SANFORD UNDERGROUND RESEARCH FACILITY

SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY

Industrial Hygiene Standard

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Revision History

Rev	Date	Section	Paragraph	Summary of Change	Authorized by
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1.0 Purpose

The Sanford Underground Research Facility (SURF) Industrial Hygiene (IH) Standard requires all operations at the laboratory be performed in a safe, responsible, and compliant manner. This includes maintaining personnel exposure to chemical, physical and biological agents within acceptable exposure limits. This plan further requires that exposures be minimized by the use of hazard elimination, engineering controls, personal protective equipment and administrative controls.

2.0 Scope

This standard provides requirements and guidance related to select industrial hygiene concerns, hazards and controls for workplace health-related exposures of onsite workers affiliated with South Dakota Science and Technology Authority (SDSTA). Hazards affecting the general public and/or environment will be covered in the SDSTA Environmental, Safety and Health (ESH) standards.

Although controls to third party health hazards may not be under the direct responsibility of SDSTA, the standards stated in the IH plan will apply to all SDSTA employees, users, contractors and visitors.

3.0 Definitions

American Industrial Hygiene Association (AIHA) – An association for scientists and professionals committed to preserving and ensuring occupational and environmental health and safety in the workplace and community. AIHA provides resources and consensus standards for health professionals as well as accreditations to labs used for contaminant sampling analysis.

Analytical Method – A standardized laboratory procedure used to determine the amount or concentration of a certain contaminant in an air or wipe sample.

Biological Hazard – Hazard from biological agents such as viruses, bacteria, spores, fungi, blood borne pathogens.

Carcinogen – A material that causes the development of cancerous growth in living tissue.

Industrial Hygiene – The science devoted to the anticipation, recognition, evaluation, prevention and control of those occupational factors or stresses arising in or from the workplace, which may cause sickness, impaired health and well-being, or significant discomfort among workers or citizens of the community.

Industrial Hygienist – A professional qualified by education, training and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards and environmental issues.

Hazard Control Ventilation – An industrial exhaust system that captures and removes contaminants emitted from local sources before dilution into ambient workplace air can occur; includes chemical fume hoods, soldering bench hoods, extractor arms, glove boxes and biological safety hoods or cabinets.

Medical Surveillance – Periodic medical evaluation for personnel potentially exposed to designated chemical, biological and physical hazards.

Mine Safety and Health Administration – The U.S. Department of Labor's Mine Safety and Health Administration (MSHA) develops and enforces safety and health rules for all U.S. mines, and provides technical, educational and other types of assistance to mine operators in order to reduce deaths, injuries, and illnesses in the nation's mines. MSHA works cooperatively with industry, labor and other federal and state agencies to improve safety and health conditions for all miners in the United States.

National Institute for Occupational Safety and Health (NIOSH) – The Occupational Safety and Health Act of 1970 established NIOSH as a research agency focused on the study of worker safety and health, and empowering employers and workers to create safe and healthy workplaces. NIOSH is part of the U.S. Centers for Disease Control and Prevention, in the U.S. Department of Health and Human Services.

Occupational Exposure Limit – An exposure limit that is the lower of the permissible exposure limit or threshold limit value (see permissible exposure limit or threshold limit value).

Occupational Safety and Health Administration – Regulatory agency under the United States Department of Labor created by Congress to ensure safe and healthful working conditions for working men and women by setting and enforcing standards and by providing training, outreach, education and assistance.

Permissible Exposure Limit (PEL) – An exposure limit published and enforced by the federal OSHA as a legal standard. PEL may be either a time-weighted-average (TWA) exposure limit (eight hour), a 15-minute short term exposure limit (STEL), a ceiling (C), and may have a skin designation.

Physical Hazard – Hazard from physical agents such as noise, non-ionizing radiation and magnetic fields.

Similar Exposure Groups (SEG) – A is a group of workers having the same general exposure for the substances being monitored because of the similarity and frequency of the tasks performed, the materials and processes worked with, and the similarity of the way those tasks are performed.

Threshold Limit Value (TLV) – Recommended guidelines for occupational exposure to airborne contaminants published by the American Conference of Governmental Industrial Hygienists (ACGIH). TLVs represent the average concentration for an eight-hour workday and a 40-hour workweek to which nearly all workers may be repeatedly exposed without adverse effect.

Wipe Sampling – A procedure to check for contaminants by wiping a representative surface of known area with an acceptable wipe material, which is analyzed by chemical extraction.

4.0 Responsibilities

4.1. SURF Laboratory Director

4.1.1. Ensures accountability of the requirements of this standard with direct reports.
4.1.2. Follows all requirements within this standard.

4.2. Department Directors

4.2.1. Ensures that all direct reports follow all requirements within this standard.
4.2.2. Follows all requirements within this standard.
4.2.3. Works in conjunction with various departments to ensure engineering controls (such as hazard control ventilation) are meeting minimum performance standards and effectively preventing personnel over-exposure to chemical, physical or biological hazards.
4.2.4. Includes qualitative exposure assessment of chemical, physical and biological hazards during the development and annual review of work planning documents.
4.2.5. Reviews proposed processes involving industrial hygiene hazards with the ESH Department before installing new or moving existing equipment.
4.2.6. Ensures areas where substances hazardous to health of employees are used have the proper warning signs displayed, in consultation with the ESH Department.
4.2.7. Ensure that all employees in their department have received the proper training.

4.3. Engineering Director

4.3.1. Ensures that all direct reports follow all requirements within this standard.
4.3.2. Follows all requirements within this standard.
4.3.3. Works in conjunction with various departments to ensure engineering controls are meeting minimum performance standards and effectively preventing personnel over-exposure to health hazards.
4.3.4. Chooses less-hazardous design options whenever possible, in consultation with the ESH department.

4.4. Environment, Safety and Health Director

4.4.1. Maintains, administers, and revises the Industrial Hygiene Plan as needed.
4.4.2. Develops and implements industrial hygiene training.
4.4.3. Works with appropriate staff to identify & control health hazards.
4.4.4. Works with the IH/Safety Representative to establish monitoring priorities.
4.4.5. Serves as a resource for health-related questions & assistance.
4.4.6. Ensures that all direct reports follow all requirements within this standard.
4.4.7. Follows all requirements within this standard.
4.4.8. Identifies appropriate medical surveillance options.

4.5. Industrial Hygiene Representative

4.5.1. Follows all requirements within this standard.
4.5.2. Performs or oversees industrial hygiene sampling.
4.5.3. Provides industrial hygiene consultation, oversight and review for contractor activities.
4.5.4. Notifies supervisors and personnel of monitoring results.
4.5.5. Provides concurrence that added controls are sufficient to reduce exposure below OELs.
4.5.6. Recommends controls to potential health hazards where appropriate.
4.5.7. Reviews plans for new operations and significant changes to ongoing operations that may create health hazards.
4.5.8. Performs or oversees respirator fit tests to laboratory personnel.
4.5.9. Maintains monitoring, sampling and calibration equipment.

4.5.10. Maintains records, notifications of personal monitoring memos and equipment calibration logs.
4.5.11. Coordinates hazard-specific training for personnel exposed to potential health hazards in the workplace.
4.5.12. Revises the Industrial Hygiene Standard on a routine basis.

4.6. Project Managers

4.6.1. Follows all requirements within this standard.
4.6.2. Reviews proposed processes involving chemical, physical or biological hazards with the ESH Department before installing new or moving existing equipment.
4.6.3. Works in conjunction with various departments and the involved contractor(s) to ensure engineering controls (such as hazard control ventilation) are meeting minimum performance standards and effectively preventing personnel over-exposure to chemical, physical or biological hazards.
4.6.4. Reports deficient engineering controls to the proper authority for repairs.
4.6.5. Follows up on recommendations provided by the ESH Department staff.
4.6.6. Ensures that personnel under their supervision wear any personal protective equipment (PPE) needed for the task performed.
4.6.7. Ensures all chemicals and carcinogen containers brought onsite by the involved contractor(s) display manufacturer's warning labels or appropriate substitute labels.
4.6.8. Ensures areas where substances hazardous to health of contractor employees are used have the proper warning signs displayed, in consultation with the ESH Department.
4.6.9. Chooses less hazardous or non-carcinogenic materials whenever possible, in consultation with the ESH Department.
4.6.10. Includes qualitative exposure assessment of chemical, physical and biological hazards during the development of Job Hazard Analysis (JHA).
4.6.11. Ensures that contractors/researchers follow all requirements within this standard.

4.7. Supervisors

4.7.1. Ensures that all direct reports follow all requirements within this standard.
4.7.2. Follows all requirements within this standard.
4.7.3. Reviews proposed processes involving chemical, physical or biological hazards with the ESH Department before installing new or moving existing equipment.
4.7.4. Ensures that personnel under their supervision wear any PPE needed for the task performed.
4.7.5. Works with the IH representative to notify personnel about exposure results.
4.7.6. Ensures all chemical containers display manufacturer's warning labels or appropriate substitute labels.
4.7.7. Chooses less hazardous or non-carcinogenic materials whenever possible, in consultation with the ESH Department.
4.7.8. Reports deficient engineering controls to the proper authority for repairs.
4.7.9. Follows up on recommendations provided by the ESH Department staff.
4.7.10. Includes qualitative exposure assessment of respiratory hazards during the development and annual review of work planning documentation.

4.8. Occupational Health Nurse

4.8.1. Reviews the Baseline Questionnaire for Respirator Users.
4.8.2. If additional medical evaluation is needed, refers the individual to a suitable medical expert.
4.8.3. Assesses vital signs and lung sounds.
4.8.4. Assists with fit testing.

4.8.5. Completes documentation of assessments, fit tests and ensure all documentation is kept confidential as a medical file.
4.8.6. Reviews Medical Clearance Forms or medical evaluations received.

4.9. Workers

4.9.1. Follows all requirements within this standard.
4.9.2. Completes required training in hazardous materials usage before working with them.
4.9.3. Receives medical monitoring and sampling of work tasks as required.
4.9.4. Refrains from consuming food or beverages (including chewing gum) in any industrial area where chemicals are used.
4.9.5. Uses hazard controls, including any ventilation and personal protective equipment provided.
4.9.6. Reports any health concerns or suspected exposures to supervisors and/or to the ESH Department.

5.0 Instructions

5.1. Planning

5.1.1. Planning for IH exposures will consist of two major components, a qualitative and quantitative exposure assessment.
5.1.2. These assessments can be summarized, provided to field staff as part of their IH hazard awareness training and used to assist them in conducting a pre-job safety analysis.

- Qualitative Assessments
  - SDSTA uses a Baseline Exposure Assessment process for all occupational roles for direct employees. Onsite groups outside of SDSTA may use this process or may conduct a separate qualitative assessment with work performed onsite.
  - Any qualitative assessment will use the following basic steps:
    - A listing of all significant work tasks including work task frequency, duration and conditions.
    - Potential chemicals, and other substances involved for each task.
    - Interviews and field observations about each work task made as needed.
    - Work tasks grouped into similar exposure groups (SEG).
    - Develop exposure groups based on exposure potential and chemical/physical hazards.
    - Determination of risk (i.e. high-risk activities vs. low-risk activities).
  - In addition to the items listed above, a periodic review of site work tasks is to be conducted to verify accuracy. Reassessments will include a review of past monitoring data from the specific work site as well similar data from other locations. The activities and chemical lists will be re-verified as accurate. A representative number of personnel will be interviewed to ensure conditions have not changed from the past evaluation. Any changes found will be made to the assessment documentation and utilized as part of planning for the next monitoring cycle.
- Quantitative Assessments
  - The exposure monitoring portion of the exposure assessment process is used to verify the qualitative exposure assessment ratings and to ensure personnel are adequately protected from potentially hazardous exposures. Monitoring will consist of both planned, routine monitoring as well as unplanned monitoring for non-typical activities that may occur during the year. Follow-up monitoring should also be performed if conditions change, or if activities with increased health exposures increase in frequency.

- Exposures will be evaluated using the current applicable OEL, which will be determined by the ESH Department considering both best practices and the best match for the work environment. Any OEL used for evaluation needs to be derived from an existing regulatory or consensus standard. Common OELs used at SURF include OSHA PELs, MSHA PELs and AGCIH TLVs.
- Personnel conducting monitoring will be performed using protocols from OSHA Technical Manual, NIOSH Sampling Guide of Analytical Methods, MSHA or an AIHA-certified laboratory. An AIHA accredited lab will be utilized for any lab analysis.
- Control measures will be recommended based on monitoring results. Controls will be made according to the Hazard Control Hierarchy in ESH-(2000-S)-73320 Work Planning and Control Standard, with preference given to engineering controls over administrative controls and PPE. Control measures need to be added for each substance's route(s) of exposure when possible. If respiratory protection is selected as a required control, all personnel requiring its use need to comply with the ESH-(4000-S)-73394 Respiratory Protection Standard.

5.2. Reporting and Result Notifications

5.2.1. Sampling result reports will be provided to either the specific employee that was sampled and/or the supervisor responsible for the employee. Employees will be notified within timeframes specified for the specific substances sampled. If no timetable exists for a substance, notification will be provided as soon as reasonably possible. Informational content from any sampling report will also be provided to employees at any time upon request.

5.2.2. Any sampling performed on behalf of a contractor will be communicated to the contractor representative and the SDSTA Project Manager. Contract leadership are expected to notify all affected personnel under their control, as well as implement a suitable control method(s) to keep exposures to their personnel within acceptable limits.

5.3. Specific Industrial Hygiene Programs

5.3.1. Information Involving Chemical Substance Hazards

- Asbestos
  - Asbestos is a well-known health hazard, and as such, must be handled with care. Some of the legacy buildings on site may contain significant amounts of asbestos, while the new construction contains minimal amounts. Examples of construction materials in the lab facilities that frequently contain asbestos include pipe insulation, ceiling tiles or spray-on insulation, taping compound on gypsum wallboard, floor tiles and mastic, roofing material, and transite wallboard.
  - Information about the required laws and regulations (40 CFR 61, Subpart M, National Emission Standard for Asbestos, and Subpart F, Appendix A), along with sufficient processes for recognition, monitoring, handling, and control of asbestos-related hazards, are necessary to manage asbestos safely and effectively at SURF.
- Biological Hazards
  - Biological hazards include bacteria, viruses, fungi, other microorganisms and their associated toxins. They have the ability to adversely affect human health in a variety of ways, ranging from relatively mild, allergic reactions to serious medical conditions, even death. Currently, major sources of biological exposure include:
    - Organisms in the workplace environment – organisms found in water, soil, plants, and animals. Because many microbes reproduce rapidly and require minimal resources for survival, they are a potential danger in a wide variety of occupational settings. Microbial organisms can be found at SURF as naturally occurring in soil

& water, and as elevated growths on older, previously wet materials on both the surface and underground.
    - ♦ Bloodborne pathogen exposure – responders to a medical emergency may be exposed to contact with human body fluids, including bloodborne pathogens.
    - ♦ Infectious diseases - onsite personnel may transmit infectious diseases to employees in a variety of methods, such as airborne, direct contact, or indirect contact. While some infections may be controlled by general precautions, infections that reach epidemic levels within a community may require specified planning and methods for prevention and control.
- Chemicals
    - o All work with chemicals will be conducted in a responsible manner that protects workers. SDSTA's chemical hygiene and safety guidelines and requirements are
        - ♦ ESH-(8000-S)-73278 Hazard Communication Standard, which addresses chemical use for other SURF locations. Information on requirements, including chemical inventory, may be found in these documents.
- General Particulates
    - o Dust (or particulates) is defined as small solid particles, conventionally taken as those particles below 75 micrometers (μm) in diameter, which settle out under their own weight, but which may remain suspended for some time. Particulates may be suspended in a natural environment, or introduced into the air by a variety of tasks, such as welding, grinding, abrasive blasting, drilling, operating diesel equipment, etc. While some of these particles do not present a known health hazard, others like crystalline silica or inorganic metals have shown toxic health effects to workers.
    - o Crystalline silica is a common mineral found in the earth's crust. Materials like sand, stone, concrete, and mortar contain crystalline silica. It is also used to make products such as glass, pottery, ceramics, bricks, and artificial stone.
    - o Toxic metals, including "heavy metals," are individual metals and metal compounds that negatively affect people's health. Some toxic, semi-metallic elements, including arsenic and selenium, are discussed in this page. In very small amounts, many of these metals are necessary to support life. However, in larger amounts, they become toxic. They may build up in biological systems and become a significant health hazard.
    - o The very small particles are known as diesel particulate matter (DPM), which consists primarily of solid elemental carbon (EC) cores with organic carbon (OC) compounds adhered to the surfaces. The organic carbon includes polyaromatic hydrocarbons (PAH), some of which cause cancer when tested in animals. Workers exposed to diesel exhaust face the risk of health effects ranging from irritation of the eyes and nose, headaches, and nausea, to respiratory disease and lung cancer.
    - o Information about the required laws and regulations, along with sufficient processes for recognition, monitoring, handling, and control of related hazards, are necessary to manage particulates safely and effectively at SURF.
- Lead (Pb)
    - o Lead exists at SURF in various forms and processes that present a potential employee exposure hazard. Deteriorating lead-based paint, dust from lead shielding, and research processes using lead are potential exposure sources. Employees may also be exposed to lead when construction, alteration, repair, renovation, painting, or decorating is done from the sanding, grinding, welding, removal, or disturbing of wall or surface materials that contain, or are coated, with lead. Lead exposure may also occur with installation of products containing lead. Information about the required recognition, monitoring, handling, and control of lead-related hazards are included in the ESH-(4000-S)-73393 Lead (Pb) Standard.

5.3.2. Information Involving Physical Hazards

- Ergonomics and Body Mechanics
  - Musculoskeletal disorders (MSDs) affect the muscles, nerves, blood vessels, ligaments, and tendons. Workers in many different industries and occupations can be exposed to risk factors at work, such as lifting heavy items, bending, reaching overhead, pushing & pulling heavy loads, working in awkward body postures, spending long durations with body contact against a static surface, and performing the same or similar tasks repetitively. Exposure to these known risk factors for MSDs increases a worker's risk of injury.
  - Work-related MSDs can be prevented. Ergonomics, fitting a job to a person, helps lessen muscle fatigue, increases productivity, and reduces the number and severity of work-related MSDs.
  - To reduce the chance of a MSD, work tasks should be designed to limit exposure to ergonomic risk factors. Engineering controls are the most desirable, where possible. Administrative or work practice controls may be appropriate in some cases where engineering controls cannot be implemented or when different procedures are needed after implementation of the new engineering controls. Personal protection solutions have only limited effectiveness when dealing with ergonomic hazards.

Type of Control	Workplace Examples
Engineering Controls (implement physical change to the workplace, which eliminates/reduces the hazard on the job/task)	▪ Use a device to lift and reposition heavy objects to limit force exertion ▪ Reduce the weight of a load to limit force exertion ▪ Reposition a worktable to eliminate a long/excessive reach and enable working in neutral postures ▪ Use diverging conveyors off a main line so that tasks are less repetitive ▪ Install diverters on conveyors to direct materials toward the worker to eliminate excessive leaning or reaching ▪ Redesign tools to enable neutral postures
Administrative and Work Practice Controls (establish efficient processes or procedures)	▪ Require that heavy loads are only lifted by two people to limit force exertion (ensure suitable communication for multi-person lifts) ▪ Establish systems so workers are rotated away from tasks to minimize the duration of continual exertion, repetitive motions, and awkward postures. Design a job rotation system in which employees rotate between jobs that use different muscle groups ▪ Provide support staff if needed to provide periodic breaks between scheduled breaks ▪ Properly use and maintain pneumatic and power tools
Personal Protective Equipment (use protection to reduce exposure to ergonomics-related risk factors)	▪ Use padding to reduce direct contact with hard, sharp, or vibrating surfaces ▪ Wear good fitting thermal gloves to help with cold conditions while maintaining the ability to grasp items easily ▪ Ensure that PPE is properly donned and adjusted to reduce potential for awkward positioning

Overview of Control Types and Common Examples

- Hearing Conservation
  - Noise levels that can cause interference with verbal communication when people are only a few feet away from each other may be high enough to produce a risk to hearing.

Information on noise exposure limits, noise monitoring, and control methods to prevent overexposures to noise are found in the ESH-(4000-S)-73391 Hearing Conservation Standard.

- Heat Stress
  - Heat stress, the physical stress of hot environments, can be influenced by a combination of factors, such as the type of clothing you wear, physical activity, time spent working, breaks between work activity, medications you may be taking, and environmental factors such as ambient air temperature, air velocity, and relative humidity. There may be brief periods of hot weather that can lead to uncomfortable working conditions, and possibly, heat stress for laboratory personnel on the surface. In addition, heat and humidity may intensify in the deep regions of the underground lab. A mild or moderate heat stress (i.e., office environments) may cause discomfort, but it is rarely harmful to health. However, as the heat stress approaches human tolerance limits (e.g., exterior work on hot days), the risk of heat-related disorders increases. This section is intended to provide guidance to supervisors and workers on how to recognize and control heat stress in office environments or while working outdoors.
  - Heat complaints from facility staff provide good cues for the recognition of heat stress in the workplace. Supervisors are encouraged to obtain feedback from employees on their working conditions during periods of hot weather. Methods for obtaining this input may include visiting assigned spaces, calling employees in areas known to be warm, or questioning employees during safety and group meetings. For additional information and training on heat stress and other outdoor hazards, contact the ESH Department.
- Illumination
  - Injuries due to poor workplace lighting happen often, and in a variety of workplaces and situations. Illnesses such as eye strain and severe headaches are also attributed to poor or wrong lighting. Poor lighting may also conceal additional hazards, including uneven or slippery surfaces, moving equipment, and improperly guarded electrical or mechanical components. Specific underground hazards such as poor ground conditions and open holes may also be concealed by improper lighting.
  - Several factors should be considered in determining the amount of lighting needed:
    - The nature of the work.
    - work environment.
    - daytime and nighttime lighting needs.
    - glare or reflections due to other lights or outdoor light.
    - Any specific hazardous situations.

- Adequate general lighting is required in workplaces, including the access to/from these workplaces. Below shows the workplace requirements for lighting that have been developed under the OSHA 29 CFR 1926 Construction Standard.

Workplace Lighting Requirements

Required Footcandles	Area of Operation
5	General construction area lighting.
3	General construction areas, concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls, and indoor toilets and workrooms.)
30	First aid stations, infirmaries, and offices.

- Periodic monitoring will be performed throughout SURF by the ESH Department to ensure compliance with the above table.
- Each Department Supervisor and Project Manager will arrange for increased lighting for the workplaces under their authority. The ESH Department will be available as a resource for control options and follow up monitoring.
- Contact the ESH Department for the following:
  - Assistance with determining if light levels are sufficient.
  - Assistance in developing options to increase lighting.

- Non-Ionizing Radiation
  - Non-Ionizing Radiation (NIR) refers to electromagnetic radiation with insufficient energy to release a bound electron from an atom. NIR includes the following categories of radiation: ultraviolet (UV), visible light, infrared, radio frequency, microwave, magnetic fields, and lasers.
  - Exposures to non-ionizing radiation must be maintained below the limits specified in Threshold Limit Values for Physical Agents (RF), American Conference of Governmental Industrial Hygienists (ACGIH).
  - Exposures to non-ionizing radiation may be limited by engineering controls when feasible, followed by administrative controls and personal protective equipment. Access must be limited to authorized personnel only whenever the whole body could enter magnetic field strength exceeding 5 Gauss. Delineating the 5 Gauss line and posting magnetic field warning signs are generally acceptable access control.
  - Contact the ESH Department for any further assistance with NIR.
- Vibration
  - Repeated exposure to high levels of vibration is known to cause injury to workers over time. Based on exactly how these exposures intersect an individual's work

environment, they are classified into two general types: hand-arm and whole-body vibration. Hand-arm vibration exposure (HAV), besides being a known contributing factor to carpal tunnel syndrome and other ergonomic-related injuries, causes direct injury to the fingers and hand, affecting feeling, dexterity, and grip. Whole-body vibration (WBV) can cause fatigue, nausea, headache, loss of balance, and "shakiness" shortly after or during an exposure. The symptoms are similar to those that many people experience after a long distance trip in a vehicle.
    - Contact the ESH Department for any further assistance with vibration concerns.

5.3.3. Tasks with Special Health Considerations

- Confined Space Atmospheric Hazards
    - Confined spaces - such as manholes, crawl spaces, and tanks - are not designed for continuous occupancy and are difficult to exit in the event of an emergency. People working in confined spaces face life-threatening hazards including toxic substances, electrocutions, explosions, and asphyxiation. The initial entry permit addresses initial conditions as evaluated by the site, but confined space activities may result in the changing of those conditions. As the basic confined space monitoring meter is only good for those substances it is designed to monitor, additional monitoring may be needed in a confined space if a suspected contaminant hazard exists outside of the substances detected by the meter used.
    - Further information and details on the site permitting process may be found in the ESH-(7000-S)-73369 Confined Spaces Standard in the ESH Manual.
- Drinking Water System
    - When installing potable water systems that supply chemical-containing systems, it is important to install adequate backflow devices that prevent back-siphoning of toxic materials into the potable water system. Hoses extending into sinks are a common potential problem, if backflow devices are not installed. All potable water sources onsite shall comply with the following OSHA sanitation standards in 29 CFR 1910.141(b) (1) and 29 CFR 1926.51(a):
        - An adequate supply of water shall be available at all places of employment.
        - Portable drinking water dispensers shall be designed, constructed, and serviced so that sanitary conditions are maintained, shall be capable of being closed, and shall be equipped with a tap.
        - Open containers such as barrels, pails, or tanks for drinking water from which the water must be dipped or poured, whether or not they are fitted with a cover are prohibited.
        - Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.
        - The common drinking cup is prohibited. Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.
    - Contact the ESH Department for the following:
        - Concerns regarding drinking-water quality.
        - Sampling of the water for contamination may be warranted, depending on the specific situation.

5.4. Training and Recordkeeping

5.4.1. Training

- Training for health hazards will be part of an employees' initial training and will be refreshed annually. Training topics will include:
    - The health risks associated with exposure to the hazard.

- The methods used to control the hazard.
- Identification of the personnel responsible for maintaining controls.
- Actions that must be taken to ensure the controls operate as intended.

5.4.2. Recordkeeping

- Training for health hazards will be retained according to the SDSTA ESH Training Standard.
- When sampling is completed, a summary is added to the IH Sampling Index. The IH Sampling Index is an electronic source summary for completed IH monitoring data. All IH monitoring samples are documented with specific information pertaining to these samples. Sampling reports are also posted electronically on the N/Drive and hard copies are available from the ESH Department.
- Contractors and other outside stakeholders are responsible who maintaining any exposure records or medical records relating to exposures and must comply with OSHA standards at a minimum. SDSTA may request general information from an outside stakeholder, such as number of samples and information on worker overexposures to ensure that appropriate onsite monitoring is being performed.
- Industrial hygiene-related documents will be retained according to the specification of the Record Retention Policy in SDSTA-(Manual)-187303 SDSTA Policy and Policy-Procedure Manual.

6.0 Documented Information/Related Document

6.1. SDSTA-(Manual)-187303 SDSTA Policy and Policy-Procedure Manual.
6.2. ESH-(2000-S)-73320 Work Planning and Control Standard
6.3. ESH-(7000-S)-73369 Confined Spaces Standard
6.4. ESH-(8000-S)-73278 Hazard Communication Standard
6.5. ESH-(4000-S)-73391 Hearing Conservation Standard
6.6. ESH-(4000-S)-73393 Lead (Pb) Standard
6.7. ESH-(4000-S)-73394 Respiratory Protection Standard
6.8. NIOSH Sampling Guide of Analytical Methods
6.9. 40 CFR 61, Subpart M, National Emission Standard for Asbestos, and Subpart F, Appendix A
6.10. The OSHA Technical Manual
6.11. OSHA sanitation standards in 29 CFR 1910.141(b) (1) and 29 CFR 1926.51(a)