

SECTION 01 35 23 – HEALTH AND SAFETY REQUIREMENTS

1.01 ^{A16}**SCOPE:** This Section identifies those particular conditions that complement or are additional to the Contractor's obligations stipulated in Sub-Clause 6.7 (*Health and Safety*) of the Conditions of Contract.

1.02 **REFERENCES:** ^{A16}

A. **Autoridad del Canal de Panamá (ACP):** In addition to the documents explicitly referenced, the Contractor shall comply with all the applicable safety, health, and marine regulations of the Employer, available through the following URL address: <http://www.pancanal.com/esp/legal/reglamentos/security/index.html>.

	^{A13} Manual de Seguridad y Salud Ocupacional. ^{A13}
	Manual de Seguridad en Operaciones de Alto Voltaje.
^{A17} 2600SEG-102	Norma de Seguridad Ferroviaria.
2600SEG-104	Norma de Programa de Lentes de Seguridad con Prescripción.
2600SEG-105	Norma de Seguridad para la Operación de Equipo Pesado de Movimiento de Tierra.
2600SEG-106	Norma de Seguridad para Trabajos con Actividad Eléctrica Atmosférica (Tormentas Eléctricas).
2600SEG-109	Norma de Seguridad Sobre Protección Contra Caídas.
2600SEG-112	Norma de Seguridad en Operaciones de Soldadura y Corte.
2600SEG-114	Norma Programa de Equipo de Protección Personal.
2600SEG-116	Norma de Seguridad para el Manejo y Almacenamiento de Cilindros de Gas Comprimido.
2600SEG-118(R1)	Norma de Trancar y Colocar Etiquetas en el Equipo.
2600SEG-121	Norma de Seguridad de Señalización y Barricadas.
2600SEG-123	Norma de Seguridad para Demolición de Obras Civiles.
2600SEG-124(R2)	Norma de Seguridad en la Operación de Grúas.
2600SEG-130	Norma y Manual de Seguridad de Buceo Industrial.
2600SEG-131	Norma de Prácticas de Trabajo Seguro para Electricistas de Bajo Voltaje.
2600SEG-133	Norma de Seguridad para la Operación de Plataformas de Trabajos Aéreos
^{A13} 2600SEG-134	Norma de Excavaciones ^{A13}
2600SEG-141	Norma de Seguridad de Andamios.
2600SEG-201(R8)	Norma de Información sobre Materiales Peligrosos.
2600SEG-205(R4)	Norma para la Protección Respiratoria.
2600SEG-210	Norma para Aire Respirable.

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| 2600SEG-213(R4) | Norma Sobre Ropa Protectora. |
| 2600SEG-215(R5) | Norma para la Conservación de la Audición. |
| 2600SEG-230 | Norma para la Exposición al Plomo. |
| 2600SEG-248 | Norma de Protección Intrínseca. |
| 2600SEG-270 | Manual de Protección Radiológica. |
| 2600SEG-285 | Norma de Orden y Saneamiento en los Sitios de Trabajo. |
| 2600SEG-290(R3) | Manual de Prácticas Seguras en Espacios Confinados. |
| 2600SEG-306(R2) | Norma de Seguridad de Trabajos Cerca o Sobre el Agua. ^{A17} |
- B. Compressed Gas Association (CGA):**
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| G 7-03 | Compressed Air for Human Respiration |
| G 7.1-04 | Commodity Specification for Air Guidelines. |
- C. Code of Federal Regulations (CFR):**
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| 29 CFR 1910 | Occupational Safety and Health Administration (OSHA), Department of Labor - Occupational Safety and Health Standards. |
| 29 CFR 1926 | Occupational Safety and Health Administration (OSHA), Department of Labor - Safety and Health Regulations for Construction. |
| 49 CFR 40 | Department of Transportation (DOT) Procedures for Transportation Workplace Drug and Alcohol Testing Program |
- D. Federal Highway Administration (FHWA):**
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| MUTCD-03(1) | Manual on Uniform Traffic Control Devices. |
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- E. U.S. Army Corps of Engineers (USACE):**
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| EM 385-1-1 | Safety and Health Requirements Manual. |
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- F. National Fire Protection Association (NFPA):**
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| C2-07 | National Electrical Safety Code (NESC) (ANSI/IEEE). |
| 10-07 | Portable Fire Extinguishers. |
| 30-03 (R1) | Flammable and Combustible Liquids Code. |
| 30A-03 | Motor Fuel Dispensing Facilities and Repair Garages Code. |
| 33-07 | Standard for Spray Application Using Flammable or Combustible Materials. |
| 51-07 | Standard for the Design and Installation of Oxygen–Fuel Gas Systems for Welding, Cutting, and Allied Processes. |
| 55-05 | Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks. |

^{A13} 70-08	National Electrical Code. ^{A13}
241-04	Standard for Safeguarding Construction, Alteration, and Demolition Operations.
780-04	Standard for the Installation of Lightning Protection Systems.

G. Ministerio de Comercio e Industrias, Dirección General de Normas y Tecnología Industrial (Technical Regulation):

Resolución N° 124 del 20 de marzo de 2001, (Gaceta Oficial N° 24303): Reglamento técnico DGNTI-COPANIT 43-2001, Higiene y seguridad industrial, condiciones de higiene y de seguridad para el control de la contaminación atmosférica en ambientes de trabajo producida por sustancias químicas.

H. ^{A5}American National Standards Institute (ANSI) Standards:

B30 Series	Cranes and Hoists
B56 Series	Industrial Trucks ^{A5}

I. Federal Registers:

69 FR 19644	Department of Health and Human Services (HHS) Mandatory Guidelines for Federal Workplace Drug Testing Programs (April 13, 2004)
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1.03 SUBMITTALS:

- A. ^{A16}**Material Safety Data Sheets (MSDS):** ^{A17}For each hazardous material proposed for procurement, MSDS shall be submitted for approval in the English and Spanish languages at least 28 days in advance of pertinent work. ^{A17}
- B. **Safety Equipment for Confined Spaces:** ^{A17}At least 14 days before any work in confined spaces is carried out, the Contractor shall provide, to the Employer's Representative for review, details about the safety equipment it intends to use. ^{A17A16}
- C. ^{A16}**Radiation Protection Manual:** ^{A17}The Contractor shall, 63 days before any equipment using ionizing radiation is brought into Panama, submit for review a radiation protection manual that meets ACP 2600SEG-270 requirements. ^{A17} The Contractor shall procure a license to operate the source from the Ministry of Health of Panama. ^{A16}
- D. **Competent Person(s):** ^{A17}The names and qualifications of the proposed competent person(s) required for the specific parts of the Works shall be submitted by the Contractor to the Employer's Representative for **review** at least 28 days in advance of the work concerned. Competent person is defined in ACP 2600SEG-290, Volume II, Part 3, Subpart 2 (ACP Safety Standards/Regulations). ^{A17}
- E. ^{A16}**Fall Hazard Prevention Program:** Within 42 days of the Commencement Date, the Contractor shall develop and submit, to the Employer's Representative for **review** a Site-specific program to protect all workers at elevations above 1,800 mm (6 feet). ^{A16} ^{A17}The program shall identify the appropriate fall-arrest systems. Plans shall be based on ACP 2600SEG-109, 133, and 141. ^{A17}

1. ^{A16}**Training:** As part of the Contractor’s fall protection program, all Contractor’s Personnel who might be exposed to fall hazards shall receive training prior to any such exposure. ^{A16}
 2. ^{A16}**Scaffolds:** As part of the fall protection program, the Contractor shall delineate the fall protection requirements necessary during the erection and dismantling operation of scaffolds used in the Works. ^{A17}This analysis shall be submitted to the Employer’s Representative for review at least 28 days in advance of any such use. ^{A17A16}
- F. **Contractor’s Personnel Safety Certifications:** The Contractor shall, in advance of pertinent work, submit certifications for divers, high-voltage electrical workers, and personnel who will work with materials containing lead (in the removal of lead-based paint).
- G. **Dust Control Plan:** ^{A17}The Contractor shall submit to the Employer’s Representative a dust-control plan for review at least 28 days prior to commencement of any work. ^{A17} The Contractor will not be allowed to start until approval of the plan has been received.
- H. **Contractor’s Equipment Inspections and Certifications:** ^{A17}At least 28 days in advance of any pertinent work, the Contractor shall submit, to the Employer’s Representative for review, inspection reports and certifications for cranes and other Contractor’s Equipment. The Contractor shall include relevant references of the certifying entity and the qualifications of the person designated by the Contractor as the inspector under ACP 2600SEG-124. ^{A17}
- I. **Substance Abuse Program:** Within 28 days of the Commencement Date, the Contractor shall submit:
1. The substance abuse program to the Employer’s Representative for review.
 2. The laboratory where tests will be analyzed, to the Employer’s Representative (Occupational Health) for approval.

1.04 GENERAL HEALTH REQUIREMENTS:

- A. **Safe Work Practices:** It is the responsibility of the Contractor to promote a healthy work environment and work force through safe work practices. ^{A17}In order to achieve this, the Contractor shall enforce the use of engineering controls, administrative practices, and personal protective equipment (PPE), in that order; perform pre-placement and periodic physical examinations; and perform blood tests, audiometric tests, visual-acuity examinations, and lung-function tests in accordance with the Employer’s physical examination protocols provided in Volume II, Part 3, Subpart 4. The Contractor shall also establish a hearing-conservation program and a respiratory-protection program to preserve and monitor the hearing and respiratory health of all Contractor’s Personnel requiring hearing respiratory protection. ^{A17}
- B. **Preventive Measures to Control Vectors:** The Contractor shall be prepared to confront and control vectors that can spread pathogens. The Contractor shall establish and execute preventive measures and shall have a physician to assist in the treatment of potential outbreaks of illnesses including, but not limited to, malaria, yellow fever, arboviral encephalitides, dengue, leishmaniasis, and rickettsiosis. The qualifications of any such physician shall be provided to the Employer’s Representative prior to the commencement of any construction work. Preventive measures shall include, but not be limited to,

preventing the accumulation of water, which may serve as a breeding ground for vectors that can spread pathogens. All cases of infectious and communicable diseases shall be reported to the “Ministerio de Salud” through the Employer’s Representative.

1.05 GENERAL SAFETY REQUIREMENTS: In case of discrepancy, safety standards shall follow the following order of priority: ACP documents; OSHA; USACE; and then codes, standards, and documents from other organizations, unless otherwise indicated.

- A. **Protective Devices:** The Contractor shall provide substantial, durable, and effective protective devices, including but not limited to, guardrails, barricades, fences, bridging, ramps, floor coverings, road plates, sidewalks, guide rails, lights, traffic control devices, warning signs and signals, and other protective devices as required by the Works or elsewhere in the Contract. In addition:
1. All protective devices shall comply with internationally recognized and Employer standards.
 2. ^{A16}Protective devices shall be designed to protect the public and others on or adjacent to the Site (and in other areas being used for the construction work) from potential exposures created by the Works.^{A16} Such protective devices shall include, but not be limited to, the use of welding screens to protect against welding flash; the use of solid barricades or tarps to protect against flying objects created by cutting, chipping, or grinding; and the use of fully sealed enclosures to protect against exposures to hazardous vapors, fumes, or dust.
 3. ^{A16}Protective devices shall be designed to withstand the reasonably anticipated forces in or around the Works, including but not limited to, wind, vibration, runoff, and other natural or man-made conditions.^{A16}
 4. Protective devices shall be maintained in a clean and smooth condition so as not to cause cuts, nicks, splinters, or snags in clothing.
 5. The Contractor shall remove each protective device when the device is no longer required.
 6. Each protective device shall be constructed of properly identified fire rated materials.
 7. ^{A16}Barricades and fences shall be a minimum of 1.2 meters (4 feet) in height and be maintained in a continuous unbroken line (save for access points) along the Works. Barricades or fences 8 feet or higher shall be provided along the Works with moderate to heavy pedestrian traffic or along the Works where Site security is required.^{A16}
 8. ^{A16}Barricades, fences, and access points shall be continuously maintained and be rigid and capable of preventing unauthorized entry into the Works.^{A16} Caution tape or unsupported fencing shall not be considered a rigid barricade.
 9. ^{A17}The Contractor shall erect and maintain sufficient barricades and bilingual (Spanish and English or other applicable language) warning signs for the protection of the public and Employer’s Personnel in the vicinity of the Works. Signs, signals, and barricades shall comply with the regulations contained in ACP 2600SEG-121 and with recognizable international standards such as 29 CFR 1926, Subpart G.^{A17}

10. ^{A16A17}The Contractor shall comply with all applicable Laws including, but not limited to, speed limits.^{A17} Contractor’s Personnel engaged in work near public roads shall wear approved safety jackets. The Contractor shall provide temporary guides and safeguards as required when the Works impose restrictions on traffic. Guides and safeguards shall include flagmen, traffic cones, delineators, barricades, lanterns, flashers, torches, and similar devices. The Contractor shall remove and protect existing traffic signs in the construction area and reinstall them upon completion of the relevant part of the Works.^{A16} Traffic barricades for construction shall conform to “Manual of Uniform Traffic Control Devices”, U.S. Department of Transportation, Federal Highway Administration (<http://mutcd.fhwa.dot.gov/>).

B. Personal Protective Equipment (PPE) and Lifesaving Equipment: ^{A17} Shall comply with ACP 2600SEG-114 and regulations contained in CFR 1926, Subpart E. Respiratory PPE shall comply with ACP 2600SEG-205.^{A17}

1. **Foot Protection:** ^{A17}Safety Work shoes, provided by the Contractor, shall be worn at all times. They shall be at least 15 cm (6 inches) high, preferably made of leather, include a safety toe, and shall be completely laced or buckled.^{A17} The shoes shall have definite heels that are no more than 25 mm (1 inch) high. Hiking shoes, dress shoes, sneakers, or other recreational shoes (including deck shoes, high-heeled shoes, sandals, and opened-toed shoes) shall not be permitted on the Site.
2. **Work Clothing:** Shall be worn at all times and shall include full-length pants, free of holes and made of durable material. Contractor’s Personnel shall not be permitted to wear work clothing that has been saturated with any flammable or combustible substance. Shirts shall completely cover the shoulders and mid-section to the waist. Athletic, sleeveless, tank top, or fishnet shirts shall not be permitted. The minimum shirt allowed will be a standard T-shirt. Personnel shall use bright colored orange/yellow reflective vests for quick easy spotting by vehicles and working machinery.
3. **Other PPE:** ^{A17}The Contractor shall provide other PPE as required by health and safety standards and in conformance with ACP hearing-conservation and respiratory-protection programs (such as, but not limited to, hearing protection; head, face, foot, and eye protection; and effective respiratory protection, including self-rescuers). The use of safety eyeglasses with side shields for visual protection is required at all times. Persons requiring prescription safety glasses must wear safety glasses over them or wear prescription safety glasses with side shields, also provided by the Contractor, complying with ACP 2600ESG-104.^{A17}
4. ^{A16}**Inspections:** The Contractor shall perform regular field inspections to ensure effective PPE compliance. Non-compliance of the PPE requirements shall lead to disciplinary action up to the removal of the Contractor’s Personnel at fault from all parts of the Works and the Site.^{A16} The Contractor shall have written documentation of field inspections, which shall be made part of the monthly safety report. Written records of such inspections shall be available for review by the Employer’s Representative at any time.
5. **Protective Clothing:** ^{A17}In accordance with ACP 2600SEG-213, personnel working in proximity to electric circuits that may expose them to the hazards of flames or electric arcs shall wear clothing of all-natural fibers, such as 100% cotton coveralls.^{A17} Unless treated to withstand the hazards mentioned above,

clothing made of synthetics alone or synthetic/natural fiber blends (such as polyester, acetate, nylon, and rayon) are prohibited. Personnel working in the above circumstances shall also use non-sparking footwear and other non-sparking items; metal items are prohibited. Personnel working in the above circumstances that are also required to wear impermeable protective clothing (disposable coveralls), shall wear natural fiber clothing beneath the impermeable clothing.

- C. **Fire Protection and Prevention:** Shall comply with the regulations contained in, but not limited to, 29 CFR 1926, Subpart F; NFPA 10, 30, 30A, 33, 51, 55, 70, and 241, and the following.
1. Open flames and smoking shall be prohibited within 30.5 meters (100 feet) of flammable materials.
 2. In addition to notifying the Employer's Representative, the Contractor shall obtain written permission from the water utility before shutting off water servicing a fire hydrant.
 3. Prior written permission from the Employer's Representative shall be obtained before blocking roadways, hydrants, post-indicator valves, or access to fire-fighting equipment.
 4. The Contractor's health and safety manager shall designate, as required, appropriately trained personnel to act as "fire watchers". ^{A16}Fire watchers shall be familiar with hazards that exist in the work area and be trained in the operation of each type of fire extinguisher on the Site. ^{A16}
 5. Flammable liquids shall be stored in Factory Mutual (FM)-approved safety cans equipped with self-closing lids and flame arrestors.
 6. Work stoppage and shutdown of equipment shall be mandatory upon alarm of fire or other emergency. Personnel shall immediately report to the designated assembly area(s).
 7. Each temporary structure shall be constructed of clearly marked, fire rated material.
 8. The Contractor shall comply with NFPA recommendations.
 9. The Contractor shall perform daily, documented, fire-hazard inspections of the entire Site. Immediate correction of substandard conditions is mandatory.
- D. **Noise Control:** ^{A17}The Contractor shall ensure that noise caused by his work does not exceed the sound levels indicated in ACP 2600SEG-215 and 29 CFR 1926, Subpart D. The Contractor shall provide signs warning of high noise and requiring hearing protection; wherever equipment and work procedures produce sound-pressure levels greater than 85 dBA in steady state or 140 dBA in impulse, regardless of the duration of the exposure. ^{A17}
- E. **Lifesaving Equipment:** ^{A17}Personnel working near water shall be provided with lifesaving equipment as indicated in ACP 2600SEG-306. ^{A17}
- F. **Railroad Safety:** ^{A17}The Contractor shall familiarize Contractor's Personnel with ACP 2600SEG-102 regarding railroad safety. ^{A17}
- G. **Riggers:** Shall be certified by ^{A5}a National Center for Construction Education and Research (NCCER) accredited assessment center, or an equivalent certifying organization. ^{A5}

- H. **Work in High Places:** The Contractor shall enforce the use of the fall protection devices for each activity all times when Contractor’s Personnel are on surfaces 1,800 mm (6 feet) or more above lower levels. ^{A17}Personal fall-arrest systems are required when working on scaffolds above 1.8 meters (6 feet), from an articulating or extendible boom, scissor lifts, swing stages, or suspended platform. Fall protection shall comply with ACP 2600SEG-109.^{A17} Safety nets shall be provided in unguarded workplaces over machinery and dangerous operations. They shall also be used for work on surfaces that are elevated above 7.5 meters (25 feet).
- I. **Scaffolding:** The Contractor shall design a program to certify workers who install and disassemble scaffolds as “competent persons” in scaffolding. ^{A17}Scaffolds shall comply with the regulations contained in ACP 2600SEG-141 and 29 CFR 1926, Subpart L. Contractor’s Personnel shall be provided with a safe means of access to the working area on scaffolds.^{A17} Climbing on any scaffold braces or supports not specifically designed for access shall be prohibited. The Contractor shall ensure that scaffold erection is performed only by qualified and certified Contractor’s Personnel. Scaffolds shall be capable of supporting at least 4 times the maximum intended load and shall include appropriate fall protection as delineated in the accepted fall protection plan. For rolling scaffolds, platforms shall not be greater in height than 4 times the dimension of the smallest width dimension. Stationary scaffolds shall be attached to structural components to safeguard against tipping forward or backward. The first tie-in shall be at the height equal to 4 times the width of the scaffold base.
- J. **Demolition:** ^{A17}The Contractor shall comply with ACP 2600SEG-123 and NFPA 241.^{A17}
- K. **Excavation:** ^{A17}The Contractor shall comply with ACP 2600SEG-134.^{A17}

1.06 HOUSEKEEPING:

- A. ^{A16}Each piece of equipment, tool, material, facility, or apparatus shall be stored, stacked, located, or placed in a manner that renders an injury highly improbable and gives the direct and obvious impression of a clean and orderly work place. This applies to all areas of the Site.^{A16} Materials and equipment shall be stored or parked in an orderly manner.
- B. When a crew begins work in an area, it is responsible for the housekeeping of that area, regardless of whether the area was left disorderly by a previous work crew.
- C. Rubbish and debris shall be cleaned and removed to acceptable containers at the end of each shift. Trash containers shall be placed in appropriate locations for the disposal of all trash, debris, and rubbish. Trash containers shall be emptied on a regularly scheduled basis or when full.
- D. ^{A17}The Contractor shall comply with ACP 2600SEG-285.^{A17}

1.07 HAZARDOUS MATERIALS (HAZMAT):

- A. ^{A17}The transport, storage, handling, and use of hazardous materials shall be in accordance with ACP 2600SEG-201.^{A17}
- B. ^{A16}A list of hazardous materials to be stored, handled, or used at locations where the Works are being carried out shall be provided to the Employer’s Representative before delivery to the Site. A copy of this inventory shall be kept at the Site, readily accessible to Contractor’s Personnel, medical staff, and Contract-inspection personnel.^{A16}

- C. A material safety data sheet (MSDS) for each hazardous material proposed for procurement shall be included with the material list submitted for approval. ^{A16}A copy of the MSDS shall be kept at the Site and be available for use by Contractor's Personnel and Contract-inspection personnel. ^{A16}
- D. ^{A17}Hazardous materials introduced to the Site shall be labeled in accordance with ACP 2600SEG-201, Appendix 2. The Contractor shall be responsible for ensuring that the blank labels are filled out in accordance with the sample labels and are properly affixed to the hazardous material containers. ^{A17}
- E. Contractor's Personnel shall receive training in the risks associated with the hazardous materials to which they may be exposed, proper methods for safe handling, the use and care of personal protective equipment, proper disposal of hazardous waste materials, and proper clean-up procedures in the event of a spill.
- F. Contractor's Personnel working with hazardous materials shall be provided with the personal protective equipment required by MSDS and hazard-warning labels. The Contractor shall be responsible for enforcing the use of personal protective equipment by Contractor's Personnel working with hazardous materials.
- G. ^{A17}The use of dangerous materials is prohibited, unless their use has been previously authorized, on a case-by-case basis, by the Employer's "Unidad de Seguridad, Salud e Higiene Industrial" (IARH). ^{A17} Dangerous materials are those indicated in the web page at URL <http://www.pancanal.com/esp/legal/reglamentos/security/industrial/materiales-peligrosos.html>

1.08 SAFETY IN CONFINED SPACES:

- A. **General:** ^{A17}It shall be the Contractor's responsibility to provide the necessary safety equipment (gas-detection equipment, personal protective equipment, tools, etc.) and Competent Person IV, as defined in ACP 2600SEG-290, for entry and monitoring responsibilities. ^{A17} Personnel who work in confined areas shall be physically and medically able to do so, as cleared by a physician.
- B. **Equipment:** ^{A17}The safety equipment to be utilized for entry and the monitoring responsibilities shall be as indicated in Form 7041, shown in 2600SEG-290, or equivalent. ^{A17}
- C. **Training:** ^{A17}The Contractor will train, test, and certify Contractor's Personnel who are each to be designated as Competent Person IV. These trainees shall be on-Site supervisors or other key personnel assigned permanently to the Works. However, if the Contractor's Personnel fails, then the Contractor shall re-train, test and certify again the Contractor's Personnel as required to satisfy the requirements for the Works. ^{A17} Contractor's Personnel who have been trained, tested, and found qualified, will each receive Competent Person IV certification. Supervisors shall also receive the introductory course to confined spaces. The criteria for selecting Contractor's Personnel for courses shall follow the guidelines/criteria below.
 - 1. **Orientation on Confined Spaces:** For personnel who must work in confined spaces.
 - 2. **Competent Person IV for Confined Spaces:** Personnel who require certification as competent persons in order to issue entry permits to confined spaces.

3. **Competent Person Re-Certification:** Only to re-certify competent persons.

1.09 COMPRESSED-AIR DIVING:

- A. The Contractor shall be responsible for ensuring the safety of all personnel who participate in or support compressed-air diving. ^{A17}The Contractor shall comply with ACP's 2600SEG-210 and 2600SEG-130. ^{A17}
- B. The management of health and safety risks shall, as a minimum, comply with the standards and regulations of the Employer.
- C. ^{A16}A decompression chamber or hyperbaric facility of a size related to the numbers of people diving or otherwise working with compressed air shall be kept available and in working order, with staff in attendance at all times from the start of compressed-air work or diving until at least 7 days after such work ceases. ^{A16} ^{A17}The hyperbaric facility shall have 1 multi-place, double-lock chamber on each side of the isthmus. A doctor experienced in diving medicine and decompression problems shall be available at the location of any diving within 10 minutes of a situation requiring such expertise becoming evident. ^{A17}
- D. Measures adopted with respect to working with compressed air shall take account of the proceedings of the ICE Second International Conference on Engineering and Health in Compressed Air Work, Sept. 2002, where applicable.

1.10 STORAGE OF COMPRESSED-GAS CYLINDERS:

- A. ^{A17}All compressed-gas cylinders shall be stored, used, and handled in accordance with ACP 2600SEG-116, CGA guidelines, NFPA standards, and the requirements of this Section. ^{A17}
- B. Each compressed-gas cylinder shall be considered to be in transport, storage, or use.
- C. Compressed-gas cylinders shall be transported and used in portable welding carts, with the cylinders securely chained to the cart.
- D. An operable dry-chemical fire extinguisher, rated not less than 1.25 kg (2.75 pounds), shall be mounted on each portable welding cart, available for instant use.
- E. Valve protector caps shall be in place, except when the cylinders are in use.
- F. Compressed gas cylinders in storage (full or empty) shall be separated by a minimum ½ hour-rated fire wall or by a minimum distance of 6.1 meters (20 feet), be chained or secured in an upright position on a firm base, have the proper protective cap in place, and be protected from sources of heat.
- G. Mixed gases shall not be stored together.
- H. ^{A17}Improperly stored cylinders shall be corrected immediately. ^{A17}
- I. Excessive or unreasonable storage of cylinders on the Site is prohibited.

1.11 BLASTING: Refer to Section 31 23 16.26 (*Drilling and Blasting*).

1.12 WORK ON OR NEAR ELECTRICAL EQUIPMENT:

- A. ^{A17}Electrical work provisions that are applicable shall comply with the the Employer's ACP "Manual de Seguridad y Salud Ocupacional", the regulations contained in 29 CFR

1926 (Subpart K), and NFPA/IEEE C2. For voltage up to 600 volts, the work shall comply with ACP 2600SEG-131 and the NFPA 70; work above 600 volts shall comply with the ACP Energy Division's "Manual de Seguridad en Operaciones de Alto Voltaje" and 29 CFR 1926, Subpart V.^{A17}

- B. ^{A17}The Contractor shall comply with ACP 2600SEG-118 whenever required to isolate, from energy systems, machinery or equipment to be inspected, serviced, or repaired. Energy sources may be electrical (600 volts or under), mechanical, pneumatic, chemical, thermal, or of other types that could cause injury to personnel or damage to equipment. Applicable Contractor's Personnel shall be trained in Lockout/tag out best practices.^{A17}
- C. For work adjacent to high-voltage electricity supply:
 - 1. ^{A17}While working within 3 meters (10 feet) of a vertical plane from live high-voltage equipment, a failure mode, effects, and criticality analysis is required and shall be subject to review by the Employer Representative.^{A17}
 - 2. ^{A17}Contractor's equipment operating within 3 meters (10 feet) of a vertical plane from live high-voltage equipment shall be securely fixed and shall be demonstrated by the detailed risk assessment to pose no threat of damage to the high-voltage equipment.^{A17}
 - 3. Piling, construction of diaphragm walls, or similar work within 3 m of a vertical plane from live high-voltage equipment shall be separated from the equipment by a protective barrier. ^{A17}This barrier shall be a continuous, solid separation between the area occupied by the Contractor's Personnel or operation of the Contractor's Equipment and the live high-voltage equipment.^{A17} The height of the barrier shall be sufficient to prevent contact with overhead lines, masts, or equipment. The barrier shall have sufficient capacity to withstand a lateral force caused by an impact of a load that is being lifted by a crane, excavator, or other lifting appliances. The design of such a barrier shall be the responsibility of the Contractor and shall be subject to review by the Employer.

1.13 WELDING:

- A. ^{A17}Welding and cutting shall comply with ACP 2600SEG-112 and the regulations contained in 29 CFR 1926, Subpart J.^{A17}
- B. ^{A17}Welders shall be certified in accordance with ACP 2600SEG-112 and using American Welding Society standards by process.^{A17}
- C. ^{A17}Before any welding, cutting, burning, or any other spark-producing operations in any working area, the Contractor shall provide or obtain the necessary "hot work" permit per Contractor's Work Permit System.^{A17}
- D. Welding apparatuses and equipment shall be inspected daily, before use. Defective units shall be removed from service until repaired or replaced.
- E. Whenever the operator leaves the work area, cylinder valves shall be closed.
- F. Torch valves shall be checked for leaks at the start of each shift.
- G. Only friction lighters or other approved devices shall be used to light torches.
- H. Splices or repaired insulation on arc welding cables shall not be permitted within 10 feet of the electrode holder. Cables shall be positioned so as not to interfere or create obstructions on walkways, scaffolds, stairs, or ladders. Splices shall be equal to or greater than the original insulation on the cable.

- I. In areas where welders are working, portable welding screens or shields shall be used to protect other workers and/or the public in the surrounding area.
- J. ^{A17}A live domestic water supply or fire extinguishers rated at 10 lbs. ABC or higher shall be in the immediate area whenever welding or cutting is being carried out.^{A17}
- K. A fire watch shall be assigned for all welding, cutting, burning, or heating operations and shall be maintained for a minimum of 30 minutes following the completion of any such operation. Fire watch personnel shall be trained in the use of fire extinguishing equipment and shall be familiar with methods for sounding an alarm in the event of a fire.
- L. ^{A17}The Contractor shall verify through a physical examination that workers assigned to do welding and cutting work have normal lung functions and blood lead levels before exposure and shall enforce the use of appropriate respiratory protection thereafter.^{A17}

1.14 CONTRACTOR'S EQUIPMENT:

- A. Motor vehicles, mechanized equipment, and vessels shall comply with the regulations contained in 29 CFR 1926, Subpart O.
- B. Vehicle and equipment operators shall effectively inspect and test essential controls, safety equipment, and safety devices before placing vehicles or equipment in use. If found unsafe, construction equipment, whether owned, leased, or rented, shall be removed from service and identified with a signed "Do Not Operate" tag, until repaired and made safe.
- C. Modifications affecting the safe operation of construction equipment shall not be performed unless approved in writing by the manufacturer.
- D. All motor vehicle and equipment operators shall be cleared medically for visual and auditory acuity and physical requirements as per ACP guidelines on medical requirements and physical examinations for license certification to operate heavy equipment. ^{A17}They shall comply with ACP 2600SEG-105 and shall be effectively trained for the type of equipment they operate. Contractor's operators shall present a medical certification (issued by an Employer authorized clinic or doctor) that includes, but shall not be limited to, illegal drug testing, audiometry, visiometry, pulmonary function check, and physical and laboratory tests.^{A17}
- E. Vehicles and equipment shall not block access for emergency responders.
- F. Pedestrians shall have the right-of-way at all times. The speed limit on Employer's property is 8 km/h (5 **mi/h**), unless otherwise posted.
- G. The Contractor's company identification shall be clearly displayed on all Contractor equipment.
- H. Cranes, hoisting equipment, and their operators shall comply with the regulations contained in 29 CFR 1926, Subpart N. Furthermore:
 - 1. ^{A17}Cranes and all hoisting equipment for use on this Contract shall be certified by the Contractor to meet the requirements of ACP 2600SEG-124, ANSI Series B30 for cranes and hoists and ANSI Series B56 for forklifts.^{A17}
 - 2. ^{A17}Contractor crane and hoisting-equipment operators who will be operating such equipment at the Site or in the vicinity of Employer Personnel shall be certified and qualified to operate the equipment proposed to be used.^{A17} This certification shall be in accordance with a National Center for Construction Education and

Research (NCCER) accredited assessment center, or an equivalent certifying organization.

3. The Contractor shall provide adequate lifting attachments where necessary to handle equipment. The lifting attachments shall be constructed to withstand, without distortion, any handling condition that might be encountered. Special slings or lifting bars, if required, shall also be furnished to handle equipment and materials. All lifting attachments require the approval of the ^{A5}Contractor's Safety Supervisors.^{A5}

1.15 IONIZING RADIATION: ^{A17}The Contractor shall comply with ACP 2600SEG-270.^{A17} When the Contractor uses equipment that produces ionizing radiation, such as X-ray weld-inspection equipment, the following requirements shall be met.

- A. The Contractor shall, in advance, obtain all certifications and licenses required by the "Ministerio de Salud" to operate ionizing radiation equipment. ^{A17}The radiation protection manual required in 1.03 shall include procedures for safely using ionizing radiation (per ACP 2600SEG-270).^{A17} The procedure shall address equipment usage as recommended by the manufacturer, safety for the source, and protection for users and others.
- B. ^{A17}Measurements, acquisition, and disposal of radiation sources shall be coordinated with the Employer's "Unidad de Seguridad, Salud e Higiene Industrial" (IARH).^{A17}
- C. Anomalies, losses, and other circumstances that may have adverse effects shall be reported to the Employer's Representative.
- D. The Contractor shall keep a log on the use of each unit of this type of equipment.
- E. ^{A17}The Contractor shall train and document all those concerned in the safe use of this equipment. Training shall be documented.^{A17}

1.16 LEAD HAZARD CONTROL ACTIVITIES: ^{A17}The Contractor shall comply with ACP 2600SEG-230.^{A17}

- A. **Scope:** The work includes the demolition, removal, and disposal of paint with lead (PWL).
- B. **Existing Conditions:** The Employer has determined that the following buildings located in Gatun contain PWL in a dry and deteriorated condition: 110, 126, 128, 130, 131, 136, 138, 191, 196, 201, 202, 203, 204, 205, 207, 209, 224, 225, 226, 228, 231, 232, 233, 234, 235, 238, 239, 240, 243, 245, 249, 254, 255, 257, 259, 261, 263, and 269.
- C. **Parameters:** Per 1.02.G, the time-weighted concentration for 8 hours shall be <0.05 mg/m³ and the short-term concentration exposure <1 mg/m³.

1.17 UNSAFE CONDITIONS:

- A. An unsafe condition is a condition that gives rise to the imminent possibility of serious injury to workers or the public or serious damage to property or the environment or that affects the safe movement of vehicular traffic or vessels. When an unsafe condition exists at the Site, work shall be stopped in the affected area until the condition is corrected. If the Contractor does not take corrective action immediately or within the time period specified by the Employer's Representative, the Employer reserves the right

to take whatever action it determines necessary to safeguard life, limb, and property. All costs incurred in so doing shall be the liability of the Contractor.

- B. Whenever an unsafe condition is determined, the Contractor will be notified verbally and in writing to correct the unsafe condition. Within 24 hours of receiving a written notice, the Contractor shall respond in writing as to the immediate corrective action taken to eliminate the unsafe condition. This written response shall also describe the procedures implemented to prevent the recurrence of similar unsafe conditions. The Contractor shall adhere to the following table of allowable times for the correction of deficiencies. When a hazard is identified, it shall be analyzed and classified based on the criteria shown in the following table.

Hazard Class	Description	Actions
A	Unsafe/unhealthy condition or practice that, if turned into an accident, could cause death, permanent disability, or loss of body parts to Contractor’s Personnel or other people or that could result in damage to or loss of structures, equipment, or materials, which could, in turn, totally or partially interrupt work activities.	<p>The activity shall be suspended immediately.</p> <p>All conditions shall be corrected and mitigation actions shall be taken prior to continuation of work.</p> <p>Corrective actions may take longer, but the immediate corrections shall guarantee that Contractor’s Personnel, other people, and property are protected in the meantime.</p> <p>The manager or supervisor shall present a correction plan (refer to ACP form 2505) indicating permanent corrective actions.</p>
B	Unsafe/unhealthy condition or practice that, if turned into an accident, could cause serious injuries or illness to Contractor’s Personnel or others, resulting in temporary inability to work (minimum of a lost workday per medical disability), or that could result in destructive property damage to a medium extent, interrupting part of an activity without necessarily interrupting the main operation.	<p>^{A16}Time to perform corrections shall not exceed 14 calendar days.</p> <p>If the correction cannot be completed within the 14 days, the manager or supervisor of the area shall prepare a correction plan (refer to ACP form 2505) and corrective action shall at least be initiated in those 14 days. ^{A16}</p>

Hazard Class	Description	Actions
C	Unsafe/unhealthy condition or practice that, if turned into an accident, could cause minor non-disabling injuries or light disease to Contractor's Personnel or others (without lost days) or that could result in minor property damage bringing about the standstill of any one part of the activity without affecting overall operations.	^{A16} Time to perform corrections shall not exceed 28 calendar days. If the correction cannot be completed within the 28 days, the manager or supervisor of the area shall prepare a correction plan (refer to ACP form 2505) and corrective action shall at least be initiated in those 28 days ^{A16}

1.18 SUBSTANCE ABUSE PROGRAM: The Contractor shall instate a substance abuse program.

- A. The substance abuse program involving drugs and alcohol for the Contractor and Subcontractors, at a minimum, shall:
1. Define the criteria for testing that shall include at least the following: pre-employment, random, reasonable suspicion/cause, post-accident, and voluntary. Random testing may be limited to designated positions. Designated positions shall include, but are not limited to: earth moving equipment operators, crane operators, floating equipment personnel, commercial divers, emergency responders, security personnel, health and safety personnel, motor vehicle operators, and high voltage electricians.
 2. Define frequency criteria for random testing that shall be at a minimum 10% of the total participants per year.
 3. Define drug-cutoff concentrations in accordance with the HSS 69 FR 19644. For alcohol testing, the Contractor shall use a baseline that does not exceed 0.1 percent for determining a positive result in testing to measure ethyl alcohol levels in exhaled breath. The Contractor may reduce the baseline for a stricter implementation, but the program must ensure that all levels over 0.1 percent are treated as positive results. The program shall also provide a mechanism for projecting concentration levels to the beginning of the work shift.
 4. Define testing protocols and procedures in accordance with HHS 69 FR 1964 (for drugs) and DOT 49 CFR part 40 (for alcohol). Urine samples shall be directly observed by Contractor's Representative (Laboratory Technician), who shall certify that he/she viewed that the urine sample came from that donor. The testing site shall be provided with an area for adequate urine sample handling and storage and enough privacy for the interview.
 5. Identify the laboratory where tests will be analyzed. All positive drug tests shall be confirmed by gas chromatography-mass spectrometry (GC-MS).
 6. Provide an on-site medical review officer, as defined in HHS 69 FR 19644 and DOT 49 CFR part 40, to oversee the substance abuse program and certify laboratory tests results.
 7. Define consequences that follow 1) a positive test, 2) a repeated positive test (if applicable), 3) a refusal to take a test, and 4) taking of a test but before results are

obtained. The program shall include conditions under which Contractor's Personnel may return to work following a positive drug and/or alcohol test, which at a minimum include an evaluation by a substance abuse professional and compliance with a recommended treatment program.

- B. The Contractor agrees that, at any time during the performance of this Contract, if the Employer's Representative reports to the Contractor that a person from the Contractor's Personnel is showing signs and symptoms of drug/alcohol influence on duty, the Contractor shall remove this person from the Site immediately and shall have the this person tested for drug/alcohol influence. If this person tests positive, the Contractor shall ensure that this person does not return to the Site until this person has met the return to work requirements contained in the Contractor's written program.
- C. The Contractor shall include the above requirements in all of its contracts with Subcontractors and shall ensure that each Subcontractor has in place a drug and alcohol-free workplace program that complies with Subparagraphs above.

END OF SECTION