

## APPENDIX E

## Appendix E

### Environmental Monitoring Plan

#### 1.0 INTRODUCTION

Collectively, EEPCI and TOTCO will manage all aspects of the Project, including those associated with environmental matters. Though EEPCI and TOTCO will be linked only through the Project Management Contract (and perhaps other agreements), their Project management responsibilities are similar and will be carried out largely by the same Project management organization. For simplicity, the text hereafter will often refer to the “EEPCI/TOTCO” organization, especially when referring to situations where the Project management organization is acting on behalf of both EEPCI and TOTCO.

This appendix describes in detail the monitoring program that will be implemented by EEPCI/TOTCO during the construction-phase of the Project to monitor biophysical, socioeconomic, and health matters associated with Project-related activities. The primary objective of EEPCI/TOTCO’s environmental monitoring effort will be to ensure that the activities by the Contractors and by EEPCI and TOTCO’s implementing organizations are pursued in accordance with:

- The laws and regulations of the Republic of Chad;
- Engineering, Procurement, Construction (EPC) Contractors' environmental management plans;
- The Project’s Environmental Management Plan (EMP);
- The Project’s environmental goals and objectives; and
- The Project’s environmental requirements and specifications (see Volume 2 of the EMP).

With regard to EEPCI and TOTCO’s environmental monitoring effort, the following text will describe:

- The organization to be used by EEPCI/TOTCO in monitoring the environmental aspects of the construction effort;
- The roles and responsibilities of individuals/groups in EEPCI/TOTCO’s monitoring organization;
- The processes for communications between the different groups within EEPCI/TOTCO and between EEPCI/TOTCO and the Engineering, Procurement, Construction (EPC) Contractor personnel;
- The processes for documenting observations and tracking environmental non-compliance situations; and

- Specific monitoring activities that will be pursued by the responsible EEPCI/TOTCO personnel.

Three notable features of EEPCI/TOTCO's monitoring program that will be described more fully in the following pages are as follows:

- An open dialog between environmental monitoring and construction personnel/groups will be used in addressing circumstances that indicate non-compliance and that require corrective action;
- Communications regarding all non-compliance observations (if any) and corrective actions will be directed to appropriate levels of management within EEPCI/TOTCO to fully document the monitoring effort and to allow management involvement in decisions; and,
- A three-tiered reporting and response process based on the potential seriousness of the situation involved will be utilized to address non-compliance situations. The three-tiered reporting and response process is intended to improve responsiveness to compliance situations at all levels by allowing rapid, in-field decisions concerning less serious matters and by providing rapid communication and focused senior management attention and decisions on more serious matters.

Although this appendix discusses only EEPCI/TOTCO's environmental monitoring organization, it should be recognized that EEPCI/TOTCO's environmental monitoring organization is not the only organization that will be monitoring environmental aspects of the construction activities. For example, as discussed in Chapter 3 of Volume 1 of this EMP, each EPC Contractor will have environmental quality assurance monitoring personnel that will monitor construction activities to ensure that they are constructed in compliance with the Contractor's environmental management plan and Project environmental requirements and specifications. In addition, the Republic of Chad will also have an environmental monitoring organization monitoring the construction activities with respect to this EMP.

This Environmental Monitoring Plan is expected to be an "evergreen" document and will be adjusted as needed to reflect changes in organizational structure, personnel responsibilities, communications/reporting requirements and processes, etc.

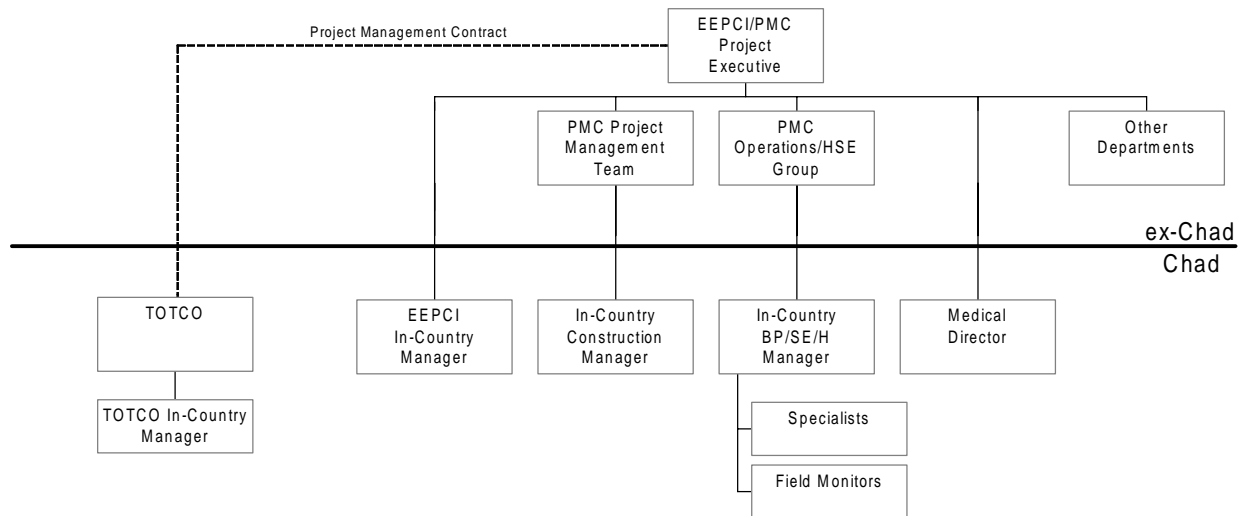
## **2.0 ENVIRONMENTAL MONITORING ORGANIZATION AND ROLES AND RESPONSIBILITIES OF PERSONNEL**

### **2.1 EEPCI/TOTCO'S ENVIRONMENTAL MONITORING ORGANIZATION**

EEPCI will supervise the engineering, construction, and commissioning of the oilfield development facilities. TOTCO will enter into a Project Management Contract with the Project Management Company (PMC) to supervise the engineering, construction, and commissioning of the TOTCO Transportation System. The Project Management Company will be EEPCI.

Thus, most aspects of the overall Project management, including the management of environmental aspects of the Project, will be performed by EEPCI and/or EEPCI's Project Management Company.

The expected EEPCI/TOTCO organization for the construction phase of the Project is shown in the simplified chart below.



**Figure 1 The Expected EEPCI/TOTCO Organization for the Construction Phase of the Project**

The EEPCI/TOTCO construction-phase organization for the Project features environmental professionals within EEPCI/TOTCO's Environmental Monitoring Organization and within the PMC's Operations/HSE Group. Together, these groups will be responsible for monitoring construction sites and activities regarding compliance with the Project's requirements, specifications, goals, and objectives related to biophysical, socioeconomic, and health (BP/SE/H) topics.

As can be seen in Figure 1, the EEPCI/TOTCO Environmental Monitoring Organization will be directed by the In-Country BP/SE/H Manager, whose staff will include technical specialists and environmental field monitors. This organization will be responsible for the majority of the on-the-ground observation and evaluation of construction activities regarding compliance with documented environmental commitments and for resolution of most routine non-compliance situations. This organization will also be responsible for communicating regarding environmental performance to the PMC's Operations/HSE Group and to EEPCI/TOTCO's construction organization.

The PMC's Operations/HSE Group will function in a management/advisory role to the EEPCI/TOTCO Environmental Monitoring Organization. For example, the PMC Operations/HSE will provide assistance in resolving more complex environmental non-compliance situations. In addition, this group will act as the primary interface with the PMC Project Executive regarding environmental matters.

A notable feature of the combined EEPCI/TOTCO organization is the independence of the environmental groups from the construction-oriented groups. Within both the in-country and the ex-Chad portions of the EEPCI/TOTCO organization, the groups responsible for monitoring BP/SE/H matters will work side-by-side with construction-oriented personnel. However, the construction and environmental groups will report through separate management up to the executive management level.

## **2.2 ROLES AND RESPONSIBILITIES OF EEPCI/TOTCO PERSONNEL RESPONSIBLE FOR ENVIRONMENTAL MONITORING**

The specific responsibilities associated with each position or group that will be directly responsible for environmental monitoring and environmental decision-making are listed below.

### **2.2.1 Environmental Field Monitors**

In general, EEPCI/TOTCO's environmental field monitors will have the principal responsibility for observing EEPCI's and TOTCO's activities (e.g., land acquisition) and EPC Contractors' construction activities in the field and ensuring that those activities are accomplished in compliance with the Project's environmental requirements, specifications, goals, and objectives. To accomplish this, each environmental field monitor will be responsible for understanding the Project Technical Specifications, Environmental Management Tools, and Contractor Environmental Management Plans, particularly as they apply to his/her monitoring assignment.

The specific responsibilities of the EEPCI/TOTCO environmental field monitors will be to:

- Assure that all plans, processes, approvals, and requirements are in place to ensure EMP compliance prior to initiation of any work.
- Verify the accomplishment of environmental measures by Contractor crews against contractual obligations by:
  - Performing monitoring activities as scheduled;
  - Evaluating Contractor efforts and effectiveness; and
  - Identifying circumstances requiring management decisions to evaluate variance or compliance issues.
- Compile documentation of monitoring observations by:

- Maintaining daily record of monitoring activity on standard logs indicating locations, dates, and times as well as general observations and compliance details;
  - Collecting specific data assigned to monitors; and
  - Documenting observed non-compliance situations on standard forms.
- Identify circumstances requiring special study or activity, such as:
    - Pre-programmed site-specific surveys;
    - A committed activity linked to a specific construction activity; and
    - Special requirements related to seasonal activity or specific resource observations (e.g., “if, then” requirements),and communicate to In-Country BP/SE/H Manager to allow timely and efficient implementation of specific commitments.
- Interface with EEPCI/TOTCO field construction personnel to:
    - Assist in field interpretation of environmental requirements;
    - Provide advice regarding corrective actions and resolving non-compliance situations (after consultation with In-Country BP/SE/H Manager, if necessary); and
    - Request issuance of specific formal instructions to Contractor, as required.
- Interface with construction Contractor environmental personnel (advisory only) to:
    - Help communicate requirements;
    - Obtain a hands-on view of special problems so that implementation difficulties can be communicated to EEPCI/TOTCO BP/SE/H management to aid in problem resolution especially in situations where adjustment of compliance requirements may be necessary; and
    - Request consideration of work stoppage or a redirection of effort in the event that imminent potential for damage to a sensitive resource or a serious non-compliance situation is observed.
- Communicate to environmental management and construction personnel by:
    - Preparation of routine weekly monitoring reports to be submitted to the In-Country BP/SE/H Manager;
    - Preparation of special non-compliance records for Level II or Level III circumstances;
    - Verbal communications to EPC Contractor environmental staff to discuss problems and explore solutions as compliance situations are identified; and
    - Interaction with In-Country BP/SE/H Manager as needed to define corrective action recommendation for any identified non-compliance situation.

### 2.2.2 In-Country BP/SE/H Manager

In general, the In-Country BP/SE/H Manager will be responsible for coordinating EEPCI/TOTCO's on-the-ground environmental monitoring effort and for communicating with regard to Contractors' environmental performance to management as well as construction groups.

The specific responsibilities of the EEPCI/TOTCO In-Country BP/SE/H Manager will be to:

- Assure all plans, processes, approvals, and requirements are in place to ensure EMP compliance prior to initiation of any work.
- Coordinate EEPCI/TOTCO's monitoring activity to verify compliance with all environmental, socioeconomic, and health commitments by:
  - Coordinating with in-country construction management to schedule monitoring efforts consistent with construction schedule demands;
  - Managing staffing levels to adequately monitor construction activity; and
  - Managing documentation of monitoring activity and results to record compliance in a timely manner.
- Review routine (weekly) field reports and special non-compliance reports from EEPCI/TOTCO environmental field monitors and from Contractors' environmental quality assurance organizations to identify specific issues to be resolved in discussion with In-Country Construction Manager, PMC Project Manager and PMC Operations/HSE Manager.
- Develop specific recommendations for corrective action required to resolve non-compliance issues for presentation to In-Country Construction Manager and exercise judgement in deciding to seek advice of the PMC Operations/HSE Manager to refine decisions.
- Manage communications concerning compliance situations and emerging issues by:
  - Expeditiously communicating regarding urgent environmental topics to the In-Country Construction Manager and the PMC Operations/HSE Manager through written and verbal reports;
  - Expeditiously completing internal discussions to resolve non-compliance situations commensurate with the urgency of each non-compliance issue addressed;
  - Weekly preparation of routine progress reports based on inputs from EEPCI/TOTCO's environmental field monitors and Contractors' environmental quality assurance organizations;
  - Preparing routine (monthly) monitoring activity and compliance summary reports for management reference and external communications; and

- Maintaining open communications with the In-Country Construction Manager to discuss results and resolve problems.
- Provide, via the In-Country EEPIC and TOTCO Managers, quarterly reporting to the Government of Chad concerning monitoring activity, compliance status, and corrective actions.
- Manage aspects of environmental-related training of in-country personnel by:
  - Implementing training programs for environmental monitoring staff;
  - As-needed conducting environmental awareness briefings and supplemental training for construction employees; and
  - Coordinating specialist activities as necessary to accomplish these efforts.
- Implement the change management process to respond to unexpected field conditions, special construction requirements, or refinement of environmental mitigation measures. This effort will involve close coordination with PMC Operations/HSE Manager, In-Country Construction Manager, and specialists.
- Manage special studies and surveys associated with site-specific conditions, special construction requirements, or changes. Coordinate specialist activities as needed to accomplish these efforts.

### 2.2.3 HSE Technical Specialists

In general, the Technical Specialists will assist the In-Country BP/SE/H Manager in the conduct of his/her duties, including coordination, communications, and reporting/documentation duties. In addition, the Technical Specialists will act as technical advisors to the In-Country BP/SE/H Manager in helping resolve and address environmental non-compliance situations and emerging issues. The specific responsibilities of the Technical Specialists will be to:

- Assist the In-Country BP/SE/H Manager in the implementation of environmental training by:
  - Preparing environmental, health, and socioeconomic monitoring training programs and implementation guidelines;
  - Preparing supplemental construction employee environmental awareness briefing and handout materials; and
  - Conducting environmental, socioeconomic, and health training and refresher training as needed for environmental field monitors under the supervision of the In-Country BP/SE/H Manager.
- Provide, as needed, support to the In-Country BP/SE/H Manager to evaluate compliance issues and recommend appropriate corrective actions. This may involve consultation and/or

special field inspections.

- Provide, as needed, support to the In-Country BP/SE/H Manager to conduct special studies required by specific commitments, or as a result of Project changes.
- Compile data and prepare routine reports and other reports.
- Manage the non-compliance tracking computer database, and use the database to analyze for non-compliance trends. Report findings to the In-Country BP/SE/H Manager.
- Prepare special reports as needed to document studies and/or present technical justification for recommended EMP revisions.
- Prepare, as needed, updates to the environmental, health, and socioeconomic monitoring training program and implementation tools (including environmental alignment sheets) to reflect clarifications, revisions, and construction changes. Provide, as-needed, refresher training to Environmental Field Monitors as directed by the In-Country BP/SE/H Manager.
- Provide, as needed, technical input to the PMC Operations/HSE Manager concerning specific compliance issues and potential corrective action.
- Provide technical support to the PMC Operations/HSE Manager for discussions with outside agencies as requested.

#### **2.2.4 PMC Operations/HSE Department**

In general, the PMC Operations/HSE Manager will act as the environmental policy advisor to the PMC Project Executive and will have full functional responsibility and accountability for the Project's environmental *monitoring*. (The PMC Project Manager will have full functional responsibility and accountability for the Project's environmental *compliance*.) As assisted by his/her staff, the specific responsibilities of the Operations/HSE Manager will be to:

- Conduct routine monthly meetings with the PMC Project Manager and the PMC Project Executive to present monthly monitoring summary and discuss compliance issues.
- Provide the PMC Project Manager with recommendations concerning the resolution of compliance situations and emerging issues based on review of technical issues and outside agency issues. Follow up on all compliance issues and sign off on all documentation required to closeout all compliance issues.
- Provide senior technical and policy advice to the In-Country BP/SE/H Manager.
- Supervise field staffing levels and manage the Operations/HSE budget.
- Develop requirements, processes, and approvals to ensure EMP compliance prior to the initiation of any work activity and throughout the conduct of any such activity.

- Review, provide advice regarding necessary upgrades, and endorse prior to approval Contractors' environmental management plans and associated plans. Approval of the Contractors' plans will be the responsibility of the PMC Project Manager.
- Identify special studies needed for development of proposed compliance commitment revisions in response to PMC Project Manager, In-Country Construction Manager, or In-Country BP/SE/H Manager change requests. Prepare written proposal for review with Project Manager and Project Executive.
- Supervise preparation of environmental monitoring training programs for in-country Environmental Field Monitors and Technical Specialists.
- Compile documentation of training programs, monitoring activity and results, special studies, and change management process.
- Assure all EMP compliance issues are identified, clearly understood, and documented in the Project management surveillance process.
- Use the non-compliance tracking computer database to analyze for non-compliance trends. Include analyses results in routine reports and, as appropriate, report findings directly to the In-Country BP/SE/H Manager for consideration of corrective actions.
- Conduct periodic audits.
- Prepare a post-construction inspection and survey plan associated with construction phase commitments to allow orderly transition to the operational compliance phase. This plan will include currently identified post-construction efforts and additional effort that may be identified by the change management process during the construction phase of the Project.
- Act as principal interface with ex-Chad outside agencies (e.g. World Bank Group, private lenders, NGOs, etc.), on an as-needed basis.

### 3.0 COMMUNICATIONS AND NON-COMPLIANCE SITUATION RESOLUTION

The management of EEPCI/TOTCO's environmental monitoring effort will involve open communications between in-country environmental monitoring personnel and EEPCI/TOTCO senior environmental and construction management personnel to keep responsible personnel informed regarding the Project's environmental performance and to effectively and expeditiously resolve environmental non-compliance situations. This chapter discusses the processes for communications between these groups.

#### 3.1 HIERARCHY OF NON-COMPLIANCE SITUATIONS AND ASSOCIATED COMMUNICATIONS

An important element of EEPCI/TOTCO's communications process will be the organized relay of information concerning situations that do not comply with the Project's environmental requirements, specifications, goals, and objectives. To help focus senior management attention on the most important issues, non-compliance observations will be separated into three levels on the basis of importance, and communications requirements for the observations will be commensurate with the severity of the non-compliance situation.

The three levels of non-compliance situation importance and expected disposition processes for such situations are as follows:

Level I - *Definition:* A non-compliance situation not consistent with original requirements, but not believed to represent an immediate threat to an identified important resource.

Repeated Level I concerns may become Level II concerns if left unattended.

*Disposition:* Level I situations will typically be addressed adequately by normal in-country coordination and routine communications (e.g. discussion with the Contractor's site construction supervisor in many cases). Corrective action should be agreed to and implemented as expeditiously as practical. Formal communications will typically be limited to routine summary reports directed to the In-Country BP/SE/H Manager.

Level II - *Definition:* A non-compliance situation that has not yet resulted in clearly identified damage or irreversible impact to a sensitive or important resource, but requires expeditious corrective action and site-specific attention to prevent such effects.

Repeated Level II concerns may become Level III concerns if left unattended.

*Disposition:* Level II events are to be reported to In-Country BP/SE/H Manager and the In-Country Construction Manager (or their designated representatives) the same day as identified. The In-Country BP/SE/H Manager will notify the PMC Operations/HSE Manager (or his/her designated representative) within three days,

as practical, with suggested corrective action. Corrective action should be agreed to and initiated as expeditiously as practical, typically within the week following initial identification of the issue requiring attention.

Level III - *Definition:* A critical non-compliance situation, typically including observed damage to a specifically protected sensitive resource or a reasonable expectation of impending damage. Intentional disregard of specific prohibitions is also classified as Level III concerns.

*Disposition:* Level III concerns are to be reported to the In-Country BP/SE/H Manager and the In-Country Construction Manager (or their designated representatives) the same day they are identified. The In-Country BP/SE/H Manager will notify the PMC Operations/HSE Manager (or his/her designate) within one day whenever practical. The PMC Operations/HSE Manager will notify the PMC Project Manager (or his designate) of all Level III concerns the same day he/she is notified. Corrective action should be agreed to and initiated within three days of original observation unless special circumstances require a longer period.

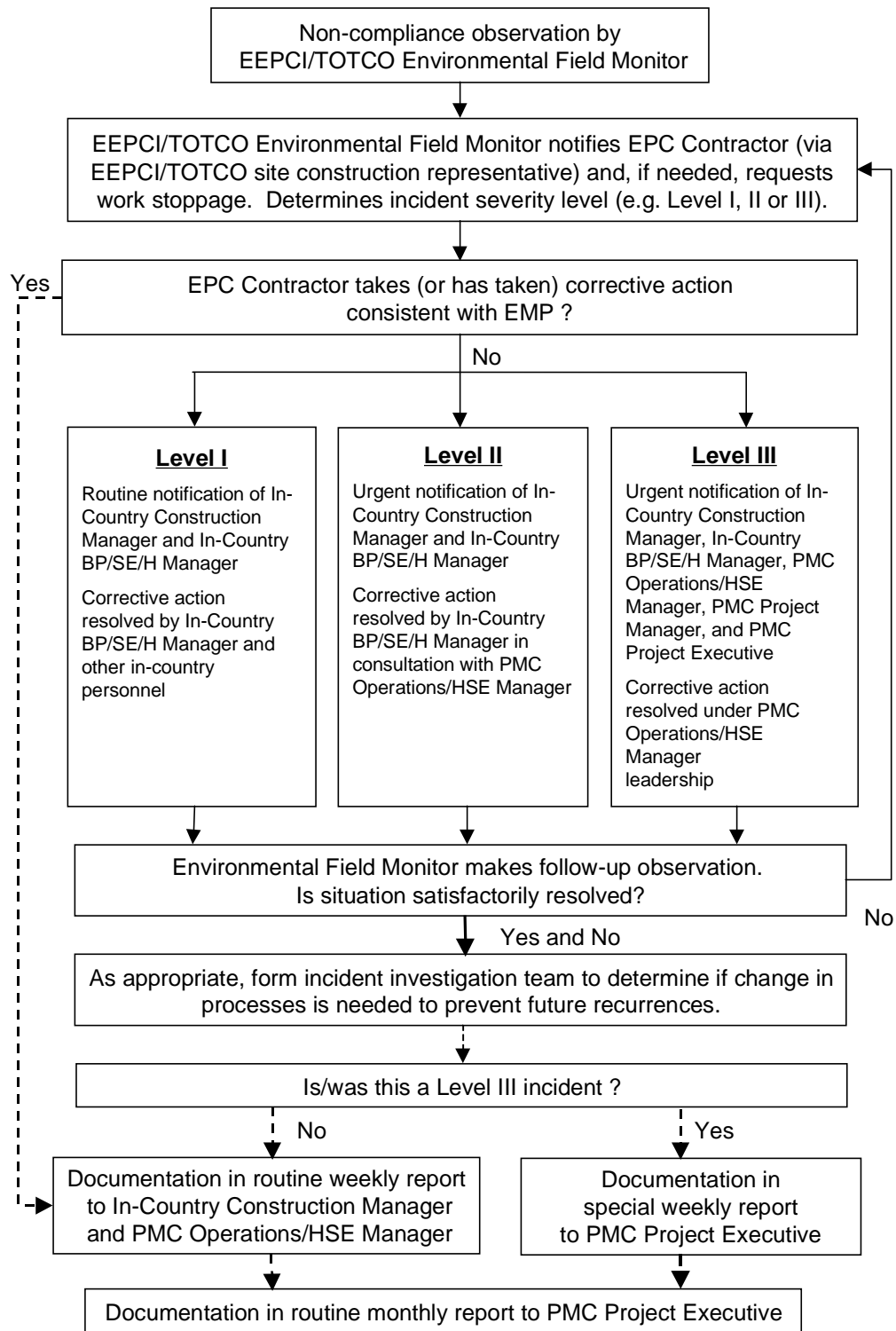
Although a specific decision/response time frame may not be achievable in all instances, the general intent will be to define and initiate action to minimize adverse effects and/or curtail adverse effects as expeditiously as practical. An adequate response to a Level III concern will include the diligent involvement of the PMC Operations/HSE Manager, the PMC Project Manager, the In-Country Construction Manager, and the In-Country BP/SE/H Manager. If necessary, the EEPCI/TOTCO Environmental Field Monitor, the In-Country BP/SE/H Manager, or the PMC Operations/HSE Manager may request the In-Country Construction Manager to halt specific activities in order to protect resources while corrective actions are implemented.

### **3.2 EEPCI'S/TOTCO'S COMMUNICATIONS, SITUATION RESOLUTION, AND REPORTING/DOCUMENTATION PROCESS REGARDING ENVIRONMENTAL NON-COMPLIANCE SITUATIONS**

As discussed above, EEPCI/TOTCO will use a tiered approach to communicate and respond to non-compliance situations observed during the construction phase of the Project. The process expected to be used to implement this tiered approach is illustrated in Figure 2, with the general flow of the communications, notification, and incident resolution decision making process being depicted with solid arrows and with the documentation and reporting process depicted by the dashed arrows. Although, for simplicity, the figure refers specifically to EPC Contractor non-compliance situations, the same process will be used for non-compliance observations associated with EEPCI and TOTCO activities.

With regard to communications, notifications, and situation resolution, Figure 2 shows the tiered approach in which emphasis will be placed on resolving less serious (e.g., Level I) situations in the field through open communications with construction personnel whereas progressively higher level personnel will be informed and brought into the decision-making process to resolve more serious (e.g., Level II and III) non-compliance situations. Although not explicitly shown in Figure 2, recurring issues associated with the failure to resolve less serious non-compliance observations are addressed by treating these topics as progressively higher level concerns.

With regard to reporting and documentation, the lower portion of Figure 2 indicates the formal documentation that will be incorporated into the process to clearly record non-compliance observations, corrective action taken, and observed results of those corrective actions. Routine documentation of monitoring observations will include the preparation of detailed weekly reports by the In-Country BP/SE/H Manager and a monthly summary report compiled by the PMC Operations/HSE Department. The monthly summary report will be provided to the PMC Project Manager and the PMC Project Executive to provide ongoing documentation of the monitoring effort and compliance issues. In addition to the routine reporting, special reports will be written for management concerning non-compliance Level II and Level III cases wherein the imminent threat of damage to sensitive resources exists.



**Figure 2 Environmental Compliance Incident Notification, Resolution, and Documentation/Reporting Process to be Used by the EEPCI/TOTCO Organization during the Construction Phase of the Project**

Aside from the tiered approach used to incorporate higher level managers into decision-making in more significant non-compliance situations, the process outlined in the figure above includes three other notable aspects.

- First, the process includes a mechanism whereby work can be stopped in the event of a serious non-compliance situation. Although the simple figure only explicitly indicates that such a request can be initiated by the Environmental Field Monitor, in reality such requests to the Contractor can be made, via the In-Country Construction Manager and his representatives, by the In-Country BP/SE/H Manager, the PMC Operations/HSE Manager, and the PMC Project Executive.
- Second, the process includes a feedback loop. Specifically, monitors are required to make follow-up visits to the sites of observed non-compliance incidents to verify that the situation has been appropriately rectified by the Contractor (or by EEPCI or TOTCO, as appropriate).
- Third, the process includes an incident investigation step which can be invoked as appropriate to determine the root causes of significant incidents and to evaluate if changes in requirements, specifications, or processes are needed to prevent similar incidents from occurring in the future.

### **3.3 SPECIFIC COMMUNICATIONS, DOCUMENTATION, AND COORDINATION RESPONSIBILITIES**

As discussed above, communications among EEPCI/TOTCO's in-country monitoring personnel and various EEPCI/TOTCO senior environmental and construction management personnel will include routine weekly communications, formal monthly reporting and review requirements, and urgent communications when needed to address issues that present an immediate threat to the environment. Table 1 presents the communications responsibilities of individual members of EEPCI/TOTCO's environmental monitoring organization.

### **3.4 DOCUMENTATION AND TRACKING**

To effectively manage the environmental performance of the Project, the environmental monitoring organization will need a process to document and track non-compliance observations, decisions on situation resolution, corrective actions taken, and the observed results of those corrective actions. Although the development of this process is not complete, it is expected that EEPCI/TOTCO will use a computer database to track and allow analysis of this information. The database, will likely be capable of generating a variety of reports sorted by key fields which may include non-compliance situation level, non-compliance type, date range, location, etc. Topics of these reports would likely include:

- Comprehensive listings of all non-compliance situations observed;
- Summaries of non-compliance situations observed; and

- Status of non-compliance situation resolution based on last monitoring observation.

The In-Country BP/SE/H Manager and his/her staff will maintain the non-compliance tracking database. The database will be available to the EEPCI/TOTCO Environmental Monitoring Organization and the PMC Operations/HSE group. It is expected that both of these groups will use the database for various purposes including report generation and trend analysis.

**TABLE 1:  
 GENERAL COMMUNICATION GUIDELINES**

<b>Originating Party</b>	<b>Recipient</b>	<b>Frequency</b>	<b>Description</b>
In-Country Construction Manager	In-Country BP/SE/H Manager	Weekly	Construction schedule update, specific activities and location of upcoming construction
In-Country Construction Manager	In-Country BP/SE/H Manager	As Required	Short-term/sudden changes in activity or special monitoring needs
In-Country Construction Manager	In-Country BP/SE/H Manager	As Required	Extra workspace or revised construction practices notification and desired schedule
In-Country BP/SE/H Manager	PMC Operations/HSE Manager	Weekly	Weekly report of compliance monitoring Monitoring staff activity log Projected staffing plan Construction schedule update Training requests
In-Country BP/SE/H Manager	PMC Operations/HSE Manager	As Required	Level II or Level III compliance issue communications Short-term staff needs and/or construction coordination assistance request Training requests
In-Country BP/SE/H Manager	In-Country Construction Manager	Weekly	Monitor activity plan Weekly report of compliance monitoring
In-Country BP/SE/H Manager	Environmental Field Monitors	Weekly	Construction schedule update Monitoring assignments (activity plan) Status of compliance issue discussions and special directives
In-Country BP/SE/H Manager	Environmental Field Monitors	Immediate	Revisions to compliance standards, monitoring practices, and/or corrective action to be implemented to resolve identified compliance issues. Site-specific applicability and general applicability to be specifically addressed

Originating Party	Recipient	Frequency	Description
In-Country BP/SE/H Manager	Technical Specialists	As Needed	Technical program change directives Implementation of special studies and assessments Training plan and documentation revision assignments, and training program implementation assignment
Environmental Field Monitor	In-Country BP/SE/H Manager In-Country Construction Manager	Weekly	Weekly activity report, routine compliance record, monitoring results, record of non-critical (Level I) issues, field observation of activity compared to planned activity
Environmental Field Monitor	In-Country BP/SE/H Manager In-Country Construction Manager	Immediate (same day)	Non-routine or potentially critical violation observations (Level II or III) Special problems requiring technical assistance Construction activities outside of planned construction area
Environmental Field Monitor	In-Country BP/SE/H Manager In-Country Construction Manager	Weekly	Record of construction personnel training performed and personnel logs
PMC Operations/HSE Manager	In-Country BP/SE/H Manager	Weekly	Staff assignment directives, staffing level revision authorization Authorization of training requests or technical specialist assignments Authorized changes in monitoring practices or other technical direction (may be accompanied by technical documentation prepared by Technical Specialists)
PMC Operations/HSE Manager	PMC Project Manager PMC Project Executive	Monthly	Routine monitoring summary report documenting observations, corrective actions, program activity, and update on resolution of prior compliance problems
PMC Operations/HSE Manager	PMC Project Manager PMC Project Executive	Immediate As Needed	Level II and Level III non-compliance action directives

Originating Party	Recipient	Frequency	Description
PMC Operations/HSE Manager	PMC Project Manager PMC Project Executive	Weekly	Update concerning action taken and compliance status of any previously identified Level III compliance issues
PMC Operations/HSE Manager	PMC Project Executive PMC Project Manager	Monthly	Summary report documenting significant (Level II or Level III) compliance issues, decisions made, and corrective action initiated. Proposed changes to compliance commitments (if any).
PMC Operations/HSE Manager	PMC Project Manager PMC Project Executive	As Needed	Technical program change recommendations. Relay information from external party interactions (e.g., World Bank Group, private lenders, NGOs, general public, Republic of Chad).
PMC Operations/HSE Manager	PMC Project Executive	Quarterly	Routine compliance documentation and non-critical issues communication. Update of resolution of previously identified compliance issues.
PMC Project Manager	In-Country Construction Manager	Weekly	Routine or non-critical compliance issues (Level I) to be addressed by Contractor's management
Technical Specialist	In-Country BP/SE/H Manager	Weekly	Routine record of monitoring staff training and technical coordination activity
Technical Specialist	In-Country BP/SE/H Manager	As Needed	Results of special technical review of Level II or Level III compliance issues and/or results of special surveys. Written reports prepared according to case-specific management instructions
In-Country Construction Manager	PMC Project Manager	Weekly	Routine feedback concerning monitoring effort and recommended improvements
EEPCI In-Country Manager	Republic of Chad	Quarterly	Report on environmental compliance.
TOTCO In-Country Manager	Republic of Chad	Quarterly	Report on environmental compliance.

## 4.0 ENVIRONMENTAL MONITOR ACTIVITIES

In implementing the environmental monitoring effort, EEPCI/TOTCO will assign individual field environmental monitors to specific elements of the Project construction effort. For example, two environmental field monitors will likely be assigned to each of the pipeline construction spreads, whereas other monitors will be assigned to pump station sites, infrastructure development, etc. Each monitor will conduct routine inspections of Project-related sites and activities in his/her area to evaluate compliance with applicable environmental commitments. The text below discusses the specific monitoring activities and the documentation of monitoring observations that will be pursued by EEPCI/TOTCO's environmental field monitors.

### 4.1 SPECIFIC ENVIRONMENTAL MONITORING ACTIVITIES OF EEPCI/TOTCO FIELD ENVIRONMENTAL MONITORS

The specific monitoring actions to be completed by the EEPCI/TOTCO field environmental monitors in association with particular sites or construction activities are presented in Table 2. For each action, the table also indicates the expected frequency of EEPCI/TOTCO's monitoring observations, and the expected level of importance of non-compliance observations associated with a specific resource. The specific compliance commitments underlying the monitoring activities in Table 2 are described in detail in Chapter 2 of Volume 1 of the Project's EMP, as well as in the Project's technical specifications.

With respect to the frequencies of monitoring activities indicated in Table 2, several points should be recognized:

- First, EEPCI/TOTCO's environmental monitoring organization will represent a redundant layer of monitoring with respect to Contractor construction activities. For example, Contractors' activities will be monitored by the Contractors' environmental quality assurance monitoring personnel. In many situations, the role of EEPCI/TOTCO's field environmental monitors will be to confirm the results of the Contractors' environmental quality assurance monitors. It is expected that the frequencies of monitoring activities will be higher for the Contractors' quality assurance monitors.

In addition to Contractors' field environmental quality assurance monitors, Contractor activities will be closely monitored by EEPCI/TOTCO's site construction representatives. These individuals will be responsible for ensuring that site-specific activities conform to the Project's requirements and specifications, including those related to BP/SE/H matters.

- Second, the frequencies indicated for EEPCI/TOTCO monitoring activities are intended to allow for a flexible monitoring system. By tailoring monitoring activities schedules on a risk basis, the EEPCI/TOTCO field environmental monitors will be better able to focus their observation energies on higher risk sites and activities.

- Third, the confirmation of Contractor quality assurance results by EEPCI/TOTCO field environmental monitors will typically be accomplished using a risk-based sampling approach. Checks will be focused on:
  - Sites/activities with higher potential BP/SE/H risk;
  - Sites/activities with previous observations of BP/SE/H performance shortcomings;
  - New sites with construction challenges similar to those where BP/SE/H performance shortcomings were observed previously; and
  - Sites/activities with a recent turnover of key responsible personnel, and/or a large number of new personnel.

#### **4.2 DOCUMENTATION OF FIELD OBSERVATIONS**

Results of field observations, either documenting compliance with environmental requirements or identifying non-compliance with those requirements, will be reported on standard forms that will be included in a monitoring handbook. The use of these standard forms will help ensure that compliance-related observations are recorded in a consistent manner and in a standard format. As such, the information can be entered into a computer database that will be used to track the status of and allow analysis of non-compliance situations (see Section 3.4 of this Appendix). Examples of such forms might include:

- Potential Damage to Sensitive Resources Form;
- Stream Crossing/Sediment Control Form;
- Right of Way Workspace / Buffer Zone Violation Form;
- Hydrotest Water Discharge Form;
- Etc.

**TABLE 2**  
**SUMMARY OF EEP/CI/TOTCO ENVIRONMENTAL MONITOR ACTIVITIES FOR CONSTRUCTION PHASE OF THE PROJECT**

Category/Topic	Monitoring Action	Typical Frequency of EEP/CI/TOTCO Monitoring	Non-Compliance Urgency		Applicable Monitor Assignment		
			First Observation	Multiple Observations	Pipeline Spread	Oilfield/Pump Stations	Roads/Telecom
<b>AIR EMISSIONS</b>							
Waste and Refuse Incinerators	Visually Inspect & Evaluate (including functioning and maintenance, operating practices, waste storage and tracking, ash handling, and safety)	Bi-weekly at new sites, quarterly thereafter	Level I, II or III	Level II or III	✓	✓	✓
<b>SEWAGE/WASTEWATER DISCHARGES</b>							
Effluent Testing	Confirm Contractor Testing (Weekly Field Tests & Quarterly Lab Analysis)	Review records weekly or bi-weekly; random risk-based field tests	Level I, II or III	Level II or III	✓	✓	✓
Treatment Equipment & Operations	Visually Inspect & Evaluate (including housekeeping, functioning and maintenance, operating practices, sludge handling, effluent test data, odors, and safety)	Monthly at new sites, quarterly thereafter	Level I, II or III	Level II or III	✓	✓	✓
<b>HYDROTESTING</b>							
Water Testing and Discharge Practices	Observe Discharges  Confirm Water Test, Erosion Control and Dilution	During significant discharges	Level I	Level II or III	✓		
<b>WASTE MANAGEMENT</b>							
Engineered Landfill Construction	Visually Inspect & Evaluate (with emphasis on review of clay liner permeability data and on QA/QC related to synthetic liner integrity and weld quality)	Bi-weekly to weekly during critical phases of construction	Level I	Level II		✓	

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<b>WASTE MANAGEMENT (CONTINUED)</b>							
Engineered Landfill Groundwater Monitoring	Confirm Groundwater Sampling (water levels and water quality in monitoring wells)	Quarterly review of contractor data and random testing as needed	Level II or III	Level III		✓	
Waste Storage, Handling, and Disposal Practices	Visually Inspect & Evaluate (including waste segregation and storage practices, waste handling, disease vectors and habitat, waste tracking, and safety)	Bi-weekly at new sites, less often thereafter (e.g., quarterly)	Level I, II or III	Level II or III	✓	✓	✓
<b>WATER CONSUMPTION</b>							
Water Use Survey Prior to Withdrawal	Confirm Community Consultation regarding groundwater and surface water use by local populace  Water Sample Collection as needed	As needed, 1 week prior to withdrawal	Level II or III	Level III	✓	✓	✓
Community Water Use Monitoring During Withdrawal	Confirm Community Consultation regarding availability and quality of water resources used by local populace  Water Sample Collection as needed	Semi-monthly at start-up, monthly to quarterly thereafter	Level II or III	Level III	✓	✓	✓
Contractor Water Withdrawal Practices	Source Well Water Level Data Verification	Weekly to bi-weekly review of Contractor records, risk-based random sampling	Level II or III	Level III	✓	✓	✓
	Visual inspection of surface water removal sites/practices (including placement of intake hoses, use of fish screens and withdrawal rates/volumes)	Semi-weekly at new sites, less often thereafter (e.g., bi-weekly to monthly)	Level II or III	Level III	✓	✓	✓

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<b>GROUNDWATER RECHARGE</b>							
Protection	Monitor Contractor topsoil management, erosion control, and land restoration/reclamation practices	On-going	Level I	Level II or III	✓	✓	✓
<b>STREAMFLOW DISRUPTION, RIVERBED AND BANK DISTURBANCE, AND FRESHWATER FISH</b>							
Construction Practices	Observe and Evaluate (including time spent by equipment in watercourse, trenching, erosion and sedimentation control, use of culverts, reclamation, equipment fueling)	Daily during active construction	Level I	Level II or III	✓	✓	✓
Turbidity Evaluation	Field Testing as needed (where construction practices and/or observed increase in turbidity suggests a need for monitoring)	Daily, as needed (typically only during active construction)	Level I (or higher for specific sensitive resources)	Level II (or higher for specific sensitive resources)	✓	✓	✓
Sediment & Erosion Control	Visual Evaluation at Watercourse Crossing Locations	<ul style="list-style-type: none"> <li>▪ Daily during active construction</li> <li>▪ Once ca. 1 week after construction</li> <li>▪ Once 1-3 months after construction</li> </ul>	Level I	Level II or III	✓	✓	✓
Water Course Crossing Flow Maintenance	Visually Inspect and Evaluate Flow at Stream Crossings (including unimpeded water movement, sizes and placements of culverts, creation of incremental disease vector habitat)	Weekly risk-based checks during rainy season; monthly otherwise	Level I or II	Level II or III	✓	✓	✓
Pipe Exposure	Visual Inspection at Stream Crossings	Monthly risk-based random checks (dry season)	Level II	Level III	✓	✓	

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<b>STREAMFLOW DISRUPTION, RIVERBED AND BANK DISTURBANCE, AND FRESHWATER FISH (CONTINUED)</b>							
Worker Fishing Policy Compliance	Verify Implementation and Evaluate Effectiveness (including worker education, violation reporting and investigation, disciplinary action and security procedures)	On-going observations and monthly to quarterly review of records	Level I	Level II or III	✓	✓	✓
<b>SOIL, VEGETATION, AND WILDLIFE</b>							
Erosion Control and Reclamation	Visually Inspect to Verify Implementation and Evaluate Effectiveness	<ul style="list-style-type: none"> <li>▪ Daily to weekly during active construction</li> <li>▪ Once immediately following construction</li> <li>▪ Once 1-3 months after construction</li> </ul>	Level I	Level II or III	✓	✓	✓
Topsoil Stockpiling Practices	Visually Inspect to Verify Implementation (where applicable) and Evaluate Effectiveness	On-going	Level I	Level II or III	✓	✓	✓
Access Control	Visually Verify Implementation and Evaluate Effectiveness	<ul style="list-style-type: none"> <li>▪ Daily to weekly during active construction</li> <li>▪ Once immediately following construction</li> <li>▪ Once 1-3 months after construction</li> </ul>	Level I or II	Level II or III	✓		
Valued/Medicinal Plant Protection	Verify Implementation and Evaluate Effectiveness (including worker education, violation reporting and investigation, disciplinary action and security procedures)	On-going observations and monthly to quarterly review of records	Level II	Level III	✓	✓	✓
Vegetation Removal/Timber Stockpiling	Visually Assess and Evaluate Effectiveness	On-going	Level I	Level II or III	✓	✓	✓

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<b>SOIL, VEGETATION, AND WILDLIFE (CONTINUED)</b>							
Buffer Zones near Sensitive Areas	Flagging of Areas to be Avoided	Prior to clearing	Level II	Level III	✓	✓	✓
	Monitoring Compliance with Avoidance Requirement	Daily to weekly (risk-based)	Level II	Level III	✓	✓	✓
Hunting Policy and Bush Meat Regulation Compliance	Verify Implementation and Evaluate Effectiveness (including worker education, violation reporting and investigation, disciplinary action and security procedures)	On-going observations and monthly to quarterly review of records	Level II	Level III	✓	✓	✓

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<b>SOCIOECONOMICS</b>							
Population Migration	Monitor population growth, establishment of unauthorized settlements, inflationary pressures, etc. in vicinity of work camps and permanent operations sites	Quarterly effort with on-going observations	Level I	Level II or III	✓	✓	✓
Encouragement of local business	Verify program to stimulate involvement of local business	Monthly	Level I	Level II	✓	✓	✓
Fair employment practices	Review Contractors' employment records to confirm fair recruitment and employment of qualified Nationals	Monthly	Level II	Level III	✓	✓	✓
Education and training of workers	Review Contractor training plans to verify compliance with training specifications	Monthly to quarterly	Level I or II	Level III	✓	✓	✓
Housing	Verify compliance with Project housing approach and housing accommodation specifications	Bi-weekly at new sites, less often (e.g., quarterly) thereafter, random checks	Level II	Level III	✓	✓	✓
Land Use	Verify reclamation of disturbed lands	One month following cleanup	Level II	Level III	✓	✓	✓
Land Use	Verify land available for traditional uses following construction  Monitor increases in land value	Inspection following construction:  <ul style="list-style-type: none"> <li>• one month after cleanup</li> <li>• three months after cleanup and reclamation</li> </ul>	Level I	Level II or III	✓	✓	✓

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<b>SOCIOECONOMICS (CONTINUED)</b>							
Sacred and Cultural Sites	Verify notification of archaeological, historical, and paleontological site identification and implementation of treatment plans	On-going  Daily to monthly (risk-based) checks at identified sites	Level III	Level III	✓	✓	✓
Sacred and Cultural Sites	Verify consultation with villages and spiritual leaders to identify sensitive cultural resources and negotiate handling and compensation	Bi-weekly at site start-up, monthly thereafter	Level III	Level III	✓	✓	✓
Sacred and Cultural Sites	Verify construction worker training regarding cultural issues	Review records after site startup and monthly to quarterly thereafter	Level I	Level II or III	✓	✓	✓
Sacred and Cultural Issues	Verify work-camp provision of religious facilities	At camp set up and quarterly thereafter	Level I	Level II	✓	✓	✓
Cattle herd movements	Verify construction schedule communications with locals	Weekly to monthly (and risk based)	Level I or II	Level II or III	✓		✓
Cattle herd movements	Verify construction practices to allow herd movement  Verify assistance to herders in construction area  Monitor use by pastoralists	Weekly to bi-weekly (as seasonally and geographically appropriate)	Level II	Level III	✓		✓
Indigenous Peoples / Fishing Resources	Verify compliance with hunting, fishing, gathering prohibitions and fishing loss compensation program	Weekly (during construction in Pygmy areas)	Level II	Level III	✓	✓	✓

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<b>HEALTH</b>							
Project worker disease education program	Review training records to confirm employee training	Bi-weekly to monthly depending on turnover	Level I	Level II or III	✓	✓	✓
Tuberculosis control	Verify pre-employment testing, worker surveillance and treatment records using Epidemiologic Information System and Sentinel Surveillance System	Bi-weekly at start-up, monthly to quarterly thereafter	Level I	Level II or III	✓	✓	✓
Respiratory protective equipment	Verify availability and use of protective equipment where appropriate	On-going	Level I	Level II or III	✓	✓	✓
Housing and Food Service Standards	Verify adequate housing standards and food handling standards prepared and implemented	Weekly at site start-up, bi-weekly to monthly thereafter	Level I or II	Level II or III	✓	✓	✓
Laundry Standards	Verify sanitation specifications for laundry facilities are available and adhered to	Weekly at start-up, monthly to quarterly	Level I	Level II or III	✓	✓	✓
Dust Control	Verify dust control on roads and construction sites	On-going	Level I	Level II or III	✓	✓	✓
Sexually-transmitted disease control	Verify pre-employment testing and active intervention, education, and treatment programs, condom availability	On-going observations with quarterly records review	Level II	Level III	✓	✓	✓
Medical facilities	Verify use of “universal precautions” to control blood-borne pathogen exposure  Inspect facilities for adequate supplies and sterile procedures	Monthly to quarterly	Level III	Level III	✓	✓	✓
Malaria control	Verify control plan and inspect Project housing for bed nets, screens, spraying, and standing water abatement	Weekly at site start-up, monthly thereafter	Level II	Level III	✓	✓	✓

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<b>HEALTH (CONTINUED)</b>							
Vector control	Verify implementation of control plan which specifically addresses viral hemorrhagic fever control	Bi-weekly at site start-up, monthly thereafter	Level II	Level III	✓	✓	✓
Vector control	Verify implementation of vector removal and habitat control near camps and permanent facilities, including: <ul style="list-style-type: none"> <li>• black fly control</li> <li>• mosquito control</li> <li>• water snail control</li> <li>• rodent control</li> </ul>	Bi-weekly at site start-up, monthly thereafter	Level II	Level III	✓	✓	✓
Water-borne disease control	Verify implementation of water sanitation and waste management practices	Weekly at site start-up, monthly thereafter	Level II	Level III	✓	✓	✓
Food-borne disease control	Verify food-borne illness reporting procedure and investigation plan	Bi-weekly at site start-up, monthly to quarterly thereafter	Level II	Level III	✓	✓	✓
Occupational Safety	Verify implementation of worker safety and first aid training program	Review of records at start-up and monthly thereafter	Level I	Level II or III	✓	✓	✓
Occupational Safety	Verify implementation of occupational injury and illness reporting program	Monthly	Level II	Level III	✓	✓	✓
Occupational Safety	Verify implementation of accident and "near miss" investigation and of cluster evaluation procedure	Monthly to quarterly	Level I	Level II or III	✓	✓	✓

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<b>HEALTH (CONTINUED)</b>							
Occupational Safety	Verify adequate signage and barricades in hazardous construction zones Verify use of PPE and proper chemical control practices	On-going	Level II	Level III	✓	✓	✓
Occupational Safety	Verify equipment and vehicle operators training Verify implementation of vehicular safety inspections	At site start-up, then monthly to quarterly	Level II	Level III	✓	✓	✓

Expected Monitor Assignments:

- Pipeline Spread - includes pipeline construction activities and the associated construction camps and access roads
- Oilfield/Pump Station - includes the oilfield development and pump station construction activities as well as the associated camp, landfill, storage yard, airfield, and field roads
- Roads/Telecom - includes roads, infrastructure, and telecom construction activities as well as the pipeline storage yard and the road construction camps

Use of Terms: Semi-weekly = twice per week; Semi-monthly = twice per month; Bi-weekly = once every two weeks; Bi-monthly = once every two months