MEDICAL SCREENING PROTOCOL
FOR THE FORMER WORKER MEDICAL SCREENING PROGRAM
U.S. DEPARTMENT OF ENERGY

General Principles:

1) The purpose of the medical evaluation component of the U.S. Department of Energy (DOE) Former Worker Medical Screening Program (FWP) is to provide interested former workers with targeted testing to screen for selected adverse health effects potentially related to their work in DOE operations. The program does not test for all potentially work-related conditions; for example, screening for work-related musculoskeletal conditions is not included in the medical evaluation.
2) The following table is intended to identify work-related health outcomes of relevance to DOE workers for which there are screening tests that are reasonably likely to be effective and beneficial to program participants.
3) The selection of specific medical evaluations is based on the collection of a detailed occupational history for each worker.
4) This protocol is intended to ensure consistency of approach in the medical evaluation of participants.
5) This protocol is not intended to dictate the clinical practice of medicine.
6) This protocol is not intended to substitute for periodic health maintenance/disease screening examinations by a former worker's personal physician. However, as a secondary goal the examination may include assessments that contribute to general health.
7) Follow-up medical evaluation and treatment are not within the scope of the FWP.
8) This protocol was developed by consensus of the cooperative agreement awardees and the DOE officials associated with the FWP.
9) The medical evaluation protocol may be changed only by or with the approval of DOE.
10) The protocol will be reviewed and updated at least every two years by a committee established by DOE and the FWP.

Recommended Medical Screening Protocol for Selected Occupational Health Conditions
of DOE Workers for Which Screening and/or Early Detection
is Reasonably Likely to be Effective and Beneficial

Hazard(s)	Target Organ(s)	Health Outcome(s)	Medical Evaluation	Re-screening through FWP
Asbestos	Lung	• Asbestosis • Other non-malignant respiratory disease	• Chest radiograph with B-reading • Spirometry • Physical examination	Up to every 3 years
		Lung cancer	Low-dose chest CT scan, where offered[1]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
Beryllium	Lung	• Sensitization • Chronic Beryllium Disease (CBD)	• Chest radiograph with B-reading (if symptomatic) • Physical examination • Beryllium Lymphocyte Proliferation Test (BeLPT), with repeat testing for other than normal results	• Up to every 3 years if asymptomatic[2] • If new symptoms develop or worker is very concerned in interim, BeLPT can be performed
		Lung cancer	Low-dose chest CT scan, where offered[3]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline

[1] DOE FWP recognizes that scientific evidence is rapidly accumulating on the use of low-dose chest CT scan for early lung cancer detection. In June 2011, the National Cancer Institute published results of a randomized clinical trial that demonstrated a 20% reduction in lung cancer mortality among high risk individuals who had three rounds of low-dose CT screening (National Lung Screening Trial Research Team, N Engl J Med. 2011; 365(5):395-409). The DOE FWP endorses the use of low-dose chest CT scan for DOE workers who are at elevated lung cancer risk and, as of January 2011, is striving to broaden its current support of such screening (at 7 DOE sites) to additional workers in the DOE complex.

[2] The inclusion of a BeLPT on the re-screening examination may vary among DOE sites and depends on the known prevalence of abnormal BeLPTs on initial and re-screening examinations at a particular DOE site, the use of beryllium at the DOE site, and the medical history and occupational risk information of the individual who will undergo the re-screening examination. The determination about whether to offer the BeLPT on re-screening to individuals is made by the FWP active at the DOE site.

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Hazard(s)	Target Organ(s)	Health Outcome(s)	Medical Evaluation	Re-screening through FWP
Plutonium, Lung Deposition of	Lung	Pulmonary Fibrosis	Chest radiograph	Up to every 3 years
		Lung cancer	Low-dose chest CT scan, where offered[4]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
Silica	Lung	Silicosis	See Asbestos above	Up to every 3 years
		Lung cancer	Low-dose chest CT scan, where offered[5]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
• Epoxy resins • Methylene dianiline • Other known bladder carcinogen	Bladder	Carcinoma	Urine cytology, plus additional biomarker supported by current research. Protocol should be tailored to specific exposure and approved by the DOE review process. [6]	Up to every 3 years
• Ionizing radiation • Chemicals (e.g., benzene)	Hematopoietic	Leukemia or non-malignant conditions	Complete blood count (CBC) with differential	Up to every 3 years

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[6] When screening for bladder cancer is included, the participant should also receive recommendations for periodic screening. Initial screening will be supported by the FWP.

Hazard(s)	Target Organ(s)	Health Outcome(s)	Medical Evaluation	Re-screening through FWP
• Asbestos • Ionizing radiation	Gastrointestinal system	Carcinoma	Stool for occult blood[7]	Up to every 3 years[8]
Diesel Exhaust	Lung	Chronic obstructive lung disease	• Respiratory symptoms questionnaire • Spirometry	Up to every 3 years
		Lung cancer	Low-dose chest CT scan, where offered[9]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
Welding	Lung	• Asthma • Chronic obstructive lung disease	• Respiratory symptoms questionnaire • Spirometry	Up to every 3 years for COPD
Chromium	Lung	Asthma	Respiratory symptoms questionnaire, plus spirometry, as indicated	No
		Lung cancer	Low-dose chest CT scan, where offered[10]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
Formaldehyde	Lung	Asthma	Respiratory symptoms questionnaire, plus spirometry, as indicated	No
Metal Working Fluids	Lung	Asthma	Respiratory symptoms questionnaire, plus spirometry, as indicated	No

[7] Recommend in letter that individuals discuss colonoscopy with PMD, per ACS guidelines.
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[9] DOE FWP recognizes that scientific evidence is rapidly accumulating on the use of low-dose chest CT scan for early lung cancer detection. In June 2011, the National Cancer Institute published results of a randomized clinical trial that demonstrated a 20% reduction in lung cancer mortality among high risk individuals who had three rounds of low-dose CT screening (National Lung Screening Trial Research Team, N Engl J Med. 2011; 365(5):395-409). The DOE FWP endorses the use of low-dose chest CT scan for DOE workers who are at elevated lung cancer risk and, as of January 2011, is striving to broaden its current support of such screening (at 7 DOE sites) to additional workers in the DOE complex.
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Nickel	Lung	Asthma	Respiratory symptoms questionnaire, plus spirometry, as indicated	No
		Lung cancer	Low-dose chest CT scan, where offered[11]	Re-screening offered at 3 or 6 months for indeterminate (non-calcified) nodules as per current recommendations; one annual scan offered 1 year after baseline
Respiratory irritants	Lung	Chronic obstructive lung disease	Respiratory symptoms questionnaire, plus spirometry, as indicated	Up to every 3 years
• Radioactive iodine • External ionizing radiation	Thyroid	thyroid disease	• Physical examination (i.e., palpation of the thyroid) • Thyroid-stimulating hormone (TSH)	Up to every 3 years
• Solvents • Lead • Mercury	Central Nervous System	Chronic neurologic disease	Clinical evaluation	No
• Toluene • Styrene • Xylene • Trichloroethylene • Methyl Ethyl Ketone • Methyl Isobutyl Ketone • Ethyl Benzene	Ears	Sensorineural hearing loss	Audiometry	No
Ionizing radiation	Female Breast	Cancer	Recommend mammography by personal physician for women 50 to 74 years of age[12]	Recommend mammography by personal physician for women 50 to 74 years of age[13]
Carbon tetrachloride and other chlorinated solvents	Liver	Hepatocellular injury and insufficiency	• Bilirubin • Transaminases	No
Hydrazine	Liver	Hepatocellular injury	Transaminases	No

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[12] Communication to participant should recommend biennial screening for women 50 to 74 years of age. The decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account.

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Hazard(s)	Target Organ(s)	Health Outcome(s)	Medical Evaluation	Re-screening through FWP
• Cadmium • Chromium • Lead	Kidneys	Chronic renal insufficiency	Serum creatinine	No
• Nickel • Chromium • Formaldehyde	Skin	• Dermatitis • Skin cancer • Cancer of the nasal mucosa	Physical examination of the skin and nasal mucosa	No
Ionizing or ultraviolet radiation	Skin	Skin cancer	Physical examination of the skin[14]	Up to every 3 years[15]
Noise	Ears	Hearing Impairment	Audiometry	No
Laser, Class 3B and 4	Eyes, Skin	Cataracts, retinal burns	• Medical history of the eye and photosensitivity • Visual acuity (far and near) for both eyes • Amsler and Ishiharra[16]	No

[14] Communication to participant should recommend annual screening with PMD for anyone at high risk for skin cancer.
[15] Communication to participant should recommend annual screening with PMD for anyone at high risk for skin cancer.
[16] In accordance with ANSI Z136.1 Standard for the Safe Use of Lasers, which states that "Laser eye examinations are performed to identify those laser users which may have a predisposition for vision related injury and to meet the medical monitoring requirements of the standard."