CHAPTER 12

OCCUPATIONAL MEDICAL SURVEILLANCE AND EVALUATION PROGRAM (OMSEP)

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CHAPTER 12. OCCUPATIONAL MEDICAL SURVEILLANCE AND EVALUATION PROGRAM (OMSEP)

Section A - General Requirements.

1. Description.

   a. The work environment and occupational activities inherent to Coast Guard missions can expose personnel to health hazards with the potential for disease or injury. The Occupational Medical Surveillance and Evaluation Program (OMSEP) is designed to identify work related diseases or conditions, through baseline and periodic examinations, at a stage when modifying the exposure or providing medical intervention could potentially arrest disease progression or prevent recurrences. The fundamental purpose of this program is to identify pre-existing health conditions, provide risk specific periodic screenings, and monitor clinical laboratory tests and biologic functions suggestive of work related environmental exposures. All OMSEP enrollees receive periodic physical examinations, in accordance with Occupational Safety and Health Administration (OSHA) requirements, for the duration of their health hazard exposure or end of their employment. Individuals are released from active surveillance at the end of their exposure. In accordance with OSHA regulations, the OMSEP personnel tracking database containing the name, social security number, billet or occupation code, applicable examination protocols, and next physical examination due date remains active for an additional 30 years.

   b. The OMSEP is the physical examination process for the Coast Guard's Occupational Health Program. The guidance for this program is outlined in the Safety and Environmental Health Manual, COMDTINST M5100.47 (series). OMSEP replaces the present version of the physical exam process described in the SEH Manual as the Occupational Medical Monitoring Program (OMMP).

2. Enrollment**.**

   a. Coast Guard Medical Surveillance Action Level: The medical surveillance action level (MSAL) is the level of worker exposure, determined by workplace sampling, at or above which occupational medical surveillance examinations will be performed. The Coast Guard MSAL will be 50% of the most stringent of the current OSHA permissible exposure limit (PEL),or, the most current American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV).

   b. Determination of Occupational Exposure.

      (1) An employee is considered occupationally exposed for OMSEP purposes if an exposure or hazardous condition is likely to occur **30 or more days per year.** Documentation of the exposure must meet the following criteria: quantitative work-site sampling measurements indicate hazard levels at or above the MSAL or that the exposure can reasonably be determined, in the absence of quantitative sampling, to exceed the MSAL.

      (2) Quantitative sampling is the primary and definitive means to characterize workplace health hazards, although personal sampling measurement is preferred to workplace sampling. Coast Guard Safety and Environmental Health Officers (SEHOs) using guidance contained in the Safety and Environmental Health

Manual, COMDTINST M5100.47 (series) will generally perform this function. SHEOs will normally characterize workplaces by frequency of exposure, type of exposure, and risk groups.

(3) Certain occupations or exposures may require surveillance by federal statutes, DOT regulations, or Safety and Environmental Health Manual, COMDTINST M5100.47 (series) without regard to the 30-day exposure threshold.

(4) Competent environmental health authority is considered to be the cognizant SEHO but the authority may be delegated to other recognized and approved personnel with the necessary technical training and abilities. Qualitative assessments must be based on expected type, frequency, mode, and duration of hazard exposure, and are considered temporary until validated by quantitative means.

(5) **Unit Directives and/or Standard Operating Procedures (SOP's)- enrollment guidelines and monitoring criteria developed and approved, at the unit level, by ALL cognizant parties (Health Services Division; Safety and Environmental Health; Industrial Hygiene-Unit Command) are acceptable so long as they comply, with the enrollment criteria set forth in Section A-2, b (1-4) above.**

c. Enrollment Criteria: Recommendations for enrollment are based on specific job assignments and the level of worker exposure. This process is initiated at the unit level and must be finalized by the IH or cognizant SEHO, with recommendations from the supervising medical officer (if necessary), before forwarding to Maintenance and Logistics Command (MLC (k)) via the OMSEP database (see section 12-A-3-(a)-3). Personnel will be enrolled in the OMSEP if either of the following criteria are met:

(1) Personnel identified as occupationally at risk/exposed to hazardous chemicals or physical agents at levels documented or reasonably determined to be above the CG Medical Surveillance Action Level (MSAL) for that hazard,

(2) Personnel actively engaged for 30 or more days per calendar year in the following occupations will be enrolled in OMSEP, unless an IH investigation determines individuals are not exposed to toxic chemicals or physical hazards: resident inspectors, pollution investigators, marine safety (general), port safety (general), vessel inspectors or marine investigators; and fire fighters.

(3) Note: New OMSEP enrollees may be considered for enrollment under the guidelines of the Hazardous Waste Protocol, which provides the most thorough surveillance for those with unknown hazardous risks and no prior history of exposures. However, the unit IH or cognizant SEHO may recommend enrollment using the medical surveillance protocol considered most appropriate.

3. Reporting Requirements.

a. Examination Reports:

(1) Required forms: OMSEP Initial/Baseline and Exit/Separation physical examinations require completion of the most current version of CG Form 5447 (7-02) in addition to forms DD-2808 and DD-2807-1. **Periodic examinations require completion of the most current version of the CG Form 5447A(07-02) and any Acute Exposure requires completion of the Acute Exposure**

Information Form. Other OMSEP specific forms and their uses are presented in Chapter 4 of this Manual.

(2) Record keeping: OMSEP personnel records will be handled in the same manner as other medical records (see Chapter 4 of this Manual) with the following exceptions: all x-ray, laboratory test, and related reports of examinations or procedures done for OMSEP purposes, as well as the medical record cover, shall be clearly labeled "OMSEP." All OMSEP examination reports, including all laboratory data, must be entered into the individual's health record and maintained in accordance with OSHA regulations. The member's medical record custodian will maintain all OMSEP medical records on file for the duration of employment. Upon separation or retirement, all records concurrently labeled "OMSEP" will be maintained, for an additional 30 years, as required by OSHA regulations [29 CFR 1915.1120].

(3) OMSEP database: MLC (k) will maintain an electronic database of all OMSEP enrollees based on enrollment information provided by the local units and will be accessible to the commands in accordance with privacy act requirements. The OMSEP personnel tracking database should include, at a minimum, the member's name, social security number (SSN), billet or occupation code, applicable examination protocols, and next physical examination due date. The handling of all data in the OMSEP database will comply with Privacy Act requirements.

(4) Substitutions: OMSEP examination forms may not be substituted for other examination forms. If another examination is anticipated/required, (i.e. FLIGHT, RELAD) at the same time as the OMSEP examination the appropriate forms for each particular examination should be provided to the examiner so they may be completed at the same time. Duplicate laboratory tests are not required, so long as all specific tests and procedures required for each exam are completed and reported.

(5) Exposure data records: Any available exposure data, from workplace surveys, industrial hygiene personal or area monitoring, material safety data sheets, or assigned IH/SEHO other appropriate sources, will be provided by OMSEP coordinator to the examining medical officer as part of the examination packet. These data should be supplied by the local unit, in coordination with the supporting industrial hygienist, prior to the examination. The protocols in Section 12-C, in addition to OSHA regulations, specify what exposure surveillance data must be maintained and made available to the examining medical officer.

b. Individual units, in coordination with the cognizant SEHO, are responsible for creating and managing a roster of all OMSEP enrollees, and providing this information to the designated medical officer (DMOA)/clinic and MLC (k)'s. This information may be accessed at any time through the database. No written reports are required.

c. Sentinel Occupational Health Event Reporting: The occurrence of a new illness or disease, which is likely associated with an occupational exposure or condition, may be considered a "sentinel event." Such an event may serve as a warning signal that the quality of preventive measures may need to be improved. In order to facilitate timely intervention, the initial diagnosis of any such diseases must be reported IAW Section 7-B of this Manual. A complete list of reportable occupational diseases is found in Figure 7-B-2.

4. Medical Removal Protection. It is the responsibility of the commanding officer to assure a safe and healthy working environment. The finding of a work-related illness or injury, which could be further exacerbated by continued exposure to a workplace hazard or condition, requires immediate evaluation to determine whether the worker must be at least temporarily removed from further exposure. A recommendation to remove the member should be made to the unit's Commanding Officer by the examining medical officer in coordination with the cognizant SEHO. (see section 12-B-4-b.)

5. Roles and Responsibilities. The OMSEP is part of a larger and more comprehensive surveillance process requiring the coordinated effort of various district units and local commands working to secure the safety and health of Coast Guard workers. Key personnel have been identified as essential in maintaining a sound occupational health prevention program. Following is a description of their expected roles and responsibilities in this process: NOTE: For the purposes of this Chapter all references to employees, workers, personnel will be assumed to be part of the ONE CG TEAM concept. Rules, regulations, and directives apply equally to ALL unless otherwise specified.

   a. Units/Commands: Each unit must appoint an OMSEP coordinator, usually the Safety Coordinator (SC) or the Safety and Occupational Health Coordinator (SOHC), or Independent Duty Corpsman. Even if units are under one servicing clinic, the unit is still required to appoint an OMSEP coordinator. The OMSEP coordinator is responsible for updating the database of OMSEP enrollees, ensuring OMSEP examinations are completed in a timely fashion, and ensuring all available exposure data is available to the medical officer at the time of the OMSEP examination. **The OMSEP coordinator is responsible for assuring the privacy, confidentiality and security of the OMSEP records and reports.**

   b. MLC (k): MLC (k)'s will ensure that SEHO work-site monitoring and reporting is completed and entered into the appropriate database. Additionally they will provide oversight to the local units ensuring the accuracy and completeness of the OMSEP personnel database. The MLC (k)'s medical officers will provide oversight over the physical examination consultation and referral process. MLC (k)'s will also provide indicated guidance and or training to HS personnel on examination practices and procedures.

   c. SEHOs: SEHOs are required to review all requested OMSEP enrollments from the unit OMSEP Coordinators. SEHOs will approve or disapprove requested enrollments through the on-line database. Disapprovals need to be explained to the requesting unit. To substantiate enrollments, SEHOs are required to conduct and update quantitative and/or qualitative IH assessments of their units' workplace environment. SEHOs are required to have these written assessments available to the medical officer for review, if requested, to determine the appropriate medical surveillance protocol to use. SEHOs are also required to provide training and day-to-day consultation with their unit OMSEP Coordinators on database management, enrollment criteria and reporting requirements.

   d. Commandant (G-WKS): Commandant (G-WKS) will provide planning, development, and expertise on occupational health issues. G-WKS is responsible for policy making, procedural decisions, and ensuring currency of Chapter 12 of the Medical Manual with OSHA standards. The G-WKS occupational medicine medical officer will provide support on physical examination problems and review all diagnosed occupational health

related abnormalities encountered by the on-site provider, will be provided to onsite providers. G-WKS is the final authority on decisions of any OMSEP related problems.

e. Medical Officer's Responsibilities:

(1) Medical Diagnosis coding. The examining medical officer is responsible for explaining and/or following any abnormalities through to a resolution. All diagnoses made must be appropriately coded **using the International Classification of Diseases (ICD), clinical modification's most current revision.** ICD codes should be noted in parentheses next to the diagnosis on the examination report and be reported to the fifth digit.

(2) Written assessment or opinion. Whenever a physical exam is performed, the examining medical officer must include the following information in writing as part of the record of each examination. This information should be included in the appropriate blocks.

(a) The occupationally pertinent results of the medical examination.

(b) An opinion about adequacy of the information available to support any diagnosed occupational disease(s), if appropriate.

(c) Any recommended limitations to the employee's assigned work.

(d) A statement that the employee has been informed about the results of the examination. (see Section 12-B-3-j.)

(e) Any additional written information required by the protocols listed in Section 12-C.

f. Medical Administrators:

(1) Support. Medical Administrators are responsible for providing administrative assistance on all OMSEP related matters. This support should extend to :

(a) All units within the designated AOR.

(b) Contracted medical providers and their respective facilities.

(c) IDT's.

(2) OMSEP report/worksite data. Medical Administrators should interact with OMSEP coordinators within their AOR to ensure currency of the roster of enrollees and ensure that work-site information is received in a timely manner. Worksite exposure information, reported history of past exposures and Material Safety Data Sheets (if needed) should precede the physical examination to give the medical officer ample time to reach an educated decision.

(3) Physical Examinations/Medical Records. The Medical Administrator is responsible for the following clinic functions in support of OMSEP:

(a) Timely scheduling of physicals.

(b) Providing qualified technicians to perform the indicated laboratory and radiological procedures.

(c) Ensuring proper calibration of equipment, and

(d) Compliance with quality assurance standards.

g. Civilian Employees: Civilian OMSEP enrollees may be entitled to services provided by Coast Guard medical facilities should a determination be made by the Safety and Environmental Health Officer and confirmed by a medical provider, that an adverse health condition resulted from a work place exposure. Employees are expected to report and explain any illnesses or injuries resulting from exposure sources outside their primary duty station or from other non-occupational settings. Should a determination of an injury or illness, resulting from an exposure at the workplace, be made by a medical provider, civilian appropriated fund employees should contact their servicing civilian Command Staff Advisor (CSA) for assistance in making a claim with the Department of Labor. Non-appropriated fund employees (NAF) should contact their immediate supervisor and/or personnel liaison office. The services provided by the Coast Guard facilities will be only to establish an occupationally-related illness/injury. Further medical care should be provided by the civilian employee's health care provider.

h. Others: In the event of an emergency situation with heavy exposure (e.g., fire, spill), 24-hour assistance is available from the Agency for Toxic Substances Disease Registry (ATSDR) at the Centers for Disease Control and Prevention. Call 404-498-0210.

Disease Registry (ATSDR) at the Centers for Disease Control and Prevention. Call 404-639-0615-6360.

LIST OF ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
ALT	Alanine aminotransferase
AST	Aspartate amino transferase
BUN	Blood urea nitrogen
CBC	Complete blood count
CNS	Central nervous system
CXR	Chest x-ray
DOT	Department of Transportation
EL	Excursion limit (OSHA mandated maximal "safe" airborne concentration of a substance)
FVC	Forced vital capacity
FEV-1	Forced expiratory volume at one second
ICD-9	International Classification of Diseases, (coding system for medical diagnoses.)
IH	Industrial hygiene or industrial hygienist
LDH	Lactic dehydrogenase
MCV	Mean corpuscular volume
MCH	Mean corpuscular hemoglobin
MCHC	Mean corpuscular hemoglobin concentration
MLC (k)/(kse)	Maintenance and Logistics Command: (k)-medical; ((kse)-safety & environmental health.
MO	Medical officer (physician, physician's assistant or nurse practitioner)
MSAL	Medical surveillance action level (Defined in 12-A-3)
OMSEP	Occupational Medical Surveillance and Evaluation Program
OSHA	Occupational Safety and Health Administration
PEL	Permissible exposure limit (The OSHA mandated TWA airborne exposure limit)
PFTs	Pulmonary function tests

LIST OF ABBREVIATIONS (continued)

RBC	red blood cell
SC	Safety Coordinator
SEHO	Safety and Environmental Health Officer
SOHC	Safety and Occupational Health Coordinator
STEL	Short-term exposure limit (The maximal "safe" airborne concentration of a substance)
STEL/C	Short-term exposure limit/ceiling (maximal "safe" airborne concentration of a substance)
STS	Significant threshold shift
TB	Tuberculosis
TLV	Threshold limit value (ACGIH) (The TWA airborne concentration of a substance)
TST	tuberculin skin test (Mantoux)
TWA	time-weighted average
U/A	Urinalysis

Section B - Administrative Procedures.

1. General: All medical examinations and procedures required under the OMSEP shall be performed by or under the supervision of a licensed medical officer and an accredited laboratory shall perform all laboratory tests. Timely completion and monitoring of scheduled examinations is essential in identifying work related health hazards and any specific health effects. All tests required as part of an OMSEP examination should be completed prior to and the results made available to the health care provider at the time of the physical examination. This requirement may be waived if travel or time costs make separate visits impractical. **The provider is required to review, approve (sign), and explain any abnormalities. Any unexplained, examination finding, laboratory abnormality, or test result must be referred to a certified Occupational Health Clinic/provider for further evaluation.**

2. Examination Types.

   a. Initial/baseline. Baseline examinations are required before placement in a specific job in order to assess whether the worker will be able to do the job safely, to meet any established physical standards, and to obtain baseline measurements for future comparison. Each baseline examination shall consist of all of the elements specified under the appropriate surveillance protocol(s) in Section 12-C. Table 12-B-1 also summarizes the required forms and tests for a baseline examination under each of the surveillance protocols. In the event that the employee is being monitored under more than one protocol, each unique form or test need only be completed once for a particular examination.

      (1) An initial examination is required for all employees prior to employment. The employee may not be exposed to a potential health hazard until the physical examination is completed. In the event of scheduling delays, this requirement may be waived, if the employee completes ALL the necessary laboratory tests specified under the appropriate surveillance protocol(s). The physical examination must still be completed at the earliest possible date, but not beyond 30 days after the initial date of employment. Longer delays will require temporary removal. Workers who transfer from operational to administrative positions on a frequent basis during the same duty assignment may, with medical officer approval, receive a periodic physical vice a complete baseline examination upon re-entering the hazardous work site.

      (2) All employees must have an initial physical examination prior to reassignment to any position with an occupational health hazard exposure as defined in Section 12-A-2-b. This requirement is subject to the stipulation described above in Section 12-B-2-a-1.

   b. Periodic.

      (1) **Periodic examinations are generally provided at twelve-month intervals, though under some protocols, the period between examinations may vary. Once enrolled in the OMSEP periodic examinations will be performed at the required interval for the duration of the health hazard. Members being monitored under more than one exposure protocol need to complete the CG-5447A, Periodic History and Report of OMSEP Examination form only once during a particular examination. The member should review the last CG**

5447, History and Report of OMSEP Examination form on record and annotate any changes, which may have occurred since the last examination. Each periodic examination shall consist of all of the elements specified under the appropriate surveillance protocol(s). (Section 12-C. and Table 12-B-1).

(2) **Any OMSEP enrollee actively monitored, identified as a risk of exposure to a new health hazard requiring additional protocols, must complete all the required laboratory tests and procedures specified under the appropriate surveillance protocol(s). The employee must also complete the CG-5447A (Periodic History and Report of OMSEP Examination). The employee may not be placed at risk of exposure until the examination is completed. This requirement is subject to the stipulation described above in Section 12-B-1.**

(3) Employees who transfer from operational to administrative positions on a frequent **basis** may, with medical officer approval, **receive a periodic physical examination** vice a complete exit (end of exposure) examination. This does not preclude a complete exit/separation examination upon the end of employment.

(4) **Laboratory tests are required for most exposure protocols as part of the periodic surveillance examination. Laboratory tests are usually performed in accordance with the specific protocol. (Section 12-C. and Table 12-B-1). Members being monitored under more than one exposure protocol need to have similar laboratory test (i.e. CBC; U/A; Chem panel) performed only once during a particular examination. The medical provider may perform additional tests as often and as deemed necessary.**

c. Acute Exposure.

(1) An acute health hazard exposure examination is required, when the applicable short-term exposure limit (STEL) ceiling limit of the substance(s) in question is exceeded. The requirement applies whether or not the employee exhibits any overt symptoms of acute exposure. Specific requirements, if any, for an acute exposure examination are found under the protocols in Section 12-C.

(2) An acute health hazard exposure examination is required if the employee exhibits any adverse effects following an acute exposure to a suspected hazardous substance. If the substance(s) is identified, an examination should be performed following the specific protocol(s) for that substance(s). In the event no specific substance is identified, an examination should be directed according to the "Hazardous Waste" examination protocol and presenting symptoms. The Acute Chemical Exposure Information form (Figure 12-B-1) should be used to collect and organize information when an acute exposure occurs. The information on this form must accompany the employee to his/her examination.

(3) All HAZMAT response personnel with a documented exposure event, including Coast Guard Strike Team members and firefighters, must complete an Acute Chemical Exposure Information form (Figure 12-B-1) at the end of each HAZMAT response. Special attention must be provided to the type, duration and degree of toxicity of the agent(s) encountered as well as the type of contact (inhalation, skin absorption, ingestion). The type of PPE utilized, type of respirator (if any), and protective clothing worn should also be noted. **This information is to be reviewed by the cognizant medical provider before entering into the medical record. Based on this information as well as any additional**

information from the exposure event, the medical provider may choose to direct an acute health hazard exposure examination. Specific requirements, if any, are found under the protocols in Section 12-C.

d. Exit/Separation (Employment/Exposure). Exit exams are designed to assess pertinent aspects of the worker's health when the worker leaves employment or when exposure to a specific hazard has ceased. Results may be beneficial in assessing the relationship of any future medical problem to an exposure in the workplace. Exit physical examinations must be completed within 30 days of the last day of exposure or employment. The worker may not be re-assigned to a hazardous area once the examination is completed. In the event the worker is exposed to a hazardous substance, after completing the examination, ALL laboratory tests required by the specific protocol for that particular substance must be repeated (see Table 12-B-1 and Section 12-C). The following conditions also apply:

(1) End of Exposure:

(a) OMSEP enrollees assigned to a non-hazardous work environment but likely to be assigned to a designated area later in their career should receive an end of exposure examination including completion of the CG-5447A (Periodic History and Report of OMSEP Examination).

(b) Individuals enrolled in the OMSEP, with exposures to known carcinogens or agents with prolonged latency periods for disease development (e.g., asbestos, benzene), will receive an end of exposure exam including completion of the CG-5447A upon reassignment to non-hazardous area and continue to receive periodic annual physicals according to the designated protocol(s). These individuals will be monitored for the duration of their Coast Guard career unless the responsible supervising medical officer or other cognizant medical authority determines such monitoring is not required.

(2) End of Employment:

(a) OMSEP enrollees permanently separating from Coast Guard employment should receive an end of employment examination, including completion of the CG-5447 (History and Report of Examination Form) specified laboratory tests and procedures and any required consultations and referrals.

(b) At the time of the examination the member's permanent home of record and phone number must be secured for notification of any abnormalities. A copy of the member's occupational health history, including all potential exposure agents, severity and duration of exposure, and any recommendations on future protocol testing or examinations, must be placed in the member's medical record. A personal copy should also be provided to the member. (see Section 12-B-3-j). **All copies that become part of the member's medical record fall under the privacy and security provisions of HIPAA.**

(c) All members must be provided with a personal copy of the "Separation Letter" in addition to the one placed in the member's medical record. Upon request, the member should also be provided with a copy of the "Medical Officer's Report," part 2 of the CG-5447.

e. Timing of next examination. The default interval between examinations is one year for all protocols except respirator wear and prior (not current) exposure to asbestos, in which case the default interval is five years. However, a medical officer may recommend for any individual patient a shorter interval between examinations than the default period, if such is medically indicated. Any recommendation on the timing of the next examination should be included as part of the physician's written assessment.

3. Use of OMSEP Forms.

a. CG Form 5447 (03-03) (History and Report of OMSEP Examination). This form must be completed whenever an OMSEP (initial or separation) physical examination is required, except when only annual hearing conservation program is needed. Ensure that the examinee and medical officer identifying information are accurately recorded, including phone numbers. All history sections on the CG-5447 must be completed.

b. CG Form 5447A (03/03) (Periodic History and Report of OMSEP Examination). This form must be completed whenever a periodic OMSEP physical examination is required. The examinee must review the last CG-5447 form or record and note any changes, which may have occurred since the last examination. If there have been no changes during the interval from the last examination, the examinee should mark the appropriate box in each of the sections.

c. OSHA Respirator Medical Evaluation Questionnaire-(mandatory). This questionnaire is to be completed by any worker who is to be issued a respirator or assigned to a task that may require a respirator.

d. CG-5140 (Audiometric Biological Calibration Check). This form is to be used to record calibration of the audiometric equipment.

e. DD Form 2215 (Reference Audiogram). This form is used to record initial audiometric test results.

f. DD Form 2216 (Hearing Conservation Data). This form is used to record the results of periodic and follow-up audiometry for individuals routinely exposed to hazardous noise. This form should be preceded by a reference audiogram (DD Form 2215 or other record) already on file in the individual's health record.

g. Notification of Summary Results. A sample of this form is provided in (Figure12-B-2). A photocopy or a locally generated form may be used to provide the required notification to the enrollee of the results of his/her OMSEP examination.

h. Acute Exposure Information Form. This form is used to record the results of any unexpected exposures and for verification of notification of the appropriate agencies. A sample of this form is provided in (Figure 12-B-1).

i. Separation Letter. This letter serves as notification of the member's documented exposure(s) while serving in the US Coast Guard. It provides the nature and levels of exposure(s), if known, and the medical provider's comments and recommendations. A sample letter is found as (Figure 12-B-4), and can be completed from this Manual. Copies of this letter should be placed in the official health record and also provided directly to the member.

j. Patient Notification. The medical officer is responsible for notifying the patient of any and all abnormalities found or diagnoses made, whether or not they are occupationally related or simply an incidental finding. Notification must be made within 30 days of completion of the examination and should be documented as a medical record entry (Figure 12-B-2).

4. Medical Removal Standards

a. The following abnormal laboratory findings during an OMSEP examination mandate immediate removal of the employee from further workplace exposure to the hazard listed, pending resolution of the abnormality or a determination that the abnormality is not due to a workplace exposure. The medical officer should coordinate all medical removal recommendations with the cognizant SEHO before forwarding to the commanding officer (CO).

(1) Benzene (any of the following):

(a) The hemoglobin/hematocrit falls below the laboratory's normal limit and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other means.

(b) The thrombocyte (platelet) count varies more than 20% below the employee's most recent prior values or falls below the laboratory's normal limit.

(c) The leukocyte count is below 4,000 per mm3 or there is an abnormal differential count.

(2) Lead: A blood lead level at or above 40µg/100 ml of whole blood.

(3) Noise: A loss of hearing of $\geq$ **25** dB in either ear at one or more of the speech frequencies (500, 1,000, 2000, or 3000 Hz), compared with the current reference audiogram.

(4) Organophosphate pesticides: cholinesterase level at or below 50% of the pre-exposure baseline.

b. Pregnancy is not a reason for automatic medical removal from the workplace. A decision to remove or restrict a pregnant woman must be based on sound clinical judgment after careful consideration of the workplace environment and the woman's physical capabilities. The woman's pre-natal health care provider (obstetrician) should be apprised early of any/all potential hazards and safety precautions available.

5. Reporting of Examination Results.

a. Coast Guard medical officers will have 30 days from completion of the examination to meet all medical officer responsibilities in Section 12-B-4.

b. Contractual providers, IDTs, and other detached HSs/units must forward all OMSEP examination questions, problems, and any unresolved matters, with accompanying supporting information, to the assigned CG medical officer for review within 15 days of receipt (includes the examination and any additional testing or consultations).

c. All records must be forwarded to the record custodian upon compliance with Sections 12-B-6- (a) and 12-B-6 (b) above.

Table 12-B-1
REQUIRED FORMS AND TESTS FOR VARIOUS OMSEP EXAMINATIONS

Exam Type Exposure Protocol	Initial/Baseline	Periodic	Exit/Separation	Acute Exposure	Biological Monitoring
ASBESTOS	CG-5447 * OSHA Resp. Quest. DD-2808 / DD-2807-1 *** (a) Stool Guaiac** PFTs / "B" Reader CXR / CBC / Multichem panel / U/A w/micro	CG-5447A *** (a) Stool Guaiac** PFTs / "B" Reader *** (b) CXR** CBC / Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 Stool Guaiac PFTs / "B" Reader CXR / CBC / Multichem panel U/A w/micro OSHA Respiratory Questionnaire	Acute Exposure Form	N/A
BENZENE	CG-5447 DD-2808 / DD-2807-1 CBC w/diff / Platelet count / RBC / Indices / Multichem panel U/A w/micro	CG-5447A CBC w/diff / Platelet count / RBC / Indices / Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 CBC w/diff / Platelet count / RBC / Indices / Multichem panel U/A w/micro	Urinary phenol CBC w/diff / Platelet count / RBC / Indices Acute Exposure Form	Only under special circumstances. Contact **G-WKS-3**
CHROMATES	CG-5447 DD-2808 / DD-2807-1 CXR / PFTs / CBC Multichem panel U/A w/micro	CG-5447A PFTs / CBC Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 CXR / PFTs / CBC Multichem panel U/A w/micro	Acute Exposure Form	N/A
HAZARDOUS WASTE	CG-5447 DD-2808 / DD-2807-1 Vision Screening CXR / PFTs / CBC w/diff Multichem panel U/A w/micro	CG-5447A Vision Screening PFTs / CBC w/diff Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 Vision Screening CXR / PFTs / CBC w/diff Multichem panel U/A w/micro	Acute Exposure Form PFTs / CBC w/diff Multichem panel U/A w/micro ***(c) Heavy Metal Screen**	Only under special circumstances. Contact **G-WKS-3**

Notes:

- OSHA Medical Evaluation Respiratory Questionnaire. DD Form 2493-1/2493-2 Asbestos Report may be required at medcial DoD facilities.
- *** (a)** only if patient is age 35+ or otherwise clinically indicated.
- *** (b)** B-reader chest x-rays will be done at periodic examinations according to the following schedule:

Years since last exposure	Age of examinee: 15 to 35	36 to 45	over 45
0-10	Every 5 yrs	Every 5 yrs	Every 5 yrs
Over 10	Every 5 yrs	Every 2 yrs	Annually

- *** (c)** Heavy metal screen includes blood lead, cadmium, mercury, and arsenic levels.

Table 12-B-1 (con't)
REQUIRED FORMS AND TEST FOR VARIOUS OMSEP EXAMINATIONS

Exam Type Exposure Protocol	Initial/Baseline	Periodic	Exit/Separation	Acute Exposure	Biological Monitoring
LEAD	CG-5447 DD-2808 / DD-2807-1 Blood lead & ZPP CBC w/diff Multichem panel U/A w/micro	CG-5447A Blood lead & ZPP CBC w/diff Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 Blood lead & ZPP CBC w/diff Multichem panel U/A w/micro	Acute Exposure Form Blood lead & ZPP CBC w/diff Multichem panel U/A w/micro	Blood ZIPP
NOISE	DD Form 2215 CG-5447 DD-2808 / DD-2807-1	DD Form 2216	DD Form 2216 CG-5447 DD-2808 / DD-2807-1	Acute Exposure Form DD Form 2216	N/A
PESTICIDES	CG-5447 DD-2808 / DD-2807-1 Blood Cholinesterase, twice / PFTs / CBC w/diff / Multichem panel / U/A w/diff	CG-5447A ***(d) Blood Cholinesterase** PFTs / CBC w/diff Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 ***(d) Blood Cholinesterase** PFTs / CBC w/diff Multichem panel U/A w/micro	Acute Exposure Form ***(d) Blood Cholinesterase** PFTs	*** (d) Blood Cholinesterase**
RESPIRATORY SENSITIZERS	CG-5447 DD-2808 / DD-2807-1 PFTs / CBC w/diff Multichem panel U/A w/micro	CG-5447A PFTs / CBC w/diff Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 PFTs / CBC w/diff Multichem panel U/A w/micro	Acute Exposure Form PFTs	N/A
SOLVENTS	CG-5447 DD-2808 / DD-2807-1 CBC w/diff Multichem panel U/A w/micro	CG-5447A CBC w/diff Multichem panel U/A w/micro Biological moni-toring (if possible)	CG-5447 DD-2808 / DD-2807-1 CBC w/diff Multichem panel U/A w/micro	Acute Exposure Form Specific blood or urine tests for specific solvents.	Specific blood or urine tests specific solvents. (see Section 12-C-11.d.)
RESPIRATOR WEAR (only)	CG-5447 ** OSHA Resp Quest	** ORQ (update)	** OSHA Resp Quest	N/A	N/A

Note:
- ***(d)** Blood Cholinesterase only required if exposure includes organophosphate and/or carbamate pesticides.
- ** Respiratory: OSHA Respiratory Questionnaire, this form is provided at the unit level (worksite), (Reference Section 12-C-9).

Table 12-B-1 (con't)
REQUIRED FORMS AND TESTS FOR VARIOUS OMSEP EXAMINATIONS

Exam Type Exposure Protocol	Initial/Baseline	Periodic	Exit/Separation	Acute Exposure	Biological Monitoring
TUBERCULOSIS	CG-5447 DD-2808 / DD-2807-1 *** (e) Tuberculin skin test (TST)**	CG-5447A *** (e) Tuberculin skin test (TST)**	CG-5447 DD-2808 / DD-2807-1 *** (e) Tuberculin skin test (TST)**	Acute Exposure Form *** (e) Tuberculin skin test (TST)**	N/A
BLOODBORNE PATHOGENS	CG-5447 DD-2808 / DD-2807-1 CBC Multichem panel U/A w/micro	CG-5447A CBC Multichem panel U/A w/micro	CG-5447 DD-2808 / DD-2807-1 CBC Multichem panel U/A w/micro	Acute Exposure Form CBC Multichem panel U/A w/micro	Only under special circumstances. Contact **G-WKS-3**

NOTES:

- ***(e)** Personnel with a history of reactive tuberculin skin tests should be monitored for development of symptoms of active TB. A CXR should be done only if the skin test is newly reactive.

Figure 12-B-1
ACUTE EXPOSURE INFORMATION FORM

This form is subject to the Privacy Act Statement of 1974

Last Name, First Name, Middle Initial:	SSN:	Date:	Time:

ONE FORM FOR EACH EXPOSURE

Name of chemical exposed to: _____

Chemical Abstract Services (CAS) number, if known: _____

Physical form: ☐ Solid ☐ Liquid ☐ Gas/Vapor ☐ Aerosol

Chemical form: ☐ Acid ☐ Alkali ☐ Organic Solvent ☐ Heavy Metals

Modes or routes of exposure: ☐ Inhalation ☐ Ingestion ☐ Skin ☐ Other _____

Exposure duration: _____ _____

Brief description of the incident:

Observed symptoms:

Associated injuries:

Personal protective equipment used:

Notify District/ISC Safety & Environmental Health Officer, cognizant MLC (kse), and G-WKS-3.

Further guidance received:

Contact ATSDR emergency response line at 404-498-0210 to obtain further guidance.

ATSDR guidance:

Attach Material Safety Data Sheet (MSDS) and shipping manifest to this form, if available.

Reviewing Authority Signature: **Date:**

FIGURE 12-B-2

OMSEP

NOTIFICATION OF SUMMARY RESULTS

Date of Examination: _____
Patient: _____ SS#:_____

Address:	Phone #

Reference. (a) Medical Manual, COMDTINST M6000.1(series).

1) An environmental health evaluation has determined that you may have been exposed to the following health hazards at your workplace:

_____

_____

2) Your physical examination was conducted in accordance to reference (a).
There ***ARE*** / ARE ***NOT*** abnormalities in your physical examination and laboratory testing.

NOTED ABNORMAL PHYSICAL FINDINGS OR LABORATORY TESTS	RESULT/INTERPRETATION

3) Additional comments on your Occupational Medical Surveillance and Evaluation physical

_____

_____

_____

_____

Name and Title of Health Care Provider: _____

_____

Signature of Health Care Provider: _____
Date:_____

Figure 12-B-4

U.S. Department of Homeland Security

United States Coast Guard

_____

United States Coast Guard

_____

_____

Staff Symbol: _____

PH: _____

FAX: _____

6120

Date: _____

MEMORANDUM

From: _____

Senior Medical Representative

To: _____

Subj: NOTIFICATION OF TERMINATION FROM THE OMSEP PROGRAM

Ref: MEDICAL MANUAL, COMDTINST M6000.1(series)

1. You have been enrolled in the Coast Guard's Occupational Medical Surveillance and Evaluation Program (OMSEP). During the past _____years you received periodic physical examinations based on Occupational Health Safety Organization (OSHA) protocols for the following known potentially hazardous exposures:

_____

_____

2. Your occupational (work-related) history also indicates suspected exposure to the following agents:

_____

_____

3. At the time of your EXIT/SEPARATION medical examination you were found to be in good health with no evidence of occupational induced disease. However, it is recommended that you continue to receive medical examinations on a periodic basis on age indicated guidelines. In addition, the periodicity of the examination should be modified to allow for adequate detection and prompt intervention on disease processes resulting from the latent effects of occupational hazardous substances. Your medical provider should follow OSHA mandated recommendations, for the aforementioned hazardous substances, in determining the frequency and level of care you require.

4. Any questions relating to this member's ocupational health history can be obtained by contacting the U.S. Coast Guard's Office of Safety and Environmental Health at # 202-267-1883.

Section C - Medical Examination Protocols.

1. General.

   a. The following protocols follow the same format. Each contains a brief description of the hazard and its possible effects; the conditions required for an individual to be surveyed under that protocol; information which must be provided to the examining medical officer; specific requirements of the history and physical, including laboratory tests and special procedures; and any additional written requirements on the part of the examining medical officer. The protocols are summarized in Figures 12-C-1 through 12-C-12. Copies of these figures may be locally reproduced. The unit OMSEP coordinator should complete the information in the first eight blocks at the very top, and the appropriate protocol summary figure(s) should be provided to the examining medical officer with the examination packet.

   b. Multiple protocols for a single individual. In the event that an individual is being monitored on more than one protocol (e.g., asbestos and noise), the final examination packet must include each of the required items for each of the protocols. However, each required form or test need only be completed once.

   c. Past exposure. Personnel who have a documented history of workplace exposure to known carcinogens, but who are not currently exposed, shall be offered an annual medical examination, according to this protocol until end of employment. Undergoing this examination is strictly voluntary.

2. Asbestos (Figure 12-C-1).

   a. Exposure effects. Asbestos exposure can cause asbestosis, bronchogenic carcinomas, mesothelioma, and gastric carcinoma. It may also be associated with multiple myeloma and renal carcinoma. Disease risk is dose dependent. There is a synergistic effect between asbestos exposure and cigarette smoking, so that the risk of lung cancer is roughly ten times greater in asbestos-exposed workers who smoke as opposed to nonsmoking asbestos-exposed workers. The primary route of exposure is inhalation, though ingestion of fibers may also occur.

   b. Required surveillance.

      (1) All personnel with current employment exposure to airborne asbestos, who meet the MSAL criteria in Section 12-C-2- (4) below, shall undergo medical surveillance. These personnel shall be included in the OMSEP and be examined according to the protocol in Section 12-C-2.d below. Medical examinations shall be provided upon enrollment and at least annually thereafter, throughout the duration of exposure or until end of employment, whichever comes first. Under current Coast Guard policies for management of asbestos, very few non-shipyard workers should be currently exposed at or above the PEL or STEL.

      (2) Construction worker standard. The OSHA standard for asbestos applies to, but is not limited to, workers who demolish, remove, alter, repair, maintain, install, clean up, transport, dispose of, or store asbestos containing materials.

      (3) The current MSALs are based on the OSHA exposure standard for shipyards [29 CFR 1915.1001].

(4) **Medical surveillance is required for those workers:**

(a) **Who are exposed at or above 50% of the PEL or STEL for a combined total of 30 or more days per year.**

c. Information to medical officer. The following information must be provided to the examining medical officer, by the OMSEP coordinator, prior to the examination taking place:

(1) A copy of the OSHA asbestos standards [29 CFR 1915.1001], with appendices D and E.

(2) A description of the affected employee's duties as they relate to the employee's exposure.

(3) The employee's representative exposure level or anticipated exposure level.

(4) A description of any personal protective or respiratory equipment used or to be used.

d. Examination protocol.

(1) Each initial, periodic, and exit examination shall include, as a minimum:

(a) A medical and work history. Emphasis should be placed on the member's history of tobacco use (smoking), and associated symptoms of dyspnea on exertion, recurrent epigastric discomfort, pleuritic chest pains or unexplained cough.

(b) Completion of the OSHA Respiratory Medical Evaluation Questionnaire Appendix C to RP Standard 29CFR 1910.134. Note: additional information on asbestos reporting guidelines may be found at www.osha.gov.

(c) A complete physical examination of all systems, with emphasis on the respiratory system, the cardiovascular system, and digestive tract.

(d) A stool guaiac test, if the patient is age 35 or over.

(e) PFTs, including FVC and FEV1.

(f) Routine screening labs, including a CBC, multichemistry panel (including glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase), and U/A with microscopic.

(g) A postero-anterior (PA) CXR, in accordance with the schedule and interpretation requirements in Section 12-C-2-d(2) below;

(h) Any other tests or procedures deemed appropriate by the examining physician, including specialty consultations.

(2) Chest x-ray requirements:

(a) A PA CXR shall be performed at the initial examination and then according to the following schedule:

Years since First exposure	Age of examinee 15 to 35	36 to 45	over 45
0 to 10	Every 5 yrs.	Every 5 yrs.	Every 5 yrs.
Over 10	Every 5 yrs.	Every 2 yrs.	Annually

(b) A PA chest-x-ray shall be performed at the exit examination.

(c) All CXRs shall be interpreted and classified in accordance with a professionally accepted classification system and recorded following the format of the CDC/NIOSH (M) 2.8 form. A B-reader or a board eligible/certified radiologist using the ILO-U/C International Classification of Radiographs for Pneumoconiosis references shall only do the interpretation.

(d) Assistance in obtaining the location of the nearest B-reader is available from MLC (k).

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the examining physician must address the following in writing:

(1) Any detected medical conditions placing the employee at increased risk of health impairment from further asbestos exposure.

(2) The employee's ability to use respiratory and other personal protective equipment (see Section 12-C-9), and any limitations thereof.

(3) Employee notification of the results of the examination and any medical conditions resulting from asbestos exposure that might require follow-up.

(4) Employee notification of the increased risk of lung cancer attributable to the synergistic effects of asbestos and smoking.

3. Benzene (Figure 12-C-2).

a. Exposure effects. Benzene exposure can cause central nervous system depression, leukemia, aplastic anemia, and dermatitis. The primary route of exposure is inhalation of vapors, though skin absorption may also occur. Within the Coast Guard, most benzene exposure occurs among marine inspectors and oil spill responders.

b. Required surveillance.

(1) The Coast Guard MSALs are based on the OSHA action level and PEL standards. Enrollment in the OMSEP is required for all personnel:

(a) who are or may be exposed to benzene at or above the current average exposure action level 30 or more days per year,

(b) who are or may be exposed to benzene at or above the current short-term exposure action level 10 or more days per year, or

(c) who served as resident inspectors, pollution investigators, marine safety officers, port safety officers, vessel inspectors, or marine investigators prior to

1990. These personnel are considered to have been exposed at/or above the MSAL unless otherwise documented.

(2) In addition to routine surveillance requirements above, if an employee is exposed to benzene in an emergency (fire, spill) situation, a urine specimen will be collected as soon as possible thereafter, but not later than 24 hrs. after the exposure, and an acute exposure examination will be performed within 72 hrs. of the exposure. Such an examination must contain a urinary phenol test on the collected urine specimen.

c. Information to medical officer. The following information must be provided to the examining physician, by the OMSEP coordinator, prior to the examination taking place:

(1) A description of the affected employee's duties as they relate to the employee's exposure.

(2) The employee's representative exposure level or anticipated exposure level.

(3) A description of any personal protective or respiratory equipment used or to be used.

d. Examination protocols.

(1) Each routine (non-acute exposure) initial, periodic, and exit examination shall include, as a minimum:

(a) A detailed history which includes:

1 past occupational exposure to benzene or any other hematological toxins, at work or at home;

2 a family history of blood dyscrasias, including hematological neoplasms;

3 a personal history of blood dyscrasias, including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements; and of renal or liver dysfunction;

4 history of exposure to ionizing radiation;

5 smoking history, alcohol usage history, and all medicinal drugs routinely taken;

6 any current history of headache, difficulty concentrating, decreased attention span, short-term memory loss, mood lability, fatigue, dry skin, abnormal bleeding, anemia, or weight loss.

(b) a complete physical examination, (Ensure the patient is examined for mental status changes, dermatitis, and pallor.);

(c) a CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC);

(d) a multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase) and U/A with microscopic;

(e) any other tests or procedures deemed appropriate by the examining physician.

(2) Each acute exposure examination shall include, as a minimum:

(a) a brief summary of the nature of the exposure and investigation of any symptoms or complaints;

(b) a total urinary phenol level (mg/L) or a urinary phenol adjusted for urinary creatinine (mg/g creatinine), plus a CBC and differential, with platelet count, and RBC indices (MCV, MCH, MCHC). Plasma folate and B12 levels to rule out megaloblastic anemia if the MCV is elevated.

(c) any other test or procedure deemed appropriate by the examining physician may be performed, if available. Coast Guard medical providers are encouraged to contact G-WKS for advise and consultation in selecting the most applicable test or procedure. Alternatively, medical providers may contact any certified Occupational Health clinic provider, available in the local community.

(d) If either the total urinary phenol level is below 50 mg phenol/L of urine, or the urinary phenol adjusted for urinary creatinine is less than 250 mg/g creatinine, and the CBC is normal, no further testing is required. Otherwise, contact Commandant (G-WKS-3) for further requirements.

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the following must be addressed in writing by the examining medical officer:

(1) Any detected medical conditions, which would place the employee's health at greater than normal risk of material impairment from exposure to benzene.

(2) The medical officer's recommended limitations upon the employee's exposure to benzene or upon the employee's use of protective clothing or equipment and respirators.

(3) A statement that the employee has been informed by the medical officer of the results of the examination and any medical conditions resulting from benzene exposure which require further explanation or treatment.

4. Chromium Compounds (Figure 12-C-3).

a. Exposure effects. Hexavalent chromium compounds are known human carcinogens. They may also cause dermatitis, skin ulceration, occupational asthma, and nasal septum perforation. The primary routes of exposure are percutaneous absorption and inhalation. Chromates may be found in certain metal alloys, paints, and masonry cements. Within the Coast Guard, most chromate exposure is from the use of chromium containing paints.

b. Required surveillance. The Coast Guard MSALs are based on the ACGIH threshold limit values (TLVs). Medical surveillance is required for all personnel who are or may be exposed to chromium IV compounds at or above the current exposure action level 30 or more days per year.

c. Information to medical officer. The following information must be provided by the OMSEP coordinator to the examining physician prior to the examination taking place:

(1) A description of the affected employee's duties as they relate to the employee's exposure.

(2) The employee's representative exposure level or anticipated exposure level.

(3) A description of any personal protective or respiratory equipment used or to be used.

d. Examination protocols. Each routine initial, annual (periodic), and exit examination must include:

(1) A detailed history, which includes:

(a) Past and current occupational exposures to chromate, asbestos, or any other pulmonary carcinogens at work or at home;

(b) Smoking history and alcohol usage history;

(c) Any past or current history of dry skin, skin ulcers—usually painless, nosebleeds, asthma, shortness of breath, wheezing, or cough;

(2) A directed physical examination, with attention to the skin, mucous membranes, and respiratory tract, both upper and lower (ensure the patient is examined for erosion of the nasal mucosa and septum, respiratory rhonchi, dermatitis, and cutaneous ulcers);

(3) A CBC, multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase), and a U/A with microscopic;

(4) PFTs (including FVC & FEV_1);

(5) A PA CXR **only** for an initial/baseline or exit examination, unless there is a current clinical indication (cough, shortness of breath, wheezing, etc.);

(6) Any other tests or procedures deemed appropriate by the examining physician.

e. Specific written requirements. Other than the general requirements specified in Section 12-B-4-b, the physician should address:

(1) The periodicity of the next routine medical surveillance examination. Examinations will be provided annually unless the physician recommends a longer interval.

(2) The employee's ability to use respiratory and other personal protective equipment (see Section 12-C-9), and any limitations thereof.

5. Hazardous Waste (Figure 12-C-4).

a. Exposure effects. The OSHA medical surveillance protocol for hazardous waste operations and emergency response (HAZWOPER)[29 CFR 1910.120] involves medical surveillance for potential exposure to numerous metals and chemicals, usually in uncontrolled spill, fire, disposal situations. Therefore, there are no specific exposure effects to describe.

b. Required surveillance.

(1) Routine medical surveillance is required for employees involved in hazardous waste operations when any of the following conditions are met:

(a) Exposure or potential exposure to hazardous substances or health hazards at or above the MSAL for that substance (as defined in Section 12-A-4), without regard to the use of respirators or personal protective equipment, for 30 or more days per year.

(b) All hazardous waste operation employees who wear a respirator for 30 or more days per year or as required under Section 12-C-9.

(c) All employees who are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

(d) Members of HAZMAT response teams, including all Coast Guard Strike Team members and firefighters.

(2) In addition to routine surveillance requirements above, if an employee is exposed to a hazardous substance above the Coast Guard MSAL in an emergency (fire, spill) situation, a urine specimen will be collected as soon as possible thereafter, but not later than 24 hrs after the exposure, and an acute exposure examination will be performed within 72 hrs of the exposure.

c. Information to medical officer. The examining medical officer shall be provided, by the OMSEP coordinator, one copy of the OSHA HAZWOPER standard [29 CFR 1910.120] and its appendices, plus the following specific information:

(1) A description of the employee's duties as they relate to the employee's exposures.

(2) The employee's exposure levels or anticipated exposure levels.

(3) A description of any personal protective equipment used or to be used, including any respirators.

(4) Information from previous medical examinations of the employee which is not readily available to the examining physician.

d. Examination protocols.

(1) Each routine (non-acute exposure) initial, periodic, and exit examination shall include, as a minimum:

(a) A medical and occupational history which includes:

1 past and current occupational exposure to hazardous chemicals, metals, dusts, fumes, and heat stress;

2 any history of heat illness, allergies, sensitivities, or physical abnormalities;

3 current medications, and immunization history;

4 smoking history, and alcohol usage history;

5 a complete review of organ systems.

(b) A complete physical examination with attention to the skin, eyes, nose, throat, and respiratory, cardiovascular, genitourinary, and neurologic systems;

(c) A CBC and differential, with platelet count, and RBC indices (MCV, MCH, MCHC);

(d) A multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase) and U/A with microscopic;

(e) PFTs (including FVC & FEV1);

(f) Vision screening;

(g) A PA CXR only for an initial/baseline or exit examination, unless there is a current clinical indication (cough, shortness of breath, wheezing, etc.);

(h) Any other tests or procedures deemed appropriate by the examining physician. (Consider a stool guaiac and/or electrocardiogram, if indicated by age or physical findings).

(2) Each acute exposure examination shall include, as a minimum:

(a) A brief summary of the nature of the exposure and investigation of any symptoms or complaints;

(b) A CBC and differential, with platelet count, and RBC indices (MCV, MCH, MCHC), a multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase) and a U/A with microscopic;

(c) PFTs (including FVC & FEV1);

(d) Appropriate biological monitoring tests (e.g., blood metal screen) depending on the exposure in question. Contact Commandant (G-WKS-3) for further information and requirements.

e. Specific written requirements. Other than the general requirements specified in Section 12-B-4-b, the physician should address:

(1) Whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from work in hazardous waste operations or emergency response, or from respirator use.

(2) The employee's ability to use respiratory and other personal protective equipment (see Section 12-C-9), and any limitations thereof.

(3) The periodicity of the next routine medical surveillance examination. Examinations will be provided annually unless the physician recommends a longer interval.

6. Lead (Figure 12-C-5).

a. Exposure effects. In adults, excessive lead exposure can cause hypertension, anemia, peripheral neuropathy, encephalopathy, spontaneous abortions in women, and decreased

fertility in men. The primary route of exposure in adults is inhalation of lead containing dust or fumes. Most exposure in the Coast Guard occurs during removal of previously applied lead-based paint coatings, or during environmental recovery of previously discarded lead-acid batteries. Some welders may be exposed to lead fumes.

b. Required surveillance. The Coast Guard MSAL is based on the OSHA PEL standard for shipyards [29 CFR 1915.1025]. Enrollment in the OMSEP is required for all personnel who are or may be exposed to lead at or above the current exposure action level for 30 or more days per year.

c. Information to medical officer. The OMSEP coordinator shall provide the medical officer with one copy of the OSHA lead standard [29 CFR 1915.1025] and its appendices, plus the following specific information:

(1) A description of the employee's duties as they relate to the employee's exposure.

(2) The employee's exposure level or anticipated exposure levels to lead and to any other toxic substance (if applicable).

(3) A description of any personal protective equipment used or to be used, including any respirators (if known).

(4) Prior blood lead determinations.

(5) Information from previous medical examinations of the employee which is not readily available to the examining physician. This includes all available prior written medical opinions concerning the employee.

d. Examination protocols.

(1) Biological monitoring or "blood lead only" examinations must be provided to each employee exposed at or above the OSHA action level (currently TWA of 30 mg/ m^3 air) **every six months**. Otherwise, only annual examinations must be performed, unless an employee's blood lead level is found to be elevated at or above 40 mg/100 ml of whole blood.

(2) Each routine initial, periodic, exit, and acute exposure examination shall include, as a minimum:

(a) A detailed work history and a medical history, with particular attention to:

1 past lead exposure (occupational and non-occupational);

2 personal habits (smoking, handwashing after work and before eating);

3 past and current gastrointestinal, hematological, renal, cardiovascular, reproductive, and neurological problems.

(b) A complete physical examination with particular attention to:

1 occular fundi, teeth, gums, hematological, gastrointestinal, renal, cardiovascular, and neurological systems;

2 blood pressure (must be recorded);

3 pulmonary status should be evaluated if respiratory protection is to be used. (see Section 12-C-9).

(c) The following routine laboratory tests:

1 a CBC and differential, with platelet count, and RBC indices (MCV, MCH, MCHC), plus examination of peripheral smear morphology;

2 blood lead level and zinc protoporphyrin (must be performed by a laboratory licensed by the CDC for proficiency in blood lead testing);

3 a multi-chemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase);

4 a U/A with microscopic examination; and,

5 PFTs (including FVC & FEV 1).

(d) Any other tests or procedures deemed appropriate by the examining physician (pregnancy testing, laboratory examination of male fertility).

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the physician should address:

(1) Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure from lead, or from respirator use.

(2) The employee's ability to use respiratory and other personal protective equipment (see Section 12-C-9), and any limitations thereof.

(3) The results of the blood lead determinations.

7. Noise (Figure 12-C-6).

a. Exposure effects. The primary effect of excessive noise is to cause loss of hearing. This hearing loss may be described by three "p-words:" painless, progressive, and permanent. Cumulative overexposures to hazardous noise levels cause millions of people to lose hearing during their working lives.

b. Required surveillance. The Coast Guard MSAL is based on DOD Instruction 6055.12, DOD Hearing Conservation Program, as well as OSHA guidance [29 CFR 1910.95]. Enrollment in the OMSEP is required for all personnel who are exposed to hazardous noise at or above the current exposure action level. Surveillance can also be started regardless of the duration of noise exposure. Personnel who infrequently or incidentally enter designated "hazardous noise areas" need not be enrolled in the audiometric testing program.

(1) Enrollment is required in accordance with the following criteria:

(a) When the member is exposed to continuous and intermittent noise that has an 8-hour time-weighted average (TWA) noise level of 85 decibels A-weighted (dBA) or greater for 30 or more days per calendar year, or

(b) When the member is exposed to impulse noise sound pressure levels (SPL's) of 140 decibels(dB) peak or greater for 30 or more days per calendar year.

(2) Reference (baseline) audiograms:

(a) All personnel shall receive a reference audiogram prior to any Coast Guard occupational noise exposure or before they are assigned to duties in "hazardous noise areas".

(b) Every effort should be made to schedule the reference audiogram on civilian workers in order to avoid conflicts with assigned duties; military personnel shall receive their reference audiogram at initial entry training.

(c) Testing to establish a reference audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protectors that attenuate workplace noise below a TWA of 85 dBA, may be used to meet this requirement, in place of exclusion from the noisy workplace.

(3) Exit audiograms: shall be conducted on all employees, previously enrolled in the "hearing conservation program", if it is determined the employee no longer works in a designated "hazardous noise area," unless that employee is moving to another Coast Guard position that also involves work in such areas. However, if the employee's audiogram shows hearing losses (compared to the reference audiogram**)** equal to or greater than 25 dB in the speech frequencies (500 - 3000 Hz) the employee must continue to receive annual audiograms until end of employment.

c. Information to medical officer. The OMSEP coordinator must provide the examining medical officer with a description of the employee's duties as they relate to the employee's exposure, the dB level of the hazardous work area and a description of any personal protective equipment used or to be used (e.g., earplugs or earmuffs).

d. Examination protocols.

(1) Each routine (non-acute exposure) initial, periodic, and exit examination shall include completion or updating of the indicated physical examination forms (i.e. CG 5447 or CG 5447A) and audiometric testing data (audiogram). All audiometric testing shall:

(a) Be performed by a licensed or certified audiologist, otolaryngologist, or other physician; or by a technician who is certified by the Council for Accreditation in Occupational Hearing Conservation. A technician who performs audiometric tests shall be responsible to an audiologist, otolaryngologist, or other physician. Standard instructions shall be given to individuals before testing.

(b) Be conducted in a testing environment with background octave band SPLs not greater than **21** dB at 500 Hz, **26** dB at 1000 Hz, **34** dB at 2000 Hz, **37** dB at 4000 Hz, and **37** dB at 8000 Hz. The test environment shall be surveyed annually to ensure these levels are not exceeded.

(c) Include pure tone, air conduction, and hearing threshold examinations of each ear at the test frequencies of 500, 1000, 2000, 3000, 4000, and 6000 Hz.

(d) Be performed on audiometers conforming to the most current calibration specifications of the American National Standards Institute (ANSI).

Audiometers currently in operation must receive annual electroacoustic calibration to maintain certification.

(e) Occur on audiometers that have received a functional operations check before each day's use for specifications in the OSHA Occupational Noise Exposure standard [29 CFR 1910.95]

(f) Be recorded on DD Form 2215 (Reference Audiogram), or DD Form 2216 (Hearing Conservation Data), or equivalent locally reproduced versions as appropriate.

(2) Significant Threshold Shift (STS). Transcribe the reference audiogram test results into the "Reference Audiogram" spaces on the DD Form 2216, Hearing Conservation Data (or equivalent). The reference levels are subtracted from the current levels at 2000, 3000, and 4000 Hz. The differences in hearing levels calculated at 2000, 3000, and 4000 Hz are added together and divided by three, for each ear. STS exists if the resulting average hearing loss in either ear is greater than or equal to ±10 dB [29 CFR 1910.95]. Additionally, any change of ±**15dB** at 2000, 3000, or 4000 Hz in either ear shall constitute an STS. Results shall be recorded on DD Form 2216 (or equivalent) as the "Reference Audiogram" results under the appropriate heading "Left" for left ear and "Right" for right ear. (Note: The National Institute for Occupational Safety and Health (NIOSH) age corrections shall NOT be applied when determining STS. (see Figure 12-C-13, Audiometric Threshold Shift Evaluation)

(3) A follow-up audiogram shall be conducted when an individual's audiogram shows an STS, in either ear, relative to the current reference audiogram. Medical evaluation is required to validate the existence of a permanent noise-induced threshold shift and/or to determine if further medical referral is required. An audiologist, otolaryngologist, or other knowledgeable physician shall perform the evaluation and determine if the noise-induced STS is/is not work-related or has/has not been aggravated by occupational noise exposure.

(4) When a negative STS (improvement in hearing threshold from the reference audiogram) is noted on the periodic audiogram, one 14-hour noise-free follow-up test is required. That may be administered on the same day as the periodic test. The results of the follow-up test may be used to create a re-established reference audiogram.

(5) When a positive STS (decrease in hearing threshold form the reference audiogram) is noted on the periodic audiogram, two consecutive 14-hour noise-free follow-up tests must be administered to confirm if the decrease in hearing is permanent. The follow-up exams may not be performed on the same day as the periodic audiogram The results of the second follow-up test may be used to reestablish a reference audiogram, if the required medical evaluation validates the existence of a permanent noise induced threshold shift (see Section 12-3-d.(3) above). If the results of the first follow-up test do not indicate an STS, a second follow-up test is not required.

(6) A new reference audiogram shall replace the original reference audiogram when the medical evaluation confirms that the STS noted during the annual and follow-up audiograms is permanent. The original reference audiogram shall be retained in the patient's medical record.

(7) Acute exposure examinations (formerly called the Detailed Surveillance Program). These examinations are designed to observe any dynamic hearing loss, to identify those who demonstrate unusual noise sensitivity, or to monitor personnel acutely exposed to unprotected high levels of noise (impulse >140dBA).

(a) The initial acute exposure examination shall consist of all elements described in Sections 12-C-7.d. (1)-(6), above. Additional follow-up audiograms will be performed at 30 and 90 days, or at more frequent intervals at the discretion of the medical officer.

(b) If any of the follow-up audiograms demonstrate an average loss of no more than 10 dB in 2000, 3000, and 4000 Hz in either ear, when compared to the revised reference audiogram, hearing may be considered stable. The reference audiogram (per Section 12-C-7-d (5) and (6)) remains the audiogram against which further testing is compared. The individual is returned to annual monitoring.

(c) If these reevaluation audiograms exhibit a loss greater than an average threshold of 10 dB in 2000, 3000, and 4000 Hz in either ear when compared to the revised reference audiogram, the individual must be referred to an otolaryngologist for a consultation. Final disposition will depend on the consultant's diagnosis and recommendations.

(d) Reporting requirements: In accordance with OSHA's Occupational Illness and Reporting Requirements effective January 1, 2003, the following rule applies: Any threshold shifts (+/- 10dB in either ear) that results in a total of 25dB level of hearing loss above audiometric zero, averaged over the 2000, 3000, and 4000 frequencies must be recorded and reported as a hearing loss case. Since most audiometers are designed to provide results referenced to audiometric zero no other calculations are required. NOTE: Any such event must be reported as a mishap in accordance with Chapter 3 of the Safety and Environmental health Manual, COMDTINST M5100.47(series).

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the medical officer must do the following:

(1) The employee shall be notified in writing within 21 days, when an audiologist or a physician confirms a threshold shift is permanent. Such determination must be entered in the employee's medical record.

(2) Supervisors shall be notified, in writing, that the worker has experienced a decrease in hearing. Release of medical information must conform to privacy act requirements.

(3) Document that the patient was counseled concerning the potential seriousness of repeated unprotected exposures to excessive noise and provided additional information on hearing protection and avoidance of hazardous noise exposures.

8. Pesticides (Figure 12-C-7).

a. Exposure effects. There are over 1,200 chemical compounds currently classified as pesticides. However, this surveillance protocol is primarily concerned with only two classes of pesticides: organophosphate and carbamate insecticides, and chlorophenoxyacetic acid herbicides. Organophosphates and carbamates are inhibitors of the enzyme acetylcholinesterase and they cause parasympathetic nervous system hyperactivity (miosis, urination, diarrhea, defecation, lacrimation, salivation), neuromuscular paralysis, CNS dysfunction (irritability, anxiety, impaired cognition, seizures, coma), peripheral neuropathy, and depression of RBC cholinesterase activity. Chlorophenoxyacetic acid herbicides cause skin, eye, and respiratory tract irritation, cough, nausea, vomiting, diarrhea, abdominal pain, and peripheral neuropathy. In the past, some chlorophenoxyacetic herbicides were contaminated with dioxins during manufacture.

b. Required surveillance. The Coast Guard MSALs for carbaryl, chlorpyrifos, malathion, parathion, 2,4, -D, and 2,4,5,-T are based on the ACGIH threshold limit values. Enrollment in the OMSEP is required for all personnel who are or may be exposed to any identified pesticide at or above the MSAL (as defined in Sect. 12-A-2) for 30 or more days per year.

c. Information to medical officer. The OMSEP coordinator must provide the examining medical officer with:

(1) A description of the employee's duties as they relate to the employee's exposure.

(2) The employee's exposure level or potential exposure level to any pesticides.

(3) A description of any personal protective equipment used or to be used, including any respirators.

d. Examination protocols.

(1) Biological monitoring or "RBC cholinesterase only" examinations must be provided at least every six months to each employee exposed to organophosphate or carbamate pesticides at or above the MSAL. If an employee's RBC cholinesterase activity is found on any testing to be less than 80% of the pre-exposure baseline, the frequency of biological monitoring will be increased to at least every three months during the application season. Non-seasonal, acute exposures will be monitored at a frequency determined by the supervising medical officer based on exposure information data.

(2) Each routine (non-acute exposure) initial, periodic, and exit examination shall include, as a minimum:

(a) A detailed work history and a medical history, with particular attention to:

1 past and current exposure to pesticides or other chemicals (occupational and non-occupational);

2 smoking and alcohol use history;

3 any symptoms of eye, nose, or throat irritation; cough; nausea, vomiting, diarrhea, or abdominal pain; irritability, anxiety, difficulty concentrating, impaired short-term memory, fatigue, or seizures; numbness, tingling, or weakness in the extremities; and

4 allergic skin conditions or dermatitis.

(b) A complete physical examination, with attention to the skin, respiratory, and nervous systems, including a mental status examination, should be performed. Pulmonary status must be evaluated if respiratory protection is used. (see Section 12-C-9).

(c) The following routine laboratory tests:

1 A CBC, a multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase), and a dipstick U/A;

2 An erythrocyte (RBC) cholinesterase level.

3 Initial examination only-two RBC cholinesterase tests must be drawn at least 24 hrs. apart. The results of these two tests will be averaged to provide the pre-exposure baseline for future reference, unless they differ by more than 15% from each other, in which case, additional testing must be performed until successive tests do not differ by more than 15%. The pre-exposure baseline blood tests must be drawn after a period of at least 60 days without known exposure to organophosphates.

(d) Any other tests or procedures deemed appropriate by the examining physician (e.g., cognitive function testing). Pulmonary function testing should be performed at least once every 4 years if the employee wears a respirator.

(3) Each acute exposure examination shall include, as a minimum:

(a) A medical and work history with emphasis on any evidence of eye, nose, or throat irritation; cough; nausea, vomiting, diarrhea, or abdominal pain; irritability, anxiety, difficulty concentrating, impaired short-term memory, fatigue, or seizures; numbness, tingling, or weakness in the extremities.

(b) A complete physical examination with attention to any reported symptoms as well as the skin, respiratory, and nervous systems. A mental status examination must be performed.

(c) An erythrocyte (RBC) cholinesterase level.

(d) Any other tests or procedures deemed appropriate by the examining physician (e.g., CBC, CXR, cognitive function testing, urinary metabolites if less than 24 hrs. post acute exposure). Pulmonary function testing should be performed at least every 4 years if the employee wears a respirator.

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4, the physician should address:

(1) Any detected medical conditions, which would place the employee's health at increased risk from exposure to identified pesticides or from respiratory wear.

(2) Counseling on the possible increased risk of health impairment from working with certain pesticides, in the event that the employee was found to have skin disease, chronic lung disease, or abnormalities of the central or peripheral nervous system that could directly or indirectly be aggravated by such exposure.

9. Respirator Wear (Figure 12-C-8).

a. Exposure effects. The OSHA medical surveillance protocol for respirator wear is a means to assess the effectiveness of respiratory protection among exposed workers. Periodic examinations are required to assess continued fitness for duties and to assess whether the present respiratory protection program provides adequate protection against illness. Respirators are often extremely uncomfortable to wear for long periods. Workers with asthma, claustrophobia, angina, and other conditions may not be able to wear respirators effectively. The worker should be questioned for a history or symptoms of past and current exposures to hazardous chemicals; fumes and dusts; smoking and alcohol use histories; wheezing or abnormal breath sounds; clubbing; and cardiac arrhythmia.

b. Required surveillance.

(1) Initial Medical Determination. An initial/baseline examination will be performed at the time of assignment to a job requiring respirator wear. Before an employee may be issued a respirator or assigned to a task that may require a respirator, that worker must complete a mandatory OSHA Respirator Medical Evaluation Questionnaire. This questionnaire will be provided, at the local unit by the cognizant SEHO, to all workers expected to require the use of a respirator. This questionnaire serves as the initial medical examination. A health care professional (nurse, nurse practitioner, physician assistant, and physician) must review this questionnaire to determine if a follow- up medical examination is required. Independent duty technicians (IDT'S) are authorized to review the questionnaire but must refer any positive responses on questionnaire (or any other concerns) to the supervising medical officer for further review. Any employee who gives a positive response to any questions among questions 1-8 in section two of the questionnaire shall be subject to a follow-up medical examination. This examination will determine whether the worker is physically and mentally capable of performing the work and using a respirator [29 CFR 1910.134].

(2) Additional Medical Evaluation and Medical Examination.

(a) Additional medical examinations maybe required to assess continued fitness for duties involving respirator wear. The following conditions will dictate the need for a follow-up evaluation:

1 The member reports signs and symptoms related to the ability to use a respirator;

2 The health care provider, supervisor, or respirator program coordinator informs the command of the need for evaluation;

3 Observations are made during fit testing, respirator use, or program evaluation that indicate the need for evaluation;

4 When changes in workplace conditions such as physical work effort, protective clothing or climate conditions result in substantial increase in physiological burden;

5 A member's scheduled quintennial physical examination.

(b) Periodic physical examinations will be provided at least once every five years. The periodic physical examination requires a review and update of the respirator questionnaire. A health care provider must review the questionnaire to determine the need for a follow-up examination. A follow-up medical examination is required for anyone with positive responses to questions 1-8 in section two of the questionnaire.

c. Information to medical officer. The OMSEP coordinator must provide the examining medical officer with:

(1) A description of the employee's duties as they relate to the employee's respirator wear.

(2) The employee's exposures or potential exposures to any hazardous chemicals or physical agents.

(3) A description of the respirator(s) used or to be used.

d. Examination protocol. Each routine (non-acute exposure) initial and periodic examination shall include, as a minimum the completion of the mandatory OSHA Respirator Medical Evaluation Questionnaire.

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4, the physician should address:

(1) Any detected medical conditions that would place the employee at increased risk of material impairment of the employee's health from respirator use.

(2) Asthmatics with normal or mildly impaired lung function should be evaluated based on the job requirements, but disapproval should be strongly considered for asthmatics that require regular medications to maintain airflow, or who have a history of airway reactivity or sensitization to extrinsic materials (dusts, fumes, vapors, or cold).

(3) Note: As a general rule, anyone with documented respiratory impairment of moderate to severe degree (FEV_1 or FVC <70% of predicted) should not be routinely approved to wear a respirator.

10. Respiratory Sensitizers (Figure 12-C-9).

a. Exposure effects. Respiratory sensitizers include numerous compounds which cause both occupational asthma and/or hypersensitivity pneumonitis (extrinsic allergic alveolitis). Respiratory sensitizers include vegetable dusts and woods, molds and spores, animal danders, metals (platinum, chromium, nickel, cobalt, vanadium), and chemicals (isocyanates, formaldehyde, trimellitic anhydride).

b. Required surveillance. The Coast Guard MSALs for formaldehyde, toluene diisocyanate, and vanadium, are based on the ACGIH threshold limit values. Enrollment in the OMSEP is required for all personnel who are or may be exposed to any identified respiratory sensitizer at or above the MSAL (as defined in Section 12-A-2) for 30 or more days per year. In the Coast Guard, exposure to respiratory sensitizers is primarily associated with industrial operations, though some marine inspection activities may also lead to exposures.

c. Information to medical officer. The OMSEP coordinator must provide the examining medical officer with:

(1) A description of the employee's duties as they relate to the employee's exposure.

(2) The employee's exposure level or anticipated exposure level to any respiratory sensitizers.

(3) A description of any personal protective equipment used or to be used, including any respirators.

d. Examination protocols.

(1) Each routine (non-acute exposure) initial, periodic, and exit examination shall include, as a minimum:

(a) A detailed work history and a medical history, with particular attention to:

1 past and current exposure to respiratory sensitizers (occupational and non-occupational);

2 smoking history;

3 any symptoms of eye, nose, or throat irritation;

4 chronic airway problems or hyperactive airway disease; and

5 allergic skin conditions or dermatitis.

(b) In the event that the employee is not required to wear a respirator and the history and routine laboratory tests are unremarkable, the medical officer may determine that a complete physical examination is not required. Otherwise, at a minimum, a system specific physical examination with attention to the respiratory system must be completed. Pulmonary status must be evaluated if respiratory protection is used. (see Section 12-C-9).

(c) The following routine laboratory tests:

1 a CBC, a multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase), and a dipstick U/A;

2 PFTs (including FVC & FEV_1).

(d) Any other tests or procedures deemed appropriate by the examining physician (e.g., CXR, bronchial provocation tests).

(2) Each acute exposure examination shall include, as a minimum:

(a) A medical and work history with emphasis on any evidence of upper or lower respiratory problems, allergic conditions, skin reaction or hypersensitivity, and any evidence of eye, nose, or throat irritation.

(b) A directed physical examination with attention to the respiratory system.

(c) PFTs (including FVC & FEV1).

(d) Any other tests or procedures deemed appropriate by the examining physician (e.g., CBC, CXR, bronchial provocation tests).

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the physician should address:

(1) Any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to identified respiratory sensitizers, or from respirator use.

(2) The employee's ability to use respiratory and other personal protective equipment (see Section 12-C-9), and any limitations thereof.

11. Solvents (Figure 12-C-10).

a. Exposure effects. There are over 30,000 industrial solvents. This protocol is designed to survey for the most frequent health effects of solvents when considered as an admittedly broad group. These effects are skin disorders (acute irritant dermatitis, chronic eczema), acute CNS effects (headache, nausea and vomiting, dizziness, light-headedness, vertigo, disequilibrium, fatigue, weakness, nervousness, irritability, depression, confusion, coma), and chronic CNS effects (chronic solvent intoxication, neurobehavioral abnormalities, cognitive dysfunction). Some other less frequent effects of solvents involve the hematopoietic, hepatic, peripheral nervous system, renal, reproductive, and respiratory systems. Most solvents are **not** carcinogenic to humans; benzene being a notable exception (see Section 12-C-3, above). In the Coast Guard, exposure to solvents is primarily associated with industrial and maintenance operations (e.g., painting).

b. Required surveillance. The Coast Guard MSALs for ethylene glycol, methyl ethyl ketone, VM & P naphtha, and xylene are based on the ACGIH threshold limit values. Enrollment in the OMSEP is required for all personnel who are or may be exposed to any identified hazardous solvent at or above the MSAL (as defined in Section 12-A-2) for 30 or more days per year. An acute exposure examination is required in the event of any documented overexposure (above the TLV or STEL) to a solvent or any presumed overexposure where symptoms are present. In the case of an acute overexposure, an appropriate urine or blood specimen should be collected as soon as possible after the overexposure incident.

c. Information to medical officer. The OMSEP coordinator must provide the examining medical officer with:

(1) A description of the employee's duties as they relate to the employee's exposure.

(2) The employee's exposure level or potential exposure level to any solvents.

(3) A description of any personal protective equipment used or to be used, including any respirators.

d. Examination protocols.

(1) Each routine (non-acute exposure) initial, periodic, and exit examination shall include, as a minimum:

(a) A detailed work history and a medical history, with particular attention to:

1 past and current exposure to solvents (occupational and non-occupational);

2 smoking history and alcohol use history;

3 any symptoms of dry skin, skin irritation, or dermatitis;

4 any CNS symptoms, including headache, nausea and vomiting, dizziness, light-headedness, vertigo, disequilibrium, fatigue, weakness, nervousness, irritability, depression, difficulty concentrating, mood changes, or confusion;

5 a review of symptoms with attention to the hematopoietic, hepatic, peripheral nervous system, renal, reproductive, and respiratory systems.

(b) A system specific physical examination, with attention to the skin and nervous systems, including a mental status examination, should be performed. Pulmonary status must be evaluated if respiratory protection is used. (See Section 12-C-9).

(c) The following routine laboratory tests:

1 a CBC and differential, with platelet count, and RBC indices (MCV, MCH, MCHC); and

2 a multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase) and a U/A with microscopic.

(d) Consideration should be given to biological monitoring tests for ongoing overexposure to certain solvents, if specimens can be obtained in a timely manner during the exposure period. For non-acute exposures, a timely manner generally implies that the specimen be obtained at the end of a work shift or the end of a workweek.

1 For toluene, measure urinary hippuric acid, at the end of a full work shift.

2 For xylene, measure urinary methyl-hippuric acid, at the end of a full work shift.

3 For methylethylketone (MEK), measure urinary MEK, at the end of a full work shift.

4 For trichloroethylene, measure urinary trichloroacetic acid, at the end of a full workweek.

(e) Any other tests or procedures deemed appropriate by the examining physician (e.g., cognitive function tests. Note that skin (patch) testing is generally of little value in solvent-induced dermatitis, since the pathophysiology is generally not allergic. Pulmonary function testing should be performed at least once every 4 years if the employee wears a respirator.

(2) Each acute exposure examination shall include, as a minimum:

(a) A medical and work history with emphasis on any evidence of skin disorders or acute CNS effects (headache, nausea and vomiting, dizziness, light-headedness, vertigo, disequilibrium, fatigue, weakness, nervousness, irritability, depression, confusion, coma).

(b) A system specific physical examination with attention to the skin and nervous systems.

(c) If at all possible, a biological monitoring test for overexposure to the solvent in question should be performed, if such a test is available and a specimen can be obtained in a timely manner. For acute exposures, a timely manner implies within the first half-life of the chemical within the human body, generally a matter of a few hours after the overexposure.

(d) Any other tests or procedures deemed appropriate by the examining physician (e.g., CBC, CXR, and bronchial provocation tests).

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the physician should address:

(1) Any detected medical conditions, which would place the employee at increased risk of material impairment of the employee's health from any identified exposures to solvents, or from respirator use.

(2) The periodicity of the next routine medical surveillance examination. Examinations will be provided annually unless the physician recommends a longer interval.

12. Tuberculosis (Figure 12-C-11).

a. Exposure effects. Tuberculous droplet nuclei are coughed, spoken, or sneezed into the air by an individual with active pulmonary tuberculosis. Exposure to these airborne droplet nuclei may cause infection with the bacterium that causes tuberculosis.

b. Required surveillance. Employees who are occupationally exposed to active TB cases will be enrolled in the OMSEP and undergo annual screening for tuberculosis. See section 7-D-3 of this Manual, Tuberculosis Screening Program, for complete details. In the Coast Guard, medical personnel and personnel involved in alien migrant interdiction operations (AMIO) are at potential risk for exposure to active TB cases.

c. Information to medical personnel. In order to assess whether the employee should remain under active surveillance for TB exposure, the OMSEP coordinator must provide the examining medical officer with the following information:

(1) A description of the employee's duties as they relate to the employee's exposure.

(2) The employee's exposure level or potential exposure level active TB cases.

(3) A description of any personal protective equipment used or to be used.

d. Examination protocols.

(1) Routine screening for exposed individuals is covered in section 7-D-3.

(a) Personnel with a history of non-reactive tuberculin skin tests will receive annual skin testing. Routine skin testing does not require an examination by a medical officer.

(b) Personnel with a history of reactive skin test(s) will be monitored for development of symptoms of active TB (cough, hemoptysis, fatigue, weight loss, night sweats) annually. A health services technician or a medical officer may complete such monitoring. Routine annual CXRs will not be done.

(2) Evaluation of personnel with newly reactive tuberculin skin tests or suspected active TB is covered in section 7-D-4. A medical officer shall perform a physical examination and obtain a complete medical history in such personnel. A CXR should be done.

e. Specific written requirements. Requirements for recording routine skin test results are covered in Section 7-D-3-c. In addition, medical personnel should make a written recommendation as to whether continued annual TB surveillance is required.

13. Bloodborne Pathogens (Figure 12-C-12).

a. Exposure effects. Bloodborne pathogens are defined as any pathogenic microorganism present in the blood of humans, which are able to cause human diseases. COMDINST 6220.8, Prevention of Bloodborne Pathogens (BBP) Transmission, includes definitions, prevention and control measures, and applicability, as well as discussing vaccination policy, and post exposure prophylaxis. Further instructions are found in Chapter 13 of this Manual which covers approved work practices and training requirements including discussions in Universal Precautions. The primary Bloodborne Pathogens (BBP's) include Human Immune Deficiency Virus (HIV), Hepatitis B (HBV), and Hepatitis C (HCV).

b. Required surveillance.

(3) Bloodborne Pathogen exposure surveillance is based on OSHA guidelines (29 CFR 1910.1030). Enrollment in OMSEP is required for all workers who reasonably anticipate contact with BBP's as a result of their duties. Determination of exposure must be based on the definition of occupational exposure without regard to personal protective equipment. Exposures should be listed according to:

(a) Jobs in which all workers have occupational exposure (i.e. lab personnel) and,

(b) Jobs where only some of the workers may be exposed (i.e. alien migrant operations). In these circumstances all the specific tasks and / or procedures potentially causing the exposure must be clearly listed.

(4) All BBP enrollees will be entered into the OMSEP database for proper identification. Monitoring and post-exposure prophylaxis will be done in accordance with any reported or suspected acute exposure (see Figure 12-C 12), and guidelines found in Chapter 13 of this manual.

c. Information to medical personnel. Since the potential for infectivity of patient's blood and body fluids is not routinely known, it is essential that all workers conform to blood and body fluid precautions, regardless of any lack of evidence of infectiousness. Acute viral hepatitis is a serious operational problem, which has significantly altered the course of many military operations. According to established classification acute hepatitis is a self-limited liver injury of <6 months duration and chronic hepatitis represents a hepatic inflammation >6 months. The usual course is six to 10 days of acute symptoms associated with a variable rise in ALT/AST and bilirubin. The common clinical presentation includes the symptom complex of anorexia, nausea, right upper quadrant pain and tenderness, hepatomegaly, and jaundice. Specific Bloodborne Pathogens are discussed in further detail:

(1) **Hepatitis B - (HBV)**, also known as "serum" hepatitis, is less of a risk for endemic outbreaks than other hepatitis viruses but is also less amenable to prophylactic measures. Serologic evidence precedes clinical symptoms by approximately 1 month. Hepatitis B is the leading cause of liver-related deaths from cirrhosis and hepatocellular carcinoma worldwide; is especially frequent in drug abusers, male homosexuals, and chronic dialysis patients; 5% to 10% of adults in the US have had the disease; and 10% develop a chronic carrier state and constitute an infectious pool. Important serological markers to follow include: HB_sAg, HB_e Ag, HB_cAg, HB_sAb, HB_e AB and HB_cAb. The AST and ALT should also be evaluated at monthly intervals following their initial rise and decline.

(a) **Hepatitis B surface antigen (HBsAg)** is found in acute illness and becomes positive 1 to 7 weeks before clinical disease. It remains positive 1 to 6 weeks after clinical disease and in chronic carrier states. Blood-containing HBsAg is considered potentially infectious.

(b) **Hepatitis B antibody (Anti-HBs)** is an antibody against the surface antigen of hepatitis B and appears weeks to months after clinical illness. The presence of this antibody confers immunity and indicates prior disease (if hepatitis B core antibody positive) or vaccination (if hepatitis B core antibody negative).

(c) **Anticore antibody (Anti-HBc)** appears during the acute phase of the illness and its presence can be used to diagnose acute HBV infection especially in the "window period" when both HBsAg and HbsAb may be undetectable. Presence of HBcIgM denotes acute infection and IgG appears chronically. The latter may be protective against reinfection.

(d) **Hepatitis Be antigen (HBeAg)** is a mark of infectivity both acutely and chronically.

(e) **Those who are hepatitis B carriers or have chronic active hepatitis will be HBsAg positive.**

(2) **Hepatitis C - (HCV)**, formerly Non A- Non B hepatitis, is responsible for most cases of post-transfusion hepatitis and presents a significant risk for the development of hepatocellular carcinoma. It accounts for 20% to 40% of acute hepatitis in the United States. Hepatitis C also causes 90% of post transfusion hepatitis. The virus has an extremely high mutation rate and is thus not easily neutralized by the body's antibody response. Acute infection is usually asymptomatic; with 20% of patients developing jaundice, and 75% of those infected developing chronic disease. **HCV** hepatitis, to date, has no serological markers that have been exclusively associated with blood transfusions, making this a diagnosis of exclusion based on the appropriate clinical setting. Most patients with hepatitis C have a history of intravenous drug abuse. Other risk factors include history blood transfusion, tattoos, alcohol abuse and cocaine snorting. Epidemiological evidence suggests that it can be transmitted sexually with risk of transmission increasing with duration of a relationship but with a very low incidence (<5%).

(a) Diagnostic serologic tests that probe for antibodies produced in response to several viral antigens are now available for the diagnosis of hepatitis C. These tests are highly sensitive and specific. If testing low risk populations, RIBA (recombinant immunoblot assay) test should be obtained since the ELISA has a higher false-positive rate.

(b) Polymerase chain reaction (PCR) can detect minute quantities of HCV RNA present in blood as early as 1-2 weeks after infection. Qualitative PCR tests detect as few as 100 HCV RNA copies, and quantitative tests detect a lower limit of 500-2000 copies.

(c) Genetic heterogeneity of HCV identifies at least 6 distinct genotypes (with numerous subtypes). Different genotypes have geographic and epidemiological differences, and they are good predictors of response to interferon.

(3) **Human Immunodeficiency Virus - (HIV),** is a retrovirus, which was recognized as an infectious cause of an unusual immunodeficiency syndrome, which is transmitted, in a similar mode to that of hepatitis B virus. Has been recognized as major public health problem for men and women, with between 5 and 10 million persons infected worldwide. It can be acquired through intimate homosexual or heterosexual contact, by receiving infected blood or blood products, or by inoculation via needles contaminated with infected blood (IV drug use, tattooing, etc). There is also good evidence that transmission via open skin wounds exposed to infected blood or saliva occurs, though such transmission is rare. The diagnosis is based on recognition of clinical symptoms in an at risk population and appropriate serological screening procedures:

(a) **Clinical diagnosis:** Some patients experience a flu-like illness when initially infected, but often there are no symptoms. A very variable, prolonged period may pass in which there are no signs or symptoms as immunosuppression proceeds. When the immune system is sufficiently impaired, infections with various organisms usually not pathogenic occur. The clinician should be attentive to signs of global dementia that occur in the absence of an opportunistic infection of the CNS. This appears to be a direct consequence of HIV viral infection and precedes any other clinical manifestation in between 10 and 25 percent of infected patients who develop AIDS. Initially, there are mild cognitive defects involving judgment and memory, which progress to a severe global dementia.

(b) **Serological diagnosis:** HIV ab test (western blot) serves as the screening tool during routine medical evaluations. This is a commercially available enzyme immunoassay (EIA) test. The median interval between infection and seropositivity is estimated at three months. Results are considered reactive only when a positive result is confirmed in a second test.

d. Examination protocols. Each examination should, as a minimum:

(1) Follow the post exposure guidelines found in Chapter 13 of this manual.

(2) Ascertain source and exposed person's HCV exposure and immune status.

(3) Follow up any suspicious laboratory findings with a detailed work and medical history giving particular attention to:

(a) Past and present history of exposures to BBP's.

(b) Smoking and alcohol use history.

(c) Any symptoms of skin irritation, bleeding or recurrent dermatitis.

(d) Any CNS symptoms, including headaches, nausea, vomiting, dizziness, weakness, and disorientation.

(e) A review of the immunologic and hematopoietic systems.

(f) A system specific physical examination with attention to the skin, mucous membranes, respiratory, and nervous system including a mental status evaluation.

(g) The following laboratory tests: CBC, and WBC counts with differential, CD4 counts, immunoglobulins, platelet counts, liver enzymes and hepatitis profile and a multichemistry panel (including glucose, BUN, total protein and creatinine) and urinalysis.

(4) Provide a complete review of the medical record to confirm documentation of compliance with indicated immunizations and completion of baseline laboratory studies before assignment to specific tasks or procedures with potential risk of exposure.

e. Specific written requirements. In addition to the general requirements specified in Section 12-B-4-b, the physician should address:

(1) Any other medical conditions, which could place the worker at greater than normal risk.

(2) The periodicity of the next evaluation and/or referral to the appropriate specialty clinic.

(3) The recommended duty limitations, hygiene care and infectious disease precautions.

(4) The exposure risk (unprotected exposure) for HIV, HBV and HCV.

(5) **"Universal Precautions"**- defined as an approach to infection control where all human blood and body fluids are treated as if known to be infectious for blood borne pathogens. Specimens that entail "universal precautions" are all excretions, secretions, blood, body fluid, and any drainage. Personnel should protect themselves from contact with these specimens by using the appropriate barrier precautions to prevent cross-transmission and exposure of their skin and mucous membranes, especially the eyes, nose, and mouth. See Chapter 13 of this Manual for further guidance.

14. Radiation (Ionizing/Non-ionizing) (Figure 12-C-14).

a. Exposure effects. Humans are exposed routinely to radiation from both natural sources, such as cosmic rays from the sun and indoor radon, and from manufactured sources, such as televisions and medical x-rays and even the human body, which contains natural radioactive elements. There are many forms of radiation. For the purpose of Occupational Health Monitoring, only two major types of radiation will be addressed here: Ionizing and Non-ionizing radiation.

(1) Ionizing Radiation. This type of radiation is defined as any electromagnetic or particulate radiation capable of producing ions. Ionizing radiation includes the following: gamma rays, X-rays, alpha particles, beta particles, neutrons, and protons. Biological effects are due to the ionization process that destroys the capacity for cell reproduction or division and causes cell mutation. Equipment or devices capable of generating ionizing radiation include: nuclear reactors, nuclear

detonation devices, medical or dental radiological or fluoroscopic equipment, industrial radiographic equipment, and any contraband material capable of generating ionizing radiation.

(2) Non-Ionizing Radiation. The term non-ionizing radiation refers to forms of radiation which do not have sufficient energy to cause the ionization of atoms or molecules. Sources of non-ionizing electromagnetic emissions include ultraviolet, visible or infrared light radiated by lasers, radars, radiofrequency (radio transmissions), and microwave sources. Broadband optical sources such as germicidal lamps, phototherapy, backlights, sunlamps, arc lights and projector lamps used in many medical and industrial applications can also be sources of non-ionizing radiation exposure.

b. Required surveillance.

(1) Radiation surveillance is based on Federal regulations issued by the Nuclear Regulatory Commission (10 CFR 19, 20, and 71), Department of Health and Human Services, Department of Transportation (49 CFR), Department of Labor, Occupational Safety and Health Administration (OSHA), personnel exposures (29 CFR 1910.96, 1910.120), guidelines from the American Conference of Governmental Industrial Hygienists (ACGIH) and the Environmental Protection Agency (40 CFR). As an additional safeguard and in addition to these regulations, in order to decrease the risk of stochastic effects resulting from exposure, the nuclear industry follows the **ALARA** concept- **As Low As Reasonably Achievable**.

(2) Although the potential for radiation exposure in the Coast Guard is small, it is essential that all workers conform to established safety guidelines, regardless of any lack of suspected exposure. Procedures and guidance for the evaluation of suspected radiological exposures, during many operational activities, can be obtained from "Guidance for Actions when Encountering Radioactive Materials During Vessel Boarding, COMDTINST 16600.2, Cargo Inspections and Other Activities".

(3) Enrollment in a medical surveillance program should be limited to those personnel who are clearly at risk of exposure to ionizing and/or non-ionizing radiation, above established exposure limits, as a result of their duties. Determination of exposure must be based on the definition of occupational exposure without regard to personal protective equipment. All personnel referred to the Radiation Exposure Protocol will be entered into the OMSEP database for proper identification. Monitoring will be based upon reported or suspected acute exposures. Enrollment should be considered for each of the following categories of workers:

(a) Field unit personnel exposed during daily operations, which may potentially lead to exposure to radiological materials. This would include: Marine Safety Inspectors; Port-Safety Control Boarding Teams; High Interest Vessel Boarding Teams; Recreational Boating Safety Inspectors; Container Inspection Inspectors (CIP); Spill Response Personnel and, Emergency Response personnel responding to incidents involving radiation.

(b) Medical and dental personnel, including dental and X-ray technicians as well as other dental paraprofessional staff, Research and Development (R&D) staff, and laboratory personnel.

(c) Aviation personnel exposed to cosmic radiation, radar emissions; shipment of radiation materials and radar, radio and video display terminal maintenance and repair personnel.

(d) **NOTE:** Exclusion from enrollment should apply to workers whose routine job activities have a low radiation exposure potential. For ionizing radiation this would include such activities as: the routine handling of radiation monitoring sources, electronic (radio) tubes, static eliminators, smoke detectors, weapon sights and certain gauging devices. For non-ionizing radiation this would include the routine handling of: microwave ovens, radio and radar equipment.

c. Information to medical personnel.

(1) Radiation effects fall into two broad categories: *deterministic and stochastic.* "Deterministic" effects usually manifest soon after exposure and have definite threshold doses. Examples include radiation skin burning, blood count effects, and cataracts. In contrast, "*stochastic*" effects are caused by more subtle radiation-induced cellular changes (including DNA mutations) that are random in nature and have no threshold dose. Cancer is a known clinical manifestation of radiation-induced stochastic effects.

(2) Radiation measures used in the United States include the following (the internationally used equivalent unit of measurement follows in parenthesis):

(a) **Rad** (radiation absorbed dose) measures the amount of energy actually absorbed by a material, such as human tissue (Gray=100 rads).

(b) **Roentgen** is a measure of exposure; it describes the amount of radiation energy, in the form of gamma or x-rays, in the air.

(c) **REM** (Roentgen Equivalent Man) accounts for the biological damage induced by radiation. It takes into account both the amount, or dose, of radiation and the biological effect of the type of radiation in question. A millirem is one one-thousandth of a rem (Sievert=100 rems).

(d) **Curie** is a unit of radioactivity. One curie refers to the amount of any radionuclide that undergoes 37 billion atomic transformations a second. A nanocurie is one one-billionth of a curie (37 Becquerel = 1 nanocurie).

(e) A conversion factor ("f" factor) is used to convert exposure (measured in air) into a more meaningful unit, the radiation absorbed dose (Rad), which is the energy deposited in a mass of tissue.

******Dose (in Rads)= 0.869 (f) (Roentgens)******

(3) OSHA's occupational limit for whole body exposure is 5 REM (50 mSv) per year. At this level the risk to individuals is considered to be very low. In the U.S., the average individual is exposed to a dose of approximately one REM (10 mSv) every 12 years, as a result of natural and medical procedures. The following table shows average radiation doses from several common sources of human exposure. (EPA's Rad facts)

Radiation Source	Dose (millirems)
Chest x-ray	10
Mammogram	30
Cosmic rays	31 (annually)
Human body	39 (annually)
Household radon	200 annually
Cross-country airplane flight	5

(4) Most radiation exposure data should be made available to medical personnel at the time of the member's referral. The member or the member's Unit Safety Coordinator may provide this data based upon dose measurements from a personal radiation dosimeter. Information may also be obtained from the cognizant Safety and Environmental Health Officer (SEHO), who may have previously evaluated the worker or work task to obtain a representative dose. General principles that apply to the evaluation and monitoring of ionizing and nonionizing radiation induced health effects follow:

(5) **Ionizing Radiation-** The nature and extent of the radiation damage depend on the amount of exposure, the frequency of exposure, and the penetrating power of the radiation to which an individual is exposed as well as the sensitivity of the exposed cells. A given total dose will cause more damage if received in a shorter period of time (**dose rate)**:

Radiation Absorbed Dose (RAD)	**Effect**	**Time**
0-25	No observable effect	
25-50	Minor temporary blood changes	Hours
50-150	Possible nausea and vomiting; decreased WBC	2-3 weeks
150-300	Increased severity of above symptoms; diarrhea; malaise; decreased appetite; some death	3-4 weeks
0-500	Increased severity of above plus hemorrhaging; depilation; LD_{50} at 450-500 Rads	Within 2 months
> 500	Symptoms appear sooner; LD_{100} approx. 600 Rads	1-2 weeks

(a) Acute **Somatic Effects** are the relatively immediate effects, which present in a person acutely exposed. Severity is dose dependent and death results from damage to bone marrow or intestinal wall. High doses of external irradiation can manifest as severe radiation sickness ("radiation poisoning). Skin effects (radiation dermatitis) are noted as an acute effect of radiotherapy and as a chronic effect of industrial exposure.

(b) **Delayed Somatic Effects** manifest as cancer, leukemia, cataracts, organ failure and abortion. The severity may be dose independent but the probability of the effect may be proportional to the dose received.

(c) **Genetic Effects** conveyed to offspring are usually irreversible and nearly always harmful. Radiation can cause changes in "DNA" leading to teratogenic or genetic mutations. The severity may be dose independent but the probability of the effect is likely to be proportional to the dose.

(d) **Organs Effects** are most significant in the hematopoietic and gastrointestinal systems (most susceptible are lymphocytes; bone marrow; gastrointestinal; gonads and other fast growing cells). The immune and cardiovascular systems can also be significantly affected, while the central nervous system is less susceptible.

(6) **Non-Ionizing Radiation-** the biological effects of non-ionizing radiation depend on the frequency and intensity of the electromagnetic emissions radiated by lasers, radiofrequency (RF), and microwave sources.

(a) **Laser Radiation**- lasers are designed to operate at various wavelengths in the ultraviolet, visible and infrared portions of the electromagnetic spectrum. Laser exposure can result in permanent and disabling eye injury. Laser exposure levels are set to protect the tissues from damage and are not the equivalent of comfortable viewing levels.

1 Lasers are grouped into four categories: Class I; II; III A and B and Class IV. Class I lasers are typically safe to view under all conditions, while Class IV can cause eye damage under most conditions. Laser exposures that are within the TLV produce no adverse biological effects.

2 Enrollment for laser surveillance should be limited to those personnel who are clearly at risk of exposure, typically associated with accidental injuries and not chronic exposures. Member's requiring surveillance include: Researched & Development (R&D) personnel and laboratory personnel who routinely work with Class III and IV lasers; Maintenance personnel who routinely repair Class III and IV lasers, and Engineering operators who routinely work with Class III and IV lasers.

(b) **Radiofrequency *(RF) Electromagnetic Radiation***- RF exposure is primarily associated with operation of various radars, and communication systems.

1 Exposure limits are defined based upon whether the location can be characterized as a controlled or uncontrolled environment. Controlled areas are those where the personnel working in those areas are aware of and trained to protect themselves from the presence of RF radiation. Uncontrolled areas are public or berthing areas where exposures are not expected to be present.

2 Enrollment for RF surveillance should be limited to individuals who knowingly enter (work) areas where higher RF levels can reasonably be anticipated to exist, and those individuals exposed, in an uncontrolled area, where RF exposure levels have been determine to be over the TLV. The TLV's refer to time-averaged exposure values obtained by spatial averaging RF measurements over an area equivalent to the vertical cross section of the human body.

3 The farther away the individual is from the radiation source, the less the exposure. As a rule, if you double the distance, you reduce the exposure by a factor of four. Halving the distance increases the exposure by a factor of four. This is promulgated by the fact that the area of the sphere depends on the distance from the source to the center of the sphere (radius). It is proportional to the square of the radius. As a result. If the radius doubles, the sphere surface area increases four times.

(c) **VDT*/Microwave Radiation***- no specific surveillance is required for VDT users. Precautions should be maintained for individuals with prosthetic heart valves working with or near microwave equipment.

d. Examination protocols. Each examination should, as a minimum:

(1) ***Physical examination forms***- Complete all clinical evaluation blocks of the physical examination forms: DD 2808 and 2807 and the CG 5447A (Acute Exposure Form), when applicable. The only exceptions are as follows: breast examinations are not required for females under the age of 36 years and digital rectal exams are not required for males under the age of 45 years. The medical officer should pay close attention to the preexisting medical and occupational work histories with particular attention to radiation exposures and malignancies, as well as accounting for the member's age and type of billet assignment.

(2) ***Special Studies***- the only required tests are a complete ***CBC*** and ***Urinalysis***.

(a) Any ***CBC*** (manual or automated) with a ***WBC*** count that falls outside the normal parameters of the laboratory reference values requires a ***differential white blood cell count***. Any member with persistent abnormal blood counts, as per reference values, shall be removed from work pending a complete evaluation (consultation referral) with a Board Certified Hematologist. The evaluation and consultation referrals for an abnormal CBC should be directed toward the possible diagnosis of a malignant or premalignant condition.

(b) The urinalysis will be tested for red blood cells using a standard clinical dipstick method or microscopic high power field (HPF). Any persistent hematuria (> 5 RBC's per HPF) on a repeat urinalysis will be considered disqualifying pending a definitive diagnosis. Other urine findings, such as WBC casts, albuminuria, glucosuria, low specific gravity, etc will require further evaluation by the medical officer but will not be considered disqualifying for the purposes of this protocol.

(c) Additionally, any member who handles radioactive material that could reasonably be expected to exceed 10% of an annual limit on intake or in 1 year through inhalation should be evaluated for a ***partial body burden,*** by bioassay or external counting, at the initial assignment and at the time of termination. Periodic monitoring will be conducted on these individuals at the discretion of the medical officer. All personnel assigned to the handling of Radon should also have a ***Radon Breath Analysis*** or ***Radium Urine Bioassay*** at the initial and exit physicals.

e. Physical Examinations- Late or delayed effects of radiation may occur following a wide range of doses or dose rates. Although not anticipated, it is likely that if Coast Guard workers incur an exposure it would be the result of a single low-level accidental event. Low-level long-term exposure resulting in a Chronic Radiation Syndrome (CRS) is considered highly unlikely, providing safety practices are followed.

(1) **Initial/Baseline Examination** - Any worker known to be potentially exposed or at risk (controlled environment), should have an *Initial/Baseline* examination performed. This includes all workers assigned to billets where radiation inspection duties are considered part of the employment criteria. Emergency Response personnel; dentists; dental technicians; other dental paraprofessionals; radiology technicians; nurses; laboratory and other medical personnel; as well as air crew members who may be sporadically exposed DO NOT require an initial / baseline examination.

(2) **Acute Exposure Examination**- Any individual exceeding the radiation protection standards or who has ingested or inhaled radioactive material exceeding 50% of the TLV, or as deemed by the supervising medical officer, should be given an *Acute Exposure* examination with completion of CG 5447 A.

(3) Personnel NOT required having a regular physical examination but who exceed 500 mrem (5mSv) exposure within a calendar year must have an Acute Exposure examination within 1 month of the time they exceeded the 500 mrem level.

(4) **Periodic Examination**- Personnel routinely assigned to duties with potential radiation exposure must have a *periodic examination not to exceed* every 5 years until the age of 50. Thereafter, the examinations should be every 2 years until the age of 60 when the examinations should be performed yearly.

(5) **Exit/ Separation Examination**- Every reasonable effort should be made to ensure that workers who have had a history of radiation exposure complete an Exit physical *examination* upon separation or termination of employment or when permanently removed from the hazardous radiation exposure duties.

f. Specific written requirements. In addition to the general requirements specified in section 14-d (1&2) above: the medical officer should address the following:

(1) Any preexisting condition or history of cancer; radiation therapy; polycythemia vera; cancerous or pre-cancerous lesions will be considerations for rejection or disqualification, unless adequately treated (e.g. Actinic keratosis, basal cell carcinomas, abnormal PAP smears)

(2) Any open lesions or wounds (including abrasions, lacerations, ulcerative, exfoliative or eruptive lesions) may be temporary or permanently disqualifying, depending on the condition, for any individual actively handling radioactive materials.

(3) Any history of gastrointestinal, pulmonary and ocular conditions, particularly vision impairment and cataracts, should be fully evaluated (Ophthalmology referral), to ensure that they are not related or aggravated by exposure to radiation. Any history of unconsciousness, e.g. epilepsy, vertigo, middle ear disease should also be investigated.

(4) Members under the age of 18 years and pregnant women need to be identified. Young workers should not be exposed to potential radiation and pregnancy is subject to special provisions in the exposure radiation regulations (reduced exposure limits). The main effects of ionizing radiation on the fetus are growth retardation, congenital malformations, fetal death and carcinogenesis.

(5) Preventive Practices / Basic Management- The spectrum of care will vary according to the level, intensity and nature of the radiological event. The medical provider should formulate a plan for the management of febrile, neutropenic patients, blast and thermal injuries, incidental wounds, ocular effects and psychological problems.

(a) **Infections**- provide broad-spectrum antibiotics until patient is afebrile for 24 hours. Avoid aminoglycoside toxicity. Consider reverse isolation. Obtain blood cultures if possible.

(b) **Thermal Injuries**- likely to be most common injury following nuclear detonation. Burns will be dictated by clothing pattern. Evaluate respiratory system for hot-gas effect. Intubate early. Provide IV hydration. High mortality expected.

(c) **Ocular Injuries**- Chorioretinal areas most affected following high-intensity visible and infrared radiation. Injury secondary to infrared energy along with photochemical reaction. Flashblindness is temporary, may last 30 minutes. Slit lamp exam should be considered.

(d) **Skin Injuries**- radiation dermatitis results from high-level doses. Usually delayed and irreversible. Copious irrigation will help prevent beta skin damage. Clean and barrier all wounds to prevent absorption of radionuclides. If unable to remove contaminants, member must be referred for further assessment. Internal uptake of radionuclides should be considered on all contaminated open wounds. (See section d.2.c)

(e) **Internal contamination**- results from absorbed, inhaled or ingested radioactive material. Treatment reduces the absorption dose and the risk of future biological effects. Use chelating or mobilizing agents as soon as possible. Gastric lavage and emetics may also be used. Purgatives, laxatives

and enemas may help reduce retention time of radioactive substances in colon. Ion exchange resins may also be helpful. . NOTE: If offending agent is identified contact DOD or REAC/TS for guidance. Blocking agents, such as iodine compounds, should be given as soon as possible (for radioiodine exposures)- radioiodine is blocked with a 300 mg dose of iodide.

(f) **Acute High-Dose Radiation**- The three principal situations for this exposure are a nuclear detonation; formation of a critical mass ("criticality") by high-grade nuclear material; and as a result of radiation dispersal from highly radioactive material (e.g. cobalt-60). In an ***Acute Radiation Syndrome*** situation the most highly radiosensitive organs that would be affected would be the gastrointestinal tract and hematopoietic systems. The severe radiation sickness resulting from these effects would be a primary medical concern. If appropriate medical care is not provided, the medial lethal dose, $LD_{50/60}$ (50% kill rate in 60 days) is estimated at 3.5 Gy.

1 **Acute Radiation Syndrome**- this represents a sequence of phased symptoms, which vary with individual radiation sensitivity, type of radiation, and the level of absorbed radiation.

2 **Prodromal Syndrome**- this is characterized by a rapid onset of nausea, vomiting and malaise. This is a non-specific clinical response, whose early onset, in the absence of trauma, represents a large radiation exposure. Radiogenic vomiting cannot be easily distinguished from psychogenic vomiting resulting from stress or fear. Use of oral prophylactic antiemetics would be indicated for anticipated unavoidable high- dose radiation exposure

3 **Latent Period**- Manifest with an asymptomatic phase, which varies according to the dose absorbed. This phase may last from 2-6 weeks and is longest preceding the neurovascular syndrome and shortest prior to the gastrointestinal syndrome.

4 **Manifest Illness**- This phase presents with the clinical symptoms associated with the major organ systems affected. Earliest symptoms are found in the peripheral blood system occurring within 24 hours post radiation as a result of bone-marrow depression. Clinical evidence of anemia and decrease immunity (infections) will vary from 10 days to as long as 6-8 weeks following exposure. Erythrocytes are the least affected due to their short lifespan. The average time from clinical anemia to bleeding diathesis and decreased resistance to infection is from 2-3 weeks. The most useful laboratory procedure to evaluate bone marrow depression is the peripheral blood count. A 50% drop in lymphocytes within 24 hours indicates significant radiation injury.

g. NOTE: Coast Guard medical facilities are not equipped to handle large number of radiobiological injuries resulting from a nuclear detonation or a radiation dispersal device. Medical Providers should develop a referral / transportation and consultation plan in coordination with local emergency services, medical specialty providers and regional DOD MTF facilities. Participation is highly encouraged in USAMRIID's Chem-Bio training course and familiarization with guidelines provided in the "Medical Management of Radiological Casualties" handbook published by the Armed Forces Radiobiology Research Institute (AFRRI) http://www.afrri.usuhs.mil.

Figure 12-C-1

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: ASBESTOS

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2802/DD-2807-1 DD Form 2493-1 or OSHA Respiratory Disease Questionnaire (Part1) optional
Periodic	☐ ☐	DD Form 2493-1 or OSHA Respiratory Disease Questionnaire (Part2) optional CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types (except acute exposure)	☐ ☐	Complete blood count (CBC); multichemistry panel (includes liver function tests, BUN , creatinine); urinalysis with microscopic (U/A). Pulmonary function tests (FVC & FEV1)
All types	☐ ☐	Physician's notification regarding examination results. (Final action.) Chest x-ray (PA) with "B-reader" or board certified radiologist evaluation at initial exam then per table:

YEARS SINCE FIRST EXPOSURE- X-rays

	Age 15-35	Age 36-45	Age≥45
0-10	Every 5 years	Every 5 years	Every 5 years
Over 10	Every 5 years	Every 2 years	Every year

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: smoking history, dyspnea on exertion, cough, pleuritic pain, heartburn or epigastric pain. (See OSHA Respiratory Disease Questionnaire.)
- Ensure that the patient is examined for the following possible signs: clubbing, basilar rales
- You must address the following four items in writing: 1) whether the employee has any detected medical conditions placing him/her at increased risk of health impairment from further asbestos exposure; 2) any recommended limitations on use of personal protective equipment; 3) that the employee has been informed by you of the results of the examination and any medical conditions resulting from asbestos exposure that require follow-up; 4) that the employee has been informed of the increased risk of lung cancer attributable to the synergistic effects of asbestos and smoking.
- Asbestos exposure can cause asbestosis, bronchogenic carcinomas, mesothelioma, and gastric carcinoma. It may also be associated with multiple myeloma and renal carcinoma. Disease risk is dose dependent.
- Asbestos was used in shipbuilding until the 1970s. Exposure among OMSEP participants is mostly associated with repair and overhaul of vessels built prior to that time
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: DATE:

Figure 12-C-2

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: BENZENE

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2802/DD-2807-1
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐ ☐ ☐	Urinary phenol. (Only immediately after acute exposure) Blood or breath benzene level (optional-if available) CBC w/Diff Acute Exposure Form
All types	☐	Physician's notification regarding examination results. (Final action.)
All types (except Acute Exposure)	☐ ☐ ☐	CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC). Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, GGT, LDH, and alkaline phosphatase) U/A/ with microscopic

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: smoking history, headache, difficulty concentrating, decreased attention span, short-term memory loss, mood lability, fatigue, dry skin, abnormal bleeding, anemia, weight loss.
- Ensure that the patient is examined for the following signs: mental status changes, dermatitis, pallor.
- Benzene exposure causes CNS depression, leukemia, aplastic anemia, and dermatitis.
- The employee should be medically removed from the workplace if any of the following are noted on the exam:
  - The hemoglobin/hematocrit is below the laboratory's normal limit and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other means.
  - The thrombocyte (platelet) count has dropped more than 20% below the employee's most recent prior values or falls below the laboratory's normal limit.
  - The leukocyte count is below 4,000 per mm^3 or there is an abnormal differential count.
- Benzene is commonly associated with petrochemical manufacturing. Exposure among OMSEP participants is generally related to marine vessel inspection or disaster response (oil spill, fire). Commercial gasoline is about 3% benzene.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: DATE:

Figure 12-C-3

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: CHROMATES

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2808/DD-2807-1 Chest x-ray (PA)
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types (except acute exposure)	☐ ☐ ☐	Complete blood count (CBC) Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase) U/A with microscopic
All types	☐ ☐	Physician's notification regarding examination results. (Final action.) Pulmonary function tests (FVC & FEV1).

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: smoking history, shortness of breath, wheezing, cough, dry skin, skin ulcers.
- Ensure that the patient is examined for the following signs: erosion of nasal mucosa and septum, respiratory rhonchi, dermatitis, cutaneous ulcers.
- Make a recommendation as to when the next OMSEP examination for this employee should take place. The default interval is 1 year, but you may recommend a longer period of 18 or 24 months, if exposures are limited and there is no evidence of occupationally significant illness.
- Chromium exposure causes lung cancer, dermatitis, skin ulcers, and nasal septum perforation.
- Chromic acid may cause acute burns or irritation to skin, eyes, and upper respiratory tract. Inhalation may cause acute epiglottitis, laryngospasm, pneumonitis, and pulmonary edema.
- Some chromium compounds cause occupational asthma.
- Chromium compounds are commonly associated with steel and chemical manufacturing. Exposure among OMSEP participants is generally related to working with chromium containing paints.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-4

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: HAZARDOUS WASTE

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐	CG-5447 History and Report of OMSEP Examination
	☐	DD-2802/DD-2807-1
	☐	Chest x-ray (PA)
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Blood lead and/or heavy metal screen, if indicated.
	☐	Acute Exposure Form
All types (except acute exposure)	☐	Vision screening (distant and near)
All types	☐	Pulmonary function tests (FVC & FEV_1).
	☐	CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC).
	☐	Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, and alkaline phosphatase)
	☐	U/A with microscopic
	☐	Physician's notification regarding examination results. (Final action)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: smoking history, weight loss, headache, visual disturbances, difficulty concentrating, decreased attention span, short-term memory loss, confusion, mood lability, fatigue, ataxia, peripheral numbness or paresthesias, weakness, shortness of breath, anemia.
- Ensure that the patient is examined for the following signs: gingivitis, sialorrhea, tremor, mental status changes, decreased deep tendon reflexes, decreased vibratory sensation, respiratory rhonchi and hyperresonance, dermatitis, edema.
- Make a recommendation as to when the next OMSEP examination for this employee should take place. The default interval is 1 year, but you may recommend a longer period of 18 or 24 months, if exposures are limited and there is no evidence of occupationally significant illness.
- The hazardous waste protocol involves medical surveillance for effects of exposure to a variety of heavy metals and chemical compounds. Neurotoxicity, pulmonary disease, dermatitis, and cancer are possible effects of excessive exposures to hazardous wastes.
- The top ten most hazardious substances found are: Lead; arsenic; mercury; benzene; vinyl chloride; cadmium; polychlorinated biphenyls; benzo(a) pyrene; chloroform; benzo (b) fluoranthene.
- OMSEP participants monitored under this protocol are primarily members of HAZMAT and spill response teams, firefighters, and marine safety inspectors. Individual, specific exposure histories are often ill defined. If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-5

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: LEAD

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐	CG-5447 History and Report of OMSEP Examination
	☐	DD-2802/DD-2807-1
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types	☐	Blood lead and zinc protoporphyrin (ZPP) / erythrocyte protoporphyrin (EP)
	☐	CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC), plus examination of peripheral smear morphology.
	☐	Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, alkaline phosphatase, and uric acid)
	☐	U/A with microscopic
	☐	Physician's notification regarding examination results. (Final action.)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: past lead exposure, smoking history, abdominal pain and cramping, joint and extremity pain, difficulty concentrating, irritability, short-term memory loss, confusion, mood lability, fatigue, ataxia, peripheral numbness or paresthesias, weakness, anemia, and infertility.
- Ensure that the patient is examined for the following signs: hypertension, papilledema, gum "lead lines", pallor, mental status changes, decreased deep tendon reflexes, decreased vibratory sensation, extensor motor weakness.
- Lead exposure can cause fatigue, anemia, arthralgias and myalgias, peripheral motor neuropathy, neurobehavioral disturbances and encephalopathy, acute abdominal pain, gout and gouty nephropathy, acute and chronic renal failure, spontaneous abortions, and male infertility.
- If the blood lead level is greater than 40 µg/100 g of whole blood, the employee must be medically removed from any workplace exposure.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.
- ZPP/EP assays are used as a complement to BLL testing. ZPP/EP assay is not sufficiently sensitive at lower BLLs and thus are not a useful screening test. ZPP/EP elevated in jaundice, iron diff anemia and hemolytic anemias.

Reviewing Authority Signature: Date:

Figure 12-C-6

Examination Protocol for Exposure to: NOISE

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐	CG-5447 History and Report of OMSEP Examination DD Form 2215 or equivalent locally reproduced version.
Periodic	☐ ☐	CG 5447A Periodic History and Report of Examination DD Form 2216 or equivalent locally reproduced version.
Acute Exposure	☐	Acute Exposure Form
All types	☐ ☐	Physician's notification regarding examination results. (Final action.) DD Form 2216 or equivalent locally reproduced version.

To the examining medical officer**:**

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- A significant threshold shift (STS) exists if the average change in hearing from the reference audiogram at, 2000, 3000, and 4000 Hz is greater than or equal to ±10 dB in either ear.
- Additionally, any change of ±**15** dB at 1000, 2000, 3000, or 4000 Hz in either ear constitutes an STS.
- Do not apply the National Institute for Occupational Safety and Health (NIOSH) age corrections when determining STS.
- Follow-up audiograms must be conducted when an individual's audiogram shows an STS relative to the current reference audiogram in either ear. When a positive STS (decrease in hearing threshold) is noted, two 14-hour noise-free follow-up tests must be administered to confirm that the decrease in hearing is permanent. When a negative STS (improvement in hearing) is noted, one 14-hour noise-free follow-up tests must be administered.
- Medical evaluation is required to validate the existence of a permanent noise-induced threshold shift and/or to determine if further medical referral is required. That evaluation must be performed by an audiologist, and otolaryngologist, or other knowledgeable physician.
- If, compared with the current reference audiogram, a loss of hearing of ≥ **25** dB in either ear at one or more of the speech frequencies (500, 1,000, 2000, or 3000 Hz) is noted , the employee must be medically removed from further workplace exposure.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-7

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: PESTICIDES

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2802/DD-2807-1 Blood cholinesterase level, two specimens at least 24 hrs. apart
Periodic	☐ ☐	CG 5447A Periodic History and Report of OMSEP Examination Blood cholinesterase level, if current exposure involves organophosphate or carbamate pesticides
Acute Exposure	☐ ☐	Acute Exposure Form Blood cholinesterase level, if current exposure involves organophosphate or carbamate pesticides
All types	☐ ☐ ☐ ☐ ☐	Pulomonary function tests (FVC & FEV1) CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC) Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, alkaline phosphatase. U/A with microscopic Physician's notification regarding examination results. (Final action.)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: past and current exposures to pesticides, smoking and alcohol use history; eye, nose or throat irritation; cough; nausea, vomiting, diarrhea or abdominal pain; irritability, anxiety, difficulty concentrating, impaired short-term memory, fatigue, or seizures; numbness, tingling, or weakness in the extremities; allergic skin conditions or dermatitis.
- Ensure the patient is examined for the following possible signs: dermatitis, meiosis, rhinitis, mental status changes Pulmonary system must be examined if respiratory protection is used.
- If the cholinesterase level is at or below 50% of the pre-exposure baseline, the employee must be medically removed from any further workplace exposure.
- Organophosphates and carbamates are inhibitors of the enzyme acetylcholinesterase. They cause parasympathetic nervous system hyperactivity, neuromuscular paralysis, CNS dysfunction, peripheral neuropathy, and depression of RBC cholinesterase activity. Chlorophenoxyacetic acid herbicides cause skin, eye, and respiratory tract irritation, cough, nausea, vomiting, diarrhea, abdominal pain, and peripheral neuropathy.
- Arterial blood gases and chest radiography are useful in cases of inhalation exposure or respiratory compromise. Metabolites of organophosphates can be detected in urine up to 48 hrs after exposure though testing is available only from reference laboratories.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-8

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: RESPIRATOR WEAR

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐	OSHA Respiratory Medical Evaluation Questionnaire
Periodic	☐	OSHA Respiratory Medical Evaluation Questionnaire (update).
All types	☐	Physician's notification regarding examination results. (Final action)

To the examining medical officer**:**

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- This protocol applies to all employees required to wear a respirator in the course of their work.
- Ensure that the patient is questioned about the following history or symptoms: past and current exposures to hazardous chemicals, fumes, and dusts; smoking and alcohol use history; any history of claustrophobia, asthma, angina, syncope, and other respiratory or cardiovascular disease.
- Ensure the patient is examined for the following possible signs: wheezing or other abnormal breath **sounds,** clubbing, and cardiac arrhythmias**.**
- You must address whether the employee as any detected medical conditions which would place him or her at increased risk of material health impairment from the required respirator use. Consider whether the employee's health will allow him or her to tolerate respirator wear.
  - Note: There currently exists no consensus standard by which physicians may assess a worker's ability to wear a respirator. As a general rule, however, anyone with documented respiratory impairment of moderate to severe degree (FEV1 or FVC <70% of predicted) should not be routinely approved to wear a respirator. Asthmatics with normal or mildly impaired lung function should be evaluated based on the job requirements, but disapproval should be strongly considered for asthmatics that require regular medications to maintain airflow, or who have a history of airway reactivity or sensitization to extrinsic materials (dusts, fumes, vapors, or cold).
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-9

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: RESPIRATORY SENSITIZERS

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2808/DD-2807-1
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types	☐ ☐ ☐ ☐ ☐	Pulmonary function tests (FVC & FEV1) CBC (complete blood count) Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, alkaline phosphatase) U/A (dipstick sufficient) Physician's notification regarding examination results. (Final action)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: past and current exposures to respiratory sensitizers, smoking history; eye, nose or throat irritation; cough; asthma or other chronic airway problems; allergic skin conditions or dermatitis.
- In the event that the employee is not required to wear a respirator, and the history and routine laboratory tests are unremarkable, the medical officer may determine that a complete physical examination is not required. Otherwise, at a minimum, a directed physical examination with attention to the respiratory system must be completed. Pulmonary status must be evaluated if respiratory protection is used.
- Respiratory sensitizers include numerous compounds which cause both occupational asthma and/or hypersensitivity pneumonitis (extrinsic allergic alveolitis). Respiratory sensitizers include vegetable dusts and woods, molds and spores, animal danders, metals (platinum, chromium, nickel, cobalt, vanadium), and chemicals (isocyanates, formaldehyde, trimellitic anhydride).
- In the Coast Guard, exposure to respiratory sensitizers is primarily associated with industrial operations, though some marine inspection activities may also lead to exposures.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-10

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: SOLVENTS

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2808/DD-2807-1
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute exposure	☐ ☐	Acute Exposure Form Specific blood or urine tests for specific solvents
All types (except acute exposure)	☐ ☐ ☐ ☐	Pulmonary function tests (FVC & FEV1) CBC and differential, with platelet count and RBC indices (MCV, MCH, MCHC). Multichemistry panel (includes glucose, BUN, creatinine, total protein, total bilirubin, AST, ALT, LDH, alkaline phosphatase) U/A with microscopic
All types	☐	Physician's notification regarding examination results. (Final action)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: past and current exposures to solvents, smoking and alcohol use history; allergic skin conditions, dry skin, or dermatitis ; eye, nose or throat irritation; headache, nausea, vomiting, dizziness, vertigo; fatigue, weakness, irritability, depression, difficulty concentrating, or impaired short-term memory; and numbness, tingling, or weakness in the extremities.
- Ensure the patient is examined for the following possible signs: dermatitis, peripheral neuropathy, cognitive dysfunction, and mental status changes.
- If the particular solvent exposure is well characterized and specific laboratory tests are available, biological monitoring should be considered.
- Make a recommendation as to when the next OMSEP examination for this employee should take place. The default interval is 1 year, but you may recommend a longer period of 18 or 24 months, if exposures are limited and there is no evidence of occupationally significant illness.
- There are over 30,000 industrial solvents. This protocol is designed to survey for the most frequent health effects of solvents when taken as a broad group. These effects are skin disorders, and acute and chronic CNS effects. Some other less frequent effects of solvents involve the hematopoietic, hepatic, peripheral nervous system, renal, reproductive, and respiratory systems. Most solvents are **not** carcinogenic in humans; benzene being a notable exception.
- In the Coast Guard, exposure to solvents is primarily associated with industrial and maintenance operations (e.g., painting).
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-11

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: TUBERCULOSIS

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation (with no history of prior reactive skin test)	☐ ☐ ☐	CG-5447 History and Report of OMSEP Examination DD-2808/DD-2807-1 PPD tuberculin skin test (TST)
Newly reactive TST	☐ ☐	Enter results on SF 601 anf PHS 731 Chest x-ray
Acute Exposure	☐ ☐	PPD tuberculin skin test (TST) Acute Exposure Form
Periodic follow-up on reactive TST	☐	CG 5447A Periodic History and Report of OMSEP Examination
All types	☐	Physician's notification regarding examination results. (Final action.)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- For personnel with a prior history of a reactive TST, ensure the patient is questioned about the following symptoms of active TB: fever, night sweats, weight loss, cough, and hemoptysis. This questioning may be completed by a nurse or health services technician.
- See section 7-D of the Medical Manual for full information on the tuberculosis control program.
- Forward a copy of all test results to the unit OMSEP coordinator.
- If the patient is on multiple monitoring protocols, ensure each unique item is completed. However, it is not necessary to duplicate tests and forms.

Reviewing Authority Signature: Date:

Figure 12-C-12

This form is subject to the Privacy Act Statement of 1974

Date:	Patient Name:	SSN:	Unit:

Examination Protocol for Exposure to: BLOODBORNE PATHOGENS

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐	CG-5447 History and Report of OMSEP Examination
	☐	HIV ab test (western blot)
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types	☐	CBC (complete blood count) / WBC and differential / Platelet count
	☐	Multichemistry panel (including total protein, liver enzymes, BUN and creatinine, bilirubin and alkaline phosphatase)
	☐	Hepatitis profile, HBV ab, HCV ab, CD4 count, HBV sag/sab
	☐	CXR
	☐	Physician's notification regarding examination results. (Final action)

To the examining medical officer:

- Establish safe practice rules: "Universal Precautions"- defined as an approach to infection control where all human blood and body fluids are treated as if known to be infectious for bloodborne pathogens. Specimens that entail "universal precautions"" are all excretions, secretions, blood, body fluid, and any drainage. Laboratory personnel should protect themselves from contact with these specimens by using the appropriate barrier.
- In the event of any indication or suspicious results from lab tests/X-ray procedures:
  - Follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
  - Ensure the patient is questioned about his/her general medical and work history, including: social habits, blood donations, use of drugs or medications, and a complete review of systems.
  - Notify chain of command while adhering to privacy act requirements.
  - Ensure the patient is examined for any for the following signs: gingivitis, dermatitis, open (weeping or bleeding) skin lesions, shortness of breath, loss of memory, fatigue, mood lability, paresthesias, anemia.
- Provide a complete review of the medical record to confirm documentation of compliance with indicated immunizations and completion of baseline laboratory studies before assignment to specific tasks or procedures with potential risk of exposure.

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Figure 12-C-13

AUDIOMETRIC THRESHOLD SHIFT EVALUATION

Name:	Date of Birth:	Gender: ☐ Male ☐ Female

Threshold Shift = a value greater than or equal to 10dB, in either ear, when the average of the actual values at 2K, 3K, and 4K on the Baseline Audiogram are subtracted from the Current Audiogram. The following example illustrates this calculation:

Baseline Audiogram Date:

Left:
2K + 3K + 4K = ( )* divided by 3 = ( ) **

Right:
2K + 3K + 4K = ( )* divided by 3 = ( ) **

*** Actual (added value)** **** Average baseline value**

Current Audiogram Date:

Left:
2K + 3K + 4K = ( )* divided by 3 = ( ) **

Right:
2K + 3K + 4K = ( )* divided by 3 = ( ) **

*** Actual (added value)** **** Average baseline value**

Threshold shift: = Current Audiogram - Baseline Audiogram

Left:
Current Audiogram _____ **
Baseline Audiogram (-) _____ **
_____ ***

Right:
Current Audiogram _____ **
Baseline Audiogram (-) _____ **
_____ ***

***** Threshold Shift (?) - is value equal to or greater than 10dB**

Figure 12- C-14

Examination Protocol for Exposure to: RADIATION

IF EXAM TYPE IS		DO or COMPLETE THESE ITEMS
Initial/Baseline or Separation	☐	CG-5447 History and Report of OMSEP Examination
	☐	DD-2808/DD-2807-1
	☐	Radon Breath Analysis (if indicated)
	☐	Radium Urine Bioassay (if indicated)
	☐	Partial Body Burden (by bioassay or ecternal counting)-if indicated
Periodic	☐	CG 5447A Periodic History and Report of OMSEP Examination
Acute Exposure	☐	Acute Exposure Form
All types	☐	Physician's notification regarding examination results. (Final action.)
	☐	CBC and Differential
	☐	Urinalysis
	☐	Multichemistry Panel (optional)

To the examining medical officer:

- You must follow-up any significant abnormality through to a physical diagnosis. Provide ICD codes.
- Ensure that the patient is questioned about the following history or symptoms: headache, difficulty concentrating, decreased attention span, short-term memory loss, mood lability, fatigue, skin rashes, abnormal bleeding, anemia, weight loss.
- Ensure that the patient is examined for the following signs: mental status changes, dermatitis, pallor.
- Be attentive to the preexisting medical and occupational work histories- particularly radiation exposures and malignancies. Note the member's billet assignment, gender, age and pregnancy status.
- The employee should be medically removed from the workplace if any of the following are noted on the exam:
  - The hemoglobin/hematocrit is below the laboratory's normal limit and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other means.
  - The urinalysis reveals persistent hematuria (>5 RBC's/HPF) on repeat studies.
  - The leukocyte count is below 4,000 per mm^3 or there is an abnormal differential count.
- Any member who handles radioactive material and who is anticipated to exceed 10% of an annual limit on intake or 1 year inhalation, should be evaluated for a partial body burden by bioassay or external counting
- Members assigned to the handling of Radon should have a Radon Breath Analysis or Radium Urine Bioassay at entry and exit.
- Any member with persistent abnormal blood counts, as per reference values, should have a complete evaluation referral with a Board Certified Hematologist.

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