

SECTION 01 57 19.13 – ENVIRONMENTAL-MANAGEMENT SYSTEM

1.01 GENERAL: ^{A19}The purpose of this Section is to ensure that the Contractor assumes full responsibility for his actions and those of his Subcontractors regarding the environmental requirements identified in the approved Environmental Impact Study (EsIA) [the EsIA is included in Volume II, Part 3, Subpart 3 (*ACP Environmental Requirements*)] of the Employer's Requirements and, additionally, that the procedures in place for the management and control of the environmental impact during the execution of the Works are such that they: ^{A19}

- A. Encourage the establishment and maintenance of a responsible approach to the protection of the environment,
- B. ^{A7}Consider^{A7} the quality of existing environments,
- C. Monitor and ^{A7}protect environments^{A7} that may be affected by the design and execution of the Works, and
- D. Allow the Employer's Representative to monitor and audit the implementation and success of procedures ^{A7}and ensure compliance by the Contractor. ^{A7}

^{A16}**1.02 REFERENCES:**^{A16}

A. **International Finance Corporation (IFC) Publication:**

^{A19}Equator Principles (see following link).
<http://www.equator-principles.com/principles.shtml>

Environmental, Health, and Safety Guidelines
(see following link)
<http://www.ifc.org/ifcext/sustainability.nsf/Content/EnvironmentalGuidelines>

B. **Autoridad del Canal de Panamá (ACP):**

Environmental Impact Study of the Third Set of Locks (and the management plan requirements therein). ^{A19}

Acuerdo No. 116

Por el cual se aprueba el Reglamento sobre Ambiente, Cuenca Hidrográfica y Comisión Interinstitucional de la Cuenca Hidrográfica del Canal de Panamá. ^{A7} (De 27 de julio de 2006.)

Directriz AD 2006-02

Programa de Ahorro de Energía de la ACP. ^{A7}

Manual para Manejo de Materiales y Desechos.

2610ESM103

Norma Ambiental de Manejo y Utilización de Aceites Lubricantes y Derivados de Hidrocarburos.

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| 2610ESM104 | Norma Ambiental de Manejo de Tanques de 55 Galones y otros Recipientes. |
| 2610ESM105 | Norma Ambiental de Condiciones para Tanques de Almacenamiento de Petróleo, Aceites y Lubricantes. ^{A7} (deleted text) ^{A7} |
| 2610ESM107 | Norma Ambiental para Manejo de Desechos Sólidos. |
| ^{A19} 2610ESM109 | Norma de Calidad de Aire Ambiente ^{A19} |

C. Autoridad Nacional del Ambiente (ANAM):

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| Resolución DIEORA-IA-632-07 | Que aprueba el Estudio de Impacto Ambiental Categoría III y el Plan de Manejo Ambiental de la Ampliación del Canal – Tercer Juego de Esclusas. |
| ^{A7} Decreto Ejecutivo N° 209 | Por el cual se aprueba el Reglamento del Proceso de Evaluación de Impacto Ambiental. (De 5 de septiembre de 2006.) |
| Título III, Capítulo I Ley N° 24 de 7 de junio de 1995 | Por la cuál se establece la Legislación de Vida Silvestre en la República de Panamá. |
| Ley 1 de 3 de febrero de 1994 | Por la cual se establece la Legislación Forestal. |
| Resolución No. AG-0174-2005 | Por la cual se reglamenta el transporte de madera en tucas, aserrada y semiaserrada y se dictan otras medidas y otras disposiciones. (De 25 de marzo de 2005.) |
| Resolución N° AG 363-2005 | Por la cual se establece la obligatoriedad del registro de los hallazgos históricos y arqueológicos nacionales. |
| ^{A19} Resolución No. 0020-98 del | Por la cual suministra los estándares de los niveles de emisión permisibles para centrales térmicas que utilicen combustible líquido. (De 11 de noviembre de 1998.) |
| Resolución AG-0292-2008 | Por la cual se establecen los requisitos para los Planes de Rescate y Reubicación de Fauna Silvestre. ^{A19} |

D. Ministerio de Comercio e Industrias, Reglamentos Técnicos:

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| DGNTI-COPANIT 35-2000 | Descarga ^{A7} de efluentes líquidos directamente a cuerpos y masas de aguas superficiales y subterráneas. |
| DGNTI-COPANIT 39-2000 | Descarga de efluentes líquidos directamente a sistemas de recolección de aguas residuales. |
| DGNTI-COPANIT47-2000 | Usos y Disposición Final de Lodos. |
| DGNTI-COPANIT 44-2000 | Higiene y Seguridad Industrial. Condiciones de Higiene y Seguridad en Ambientes de Trabajo donde se genere ruido. |
| DGNTI-COPANIT 45-2000 | Higiene y Seguridad Industrial. Condiciones de Higiene y Seguridad en Ambientes de Trabajo donde se Genere Vibraciones. |
| DGNTI-COPANIT 43-2001 | Higiene y Seguridad Industrial. Condiciones de Higiene y Seguridad para el Control de la Contaminación Atmosférica en Ambiente de Trabajo Producida por Sustancias Químicas. |

E. ^{A7}Ministerio de Salud (MINSA) Decree-Law:

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| Decreto Ejecutivo N° 306 | Por el cual se adopta el reglamento para el control de los ruidos en espacios públicos, áreas residenciales o de habitación, así como en ambientes laborales. (De 4 de septiembre de 2002.) |
| Decreto Ejecutivo No. 1 | Que modificó el Art. 7 del Decreto Ejecutivo N° 306 del 4 de septiembre de 2002. (De 15 de enero de 2004.) |

F. Coordinación de las Oficinas de Seguridad para la Prevención de Incendios(COSEPI), Cuerpo de Bomberos, Dependiente del Ministerio De Gobierno Y Justicia:

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| Resolución N° 03-96 | Por la cual se crea Manual Técnico de Seguridad para instalaciones, almacenamiento, manejo, distribución y transporte de productos derivados del petróleo. (De 18 de abril de 1996.) |
| Resolución CDZ-03/99. | Por la cual se aclara la Resolución CDZ-10/98 del 9 de mayo de 1998 por la cual se modifica el Manual Técnico de Seguridad de Combustibles y se actualizan y unifican las normas y especificaciones bajo las cuales se elaboran, aprueban, construyen e inspeccionan |

las instalaciones que expenden y almacenan combustible derivados del petróleo, ya sean privadas, industriales u otras. (De 11 de febrero de 1999.)

G. **Instituto Nacional de Cultura:**

Ley No. 14

Por la cual se dictan medidas sobre custodia, conservación y administración del patrimonio histórico de la nación. (De 5 de mayo de 1982.)

1.03 REQUIREMENTS:

A. ^{A16}**Environmental Management Organization and Plan (in Manual Format):**

The Contractor shall establish and designate a part of his organization to deal with all aspects of environmental compliance. ^{A17}The Contractor shall establish an environmental-management system (EMS) which shall be described and implemented through a comprehensive environmental plan, which shall be presented to the Employer's Representative in the form of an environmental management system manual (EMS Manual). ^{A17} A detailed description of the organization, including its structure (complete with an organizational chart), shall be included in the EMS Manual. ^{A16}

1. ^{A16}**Environmental System Manager (ESM):** The Contractor shall appoint an ESM to administer the EMS. The ESM shall have day-to-day responsibility for planning and enforcing all environmental compliance measures required under the Contract. ^{A16}

a. ^{A17}The ESM appointed by the Contractor shall be assigned full-time and exclusively to the Works from the Commencement Date to the issue of the Taking-Over Certificate. ^{A17} His sole responsibility shall be the management of all environmental matters specified for the Works. ^{A16}

b. ^{A17}The ESM shall report directly to the corporate officer of the Contractor. ^{A17}

c. ^{A16}References and related experience shall be submitted for approval by the Employer's Representative as part of the draft EMS Manual. (See 1.04 A.) ^{A16}

2. **Qualifications of Specific EMS Staff Members:**

a. **ESM:** The ESM shall have not less than 10 years of environmental protection auditing and compliance related experience and shall be familiar with the type of work being performed.

b. **Environmental Specialists:** The Contractor shall provide environmental specialists (one for the Atlantic area and one for the Pacific area), furnishing enough information to demonstrate their qualifying experience for the type of job specified. References and

related experience will be verified by the Employer's Representative prior to any such person commencing duties.

3. ^{A16}The Contractor shall not change the approved ESM, environmental specialists, supervisors, or shift representatives without prior written consent from the Employer's Representative.^{A16} Any replacement must be at least equal in terms of qualification and experience to the person who will be replaced.

4. **EMS Responsibilities:**

- a. ^{A16}Environmental compliance responsibilities — including emergency responsibilities — for all Contractor's Personnel shall be clearly defined in the EMS Manual (paragraph 1.03 B.). Management responsibility shall be clearly documented in the job descriptions of the Contractor's Representative and other members of the Contractor's Personnel whose activities could have a social or environmental impact. These job descriptions shall be published in the manual, along with the job descriptions for the following personnel.^{A16}

- 1) ^{A16}The ESM, supervisors, shift representatives, and employees designated as competent persons in environmental protection and compliance.^{A16}

- 2) The environmental specialists referred to in point 2.b.

- b. ^{A16}Upon discovery of an unsafe environmental condition, the ESM, environmental specialist, supervisor, or shift representative (as the case may be) shall order the work to be stopped and the unsafe environmental condition immediately corrected. Their routine responsibilities shall include, as a minimum, the following:

- 1) Produce and update the EMS Manual and enforce its provisions, covering all procedures for carrying out work activities (see paragraph 1.03 B).^{A16}

- 2) ^{A16}Perform and document daily environmental inspections of the Site.^{A16} Initiate immediate corrective action(s) to eliminate unsafe environmental conditions.

- 3) Coordinate the training of work crews and first-line supervision affected by each corrective-action plan.

- 4) Conduct incident investigations.

- 5) ^{A19}Develop and implement effective initial and periodic environmental training programs for supervisors and Contractor's Personnel.^{A19}

- 6) ^{A16}Ensure that all Subcontractors and their employees comply with environmental regulations and that each Subcontractor's environmental reports are completed.^{A16}

- ^{A16}c. (Reserved)

- d. (Reserved)^{A16}

B. ^{A16}**EMS Manual:** ^{A19}This manual shall be based on the Environmental Impact Study and on related documents. It shall be prepared using Prudent Industry Practices.

1. The EMS Manual shall include specific information on the programs and plans required in this section. It shall contain standard operating procedures (SOPs) for specific activities including, but not limited to, management of liquid and solid wastes (both hazardous and non-hazardous), spill prevention and control, and fuel-supply operations. ^{A19}
2. ^{A17}The EMS shall be supported by the organizational structure specified in Subparagraph 1.03 A. ^{A17} The Contractor shall not only provide details on key environmental management staff, but also identify resources that will be needed at the different construction areas of the Site for the duration of the Works. ^{A17}A schedule for implementing the different phases of the EMS shall also be provided by the Contractor to the Employer's Representative. ^{A17}
3. The EMS Manual shall be updated every 175 days, with revisions distributed to the Employer's Representative for approval and to all parties involved in the Works. ^{A19}The Contractor shall submit five printed copies of all updated sections of the EMS Manual. ^{A19} The EMS Manual shall set out a comprehensive set of guidelines and instructions demonstrating how the Contractor plans to manage and protect all aspects of the environment and to monitor, record, and audit the implementation of the environmental requirements. The EMS Manual shall include, but not be limited to, the topics identified below. ^{A16}

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| 1. Environmental protection policy and objectives |
| 2. Applicable legislation and rules |
| 3. Organizational chart |
| 4. Environmental management system responsibilities |
| ^{A16} 5. Detailed implementation proposal (see 1.05 for minimum contents) ^{A16} |
| ^{A17} 6. Risk-assessment and mitigation measures not included in the EsIA, but that arise as a result of the design and are in line with Prudent Industry Practices ^{A17} |
| 7. Management of Subcontractors |
| 8. Workplace inspections, audits, and reviews |
| 9. Monitoring to be performed by Contractor |
| 10. Environmental reports |
| ^{A16} 11. Implementing schedule ^{A16} |

4. The Contractor shall identify the appropriate best practices in line with Prudent Industry Practices. ^{A19}The implementation proposal is to be based on these practices, but shall meet, as a minimum, applicable Laws, the relevant Panamanian regulations, and measures specified in the EsIA. (Refer to the Environmental Resolution, which implements the study and corresponding plan requirements.) ^{A19}

1.04 SUBMITTALS: The Contractor's submittals with respect to the EMS shall include the following.

- A. ^{A17}Draft version of the EMS Manual shall be submitted for review within 21 days of the Commencement Date.^{A17}
- B. ^{A19}Five printed copies of the final version of the EMS Manual (complete with all environmental plans) shall be submitted for approval 14 days after the Employer's Representative has returned the draft version submitted under Subparagraph A. above. The approval of the EMS Manual by the Employer's Representative is a requirement to initiate field works.^{A19}

1.05 ^{A16}DETAILED IMPLEMENTATION PROPOSAL: ^{A19}This section of the EMS Manual shall describe all the actions required to implement or comply with all the requirements of the references listed in 1.02 B., with particular attention to the applicable parts of Chapter 8 of the Environmental Impact Study and to all other sections of the document that apply to the Works. Refer to Section 01 57 19 (*Temporary Environmental Controls*), Subparagraph 1.01 A for the parts of Chapter 8 of the EsIA that shall not apply to this Contract.^{A19} The implementation proposal shall, as a minimum, contain the following.^{A16}

A. **Mitigation Plan:**

1. **General:**

- a. Include actions which have been grouped, by their nature and the specific objectives they pursue, into a series of programs to specifically cover air quality and noise- and vibration-control; soil protection; water-resource protection; flora and fauna protection; waste management; and socioeconomic and cultural concerns.^{A16}In addition to minimizing adverse impacts, the mitigation plan shall also seek to strengthen the positive impact of the Works.^{A16}
- b. ^{A16}Incorporate the necessary requirements for compliance with the IFC Social and Environmental Performance Standards as set out in the IFC Equator Principles.^{A16} ^{A19}The Contractor shall refer to the current version of the IFC Environmental, Health and Safety (EHS) guidelines when evaluating and selecting pollution prevention and control techniques. When local or the Employer regulations differ from the levels and measures presented in the EHS guidelines, the Contractor shall comply with whichever is more stringent.^{A19}

2. **Air Quality and Noise- and Vibration-Control Program:**

- a. ^{A16}This program shall be directed toward the opportune execution and implementation of the measures considered necessary to prevent and minimize significant deterioration in air quality or excessive noise or vibrations resulting from the Works.^{A16} This program shall include measures to mitigate any negative impact of this nature.

- b. ^{A16}The areas, as identified in the Environmental Impact Study, where receivers are located in the José Dominador Bazán vicinity (formerly known as Espinar) and in Paraíso have been identified as critical for noise control with respect to Area 2 (Gatun Locks) and Area 5 (Pacific Locks) of the Site, respectively. ^{A16}
 - c. ^{A16}A blasting plan shall be developed and implemented by the Contractor and shall be subject to approval by the Employer's Representative before any blasting is undertaken. ^{A16} Refer to Section 31 23 16.26 (*Drilling and Blasting*).
- 3. **Soil-Protection Program:** The objective of this program shall be the timely execution and implementation of the measures considered necessary to prevent and minimize any significant negative impact from the Works on soils or, indirectly, on the quality of the water through sediment generation, principally during the rainy season. Mitigation-impact shall be included for undermining / sinking, increased landslide risks, increased soil erosion, increase in sedimentation, soil compaction, and soil contamination.
- 4. ^{A19}**Hydric-Resource Protection Program:** The hydric-resource protection program is directed toward the opportune execution and implementation of measures considered necessary to prevent and minimize significant negative impact from the project on waters, mainly during excavation activities. ^{A19} The mitigation measures during the construction stage shall address any water-quality deterioration, alteration of the water flow regime, and alteration of the drainage pattern.
- 5. **Flora- and Fauna-Protection Program:**
 - a. This program shall set forth the measures to be applied during clearing and disposal activities and procedures to minimize disturbances of wild flora and fauna that might be caused by construction activities. The program shall include:
 - 1) ^{A19}Measures to minimize the risk of collision with wild animals, as well as poaching control. Measures shall include the use of signs to alert drivers to the possibility that fauna may be crossing their paths.
 - 2) The implementation of the rescue and relocation wildlife plans prepared by the Employer for the Site. The plans to be implemented for the Atlantic and for the Pacific areas are in Volume II, Part 3, Subpart 3. These plans shall be implemented before the construction phase and shall be continued throughout the duration of the Works, with emphasis on preventing activities that have the potential to cause the most disturbances. These plans will be submitted by the Employer to ANAM for approval, as indicated in ANAM Resolución AG-0292-2008.
 - 3) The preparation and implementation of a rescue and

relocation wildlife plan for the borrow and disposal areas assigned to the Contractor in the Pacific sector that are located outside the Site and have not been used previously. This plan shall be implemented before the clearing of vegetation and shall be continued throughout the duration of the Works. The plan shall be submitted by the Contractor, through the Employer's Representative, to ANAM for approval, as indicated in ANAM Resolución AG-0292-2008.

- b. The Contractor shall support the wildlife rescue and relocation plans with the necessary resources, including provisions for the capture and transfer of animals and the required veterinarian treatment. Provisional care and holding shall be arranged for ill or adversely affected species. The Contractor's Personnel responsible for these matters, including the elaboration and the implementation of the plans, shall have experience with ANAM in the development and implementation of similar plans and shall comply in all cases with those requirements set forth in the rescue and relocation plans for the Atlantic and Pacific Sites. For details on the required contents and scope of the plans to be prepared, see chapter 8 of the Environmental Impact Study and ANAM Resolución AG-0292-2008; for details on the plans for the Atlantic and Pacific Sites to be implemented, refer to Volume II, Part 3, Subpart 3. Monthly reports shall include detailed information on the implementation of the rescue and relocation plans; refer to Section 01 57 19 (*Temporary Environmental Controls*).
 - c. The Contractor shall include a detailed plan for the work activities to be performed in the 1939 excavations and for other uses of these areas so that the details can be approved by the Employer's Representative.^{A19} If the Contractor plans to dewater or to displace water from the 1939 excavations near the area for the Pacific locks, the discharge from both basins shall be toward the entrance to the Canal and a drainage area with adequate dimensions to filter the water prior to discharge shall be provided in order to prevent the possible bio-contamination of receiving waters. ^{A19}Pumping system specifications shall be adequate for the discharge requirements.^{A19}
6. **Waste-Management Program:** The waste-management program shall be designed to reduce health risks resulting from deficient storage and mishandling of wastes; to identify and classify wastes; to minimize waste production; to select appropriate alternatives for waste reduction and disposal; to document all aspects of the waste management process, including reuse and recycling; and to ensure compliance with the regulations on waste-management practices for solids, hazardous materials, and other wastes, including liquid effluents, to cover handling, use, storage, and disposal, together with record keeping and reporting. The Contractor shall prepare a waste-management plan for the handling of all wastes generated by his work. Refer to Section 01 74 19 (*Construction Waste Management and Disposal*).

7. ^{A19}**Materials Management Program:** This program shall include measures to minimize any adverse impact on workers' health or the environment, as well as to limit exposure to hazards by providing instruction on the management of hazardous and non hazardous materials and of the worker personal use items. The materials management program shall include load-management procedures; management of hazardous and non-hazardous materials, including worker personal items; and inspection of materials-storage zones.
8. ^{A19}**Socioeconomic and Cultural Program:** This program shall include measures to mitigate the impact of increased traffic and to protect sites of historical, archaeological, paleontological, and cultural value. Traffic management shall cover the transportation of materials and machinery, the use of heavy equipment and transportation vehicles, and coordination requirements with traffic authorities.

B. Monitoring, Follow-up Plan, and Corrective Actions:

1. ^{A16}**General:** As part of these efforts, the Contractor shall record the degree to which the prevention, mitigation, and compensation actions described in the EMS Manual achieve their objective of minimizing the negative impact associated with the project. ^{A16} ^{A19}The Contractor shall implement, in a timely manner, as defined by the Employer's Representative, all corrective actions identified during the inspections and monitoring. In the case of any fact, circumstance, condition, or occurrence that has or could likely result in any non-compliance with the environmental requirements applicable to the Works or in any adverse environmental or social impact, and upon request of the Employer's Representative, the Contractor shall prepare a corrective action plan. The corrective action plan shall include (a) a brief description of such non-compliance, including the extent, magnitude, impact, and cause thereof; (b) the proposed actions to correct, and to remedy all damage and adverse consequences caused by, the non-compliance; (c) the assignment of responsibility for implementing such proposed actions; (d) a time schedule for implementing such proposed actions, including the start date, the end date, and key milestones; and (e) the proposed actions to prevent ^{A17} similar non-compliances from occurring in the future. The timeframe for submitting any required corrective action plan to the Employer's Representative will be determined by the Employer's Representative on a case by case basis. ^{A19}
2. **Air Quality:** This monitoring program shall include the activities required to monitor the quality of air in the working environment and in the surrounding ambient environment. ^{A19}Monitoring shall take place during construction activities in the area of José Dominador Bazán, Cocoli, and Monte Lirio at the frequency defined within the EsIA; PM10 sampling (of particle matter of 10 microns or less in diameter) shall be at least once every six (6) days in each monthly period. The air-quality monitoring program shall be updated yearly on the basis of the results of the previous

monitoring in order to adjust the work schedule as required. Gravimetric and passive techniques shall be used for PM10 and NOx, (nitrogen-oxide) testing. Monitoring methods shall be in conformance with the Employer's ambient air quality standard, 2610-ESM-109, and the results shall be compared with this standard.^{A19}

3. **Noise:** Permanent noise-monitoring stations shall be installed in the José Dominador Bazán area, which has been identified as critical due to presence of noise-sensitive noise receptors. Monthly readings shall be taken with sound-level meters during periods of at least 24 continuous hours for the duration of the construction at work sites near this zone. A similar program shall be used for Diablo and La Boca; however, the reading periods shall be of 1 hour (both during the day shift as well as during the night shift) on a quarterly basis. ^{A19}According to the Environmental Impact Study, the Environmental Resolution approving it, and the Executive Decree of 2004, the maximum noise level in residential areas is 60 dB on scale A from 6 a.m. to 9:59 p.m. and 50 dB on scale A from 10 p.m. to 5:59 a.m. ^{A19}
4. ^{A16}**Vibrations:** The Contractor shall monitor the vibrations that result from blasting, as measured at the nearest residence, and submit a report with the data to the Employer's Representative. ^{A16} From the beginning of blasting activities, seismographs shall be installed, as a minimum, at the following locations: José Dominador Bazán, Paraiso, Diablo, [Clayton](#), and La Boca. Refer to Section 31 23 16.26 (*Drilling and Blasting*).
5. ^{A16}**Soil:** Soil monitoring shall include the assessment of conditions that can cause landslides, erosion, and soil contamination and plans for their control. ^{A16}
6. **Water Quality and Sediments:**
 - a. ^{A19}The objective of this part of the plan is to verify the effectiveness of the preventive and corrective actions that seek to minimize the impact of the Works on water resources. The Contractor shall include a detailed work plan that describes the various monitoring activities to be conducted over given periods. These details will be evaluated and approved by the Employer's Representative, who may suggest additional actions as he deems appropriate. Throughout the duration of the Contract, the Contractor shall submit additional reports on the various related activities when requested to do so by the Employer's Representative.
 - b. The environmental specialists in each of the work areas — see 1.03 A.2.b. — shall devote adequate attention to specific water quality problems that may arise in connection with the Works. Monitoring plans shall be included for water and sediment, drainage and runoff at disposal sites, and wastewater. The monitoring plan shall include at least the following.

- 1) The Contractor shall take aerial photographs before initial work commences and twice a year thereafter to evaluate sediment dispersion close to underwater disposal sites.
 - 2) Monthly light penetration (Secchi disk) measurements at underwater disposal sites.
 - 3) Twice a year monitoring of currents, short and long term circulation, and sediment movements close to underwater disposal sites.
 - 4) Twice a year depth and bathymetry at underwater disposal sites.
 - 5) Monthly monitoring of the water in main creeks, rivers, natural watercourses, and dredged material disposal sites for turbidity, suspended solids, heavy metals, hydrocarbons, total organic carbon, pH, conductivity, dissolved oxygen, and most probable number (MPN) of coliforms and E. coli. Dredged material disposal site monitoring shall include sampling before any discharge from each location, as well as effluent sampling within the discharge flows and post-discharge sampling in the receiving bodies of water.
 - 6) Annually and final evaluation of the morphology and draining patterns at the dredged and excavated material-disposal sites.
 - 7) Annual physical and chemical characterization of sediments in dredged material disposal sites and in disposal site outlet or discharge areas.
 - 8) Wasterwater monitoring of applicable parameters at frequencies based on the volumes generated, as required by local regulations.
- c. In addition to the water-quality monitoring requirements defined within the EsIA, the Contractor shall include complementary monitoring parameters and monitoring frequencies for evaluating the efficiency of implemented erosion and sedimentation controls.
7. **Air Emissions:** The Contractor shall monitor, on a semiannual basis, airborne vehicle emissions. This monitoring shall include all motor vehicles; gasoline vehicles shall be monitored for CO (%), CO₂ (%), and HC (ppm); diesel vehicles shall be monitored for opacity (UH).

C. Citizen Participation Plan:

1. In order to continue the process of community participation that was launched as part of the Environmental Impact Study, the Contractor shall

establish a community-relations office on the Pacific side and another on the Atlantic side. These offices shall be located within the Contractor's field offices. ^{A19}

2. Each community-relations office shall have a person in charge of receiving and handling any communication with community representatives and of ensuring that their concerns are passed on to the appropriate responsible parties for resolution. Any complaint, concern, request, or comment from the community shall be handled promptly.
3. ^{A16}Any calls or visits shall be recorded in a communications log. A weekly report on the follow-up of requests or grievances shall be prepared and submitted by the person in charge of each community-relations office to the ESM and to the Employer's Representative. ^{A16} This follow-up report shall clearly state whether the concern was already handled and resolved, what corrective actions are ongoing, or why the problem could not be resolved and the conditions that would facilitate a solution.

D. **Risk-Prevention Plan:** ^{A19}As required by Chapter 8 of the EsIA, this plan shall define the preventive actions and measures to be applied to prevent accidents and near accidents, as well as occupational illnesses. For details on plan requirements, see Section 8.7 of the EsIA. In addition to the EsIA requirements, the risk-prevention plan shall include a spill prevention, control, and countermeasure (SPCC) plan. The main thrust of the SPCC plan shall be the prevention of discharges of petroleum, oil, or lubricants (POLs) into navigable waters and adjoining shorelines rather than the after-the-fact reactive measures to contain any such spills. The SPCC plan shall be based upon the geographical and locational aspects of any POL storage facilities, considering their location with respect to streams, ponds, and ditches (be they perennial or intermittent); storm and sanitary sewers; and wetlands, mud flats, and sand flats. Factors that shall be taken into account include the distances to navigable waters, volumes of materials stored, worst-case weather conditions, drainage patterns, land contours, and soil conditions.

E. **Environmental Education Plan:**

1. The implementation of this plan is required by regulation for project workers in order to minimize the possible impact (poaching, illegal logging, pollution, etc.) that could result from the presence of the Contractor's Personnel at the Site.
2. ^{A16}The objective of the plan shall be to instruct, educate, generate awareness among, and provide tools to Contractor's Personnel and others to comply with applicable Laws, existing Panamanian environmental-protection regulations, and the obligations derived from the ^{A16} Environmental Impact Study.
3. The Contractor shall provide the Employer's Representative with details on the training plan, breaking it down by the type of work to be performed by different crews. The plan must include, as a minimum, the guidelines defined in Section 8.9 of the EsIA and the standard operating procedures specified in paragraph 1.03 B.1 of this section.

F. Contingency Plan:

1. This plan is required to reduce the possibility of harm, damages, or disturbances to persons, property, the environment, or the operation of the Canal as a result of the Works, by preserving environmental quality, minimizing pollution, preventing fires or explosions, protecting infrastructure and project equipment, and responding quickly to any unexpected incident in order to mitigate its impact.^{A19} ^{A17}The plan must include, as a minimum, the guidelines defined in Section 8.10 of the EsIA.^{A17}
2. The contingency plan shall be revised yearly, whether or not emergencies have occurred, since the purpose is to update the information it contains and improve the established procedures. This revision shall be assigned to those responsible for the implementation of the plan, who shall include, as a minimum, the project administrator, health and safety manager, and the supervisors responsible for POL management. ^{A16}Updated versions of the contingency plan shall be submitted to the Employer's Representative for approval.^{A16}

- G. Post-Operations Environmental Recovery Plan:** ^{A19}Environmental-recovery work shall be performed as required after the completion of all activities and closure of worksites that will not be used again.^{A19} The objective of the environmental recovery is to restore conditions that facilitate the reestablishment of natural biological communities in former work areas. Environmental recovery includes reshaping of the terrain, erosion control, revegetation, and landscaping.^{A7}

END OF SECTION