. Some individuals had multiple low-dose CT scans during FY 2020 because they required a follow-up low-dose CT scan. The FWP performed a total of 2,003 low-dose CT scans in FY 2020, including 68 scans among newly enrolled program participants (baseline scans) and 1,935 annual or follow-up low-dose CT scans. Since 2000, the ELCD program has screened 15,597 eligible participants and provided 61,787 low-dose CT scans. As of the end of FY 2020, this vital component of the FWP has detected 238 lung cancers.

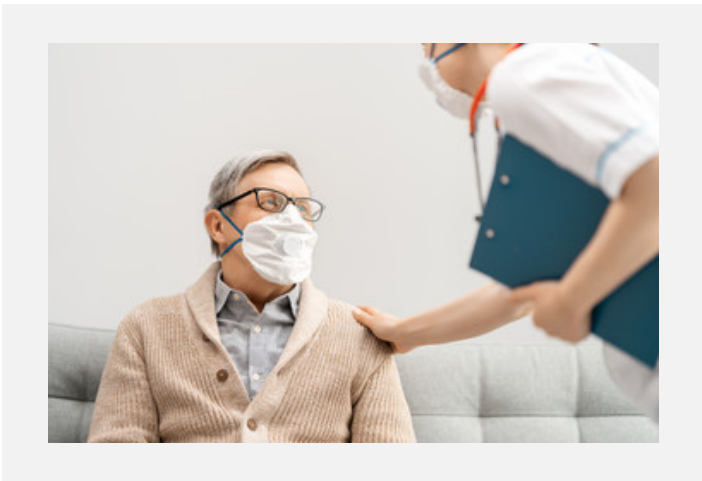
A cumulative summary of ELCD low-dose CT scans findings from 2000 to FY 2020 is provided in Section 4 of this report. Appendix B contains the number of initial and re-screen exams conducted, by DOE site. The medical findings listed by DOE site are in Appendix C. More in-depth information regarding the 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 FWP 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 be work-related.

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.



All participants are provided with a summary of findings, both occupational and non-occupational related, 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 to quit smoking. 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 Program physicians who review the medical screening exam results, include language in the results letters regarding the possibility that an identified condition may be work-related 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 the EEOICPA administered by DOL. In addition, the FWP Programs provide participants with contact information in the results letters for DOL EEOICPA Resource Centers, as well as other State and Federal workers’ compensation programs when appropriate.

While participation in the DOE FWP 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 or DOE-related site. FWP project staff, many of whom are former DOE workers, can also assist participants by providing useful site and exposure information to include in their claim packages.

4. Protect Personally Identifiable Information and Protected Health Information:

Protect the confidentiality and privacy of participants.

The confidentiality and privacy rights of former workers are not only a legal requirement, they are also crucial to establishing and maintaining credibility with the DOE former worker community. All medical information collected as part of the FWP is confidential and used only as allowed by the Privacy Act of 1974 and the Health Insurance Portability and Accountability Act (HIPAA). The 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 before participating. In addition, all program staff take annual privacy awareness training, and all FWP Projects have security procedures in place for the safe transmittal and storage of protected information.

During 2020, all the FWP Projects continued to protect participants’ personal information while teleworking, by working on secured networks. Some programs used an eFax electronic service to replace their current traditional fax machine. This service provides the ability to send and receive participant medical documents with protected information to and from the clinic’s traditional fax machines or by having the clinic access the secure portal. Utilizing this service in conjunction with clinic-based encrypted email for receiving medical charts, will also reduce turnaround time for participant results and delayed or lost packages.

4.0 Cumulative Medical Screening Exam Findings

A cumulative summary of FWP conventional medical screening exam findings from FY 1997-2020 is provided in Tables 1-4. Only new abnormal findings on re-screen exams are reported (i.e., abnormal results found on initial medical screening 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. A cumulative summary of ELCD program low-dose CT scans findings from 2000 through September 2020 is provided in Tables 5 and 6.

**Table 1. Chest X-Ray Exam Findings
(1997 through September 2020)**

Exam		Asbestos related Lung Disease ¹ Cases Detected	Silicosis ² Cases Detected	Other Dust related Diseases ³ Cases Detected	Lung Nodules, Nodes, or Lesions ⁴ Detected
Type	Conducted				
Initial	87,668	9,884 (11.3%)	175 (0.2%)	1,277 (1.5%)	2,783 (3.2%)
Re-screen	33,098	2,664 (8.0%)	29 (0.1%)	476 (1.4%)	1,321 (4.0%)

**Table 2. Spirometry Exam Findings
(1997 through September 2020)**

Exam		Obstructive Airway Dysfunction Cases Detected ⁵
Type	Conducted	
Initial	86,384	13,585 (15.7%)
Re-screen	33,286	3,455 (10.4%)

¹ Asbestos-related diseases include asbestosis of the lungs and asbestos-related pleural plaques, caused by breathing in asbestos fibers.

² Silicosis is a lung disease caused by breathing in silica dust.

³ Mixed dust pneumoconiosis or pneumoconiosis not otherwise specified.

⁴ The presence of non-trivial parenchymal lung nodules, enlarged lymph nodes in the chest, or other lung or pleural abnormality that requires medical follow-up as suggested by the chest x-ray B-reader or the local radiologist.

⁵ Obstructive airways dysfunction includes chronic obstructive pulmonary disease, 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. Beryllium Lymphocyte Proliferation Test (BeLPT) Findings (1997 through September 2020)

Test		1 Abnormal ⁶ Result Detected	2 Abnormal ⁷ Results Detected	1 Abnormal and 1+ Borderline ⁸ Results Detected
Type	Conducted			
Initial	78,780	922 (1.2%)	769 (1.0%)	262 (0.3%)
Re-screen	26,127	232 (0.9%)	220 (0.8%)	127 (0.5%)

Table 4. Audiometry Exam Findings - Initial Screening Exams Only (1997 through September 2020)⁹

Exams Conducted	Noise Induced Hearing Loss Cases Detected
78,112	41,584 (53.2%)

Table 5. Lung Cancers Detected via ELCD Program by DOE Site¹⁰ (2000 through September 30, 2020)

DOE Site ¹¹	Participants Screened	Lung Cancers		Early Cancers Detected ¹² (Carcinoma In Situ, Stage I or II Non Small Cell, or Limited Small Cell)
		Detected	Staged	
Fernald FMPC - Construction Workers	208	4	4	4 (100.0%)
Fernald FMPC - Production Workers	463	5		4 (80.0%)
Hanford Site - Construction Workers	361	8	8	7 (87.5%)
Idaho NL - Production Workers	718	10	9	6 (66.7%)
Mound Plant - Production Workers	619	7	6	5 (83.3%)
Nevada National Security Site	744	9	8	3 (37.5%)
Oak Ridge GDP - Production Workers	2,885	40	40	31 (77.5%)

⁶ Number of individuals who receive exactly 1 abnormal BeLPT result with zero borderline results and any number of normal or uninterpretable results; BeLPT results categories are mutually exclusive. Individuals with one abnormal BeLPT are encouraged to file a claim under the DOL EEOICPA. An occupational medicine physician will diagnose beryllium sensitization based on the BeLPT results.

⁷ Number of Individuals with 2 Abnormal BeLPT results: Number of individuals who receive 2 abnormal BeLPTs; BeLPT results categories are mutually exclusive

⁸ Number of Individuals with 1 Abnormal and 1+ Borderline BeLPTs: Number of individuals who receive 1 abnormal and 1+ borderline BeLPT; BeLPT results categories are mutually exclusive.

⁹ Audiometry is offered only on the initial exam since occupational hearing loss would typically be detected during the initial screen exam of retired workers.

¹⁰ Findings include results from baseline, follow-up, and annual scans from WHPP, BTMed, and NSSP FWP Projects.

¹¹ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC =National Security Complex/Campus; NL = National Laboratory.

¹² The classification system describes the stage of lung cancer defined by the American Joint Committee of Cancer, Cancer Staging Manual. 7th Edition, 2010) and is based on the extent of the tumor, the extent of spread to the lymph nodes, and the presence of metastasis. Staging is based on pathology status, or clinical status if pathology status is not available.

Table 5. Lung Cancers Detected via ELCD Program by DOE Site¹⁰
(2000 through September 30, 2020)

DOE Site ¹¹	Participants Screened	Lung Cancers		Early Cancers Detected ¹² (Carcinoma In Situ, Stage I or II Non Small Cell, or Limited Small Cell)
		Detected	Staged	
Oak Ridge NL - Production Workers	1,290	18	17	9 (52.9%)
Oak Ridge Reservation ¹³ - Construction Workers	527	17	17	9 (52.9%)
Miscellaneous Sites	317	8	8	8 (100.0%)
Paducah GDP - Production Workers	2,030	29	25	20 (80.0%)
Portsmouth GDP - Production Workers	2,277	28	27	21 (77.8%)
Rocky Flats - Production Workers	98	1	1	1 (100.0%)
Savannah River Site - Construction Workers	289	6	6	4 (66.7%)
Y-12 NSC - Production Workers	2,771	48	42	31 (73.8%)
Grand Total	15,597	238	223	163 (73.1%)

Table 6. Other Diseases Identified via ELCD Program
(2000 through September 30, 2020)

Condition	Cases Detected
Aortic Aneurysm	90
Appendiceal Cancer	3
Breast Cancer	1
Heart Aneurysm	7
Hemangiopericytoma	1
Kidney Cancer	14
Liver Cancer	5
Lymphoma	10
Mesothelioma	4
Metastatic Cancer (primary site other than lung)	8
Metastatic Cancer (primary site unknown)	7
Pneumonia	126
Solitary Plasmacytoma	1
Splenic Aneurysm	6
Thymoma	12
Thyroid Cancer	5
Grand Total	300

¹³ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

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5.0 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 exam 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 80 years of nuclear weapons design and production, as well as other activities that may have exposed its workers to toxic substances and hazardous conditions. The exams offered by the FWP can provide important information on health conditions, which may be treatable if caught early. Participants who are found not to have work-related conditions during their exams receive the benefit of this reassurance.

Since 1997, the FWP has provided a total of 158,061 conventional medical screening exams (initial and re-screen exams) to 95,632 former workers. Since 2000, through the ELCD program, the FWP has screened 15,597 participants for occupational lung cancer with low-dose CT scans, and completed 61,787 baseline, follow-up, and annual low-dose CT scans. The FWP is responsible for identifying thousands of cases of medical conditions ranging from auditory loss to early cancer detection, and many of these conditions were identified in an early stage, leading to more successful medical outcomes.

While the Department strives to improve upon past successes, the program is not without its challenges. AU staff members meet regularly with the FWP Project PIs to seek their input on how to improve the program and ensure that it offers the most appropriate medical tests. Also, the FWP Projects routinely monitor participant satisfaction with program elements, including medical clinic staff, wait times, and locations, and remove clinics that perform poorly from the program.

The year 2020 was a challenging year for everyone, and it was certainly a difficult year for the FWP due to the COVID-19 pandemic. The health and safety of DOE workers is of paramount importance to the Department, and the FWP is a vital part of this responsibility. The FWP usually protects former workers by providing comprehensive medical screening exams, but in 2020, in the interest of keeping former workers safe, the FWP had to make the very difficult decision to temporarily suspend medical screening exams due to the Covid-19 pandemic. This decision was not taken lightly, because these screenings are critically important to workers, and in some cases can be lifesaving. After suspending screenings in March of 2020, the FWP began planning immediately for a safe return to screening. The FWP conducted limited screenings throughout 2020 when and where it was deemed safe, but overall, the FWP Projects have accumulated a backlog of former workers waiting to be screened. In 2021 the FWP looks forward to resuming operations and doing everything possible to reduce the backlog of workers waiting for an exam.



"This is an excellent program. It is a great supplement to my medical program. Thanks for making this program possible, I'm glad to be a part of it."

— Jerry Whitehead, Former Oak Ridge Worker, BTMed Participant



"Working at a nuclear facility, you have to protect yourself and monitor your health. That is the reason why I am part of the Building Trades program and I recommend it to all those who worked out there. It could be life-saving."

— James Edward Johnson, Former Savannah River Worker, BTMed Participant

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Appendix A: Former Worker Program Project Descriptions

The U.S. Department of Energy (DOE) Former Worker Program (FWP) Projects are briefly described. Additional information can be found on each of their websites.

Building Trades National Medical Screening Program



Who we are:

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

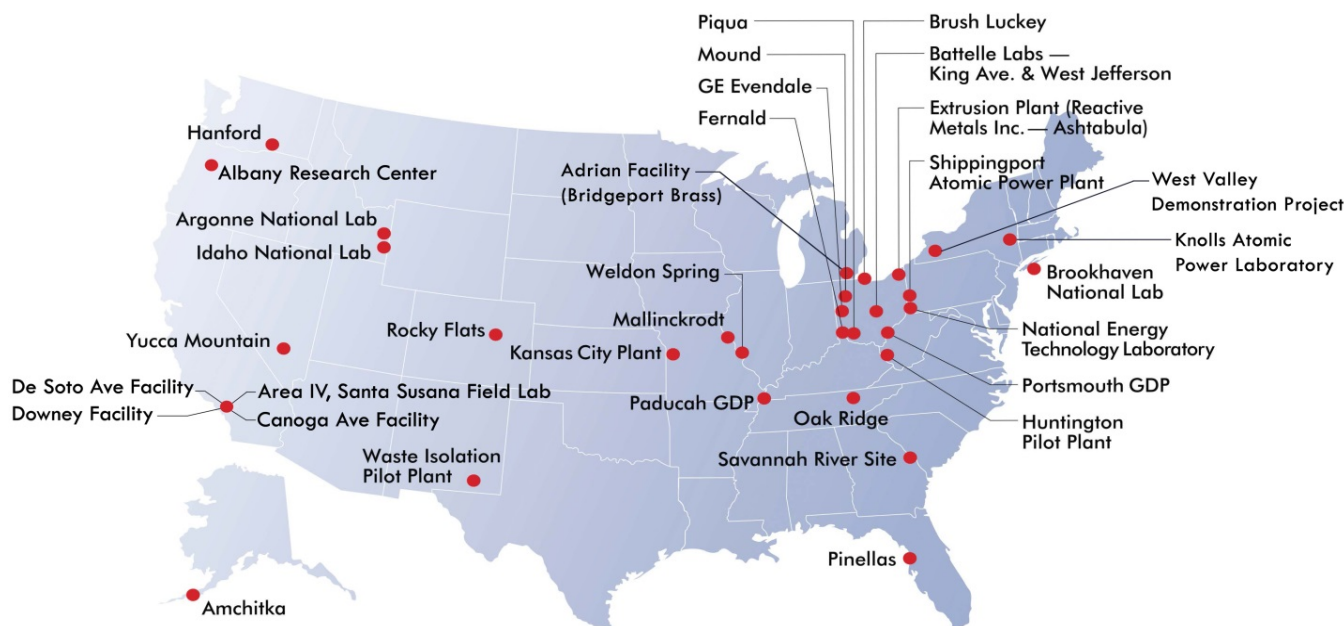
What we do:

Since 1996, BTMed has provided free, ongoing medical screening exams to construction workers previously employed at DOE nuclear weapons sites (see map for covered facilities). These workers may have been exposed to toxic substances and hazardous conditions which increase their risk for occupational illnesses. The medical screening exams help identify work-related health conditions at an early, more treatable stage and contribute to the overall health and well-being of these workers. Since its inception, BTMed has provided over 41,000 medical screening exams and 6,900 low-dose computed tomography (CT) scans to former DOE workers.

BTMed COVID-19 Response:

In mid-March 2020, the COVID-19 pandemic forced suspension of medical screening exams and low-dose CT scans, and BTMed responded by adapting its practices to continue serving participants. This ongoing work has included over 5,500 wellness calls to update participants; communicating with health clinics, local outreach coordinators, and state and local Building Trades Council; enrolling and interviewing more than 250 new participants; and continuing outreach through telephone calls, mailings, and virtual events. BTMed developed a Remote Health Assessment alternative to in-clinic exams, with participants interviewed by phone to identify conditions that may be referred for medical follow-up or compensation. BTMed also created plans for restarting, including ongoing community, provider, and participant readiness determinations. These plans have been approved by the Central Department of Energy Institutional Review Board.

BTMed Covered Sites



What we have found:

Important Occupational Health Findings

a. Conventional Medical Screening Exams

- Chest x-ray (N=23,128 participants receiving at least one x-ray): 19.2 percent of 23,128 participants demonstrated findings consistent with work-related lung disease.
- Pulmonary function test (N=22,770 participants receiving at least one test): 22.6 percent of 22,770 participants demonstrated findings consistent with obstructive disease.
- Beryllium Lymphocyte Proliferation Test (N=21,874 participants receiving at least one test): 2.2 percent of 21,874 participants had at least one abnormal test.
- Audiometry (N=21,257 participants receiving at least one audiogram): 64.7 percent of 21,257 participants demonstrated hearing loss for normal speech tones.

b. Early Lung Cancer Detection Program Exams

- Lung cancer was detected in 43 of 1,684 DOE workers (N=1684).
- 32 of the 43 (74.4 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's commitment to research to improve screenings for construction workers was highlighted in a study on lung cancer mortality. Published in the *Journal of Occupational and Environmental Medicine*, the study examined records of more than 17,000 program participants, including 352 who died from lung cancer, to identify predictors that can better define eligibility for low-dose CT scans, which can improve early detection. It found that while using only age and smoking history as criteria identified 51 percent of those who would eventually die of lung cancer, adding factors including chest x-rays, spirometry, prior cancer history, and duration of construction work raised the identification rate to 86 percent. The results support inclusion of risk

from occupational exposures and respiratory clinical findings in low-dose CT scans clinical guidelines to better target high-risk individuals for screening. The full paper can be found on www.btmed.org. BTMed has completed and published 17 studies in the scientific literature.

BTMed is currently working on a research study of chronic obstructive pulmonary disease, with the aim of better defining the risk of the disease by construction trade and exposure risk factors.

BTMed Medical Team:

Knut Ringen, DrPH, MHA, MPH Principal Investigator, BTMed



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 exam program for former DOE construction workers, which evolved into the BTMed program. 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, BTMed added a special focus of early lung cancer detection for a subset of its participants who have a very high risk.

In 1979, Dr. Ringen launched three projects to demonstrate that medical screening exams 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 screening exams, Dr. Ringen and others could show how effective this model of medical screening exams 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 the DOE FWP.

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



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.

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

Email: btmed@btmed.org

Web site: www.btmed.org

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



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 (UTHSCT); Co-PI: C. David Rowlett, MD, MS.
- Clinical Services: Amarillo Medical Specialist, LLP, Amarillo, Texas; Clinician: Angela Phillips, DNP, APRN, FNP-BC, Associate Professor, West Texas A&M University.

What we do:

- The Pantex Former Worker Medical Surveillance Program (FWP) 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 health care providers experienced in occupational medicine.
- Participants are scheduled for an appointment at a time convenient for them at a clinic in Amarillo, TX. Former workers that live outside the Amarillo area are referred to the National Supplemental Screening Program.
- Each participant completes an occupational exposure history, as well as past medical history, prior to having their medical screening exam.
- The initial medical screening exam includes offering the following tests: physical exam, chest x-ray with International Labor Organization B-read, spirometry, Beryllium Lymphocyte Proliferation Test (BeLPT), blood chemistry tests, and urinalysis.
- Former workers who participate in the program receive the results of their clinical exam and medical tests in a personalized “results letter” from a board certified occupational medicine physician along with any necessary follow-up recommendations.
- The screening process is an opportunity for former workers to receive additional wellness information and support for lifestyle changes to improve their health and quality of life.
- Each participant is offered the opportunity to return for a “re-screening” exam every 3 years. The re-screening exam is focused on previous findings and any new health developments with all laboratory testing repeated as appropriate.
- Workers are assisted with claims made through the Department of Labor Energy Employees Occupational Illness Compensation Program Act program, as appropriate.

Drexel COVID-19 Response:

- Due to the rapid spread of COVID-19, the Pantex FWP suspended exams shortly before the declaration of a national emergency in mid-March 2020 and hasn’t restarted. Though Texas as a whole began re-opening in late April 2020, Amarillo has had two severe local outbreaks, first in a meatpacking plant in

May 2020 and in late September 2020, at a nearby state prison. During 2020, the Panhandle case rates are among the highest in the state. Currently, the COVID-19 case rate in Amarillo (7-day average, 11/13/20) is ~110/100,000 population.

- During the temporary exam suspension due to COVID-19, interested participants continue to be enrolled with the program and receive list placement for when the exams resume.

What we have found:

- Chest x-ray: 5.46 percent of 1282 participants demonstrated findings consistent with work-related lung disease.
- Chest x-ray: 4.91 percent of 1282 participants demonstrated findings consistent with suspicious lung nodules or lesions.
- Pulmonary function test (PFT): 40.72 percent of 1282 participants demonstrated findings consistent with obstructive disease.
- BeLPT: 1.48 percent of 1282 participants had at least one abnormal test.
- Audiometry: N/A.
- Our Participation Surveys continue to show 99.2 percent satisfaction with the program.

Medical Team:

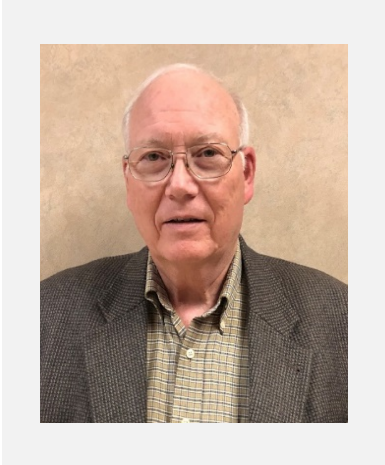
Arthur L. Frank MD, PhD

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 the National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, Environmental Protection Agency, and the Center for Disease Control. 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.

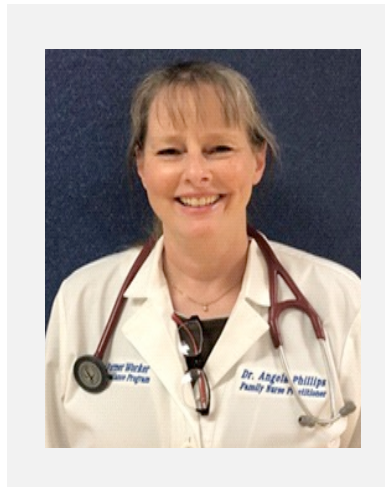


C. David Rowlett, MD, MS, FACOEM **Co-Principal Investigator**

Dr. Rowlett joined the Department of Occupational Health Sciences at UTHSCT as an Associate Professor in 2010 and began working directly with the Pantex FWP in 2014. Prior to UTHSCT, Dr. Rowlett was first a designated physician and then the site occupational medical director 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 four years active duty in the US Army Medical Research and Development Command. Following this, he worked in industry as a process engineer and technical superintendent for El Paso Products. After several years in industry, Dr. Rowlett entered medical school at Texas Tech Health Sciences Center and 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, and University of Iowa Hospitals, 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 practices, 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.



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. 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 in 1999, and Doctor of Nursing Practice in 2009 from University of Texas at Houston. She has been employed at West Texas A&M University since 2003.

Dr. Phillips is the Director of the Family Nurse Practitioner program and teaches Advanced Health Assessment, Primary Health Care courses, Capstone Practicum for Family Nurse Practitioner, and Research Synthesis. Dr. Phillips is involved in the Nursing Health and Wellness Clinic on campus at West Texas A&M University. 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.

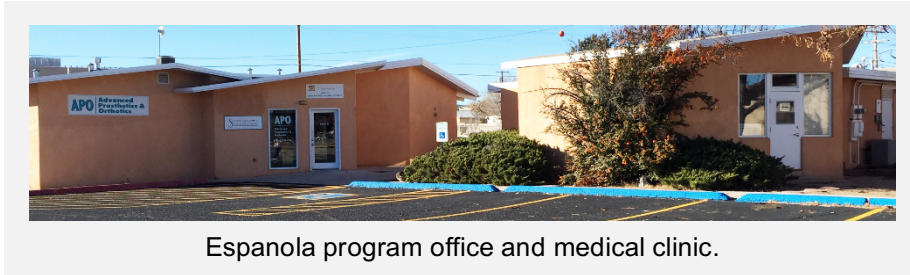
Dr. Phillips has been involved in Pantex Former Worker Medical Surveillance Program since 2005. She has published an article and given presentations related to this research.

Amarillo Medical Specialists, LLP
Clinical Location
Angela Phillips and Ken Phillips



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

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



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

What we do:

- Provide medical screening exams to all interested former workers from Los Alamos National Laboratory (LANL) and Sandia National Laboratories – New Mexico (SNL-NM).
- The JHBSPH Medical Exam Program is one of several unique programs within the DOE Former Worker Medical Screening Program (FWP). Examinations are performed in Espanola and Albuquerque, NM, by occupational health professionals from JHBSPH and University of New Mexico. We offer initial examinations and re-examinations every three years.
- Physicians, health care providers, and occupational health professionals travel from Baltimore, MD; and Espanola and Albuquerque, NM, to the examination site to conduct physical examinations.
- Examination sessions are scheduled over a 2-day or 3-day period two to three times per year.
- 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 4,598 examinations of former workers since the program began in 2000. Of these exams, 3708 were new exams, and 812 were re-examinations of former LANL workers for past exposures to asbestos, beryllium, and radiation, and SNL-NM former workers for past exposure to asbestos, beryllium, radiation, and silica.
- On exit surveys, over 80 percent of program participants stated that they were satisfied with their overall evaluation. Due to an increase in referrals to the program from outside sources we had many program participants who had to wait for a long period of time to receive their examinations and 97 percent who had examinations would recommend the program to other former workers.
- The program works with the Joint Outreach Task Group to develop outreach strategies to recruit former

workers who are eligible for the FWP and Energy Employees Occupational Illness Compensation Program Act compensation. The Joint Outreach Task Group has representatives from the National Institute for Occupational Safety and Health, DOE FWP, Department of Labor (DOL) Office of Workers Compensation, DOL Ombudsman's Office, National Institute for Occupational Safety and Health Ombudsman's Office, and the DOL Resource Centers.

- In February 2020, we participated in a town hall meeting with the DOL program in Santa Fe, NM. All members of the Joint Outreach Task Group attended the town hall meeting and made presentations for their programs. We sent invitations to all former workers who participated in the LANL and SNL-NM FWP. We had a good response to the mailing. At the town hall meeting, we did a presentation to update any former workers in the audience about the status of the program. The PI answered questions and recruited individuals for the screening program.
- When we are unable to attend DOL meetings in the New Mexico area we send brochures for both programs to the Espanola Resource Center for these meetings.

JHU COVID-19 Response:

- Since March 14, 2020, the Johns Hopkins University had been under work-from-home status.
- All educational programs are done via online education.
- All meetings are done via ZOOM.
- We have not done any former worker medical examinations and testing.
- Our program employees in New Mexico answer telephone calls and handle questions and issues of the program former workers.
- As you will read below, our model for this program is 2 to 3-day trips to New Mexico with all the occupational safety and health personnel that we need to perform examinations and testing. We see 30 to 35 former workers per day.
- We discontinued these examinations due to the pandemic in Maryland and New Mexico. During our examination sessions, most former workers gathered in our waiting room or the hospital waiting area for the completion of consent forms, examinations and testing (blood tests, spirometry, hearing tests, and chest x-rays).
- We are working to form a relationship with Concentra Health Services, Inc. located in Albuquerque and Santa Fe, NM. This company will perform examinations and testing of the program former workers until the end of the COVID-19 pandemic and when we can return to New Mexico to resume our program model.
- One of our employees from New Mexico attended a meeting with The Cold War Patriots Group prior to the COVID-19 lock down in New Mexico,
- Due to the quarantine in New Mexico, the DOL meetings are now presented online, and other meetings are not being done at this time.

What we have found:

- Chest x-ray: N= 3,480 had at least 1 chest x-ray and 10.0 percent demonstrated findings consistent with work-related lung disease.
- Pulmonary function test: N = 2,553 had at least 1 test and 5.4 percent demonstrated findings consistent with obstructive disease, and 3.5 percent had mixed pattern of disease.
- Beryllium Lymphocyte Proliferation Test: N = 3,447 had at least 1 test and 1.53 percent had at least one

abnormal test, and 1.8 percent had 2 abnormal tests or 1 abnormal and 1 borderline test.

- Audiometry: N= 3,156 had at least 1 audiogram and 54.5 percent demonstrated hearing loss for normal speech tones, and 3.92 percent had the supplemental definition of hearing loss.

Medical Team:

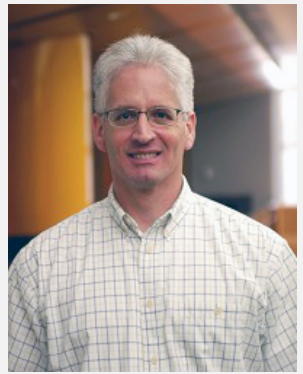
Maureen Cadorette, PhD, COHN-S



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 John Hopkins University. 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 John Hopkins University 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 for Occupational Safety and Health 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-PI. She manages the day-to-day activities of the program and works with their staff in New Mexico to keep the program working smoothly.

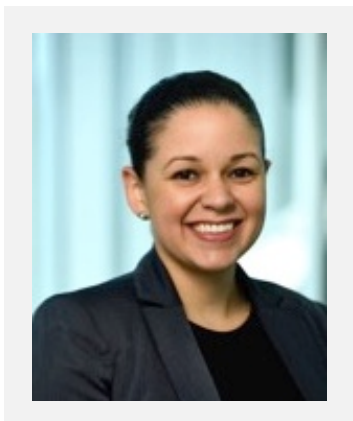
Brian S. Schwartz, MD, MS



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 University 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 Deputy Program 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-NM 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.

Aisha Rivera Margarin, MD, MS



Aisha Rivera is board certified in Occupational and General Preventive Medicine and serves as the Program Director for the Johns Hopkins Occupational and Environmental Medicine Residency. In that role, she is responsible for organizing training and educational experiences, evaluating and mentoring residents and maintaining the residency's Accreditation Council for Graduate Medical Education accreditation through a number of reporting and administrative tasks. She also serves as a Medical Advisor to the International Association of Fire Fighters through a longstanding relationship between the union and the residency program and is the course director for the Department of Environmental Health and Engineering's Clinical Occupational and Environmental Toxicology Course. She enjoys overseeing the growing premed focus area for the Master of Health Sciences offered by the Department of Environmental Health and Engineering where she gets to connect with students aspiring to pursue careers in medicine. She joined the FWP team as co-investigator in June 2020.

Outside of JHBSPPH, she maintains various professional relationships, including working as a per diem physician with Concentra where she was most recently medical director and providing oversight for an onsite clinic, is a credentialed Clinical Peer Reviewer for several private companies, and has been assisting the New York City Metropolitan Transit Authority with reviewing their practices in response to COVID-19 pandemic.

Her professional interests include: mentoring students and residents, medical education, firefighter health and safety, medical surveillance, healthcare worker health, exploring the link between workplace culture and worker well-being, systems thinking, women in the workplace, vulnerable populations, work as a social determinant of health, workplace policies that promote healthy families, and international occupational health. She is a member of the American College of Occupational and Environmental Medicine and is currently on the Presidential Taskforce to Increase Occupational and Environmental Medicine visibility and a separate committee on fundraising for education.

Toll-free number: 1-877-500-8615
Web site: <http://www.jhsph.edu/lanlwf/>

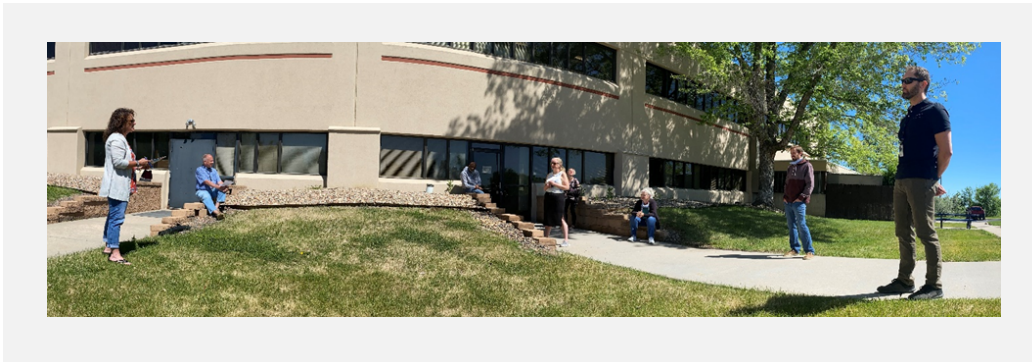


National Supplemental Screening Program

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 DOE former workers to the right people and resources in their area for medical screening exams.

The NSSP team of experts includes:

- **National Jewish Health** – 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. In 2020, the university named ORAU its first-ever Partner of the Year for the superb collaboration between the two organizations on the NSSP over the program’s fifteen-year history.
- **Comprehensive Health Services (CHS)** (a Caliburn Company) – a leading provider of medical management solutions, with one of the country’s largest nationwide clinic networks. CHS provides the NSSP with participant scheduling and medical examination services at more than 2,600 facilities around the country. With staff physician oversight, CHS medical readiness teams respond to participants’ health care needs. CHS scalable exam and surveillance programs provide dynamic, proven, and robust solutions for national and international workplace health.
- **Axion Health** (a Cority Company) – provides the NSSP with ReadySet®, a cloud-based health management system to increase compliance, participant engagement, and organizational efficiency. ReadySet® is currently used by many prestigious United States health systems, integrating occupational health and medical surveillance. The system is Health Insurance Portability and Accountability Act, National Institute of Standards and Technology, and System and Organization Controls - 2 compliant; reliable; easy to learn; and quick to implement. ReadySet® is a secure solution covering the health data of over one million individuals.



What we do:

- The NSSP is the newest of the DOE Former Worker Medical Screening Program (FWP) Projects. It began operation in 2005 and provides medical screening exams to DOE former workers in production, operations, administration, and various other occupation groups from eight primary DOE sites:
 - Argonne National Laboratory
 - Fermi National Accelerator Laboratory
 - Hanford Site
 - Kansas City National Security Campus
 - Princeton Plasma Physics Laboratory
 - Pinellas Plant
 - Rocky Flats Plant
 - Savannah River Site
- The NSSP also screens former workers from 73 additional DOE sites including referrals from site-specific FWP Projects in cases where eligible former workers live outside of those projects' respective medical screening exam coverage areas and DOE sites for which no other FWP Project has been established or assigned.
- The NSSP provides DOE former workers with exposure-based medical screening exams 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 Employees Occupational Illness Compensation Program Act benefit claims with the Department of Labor.
- Over the program’s 15-year existence, more than 99% of responding participants have been satisfied with their experience in the NSSP.
- The NSSP has developed an active research program involving projects on a range of topics related to former worker health and wellbeing. This recently revitalized research agenda maintains a consistent focus on providing a benefit to former workers and improving the reach, efficiency, and impact of the NSSP. Current projects all involve close collaboration between researchers at ORAU, National Jewish Health, and University of Colorado.

NSSP COVID-19 Response:

The NSSP, after consultation with the DOE and the other FWP Projects, decided to suspend medical screening exams and appointment scheduling on March 17, 2020. This decision was made based on the rapidly rising COVID-19 rates, hospitalizations, and deaths nationwide. By that time, the FWP Projects and DOE FWP Management had held two conference calls to discuss the issue and share thoughts about how best to proceed. The FWP Projects agreed early on that an indefinite screening pause was in the best interests of participants and clinic staff.

Bi-weekly discussions between DOE headquarters and the management and coordinators of each FWP Project have taken place since the beginning of April. These interactions have provided a useful venue for sharing ideas, concerns, resources, and lessons learned while adjusting program operations during the screening pause and planning for the eventual restart of medical screening exams. During Spring and early Summer 2020, the NSSP developed several supplemental resources for participants and created a plan for initiating a limited-scale restart of medical screening exams. Program protocols were adjusted to accommodate new procedures such as readiness assessments for participants and clinics, follow-up calls for recently screened participants, and general communications to participants regarding COVID-19 and its impact on the NSSP. All materials and plans were submitted to the Central DOE Institutional Review Board and ultimately approved for use.

On July 23, 2020, with its new protocols in place and after careful evaluation of local pandemic statistics and public health guidelines, the NSSP began performing medical screening exams of individuals at NJH, a respiratory research hospital in Denver, CO and one of ORAU's NSSP partner organizations. Shortly thereafter, limited medical screening exam restart activities were extended to the Kennewick, WA area, near the Hanford Site, and to other clinics in the Denver, CO area. With limited capacity for performing screenings since late July 2020, the NSSP continues to receive enrollments and exam requests at a rate that outpaces that of exam completion. As a result, the NSSP's backlog of exam requests has steadily grown. At the time of this report's preparation in mid-November 2020, 876 former workers were on the backlog list of exams to be completed.

The NSSP backlog includes participants whose already-scheduled exams had to be canceled at the start of the screening pause in March, as well as hundreds of participants and new enrollees who contacted the program following the scheduling suspension. The backlog list serves as a resource for tracking exam requests, sending targeted communications to participants, and evaluating "catch-up" progress. Weekly reports are compiled using updated information from the NSSP's provider partners regarding the number of new medical screening exams requested, the current total of participants awaiting rescheduling, the number of medical screening exams scheduled but not completed, "lab only" exams (such as for repeat bloodwork), and referrals received from other FWP Projects.

Since the medical screening exam pause, NSSP staff have engaged in numerous activities aimed at process improvement, quality assurance, physical and digital resource organization, and more, thereby ensuring that program records and process documentation meet the NSSP's high standards. While the results letter editing team was able to carry on with their typical work through mid-May 2020 due to the continued receipt of medical screening exam results from appointments completed prior to the pause, many other NSSP staff members had mostly transitioned to peripheral tasks by early April 2020. Important accomplishments made during the dearth of medical screening exam-related workflow include a program-wide review and update of NSSP work guidance instruction documents, program recordkeeping quality review, and a reinvigoration of the NSSP's research agenda in the form of group meetings, new projects, and progress toward ongoing study completion.

What we have found:

The NSSP has conducted initial medical screening exams for 19,365 former DOE workers from 81 DOE sites and 6,325 rescreening medical exams for those workers.

Chest X-Rays (with B-Read interpretation): N = 18,517

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 Test: N = 18,430

13.4%	had findings consistent with obstructive lung disease
3.0%	had findings consistent with mixed pattern lung disease

Beryllium Lymphocyte Proliferation Test: N = 17,172

2.7%	had at least one abnormal BeLPT
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Audiometry: N = 16,586

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 = 6,237

53.1%	Normal (A1c value < 5.7)
31.1%	Prediabetes (A1c value 5.7 - 6.4)
15.9%	Diabetes (A1c value 6.5 or greater)

Medical Team:

Donna L. Cragle, PhD



Dr. Cragle stepped down as the Senior Vice President and Director of Health, Energy, and Radiation Management at ORAU in the fall of 2019, but has retained her role as Project Director of the NSSP. She has been involved with research on occupational hazards in 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.

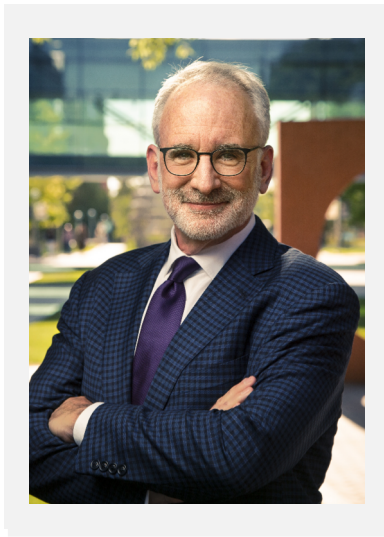
John R. McInerney, MD



Dr. McInerney is a physician with ORAU, manager of the ORAU Arvada Office, and is the Co-PI of the NSSP. Dr. McInerney coordinates the NSSP evaluation tests and procedures, participant education, and results notification with the occupational physicians and radiologists at the UC and NJH. 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, CO for 15 years that provided emergency, general, and occupational medical services to the surrounding community. He served as an elected Golden, CO 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 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 DOE former worker findings.

Lee S. Newman, MD, MA, FCCP, FACOEM, F. Collegium Ramazzini



Dr. Newman is Distinguished University Professor at the University of Colorado in the Colorado School of Public Health and School of Medicine. In the Colorado School of Public Health, he has appointments in the Department Environmental and Occupational Health and Department of Epidemiology. He is Director of the Center for Health, Work and Environment and Director of the National Institute for Occupational Safety and Health-supported Mountain and Plains Education and Research Center. In the School of Medicine, he is in the Division of Pulmonary Sciences and Critical Care Medicine at the University of Colorado Anschutz Medical Campus. Dr. Newman serves as the Co-PI of the NSSP. In his role as founder and chief medical informatics officer 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 DOE FWP medical screening exams throughout the country. He has also served as an advisor to many federal agencies, including the DOE, Department of Labor, the National Institute 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 NJH, he pioneered the use of the Beryllium Lymphocyte Proliferation Test and was instrumental in bringing this test into routine use for both clinical diagnosis and screening of beryllium-exposed workers, leading to the current clinical definition of beryllium sensitization and chronic beryllium disease. Dr. Newman received his Bachelor of Arts degree in psychology from Amherst College and his Masters of Arts degree in social psychology from Cornell University Graduate School of Arts and Sciences. He earned his medical degree 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 / National Jewish Health.

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

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



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. Former worker Medical Screening Program (FWP) medical screening exams are conducted through partnerships with local clinics and medical schools in or near local Department of Energy (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 exams in 1998 and currently provides FWP medical screening exams at 14 DOE sites in eight states. WHPP pioneered the use of low-dose computed tomography (CT) scans 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 exams occur. Activities of local coordinators include conducting outreach at community events, scheduling and assisting with program registration, answering medical screening exam questions, liaising with local site offices and worker groups, advising on the development of program materials, and providing appropriate referral guidance to claimants regarding Energy Employees Occupational Illness Compensation Program Act and state workers' compensation claims. Local coordinators have been an essential component in the recruitment of more than 34,700 DOE workers who have participated in over 70,000 total examinations through WHPP.

What we do:

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

WHPP provides both conventional and ELCD medical screening exams to former workers from:

- Lawrence Berkeley National Laboratory (California)
- Lawrence Livermore National Laboratory (California)
- Sandia National Laboratories (California)
- Idaho National Laboratory (Idaho)
- Paducah Gaseous Diffusion Plant (Kentucky)
- Nevada National Security Site (Nevada)
- Fernald Feed Materials Production Center (Ohio)
- Mound Plant (Ohio)

- Portsmouth Gaseous Diffusion Plant (Ohio)
- Oak Ridge Gaseous Diffusion Plant (Tennessee)
- Oak Ridge National Laboratory (Tennessee)
- Y-12 National Security Complex (Tennessee)

WHPP provides only conventional medical screening exams to workers from:

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

WHPP COVID-19 Response:

In response to the COVID-19 pandemic, WHPP temporarily suspended all occupational medical examinations and low-dose CT scans in mid-March 2020, with the exception of interim 3 and 6-month follow-up of previously abnormal low-dose CT scans. This “pause” in medical screening exams was implemented as a safety precaution for program participants and staff and in accordance with county, state, and professional advisory groups’ directives and guidelines.

Throughout the COVID-19 pandemic, WHPP has collaborated with other FWP Projects and the Central Department of Energy Institutional Review Board in designing updated program plans to restart medical screening exams, while minimizing the risk of COVID-19 transmission. Restart plans included in-depth assessments of our medical provider’s ability to resume medical screening exams in a safe manner, as well as developing pre-screening health and readiness questionnaires for participants.

Beginning in September 2020, WHPP was able to resume occupational medical screening exams and low-dose CT scans, on a limited basis, in DOE communities that met the requirements of our amended COVID-19 safety plans. WHPP medical staff continues to monitor and review available data on COVID-19 case rates on a weekly basis in the areas where we operate in order to determine whether or not new scheduling can occur or should be paused again. Additionally, WHPP has begun offering COVID-19 immunoglobulin G antibody testing to assess possible past exposures to the virus as part of our medical screening exams.

During the period of reduced medical screening exam activity, WHPP continues to successfully meet the routine objectives of the FWP including: conducting remote outreach and enrollment via phone calls, mailing and digital communication; assisting participants with EEOICPA claims; providing timely communication of medical results; and protecting personal health information. Notable new program activities conducted during the “COVID pause” included WHPP staff calling over 2,500 program participants to provide program status updates, collecting updated contact information and offering COVID-19 related health information.

What we have found:

a. Conventional Medical Screening Exams

- Chest x-ray (N=33,848 participants receiving at least one x-ray): 8.6 percent demonstrated findings consistent with work-related lung diseases constituted by the pneumoconioses (includes 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 Test (N=33,864 participants receiving at least one test): 16.8 percent demonstrated findings consistent with obstructive lung disease (includes abnormalities consisting of obstructive pattern and mixed pattern combined).

- Beryllium Lymphocyte Proliferation Test (N=31,054 participants receiving at least one test): 3.4 percent had at least one abnormal test (total percentage of abnormal test, including 1, 2 or 1 and \geq borderline abnormal test).
- Audiometry (N=32,044 participants receiving at least one audiogram): 48.6 percent demonstrated occupational hearing loss.

b. Early Lung Cancer Detection Program

- 194 participants have been diagnosed with primary lung cancer from 2000 to the present.
- 130 of the 180 (72.2 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 has been detected in 1 of approximately 71 DOE participants tested since 2000 (N=13,833).

Medical Staff

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 exam 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 over 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 National Institute of Health funded training for medical students and a Fogarty Center-funded international occupational health fellowship in Mexico, Brazil, and Chile. For many years, he worked with community groups in New York City to address immigrant occupational health, providing medical screening exams 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 has over the past two decades provided monitoring and conducted research on workers who worked at the clean-up site of the World Trade Centers after 9/11.

Dr. Markowitz currently serves as Chair of the Advisory Board on Toxic Substances and Worker Health for Part E of Energy Employees Occupational Illness Compensation Program Act and on the Scientific and Technical Advisory Board of the World Trade Center Health Program of the National Institute for Occupational

Safety and Health. From 2007 to 2018, he was Editor-in-Chief, *American Journal of Industrial Medicine* and, previously, Associate Editor of a major textbook, *Environmental and Occupational Medicine (4th edition)* (2007).

Founded in 1966, the Barry Commoner Center for Health and the Environment (the Center) 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, CSP, OHST



Ashlee Fitch, works as the Program Director and PI for the United Steelworkers' (USW) Tony Mazzocchi Center for Health, Safety, and Environmental Education. In 2019, she stepped down as the PI for the USW for the Worker Health Protection Program, but remains a solid voice for workers in the FWP. 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 across USW represented workplaces.

Upon joining the USW' Health, Safety, and Environment Department in 2014, she began working to improve occupational safety and health conditions by representing the USW in Occupational Safety and Health Administration's respirable silica, recordkeeping and beryllium rulemaking process.

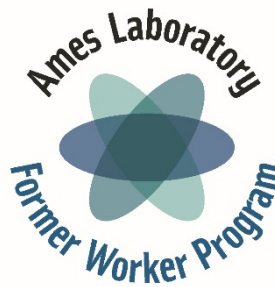
Prior to joining the USW, Ms. Fitch worked in a rolled aluminum plant and served as a union representative on the labor-management health and safety committee. She has a Bachelor of Science degree in Natural Resource and Environmental Economics and a Master of Science degree in Safety Management, both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

The USW Tony Mazzocchi Center (USWTMC) is a training organization focused on providing education to workers around occupational health, safety and environmental hazards. The USWTMC aims to provide an array of educational opportunities to members of the USW, Communications Workers of America, their management counterparts, Make the Road New York and National Day Laborer Organizing Network. The mission of the USWTMC is to decrease and ultimately prevent work-related injury, illness and death, and the release of hazardous substances. Training programs are supported by grants through the National Institute of Environmental Health Sciences (NIEHS) and the DOE via NIEHS.

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

Web site: <http://worker-health.org>

Facebook: www.facebook.com/WorkerHealthProtectionProgramwhpp



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 screening exams to former workers from two Department of Energy (DOE) facilities in Iowa: the BAECP/Line 1/Division B at the Iowa Army Ammunition Plant in West Burlington, IA, operational between 1949 and mid-1975, and the Ames Laboratory on the campus of Iowa State University in Ames, IA, established in 1942 and still in operation throughout today.

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 National Supplemental Screening Program (NSSP) for medical screening exams. Medical screening exams for BAECP workers began in 2002. As of September 30, 2020, a total of 1,432 former workers have been screened and 1,956 rescreening exams have been completed (855 have received a 3-year rescreening exam, 540 a 6-year, 348 a 9-year, 160 a 12-year, 49 a 15-year, and 4 an 18-year rescreening exam).

Over 14,000 employees worked at the Ames Laboratory conducting materials science and applied chemical and physical research, and 11,464 of those workers are still living and have known addresses; 69 percent do not live in Iowa and are being referred to NSSP for medical screening exams. Medical screening exams for former Ames Laboratory workers began in 2006. As of September 30, 2020, a total of 2,201 former workers have been screened and 2,214 rescreening exams have been completed (1,134 have received a 3-year rescreening exam, 689 a 6-year, 335 a 9-year, and 56 a 12-year rescreening exam).

COVID-19 Response:

Impact of COVID-19: In mid-March 2020, the SARS-CoV-2 pandemic caused a temporary suspension of FWP medical screening exams and low-dose computed tomography (CT) scans. During the pause, participant enrollment and NSSP referrals continued as well as assisting former workers and survivors with Energy Employees Occupational Illness Compensation Program Act claims.

A COVID-19 Safety Protocol has been developed to protect and minimize the risk of COVID-19 infection among the program participants and staff. Prior to scheduling medical screening exams, risk assessment is conducted of the county COVID-19 case trends; the screening clinic's COVID-19 safety guidelines and

readiness; and the participant's risk of complications from COVID-19 and their COVID-19 testing, exposure, symptoms and psychological comfort with having a medical screening exam appointment. Additional precautions are taken during the screening appointment with PPE, temperature readings, no-contact paperwork, physical distancing where applicable and disinfecting surfaces. Former workers are also offered the COVID-19 antibody serology blood test.

Due to COVID-19, 137 medical screening exams and 42 low-dose CT scans have been delayed and will be scheduled within the COVID-19 protocol. Medical screening exams resumed in mid-August 2020.

What we have found:

a. Conventional Medical Screening Exams

- Chest x-ray (N=2,078 participants receiving at least one x-ray): 15 percent of 2,078 participants demonstrated findings consistent with work-related lung disease.
- Pulmonary Function Test (N=2,182 participants receiving at least one test): 21 percent of 2,182 participants demonstrated findings consistent with obstructive disease.
- Beryllium Lymphocyte Proliferation Test (N=2,269 participants receiving at least one test): 3 percent of 2,269 participants had at least one abnormal test.

b. Early Lung Cancer Detection Program

- No program participants have been diagnosed with primary lung cancer.
- Lung cancer was detected in 0 of 18 DOE workers tested.

Medical Staff

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 Maryland 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 PI on the Iowa FWP since 2018 and was the Co-PI 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, DOE, 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 Act claims.

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

Web site: www.iowafwp.org

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Appendix B: Cumulative Medical Screening Exams Conducted by DOE Site

Table 7. Medical Screening Exams Conducted by Site (1997 through September 2020)

State	Sites ¹⁴	Initial Screenings	Re screens
AK	Amchitka Island Test Site	1,451	869
CA	Lawrence Berkeley NL	514	310
CA	Lawrence Livermore NL	2,296	1,736
CA	Sandia NL, CA	193	129
CO	Rocky Flats Plant - Construction Workers	1,048	765
CO	Rocky Flats Plant - Production Workers	4,434	1,877
FL	Pinellas Plant - Production Workers	793	298
IA	Ames Lab	2,201	2,214
IA	Iowa Army Ammunition Plant	1,432	1,956
ID	Idaho NL - Construction Workers	1,389	651
ID	Idaho NL - Production Workers	5,427	5,155
IL	Argonne NL	833	270
IL	Fermi National Accelerator Lab	206	35
KY	Paducah GDP - Construction Workers	1,132	687
KY	Paducah GDP - Production Workers	3,623	3,667
MO	Kansas City NSC - Construction Workers	900	449
MO	Kansas City NSC - Production Workers	2,862	893
NM	Los Alamos NL	3,458	760
NM	Sandia NL, NM	448	70
NV	Nevada National Security Site	5,916	3,880
NY	Brookhaven NL - Construction Workers	625	358
NY	Brookhaven NL - Production Workers	598	165
OH	Fernald FMPC - Construction Workers	2,434	2,035
OH	Fernald FMPC - Production Workers	1,395	1,317
OH	Mound Plant - Construction Workers	482	281
OH	Mound Plant - Production Workers	1,709	1,677

¹⁴ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

**Table 7. Medical Screening Exams Conducted by Site
(1997 through September 2020)**

State	Sites ¹⁴	Initial Screenings	Re screens
OH	Portsmouth GDP - Construction Workers	1,280	848
OH	Portsmouth GDP - Production Workers	3,936	4,304
SC	Savannah River Site - Construction Workers	5,482	2,942
SC	Savannah River Site - Production Workers	6,387	728
TN	Oak Ridge GDP - Production Workers	4,918	5,710
TN	Oak Ridge NL - Production Workers	2,503	2,769
TN	Oak Ridge Reservation ¹⁵ - Construction Workers	3,943	2,320
TN	Y-12 NSC - Production Workers	4,526	5,012
TX	Pantex Plant	1,768	803
WA	Hanford Site - Construction Workers	4,680	2,364
WA	Hanford Site - Production Workers	6,331	1,296
	Other Sites ¹⁶ - Construction Workers	1,603	777
	Other Sites ¹⁷ - Production Workers	476	52
Grand Total		95,632	62,339

¹⁵ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

¹⁶ Sites where the number of individuals screened by the BTMed to date is less than 100.

¹⁷ Sites where the number of individuals screened by the NSSP or the WHPP to date is less than 100.

Appendix C: Cumulative Medical Screening Exam Findings by DOE Site

More in-depth information regarding the exam components offered through the program can be found on the FWP Website (<http://energy.gov/ehss/conventional-medical-screening-program>). Medical findings by the DOE site/worker population are provided below.

Table 8. Initial Chest X-Ray Exam Findings by State/Site (1997 through September 2020)

State	Sites ¹⁸	Exams Conducted	Asbestos related Lung Disease Cases Detected	Silicosis Cases Detected	Other Dust related Diseases Cases Detected	Lung Nodules, Nodes, or Lesions Detected
AK	Amchitka Island Test Site	1,134	162 (14.3%)	1 (0.1%)	0 (0.0%)	62 (5.5%)
CA	Lawrence Berkeley NL	480	7 (1.5%)	0 (0.0%)	3 (0.6%)	8 (1.7%)
CA	Lawrence Livermore NL	2,219	62 (2.8%)	1 (0.0%)	9 (0.4%)	42 (1.9%)
CA	Sandia NL, CA	187	2 (1.1%)	0 (0.0%)	0 (0.0%)	2 (1.1%)
CO	Rocky Flats Plant - Construction Workers	938	255 (27.2%)	7 (0.7%)	15 (1.6%)	36 (3.8%)
CO	Rocky Flats Plant - Production Workers	3,968	846 (21.3%)	4 (0.1%)	71 (1.8%)	120 (3.0%)
FL	Pinellas Plant - Production Workers	772	70 (9.1%)	6 (0.8%)	25 (3.2%)	32 (4.1%)
IA	Ames Lab	2,118	84 (4.0%)	1 (0.0%)	64 (3.0%)	60 (2.8%)
IA	Iowa Army Ammunition Plant	1,323	126 (9.5%)	0 (0.0%)	69 (5.2%)	34 (2.6%)
ID	Idaho NL - Construction Workers	1,167	127 (10.9%)	0 (0.0%)	2 (0.2%)	33 (2.8%)
ID	Idaho NL - Production Workers	5,345	404 (7.6%)	1 (0.0%)	25 (0.5%)	160 (3.0%)
IL	Argonne NL	755	87 (11.5%)	1 (0.1%)	31 (4.1%)	25 (3.3%)
IL	Fermi National Accelerator Lab	189	21 (11.1%)	0 (0.0%)	7 (3.9%)	5 (2.8%)
KY	Paducah GDP - Construction Workers	1,036	161 (15.5%)	7 (0.7%)	12 (1.2%)	59 (5.7%)
KY	Paducah GDP - Production Workers	3,623	237 (6.5%)	9 (0.2%)	20 (0.6%)	129 (3.6%)
MO	Kansas City NSC - Construction Workers	808	105 (13.0%)	0 (0.0%)	1 (0.1%)	35 (4.3%)
MO	Kansas City NSC - Production Workers	2,804	319 (11.4%)	2 (0.1%)	74 (2.6%)	103 (3.7%)
NM	Los Alamos NL	3,169	217 (6.8%)	0 (0.0%)	99 (3.2%)	1 (0.0%)
NM	Sandia NL, NM	422	23 (5.5%)	1 (0.2%)	15 (3.6%)	3 (0.7%)
NV	Nevada National Security Site	5,668	357 (6.3%)	22 (0.4%)	55 (1.0%)	157 (2.8%)
NY	Brookhaven NL - Construction Workers	505	91 (18.0%)	0 (0.0%)	0 (0.0%)	9 (1.8%)

¹⁸ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

Table 8. Initial Chest X-Ray Exam Findings by State/Site (1997 through September 2020)

State	Sites ¹⁸	Exams Conducted	Asbestos related Lung Disease Cases Detected	Silicosis Cases Detected	Other Dust related Diseases Cases Detected	Lung Nodules, Nodes, or Lesions Detected
NY	Brookhaven NL - Production Workers	548	35 (6.4%)	1 (0.2%)	5 (0.9%)	23 (4.2%)
OH	Fernald FMPC - Construction Workers	2,163	236 (10.9%)	5 (0.2%)	0 (0.0%)	34 (1.6%)
OH	Fernald FMPC - Production Workers	1,340	60 (4.5%)	0 (0.0%)	14 (1.0%)	55 (4.1%)
OH	Mound Plant - Construction Workers	396	71 (17.9%)	0 (0.0%)	3 (0.8%)	7 (1.8%)
OH	Mound Plant - Production Workers	1,670	106 (6.3%)	2 (0.1%)	1 (0.1%)	63 (3.8%)
OH	Portsmouth GDP - Construction Workers	1,133	200 (17.7%)	3 (0.3%)	3 (0.3%)	50 (4.4%)
OH	Portsmouth GDP - Production Workers	3,904	255 (6.5%)	5 (0.1%)	16 (0.4%)	117 (3.0%)
SC	Savannah River Site - Construction Workers	4,879	450 (9.2%)	4 (0.1%)	7 (0.1%)	189 (3.9%)
SC	Savannah River Site - Production Workers	4,695	1,137 (24.2%)	60 (1.3%)	404 (8.6%)	66 (1.4%)
TN	Oak Ridge GDP - Production Workers	4,828	325 (6.7%)	5 (0.1%)	12 (0.2%)	102 (2.1%)
TN	Oak Ridge NL - Production Workers	2,442	123 (5.0%)	1 (0.0%)	2 (0.1%)	86 (3.5%)
TN	Oak Ridge Reservation ¹⁹ - Construction Workers	3,375	534 (15.8%)	6 (0.2%)	6 (0.2%)	136 (4.0%)
TN	Y-12 NSC - Production Workers	4,437	246 (5.5%)	4 (0.1%)	14 (0.3%)	175 (3.9%)
TX	Pantex Plant	1,732	89 (5.1%)	1 (0.1%)	16 (0.9%)	57 (3.3%)
WA	Hanford Site - Construction Workers	3,958	892 (22.5%)	3 (0.1%)	3 (0.1%)	194 (4.9%)
WA	Hanford Site - Production Workers	5,765	1,115 (19.3%)	4 (0.1%)	147 (2.5%)	272 (4.7%)
	Other Sites ²⁰ - Construction Workers	1,325	193 (14.6%)	5 (0.4%)	0 (0.0%)	30 (2.3%)
	Other Sites ²¹ - Production Workers	448	54 (12.1%)	3 (0.7%)	27 (6.0%)	12 (2.7%)
Grand Total		87,668	9,884 (11.3%)	175 (0.2%)	1,277 (1.5%)	2,783 (3.2%)

¹⁹ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

²⁰ Sites where the number of individuals screened by the BTMed to date is less than 100.

²¹ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

**Table 9. Re-screening Chest X-ray Findings by State/Site
(1997 through September 2020)**

State	Sites ²²	Exams Conducted	Asbestos related Lung Disease Cases Detected	Silicosis Cases Detected	Other Dust related Diseases Cases Detected	Lung Nodules, Nodes, or Lesions Detected
AK	Amchitka Island Test Site	478	42 (8.8%)	2 (0.4%)	0 (0.0%)	26 (5.4%)
CA	Lawrence Berkeley NL	113	4 (3.5%)	0 (0.0%)	1 (0.9%)	4 (3.5%)
CA	Lawrence Livermore NL	732	19 (2.6%)	1 (0.1%)	5 (0.7%)	15 (2.1%)
CA	Sandia NL, CA	54	2 (3.7%)	0 (0.0%)	0 (0.0%)	4 (7.4%)
CO	Rocky Flats Plant - Construction Workers	392	23 (5.9%)	0 (0.0%)	2 (0.5%)	11 (2.8%)
CO	Rocky Flats Plant - Production Workers	1,427	314 (22.1%)	5 (0.4%)	53 (3.7%)	40 (2.8%)
FL	Pinellas Plant - Production Workers	220	37 (16.8%)	1 (0.5%)	17 (7.7%)	1 (0.5%)
IA	Ames Lab	1,077	57 (5.3%)	2 (0.2%)	82 (7.6%)	23 (2.1%)
IA	Iowa Army Ammunition Plant	566	48 (8.5%)	0 (0.0%)	67 (11.8%)	17 (3.0%)
ID	Idaho NL - Construction Workers	395	40 (10.1%)	0 (0.0%)	0 (0.0%)	14 (3.5%)
ID	Idaho NL - Production Workers	2,193	135 (6.2%)	0 (0.0%)	6 (0.3%)	60 (2.7%)
IL	Argonne NL	213	27 (12.7%)	2 (0.9%)	21 (9.9%)	2 (0.9%)
IL	Fermi National Accelerator Lab	30	2 (6.7%)	0 (0.0%)	4 (13.3%)	0 (0.0%)
KY	Paducah GDP - Construction Workers	417	41 (9.8%)	0 (0.0%)	1 (0.2%)	29 (7.0%)
KY	Paducah GDP - Production Workers	1,881	88 (4.7%)	2 (0.1%)	1 (0.1%)	98 (5.2%)
MO	Kansas City NSC - Construction Workers	273	22 (8.1%)	0 (0.0%)	0 (0.0%)	8 (2.9%)
MO	Kansas City NSC - Production Workers	741	99 (13.4%)	1 (0.1%)	56 (7.6%)	16 (2.2%)
NM	Los Alamos NL	598	74 (12.4%)	0 (0.0%)	23 (3.8%)	0 (0.0%)
NM	Sandia NL, NM	52	12 (23.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
NV	Nevada National Security Site	1,881	131 (7.0%)	3 (0.2%)	9 (0.5%)	125 (6.6%)
NY	Brookhaven NL - Construction Workers	228	19 (8.3%)	0 (0.0%)	0 (0.0%)	4 (1.8%)
NY	Brookhaven NL - Production Workers	111	5 (4.5%)	0 (0.0%)	1 (0.9%)	1 (0.9%)
OH	Fernald FMPC - Construction Workers	1,079	94 (8.7%)	1 (0.1%)	0 (0.0%)	7 (0.6%)
OH	Fernald FMPC - Production Workers	628	18 (2.9%)	0 (0.0%)	5 (0.8%)	27 (4.3%)
OH	Mound Plant - Construction Workers	156	19 (12.2%)	0 (0.0%)	1 (0.6%)	2 (1.3%)
OH	Mound Plant - Production Workers	796	30 (3.8%)	0 (0.0%)	3 (0.4%)	41 (5.2%)
OH	Portsmouth GDP - Construction Workers	506	79 (15.6%)	0 (0.0%)	0 (0.0%)	9 (1.8%)

²² FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

**Table 9. Re-screening Chest X-ray Findings by State/Site
(1997 through September 2020)**

State	Sites ²²	Exams Conducted	Asbestos related Lung Disease Cases Detected	Silicosis Cases Detected	Other Dust related Diseases Cases Detected	Lung Nodules, Nodes, or Lesions Detected
OH	Portsmouth GDP - Production Workers	1,976	128 (6.5%)	1 (0.1%)	5 (0.3%)	123 (6.2%)
SC	Savannah River Site - Construction Workers	1,754	164 (9.4%)	1 (0.1%)	1 (0.1%)	81 (4.6%)
SC	Savannah River Site - Production Workers	626	103 (16.5%)	1 (0.2%)	40 (6.4%)	13 (2.1%)
TN	Oak Ridge GDP - Production Workers	2,573	141 (5.5%)	2 (0.1%)	5 (0.2%)	122 (4.7%)
TN	Oak Ridge NL - Production Workers	1,418	48 (3.4%)	0 (0.0%)	5 (0.4%)	66 (4.7%)
TN	Oak Ridge Reservation ²³ - Construction Workers	1,426	147 (10.3%)	0 (0.0%)	0 (0.0%)	59 (4.1%)
TN	Y-12 NSC - Production Workers	2,530	117 (4.6%)	2 (0.1%)	6 (0.2%)	137 (5.4%)
TX	Pantex Plant	490	13 (2.7%)	0 (0.0%)	1 (0.2%)	17 (3.5%)
WA	Hanford Site - Construction Workers	1,439	143 (9.9%)	0 (0.0%)	1 (0.1%)	68 (4.7%)
WA	Hanford Site - Production Workers	1,097	145 (13.2%)	1 (0.1%)	53 (4.8%)	40 (3.6%)
	Other Sites ²⁴ - Construction Workers	489	28 (5.7%)	1 (0.2%)	0 (0.0%)	10 (2.0%)
	Other Sites ²⁵ - Production Workers	43	6 (14.3%)	0 (0.0%)	1 (2.4%)	1 (2.3%)
Grand Total		33,098	2,664 (8.0%)	29 (0.1%)	476 (1.4%)	1,321 (4.0%)

²³ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

²⁴ Sites where the number of individuals screened by the BTMed to date is less than 100.

²⁵ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

**Table 10. Initial Spirometry Screening Findings by State/Site
(1997 through September 2020)**

State	Sites ²⁶	Exams Conducted	Obstructive Airways Dysfunction Cases Detected
AK	Amchitka Island Test Site	1,130	177 (15.7%)
CA	Lawrence Berkeley NL	498	50 (10.0%)
CA	Lawrence Livermore NL	2,249	264 (11.7%)
CA	Sandia NL, CA	188	16 (8.5%)
CO	Rocky Flats Plant - Construction Workers	926	223 (24.1%)
CO	Rocky Flats Plant - Production Workers	4,285	930 (21.7%)
FL	Pinellas Plant - Production Workers	761	187 (24.6%)
IA	Ames Lab	2,156	231 (10.7%)
IA	Iowa Army Ammunition Plant	1,357	272 (20.0%)
ID	Idaho NL - Construction Workers	1,145	247 (21.6%)
ID	Idaho NL - Production Workers	5,349	643 (12.0%)
IL	Argonne NL	768	73 (9.5%)
IL	Fermi National Accelerator Lab	184	13 (7.1%)
KY	Paducah GDP - Construction Workers	1,018	242 (23.8%)
KY	Paducah GDP - Production Workers	3,570	375 (10.5%)
MO	Kansas City NSC - Construction Workers	793	161 (20.3%)
MO	Kansas City NSC - Production Workers	2,772	583 (21.0%)
NM	Los Alamos NL	2,278	134 (5.9%)
NM	Sandia NL, NM	381	31 (8.1%)
NV	Nevada National Security Site	5,716	966 (16.9%)
NY	Brookhaven NL - Construction Workers	527	69 (13.1%)
NY	Brookhaven NL - Production Workers	591	35 (5.9%)
OH	Fernald FMPC - Construction Workers	2,096	399 (19.0%)
OH	Fernald FMPC - Production Workers	1,338	152 (11.4%)
OH	Mound Plant - Construction Workers	392	84 (21.4%)
OH	Mound Plant - Production Workers	1,635	219 (13.4%)
OH	Portsmouth GDP - Construction Workers	1,122	258 (23.0%)
OH	Portsmouth GDP - Production Workers	3,896	500 (12.8%)
SC	Savannah River Site - Construction Workers	4,781	791 (16.5%)

²⁶ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

**Table 10. Initial Spirometry Screening Findings by State/Site
(1997 through September 2020)**

State	Sites ²⁶	Exams Conducted	Obstructive Airways Dysfunction Cases Detected
SC	Savannah River Site - Production Workers	4,029	435 (10.8%)
TN	Oak Ridge GDP - Production Workers	4,777	642 (13.4%)
TN	Oak Ridge NL - Production Workers	2,440	250 (10.2%)
TN	Oak Ridge Reservation ²⁷ - Construction Workers	3,328	605 (18.2%)
TN	Y-12 NSC - Production Workers	4,424	532 (12.0%)
TX	Pantex Plant	1,730	543 (31.4%)
WA	Hanford Site - Construction Workers	3,925	895 (22.8%)
WA	Hanford Site - Production Workers	6,067	1,048 (17.3%)
	Other Sites ²⁸ - Construction Workers	1,312	235 (17.9%)
	Other Sites ²⁹ - Production Workers	450	75 (16.7%)
Grand Total		86,384	13,585 (15.7%)

²⁷ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

²⁸ Sites where the number of individuals screened by the BTMed to date is less than 100.

²⁹ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

**Table 11. Re-screening Spirometry Findings by State/Site
(1997 through September 2020)**

State	Sites ³⁰	Exams Conducted	Obstructive Airways Dysfunction Cases Detected
AK	Amchitka Island Test Site	467	42 (9.0%)
CA	Lawrence Berkeley NL	124	14 (11.3%)
CA	Lawrence Livermore NL	754	63 (8.4%)
CA	Sandia NL, CA	60	5 (8.3%)
CO	Rocky Flats Plant - Construction Workers	393	16 (4.1%)
CO	Rocky Flats Plant - Production Workers	1,423	173 (12.2%)
FL	Pinellas Plant - Production Workers	223	37 (16.6%)
IA	Ames Lab	1092	137 (12.5%)
IA	Iowa Army Ammunition Plant	526	240 (45.6%)
ID	Idaho NL - Construction Workers	384	20 (5.2%)
ID	Idaho NL - Production Workers	2,331	330 (14.2%)
IL	Argonne NL	215	9 (4.2%)
IL	Fermi National Accelerator Lab	26	2 (7.7%)
KY	Paducah GDP - Construction Workers	409	22 (5.4%)
KY	Paducah GDP - Production Workers	1,875	174 (9.3%)
MO	Kansas City NSC - Construction Workers	265	9 (3.4%)
MO	Kansas City NSC - Production Workers	731	63 (8.6%)
NM	Los Alamos NL	513	31 (6.0%)
NM	Sandia NL, NM	48	1 (2.1%)
NV	Nevada National Security Site	2,074	326 (15.7%)
NY	Brookhaven NL - Construction Workers	236	4 (1.7%)
NY	Brookhaven NL - Production Workers	125	8 (6.4%)
OH	Fernald FMPC - Construction Workers	1,020	47 (4.6%)
OH	Fernald FMPC - Production Workers	629	50 (7.9%)
OH	Mound Plant - Construction Workers	149	4 (2.7%)
OH	Mound Plant - Production Workers	865	72 (8.3%)
OH	Portsmouth GDP - Construction Workers	494	33 (6.7%)
OH	Portsmouth GDP - Production Workers	1,984	266 (13.4%)
SC	Savannah River Site - Construction Workers	1,701	91 (5.3%)

³⁰ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

**Table 11. Re-screening Spirometry Findings by State/Site
(1997 through September 2020)**

State	Sites ³⁰	Exams Conducted	Obstructive Airways Dysfunction Cases Detected
SC	Savannah River Site - Production Workers	612	50 (8.2%)
TN	Oak Ridge GDP- Production Workers	2,624	262 (10.0%)
TN	Oak Ridge NL - Production Workers	1,442	115 (8.0%)
TN	Oak Ridge Reservation ³¹ - Construction Workers	1,403	116 (8.3%)
TN	Y-12 NSC - Production Workers	2,578	289 (11.2%)
TX	Pantex Plant	481	44 (9.1%)
WA	Hanford Site - Construction Workers	1,392	102 (7.3%)
WA	Hanford Site - Production Workers	1,086	155 (14.3%)
	Other Sites ³² - Construction Workers	489	28 (5.7%)
	Other Sites ³³ - Production Workers	43	5 (11.6%)
Grand Total		33,286	3,455 (10.4%)

³¹ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

³² Sites where the number of individuals screened by the BTMed to date is less than 100.

³³ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

Table 12. Initial Beryllium Lymphocyte Proliferation Tests (BeLPT) Results by State/Site (1997 through September 2020)

State	Sites ³⁴	Tests Conducted	1 Abnormal Result Detected	2 Abnormal Results Detected	1 Abnormal and 1+ Borderline Results Detected
AK	Amchitka Island Test Site	108	2 (1.9%)	1 (0.9%)	1 (0.9%)
CA	Lawrence Berkeley NL	215	3 (1.4%)	9 (4.2%)	0 (0.0%)
CA	Lawrence Livermore NL	1,486	14 (0.9%)	29 (2.0%)	8 (0.5%)
CA	Sandia NL, CA	122	1 (0.8%)	3 (2.5%)	1 (0.8%)
CO	Rocky Flats Plant - Construction Workers	939	6 (0.6%)	4 (0.4%)	0 (0.0%)
CO	Rocky Flats Plant - Production Workers	2,979	27 (0.9%)	14 (0.5%)	14 (0.5%)
FL	Pinellas Plant - Production Workers	764	12 (1.6%)	24 (3.1%)	3 (0.4%)
IA	Ames Lab	2,143	28 (1.3%)	23 (1.1%)	6 (0.3%)
IA	Iowa Army Ammunition Plant	1,425	19 (1.3%)	12 (0.8%)	8 (0.6%)
ID	Idaho NL - Construction Workers	1,139	14 (1.2%)	7 (0.6%)	7 (0.6%)
ID	Idaho NL - Production Workers	4,965	36 (0.7%)	32 (0.6%)	14 (0.3%)
IL	Argonne NL	395	7 (1.8%)	2 (0.5%)	2 (0.5%)
IL	Fermi National Accelerator Lab	135	2 (1.5%)	2 (1.5%)	0 (0.0%)
KY	Paducah GDP - Construction Workers	1,034	16 (1.5%)	8 (0.8%)	1 (0.1%)
KY	Paducah GDP - Production Workers	3,098	37 (1.2%)	19 (0.6%)	7 (0.2%)
MO	Kansas City NSC - Construction Workers	797	8 (1.0%)	12 (1.5%)	3 (0.4%)
MO	Kansas City NSC - Production Workers	2,743	41 (1.5%)	24 (0.9%)	10 (0.4%)
NM	Los Alamos NL	3,144	41 (1.3%)	34 (1.1%)	22 (0.7%)
NM	Sandia NL, NM	414	12 (2.9%)	4 (1.0%)	3 (0.7%)
NV	Nevada National Security Site	3,397	27 (0.8%)	31 (0.9%)	11 (0.3%)
NY	Brookhaven NL - Construction Workers	514	5 (1.0%)	24 (4.7%)	0 (0.0%)
NY	Brookhaven NL - Production Workers	584	5 (0.9%)	23 (3.9%)	7 (1.2%)
OH	Fernald FMPC - Construction Workers	2,135	8 (0.4%)	13 (0.6%)	4 (0.2%)
OH	Fernald FMPC - Production Workers	1,182	7 (0.6%)	6 (0.5%)	2 (0.2%)
OH	Mound Plant - Construction Workers	394	0 (0.0%)	2 (0.5%)	0 (0.0%)
OH	Mound Plant - Production Workers	1,641	21 (1.3%)	15 (0.9%)	5 (0.3%)
OH	Portsmouth GDP - Construction Workers	1,126	16 (1.4%)	3 (0.3%)	1 (0.1%)
OH	Portsmouth GDP - Production Workers	3,489	21 (0.6%)	11 (0.3%)	4 (0.1%)

³⁴ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

Table 12. Initial Beryllium Lymphocyte Proliferation Tests (BeLPT) Results by State/Site (1997 through September 2020)

State	Sites ³⁴	Tests Conducted	1 Abnormal Result Detected	2 Abnormal Results Detected	1 Abnormal and 1+ Borderline Results Detected
SC	Savannah River Site - Construction Workers	4,869	33 (0.7%)	42 (0.9%)	14 (0.3%)
SC	Savannah River Site - Production Workers	3,646	71 (1.9%)	27 (0.7%)	10 (0.3%)
TN	Oak Ridge GDP- Production Workers	4,826	90 (1.9%)	90 (1.9%)	24 (0.5%)
TN	Oak Ridge NL - Production Workers	2,429	22 (0.9%)	32 (1.3%)	14 (0.6%)
TN	Oak Ridge Reservation ³⁵ - Construction Workers	3,655	28 (0.8%)	25 (0.7%)	11 (0.3%)
TN	Y-12 NSC - Production Workers	4,450	60 (1.4%)	70 (1.6%)	14 (0.3%)
TX	Pantex Plant	1,710	16 (0.9%)	7 (0.4%)	1 (0.1%)
WA	Hanford Site - Construction Workers	3,962	45 (1.1%)	36 (0.9%)	10 (0.3%)
WA	Hanford Site - Production Workers	5,535	115 (2.1%)	43 (0.8%)	19 (0.6%)
	Other Sites ³⁶ - Construction Workers	906	3 (0.3%)	3 (0.3%)	1 (0.1%)
	Other Sites ³⁷ - Production Workers	285	3 (1.1%)	3 (1.1%)	0 (0.0%)
Grand Total		78,780	922 (1.2%)	769 (1.0%)	262 (0.3%)

³⁵ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

³⁶ Sites where the number of individuals screened by the BTMed to date is less than 100.

³⁷ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

Table 13. Re-screening Beryllium Lymphocyte Proliferation Tests (BeLPT) Results by State/Site (1997 through September 2020)

State	Sites ³⁸	Tests Conducted	1 Abnormal Result Detected	2 Abnormal Results Detected	1 Abnormal and 1+ Borderline Results Detected
AK	Amchitka Island Test Site	23	0 (0.0%)	0 (0.0%)	0 (0.0%)
CA	Lawrence Berkeley NL	43	0 (0.0%)	1 (2.3%)	1 (2.3%)
CA	Lawrence Livermore NL	574	5 (0.9%)	4 (0.7%)	1 (0.2%)
CA	Sandia NL, CA	41	2 (4.9%)	0 (0.0%)	1 (2.4%)
CO	Rocky Flats Plant - Construction Workers	223	1 (0.4%)	0 (0.0%)	0 (0.0%)
CO	Rocky Flats Plant - Production Workers	1,157	4 (0.3%)	2 (0.2%)	1 (0.1%)
FL	Pinellas Plant - Production Workers	213	2 (0.9%)	1 (0.5%)	2 (0.9%)
IA	Ames Lab	972	8 (0.8%)	4 (0.4%)	1 (0.1%)
IA	Iowa Army Ammunition Plant	792	12 (1.5%)	4 (0.5%)	4 (0.5%)
ID	Idaho NL - Construction Workers	238	2 (0.8%)	0 (0.0%)	0 (0.0%)
ID	Idaho NL - Production Workers	1,814	10 (0.6%)	16 (0.9%)	12 (0.7%)
IL	Argonne NL	132	2 (1.5%)	0 (0.0%)	0 (0.0%)
IL	Fermi National Accelerator Lab	29	0 (0.0%)	0 (0.0%)	0 (0.0%)
KY	Paducah GDP - Construction Workers	295	0 (0.0%)	2 (0.7%)	0 (0.0%)
KY	Paducah GDP - Production Workers	1,629	12 (0.7%)	6 (0.4%)	12 (0.7%)
MO	Kansas City NSC - Construction Workers	262	8 (3.1%)	1 (0.4%)	1 (0.4%)
MO	Kansas City NSC - Production Workers	729	1 (0.1%)	4 (0.5%)	1 (0.1%)
NM	Los Alamos NL	555	7 (1.3%)	1 (0.2%)	0 (0.0%)
NM	Sandia NL, NM	48	2 (4.2%)	0 (0.0%)	1 (2.1%)
NV	Nevada National Security Site	1,406	23 (1.6%)	13 (0.9%)	11 (0.8%)
NY	Brookhaven NL - Construction Workers	221	8 (3.6%)	2 (0.9%)	1 (0.5%)
NY	Brookhaven NL - Production Workers	110	0 (0.0%)	2 (1.8%)	0 (0.0%)
OH	Fernald FMPC - Construction Workers	587	5 (0.9%)	0 (0.0%)	0 (0.0%)
OH	Fernald FMPC - Production Workers	487	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	592	1 (0.2%)	11 (1.9%)	7 (1.2%)
OH	Portsmouth GDP - Construction Workers	361	1 (0.3%)	0 (0.0%)	0 (0.0%)
OH	Portsmouth GDP - Production Workers	1798	8 (0.4%)	9 (0.5%)	7 (0.4%)

³⁸ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC =National Security Complex/Campus; NL = National Laboratory.

Table 13. Re-screening Beryllium Lymphocyte Proliferation Tests (BeLPT) Results by State/Site (1997 through September 2020)

State	Sites ³⁸	Tests Conducted	1 Abnormal Result Detected	2 Abnormal Results Detected	1 Abnormal and 1+ Borderline Results Detected
SC	Savannah River Site - Construction Workers	1,202	16 (1.3%)	4 (0.3%)	3 (0.2%)
SC	Savannah River Site - Production Workers	614	2 (0.3%)	3 (0.5%)	2 (0.3%)
TN	Oak Ridge GDP - Production Workers	2,296	29 (1.3%)	38 (1.7%)	22 (1.0%)
TN	Oak Ridge NL - Production Workers	1,013	6 (0.6%)	29 (2.9%)	8 (0.8%)
TN	Oak Ridge Reservation ³⁹ - Construction Workers	1,385	14 (1.0%)	7 (0.5%)	3 (0.2%)
TN	Y-12 NSC - Production Workers	1,852	17 (0.9%)	40 (2.2%)	19 (1.0%)
TX	Pantex Plant ⁴⁰	234	2 (0.9%)	5 (2.1%)	0 (0.0%)
WA	Hanford Site - Construction Workers	865	10 (1.2%)	4 (0.5%)	0 (0.0%)
WA	Hanford Site - Production Workers	1,011	9 (0.9%)	1 (0.1%)	3 (0.3%)
	Other Sites ⁴¹ - Construction Workers	200	2 (1.0%)	1 (0.5%)	1 (0.5%)
	Other Sites ⁴² - Production Workers	32	0 (0.0%)	0 (0.0%)	0 (0.0%)
Grand Total		26,127	232 (0.9%)	220 (0.8%)	127 (0.5%)

³⁹ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

⁴⁰ Repeat BeLPTs are provided by the NSSP.

⁴¹ Sites where the number of individuals screened by the BTMed to date is less than 100.

⁴² Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

**Table 14. Initial Audiometry Screening Findings by State/Site
(1997 through September 2020)**

State	Sites ⁴³	Exams Conducted	Noise Induced Hearing Loss Cases Detected
AK	Amchitka Island Test Site	1,161	774 (66.7%)
CA	Lawrence Berkeley NL	294	104 (35.4%)
CA	Lawrence Livermore NL	1,337	553 (41.4%)
CA	Sandia NL, CA	100	45 (45.0%)
CO	Rocky Flats Plant - Construction Workers	918	602 (65.5%)
CO	Rocky Flats Plant - Production Workers	4,223	2,462 (58.3%)
FL	Pinellas Plant - Production Workers	762	292 (38.3%)
IA	Ames Lab ⁴⁴	214	63 (29.4%)
IA	Iowa Army Ammunition Plant ⁴⁰	108	89 (82.4%)
ID	Idaho NL - Construction Workers	1,100	728 (66.2%)
ID	Idaho NL - Production Workers	5,147	2,255 (43.8%)
IL	Argonne NL	798	279 (35.0%)
IL	Fermi National Accelerator Lab	198	79 (39.9%)
KY	Paducah GDP - Construction Workers	978	747 (76.4%)
KY	Paducah GDP - Production Workers	3,522	1,452 (41.2%)
MO	Kansas City NSC - Construction Workers	774	456 (58.9%)
MO	Kansas City NSC - Production Workers	2,760	1,284 (46.5%)
NM	Los Alamos NL	2,882	1,686 (58.5%)
NM	Sandia NL, NM	366	209 (57.1%)
NV	Nevada National Security Site	5,192	2,902 (55.9%)
NY	Brookhaven NL - Construction Workers	537	347 (64.6%)
NY	Brookhaven NL - Production Workers	582	291 (50.0%)
OH	Fernald FMPC - Construction Workers	2,134	1,091 (51.1%)
OH	Fernald FMPC - Production Workers	1,338	328 (24.5%)
OH	Mound Plant - Construction Workers	381	242 (63.5%)
OH	Mound Plant - Production Workers	1,627	663 (40.7%)
OH	Portsmouth GDP - Construction Workers	1,169	841 (71.9%)
OH	Portsmouth GDP - Production Workers	3,806	1,526 (40.1%)

⁴³ FMPC = Feed Materials Production Center, GDP = Gaseous Diffusion Plant; Lab = Laboratory; NSC = National Security Complex/Campus; NL = National Laboratory.

⁴⁴ Audiograms are provided by the NSSP.

**Table 14. Initial Audiometry Screening Findings by State/Site
(1997 through September 2020)**

State	Sites ⁴³	Exams Conducted	Noise Induced Hearing Loss Cases Detected
SC	Savannah River Site - Construction Workers	5,005	2,993 (59.8%)
SC	Savannah River Site - Production Workers	4,056	2,256 (55.6%)
TN	Oak Ridge GDP - Production Workers	4,434	2,249 (50.7%)
TN	Oak Ridge NL - Production Workers	2,436	1,166 (47.9%)
TN	Oak Ridge Reservation ⁴⁵ - Construction Workers	3,297	2,307 (70.0%)
TN	Y-12 NSC - Production Workers	4,405	2,460 (55.8%)
TX	Pantex Plant ⁴⁶	123	52 (42.3%)
WA	Hanford Site - Construction Workers	3,178	2,208 (69.5%)
WA	Hanford Site - Production Workers	5,220	2,586 (49.5%)
	Other Sites ⁴⁷ - Construction Workers	1,100	695 (63.2%)
	Other Sites ⁴⁸ - Production Workers	450	222 (49.3%)
Grand Total		78,112	41,584 (53.2%)

⁴⁵ Includes Oak Ridge GDP, Oak Ridge NL, and Y-12 NSC.

⁴⁶ Audiograms are provided by the NSSP.

⁴⁷ Sites where the number of individuals screened by the BTMed to date is less than 100.

⁴⁸ Sites where the number of individuals screened by the NNSP or the WHPP to date is less than 100.

Appendix D: Resources

1. 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>
2. FWP Medical Protocol
<http://energy.gov/ehss/downloads/former-worker-program-medical-protocol>
3. FWP Summary of Services
<http://energy.gov/ehss/downloads/former-worker-program-summary-services>
4. A Basic Overview of the FWP (Brochure)
<http://energy.gov/ehss/downloads/former-worker-medical-screening-program-brochure>
5. DOE Chronic Beryllium Disease Awareness Website
<https://ehss.energy.gov/HealthSafety/fwsp/advocacy/cbd/>
6. Building Trades National Medical Screening Program
<http://www.btmed.org/default.cfm>
1-800-866-9663
7. FWP for Burlington Atomic Energy Commission Plant (aka Iowa Army Ammunition Plant) and Ames Laboratory
<http://www.iowafwp.org>
1-866-282-5818
8. Medical Exam Program for Los Alamos National Laboratory Former Workers
<http://www.jhsph.edu/LANLFW/index.html>
1-877-500-8615
9. National Supplemental Screening Program
<http://www.orau.org/nssp/>
1-866-812-6703
10. Pantex FWP
1-888-378-8939
11. Worker Health Protection Program
<http://www.worker-health.org/>
1-888-241-1199
1-877-771-7977 (for former Nevada National Security Site workers)
12. Medical Facilities with Experience Evaluating Chronic Beryllium Disease
<http://energy.gov/ehss/downloads/former-workers-medical-facilities-experience-evaluating-chronic-beryllium-disease>

13. DOE Human Subjects Protection Program
<http://science.energy.gov/ber/human-subjects/>
14. A Basic Overview of the Energy Employees Occupational Illness Compensation Program (EEOICPA) (Brochure)
<http://energy.gov/ehss/downloads/basic-overview-energy-employees-occupational-illness-compensation-program>
15. U.S. Department of Labor (DOL) Division of EEOICPA
<http://www.dol.gov/owcp/energy/index.htm>
16. DOL Resource Centers
<http://www.dol.gov/owcp/energy/regs/compliance/ResourceMeetings/ResourceCenters.htm>
17. National Institute for Occupational Safety and Health Dose Reconstruction
<http://www.cdc.gov/niosh/ocas/ocasdose.html>
18. DOL Office of the Ombudsman for the EEOICPA
<http://www.dol.gov/eombd/>