REPORT OF THE:

EXTERNAL COMPLIANCE MONITORING GROUP

CHAD EXPORT PROJECT

Site visit: November 2010
Cameroon - Chad

Prepared for
International Finance Corporation
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>AAQM</td>
<td>Ambient Air Quality Monitoring</td>
</tr>
<tr>
<td>BOD</td>
<td>Biochemical Oxygen Demand</td>
</tr>
<tr>
<td>BP</td>
<td>Borrow pit</td>
</tr>
<tr>
<td>BV</td>
<td>Block Valve</td>
</tr>
<tr>
<td>BWMF</td>
<td>Belabo Waste Management Facility</td>
</tr>
<tr>
<td>CMNP</td>
<td>Campo Ma’an National Park</td>
</tr>
<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
</tr>
<tr>
<td>CPSP</td>
<td>Pipeline Steering and Monitoring Committee</td>
</tr>
<tr>
<td>CRCP</td>
<td>Chad Resettlement and Compensation Plan</td>
</tr>
<tr>
<td>CRO</td>
<td>Community Relations Officer</td>
</tr>
<tr>
<td>CTF</td>
<td>Central Treatment Facility</td>
</tr>
<tr>
<td>DBST</td>
<td>Double Bitumen Surface Treatment</td>
</tr>
<tr>
<td>ECMG</td>
<td>External Compliance Monitoring Group</td>
</tr>
<tr>
<td>EEPCI</td>
<td>Esso Exploration and Production Chad Inc.</td>
</tr>
<tr>
<td>EDC</td>
<td>Electricity Development Corporation</td>
</tr>
<tr>
<td>EPA</td>
<td>Environmental Protection Agency</td>
</tr>
<tr>
<td>EMP</td>
<td>Environmental Management Plan (PGE in French)</td>
</tr>
<tr>
<td>ESIA</td>
<td>Environmental and Social Impact Assessment</td>
</tr>
<tr>
<td>ETS</td>
<td>Export Transportation System</td>
</tr>
<tr>
<td>FEDEC</td>
<td>Foundation for Environment and Development in Cameroon</td>
</tr>
<tr>
<td>FEED</td>
<td>Front End Engineering Design</td>
</tr>
<tr>
<td>FSO</td>
<td>Floating Storage and Offloading</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GPS</td>
<td>General Project Specification</td>
</tr>
<tr>
<td>HC</td>
<td>Hydrocarbon Content</td>
</tr>
<tr>
<td>HH</td>
<td>Household</td>
</tr>
<tr>
<td>HHH</td>
<td>Household head</td>
</tr>
<tr>
<td>HHM</td>
<td>Household member</td>
</tr>
<tr>
<td>H&amp;S</td>
<td>Health and Safety</td>
</tr>
<tr>
<td>HW</td>
<td>Hazardous Waste</td>
</tr>
<tr>
<td>IA</td>
<td>Interface Agreement</td>
</tr>
<tr>
<td>IAT</td>
<td>Improved Agriculture Training</td>
</tr>
<tr>
<td>IO</td>
<td>Implementing Organization</td>
</tr>
<tr>
<td>IFC</td>
<td>International Finance Corporation</td>
</tr>
<tr>
<td>IPP</td>
<td>Indigenous People Plan</td>
</tr>
<tr>
<td>KP</td>
<td>Kilometer Pipeline</td>
</tr>
<tr>
<td>KPI</td>
<td>Key Performance Indicators</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Description</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>KWMF</td>
<td>Komé Waste Management Facility</td>
</tr>
<tr>
<td>LCC</td>
<td>Local Community Contacts</td>
</tr>
<tr>
<td>LUMAP</td>
<td>Land Use Mitigation Action Plan</td>
</tr>
<tr>
<td>MA</td>
<td>Maintenance Area</td>
</tr>
<tr>
<td>MARPOL</td>
<td>Marine Pollution Convention</td>
</tr>
<tr>
<td>MBC</td>
<td>Marine Breakaway Couplings</td>
</tr>
<tr>
<td>MOC</td>
<td>Management of Change</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-Governmental Organization</td>
</tr>
<tr>
<td>NTFP</td>
<td>Non Timber Forest Products</td>
</tr>
<tr>
<td>ODME</td>
<td>Oil Detector Monitoring Equipment</td>
</tr>
<tr>
<td>OFDA</td>
<td>Oil Field Development Area</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>Oil and Grease</td>
</tr>
<tr>
<td>OWS</td>
<td>Oil/Water Separator</td>
</tr>
<tr>
<td>PAP</td>
<td>Project Affected Person</td>
</tr>
<tr>
<td>PM10</td>
<td>Particulate Matter (&lt;10 µm)</td>
</tr>
<tr>
<td>PPE</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>PMP</td>
<td>Pipeline Modification Project</td>
</tr>
<tr>
<td>PRS</td>
<td>Pressure Reduction Station</td>
</tr>
<tr>
<td>PS2</td>
<td>Pump Station No. 2</td>
</tr>
<tr>
<td>PS3</td>
<td>Pump Station No. 3</td>
</tr>
<tr>
<td>RAPID</td>
<td>Réseau d’Actions Participatives aux Initiatives de Développement</td>
</tr>
<tr>
<td>ROW</td>
<td>(pipeline) Right-of-Way</td>
</tr>
<tr>
<td>ROWIP</td>
<td>ROW Integrity Plan</td>
</tr>
<tr>
<td>SEIA</td>
<td>Specific Environmental Impact Assessment</td>
</tr>
<tr>
<td>SHE</td>
<td>Safety, Health and Environment</td>
</tr>
<tr>
<td>SNH</td>
<td>National Hydrocarbons Society</td>
</tr>
<tr>
<td>SSP</td>
<td>Site Specific Plan</td>
</tr>
<tr>
<td>STP</td>
<td>Sewage Treatment Plant</td>
</tr>
<tr>
<td>TOTCO</td>
<td>Tchad Oil Transportation Company S.A.</td>
</tr>
<tr>
<td>TPH</td>
<td>Total Petroleum Hydrocarbons</td>
</tr>
<tr>
<td>UNDP</td>
<td>United Nations Development Program</td>
</tr>
<tr>
<td>WB</td>
<td>World Bank</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
<tr>
<td>WMF</td>
<td>Waste Management Facility</td>
</tr>
<tr>
<td>WMP</td>
<td>Water Monitoring Program</td>
</tr>
<tr>
<td>Wwf</td>
<td>World Wildlife Found</td>
</tr>
</tbody>
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1 INTRODUCTION

This report presents the outcomes of the seventh Post-Project Completion field visit conducted from November the 7th to November the 18th, 2010 by the External Compliance Monitoring Group (ECMG).

According to the ECMG’s Terms of Reference, D’Appolonia shall carry out, at least on a yearly basis, a review of the Environmental Management Plan Compliance by the Chad/Cameroon Oil Development and Transportation Project (the Project) till full repayment of the Senior Project Indebtedness.

The seventh Post-Project Completion site visit focused on the activities carried out by COTCO (Cameroon) and EEPCI/TOCTO (Chad) in 2010 and relevant to the management of both social and biophysical EMP related issues.

Specific activities conducted during this mission included:

- meeting with COTCO and EEPCI EMP team to conduct a desk review of the EMP monitoring activities carried out;
- visiting the Project permanent facilities in Cameroon;
- visiting the Oil Field Development Areas (OFDA);
- visiting the future Lom Pangar Pipeline Modification Project (PMP) site;
- meeting with the Environmental Foundation (Foundation for Environment and Development in Cameroon, FEDEC) and Non-Governme nt Organizations (NGOs) belonging to the Social Platform in Cameroon; and
- conducting two dedicated closeout meetings for EEPCI/TOTCO and COTCO, focusing on key mission findings and preliminary discussion on possible recommendations and corrective actions to be implemented.

The first closeout meeting was conducted in N’Djamena, on November the 11th, 2010. The second closeout meeting for the Cameroon portion was conducted in Douala, Cameroon, on November the 18th, 2010.

The topics and mission findings presented during the close out meetings have represented, together with a desk review of the EMP monitoring records collected by the ECMG, the basis for the elaboration of the present report.

In the following sections, the outcomes of the field visit and documents desk review conducted are presented for each biophysical and socioeconomic topic or area of interested covered. A separate section dedicated to an update on the Lom Pangar PMP is provided at the end of this report. Finally, a daily activity agenda is reported in Appendix A.

In addition, as agreed with the Project and IFC representatives and to facilitate the consultation, the observations and recommendations made by the ECMG are presented under this document under separate sections dedicated respectively to the review of the EMP monitoring activities carried out in Cameroon and in Chad.
2 EMP ORGANIZATION

During the kick-off meetings held with EEPCI/TOCTO and COTCO, an update on the EMP organizations have been presented to the ECMG team. Both EMP teams appear to be sufficiently staffed to accomplish the EMP duties. Country specific observations are reported in the following sections.

2.1 EMP CHAD

As per the observations during the past ECMG missions, the EEPCI and TOTCO EMP team is provided with a very well structured and skilled team.

The EMP management team is based in N'Djamena and supervises four units permanently present in Komé that focus on 1) biophysical components, 2) socio-economic components, 3) construction related and ROW monitoring issues 4) implementation of the Land Use Mitigation Action Plan (LUMAP). According to the EEPCI organization chart updated to November 1, 2010, the EMP team includes 2 managers plus 5 member support staff at the N’Djamena headquarters and 8 supervisors and 89 specialists based in Komé, mainly local experts supported by a few senior expatriates.

The EMP organization appears to be strongly structured and consistent with the EMP requirements. In addition, a satisfactory coordination of the EMP team personnel has been observed to be in place. Team members are fully aware of the routine duties and internal coordination meetings are regularly held.

EMP manages the land use data through the EMP Information System (EMP IS) relational database. One national Database Specialist has been transferred from the Operations Technical Department and has started training. The electronic management of EMP biophysical monitoring records is done through standard MS Office tools.

Future modification of the current EMP team organization will consist in merging the LUMAP Special Project Team and the EMP Socio-Economic team into a single unit, given the strong overlap of the topics covered. Of course it is envisaged that the merging of the two teams will not result in a reduction of the team strength and available workforce.

2.2 EMP CAMEROON

COTCO EMP organization appears to be robust and well structured. A SHE manager and an EMP manager coordinate both the biophysical and socio-economic teams. COTCO’s staff is entirely formed by local specialists. Nine specialists belong to the socio-economic section and 4 specialists belong to the Environmental Section. Management of sensitive topics such as waste, wastewater and air quality monitoring is conducted through the help of resident personnel at the PSs.

COTCO is reportedly strengthening the team in place through ongoing training for new EMP team entries, in particular for the Socio-economic Section. COTCO appointed a new community relations coordinator in the frame of the Public Affairs department who will support the socio-economic team in screening, identifying, planning and monitoring community level investments beyond compliance activities. The link established between Public Affairs and the Socio-Economic department should ensure more coordination between various COTCO community investments (community compensations, donations and sponsorships).

As documented in the past reports, COTCO’s field staff has an excellent knowledge of the Project status and has a good understanding of the EMP requirements and routine EMP monitoring activities performed at each facility. In addition, a good coordination between headquarter in Douala and Project facilities visited (PS2 and PS3) has been observed during the site visit. Weekly and monthly reports are submitted to the management and EMP team performs monthly field visits at the facilities.

Recommendations

1. COTCO should consider giving Project Management and M&E training to the staff supervising the community projects.
3 WORKERS AND COMMUNITY HEALTH AND SAFETY

3.1 Occupational Health and Safety Measures

Occupational H&S measures have been observed to be strongly implemented by EEPCI/TOTCO/COTCO at all visited sites (OFDA, PS2 and PS3). As documented also in the past reports, both EEPCI/TOTCO and COTCO organizations are strongly committed to the respect of the H&S requirements for both the internal and external (contractors and sub-contractors included) staff.

3.1.2 Access Control at Well Pads (Chad)

As documented in past ECMG reports, starting in 2006, EEPCI has discontinued the installation of fences at the well pads due to recurrent thefts of the fences. This practice has been negatively commented by the ECMG due to the potential issues in terms of safety for local communities and due to the potential incidents occurring at the well heads in case of intentional manipulation.

It is noted that the Project EMP addresses the installation of fencing measures at the well pads in order to avoid any unauthorized access and any potential manipulation of valves and equipment (see Box 1 for details). These requirements are set for all kind of project facilities or equipment where a significant risk of human or environmental incident exists.

**Box 1: EMP and IFC Guidelines Requirements on Well Pads Access Control**

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The EMP Volume 3, which addresses, among the project facilities, the well pads as permanently closed facilities with no public access;</td>
</tr>
<tr>
<td>2.</td>
<td>The EEPCI OFDA Spill Response Plan, which addresses the need of preventing incidents that could result in the release of oil in the surrounding environment and the primary importance of the public safety protection;</td>
</tr>
<tr>
<td>3.</td>
<td>The requirements of the IFC Environmental, Health and Safety Guidelines for Onshore Oil and Gas Development, which address the need for fences and warning signs around any kind of permanent facility in order to prevent public contact with dangerous locations, equipment and hazardous materials.</td>
</tr>
</tbody>
</table>

In response to the concerns raised, EEPCI has conducted an internal risk analysis and implemented a hardening program aimed at enhancing the security measures at each well pad, by:

- performing public awareness campaigns on safety, health and environment;
- installing titanium locks at all valves and electrical panels;
- installing multilingual power warning signs; and
- hardening the piping and electrical cables.

During the site visit, the ECMG team consistently verified the presence of the hardening measures at all surveyed electrical panels.

In addition, and following the ECMG most recent recommendation (refer to 2009 Report), EEPCI performed a specific risk assessment in order to determine the effective safety and environmental risk associated with any possible intentional unauthorized manipulation of well head valves.

The results of this assessment have been jointly discussed with the ECMG also through a dedicated survey at selected well pads conducted in conjunction with representatives of the EEPCI Operations Department.

The main findings were that any manipulation of well head valve could only result in an automatic shutdown of the well (thanks to the presence of three redundant pressure detection and automatic shut down devices). The sampling valves on the well flowlines have screw in plugs (“bull plugs”) installed. Attempted theft of oil from these sample valves would reportedly result in a drop in flow line pressure that would trigger an automatic shutdown of the well.

According to the desk review and the observations in the field, the ECMG team deems satisfactory the results of the risk analysis and the identification of possible risks associated with manipulation.
In any case, further monitoring of the ongoing situation is required as well as keeping track of unauthorized access and manipulations, which appear to be still significant according to the records provided.

3.1.3 Minimum Distance requirements of Well Pads from Villages or Settlements

During the November 2010 visit, the ECMG had the opportunity to observe and confirm the progressive enlargement of the oil fields compared to the past years.

At the present time, the OFDA is provided with a total of 624 producing wells plus 68 injection/supply/observation wells. Further 8 well pads were under construction at the time of the visit and 28 more wells were waiting for drilling operation (for a total of 728 well pads in the OFDA).

In addition to all the socioeconomic implications and issues related to the oil wells in fill drilling program ongoing at the OFDA, which are discussed under the socioeconomic review sections, the increasing well pad construction and drilling activities were observed to be located very close to the villages or dwellings surrounding the OFDA.

In particular, the ECMG had the opportunity to spot check the current status of couple of well pads (one already working as reinjection well and one production well just drilled) located close to the Mbanga village in the Komé oil field, with the following observations:

- minimum distance requirements are, according to the documentation provided, met. The Environmental baseline assessment documents provided confirmed the identification of the village housing during the initial survey and the evaluation of the distance from the closest house to the well location;

- at the well pad under reclamation construction, a certain lack of access control to the site was observed since several local villagers were seen standing on the side berm, made of excavated soil, within the working area.
3.1.4 Abandoned and Newly Constructed Well Pads (Chad)

As observed during past ECMG visits, a potential issue in terms of community safety at the OFDA is due to the risk of potential falls inside the open pits installed at each newly constructed well pad, which are left unguarded during time elapsing between pad construction and drill rig mobilization.

The Project EMP requires that “all open trenches and other excavations shall be provided with suitable barriers, signs and lights to the extent that adequate protection is provided to the public (General Project Specification [GPS] 008).”

Following ECMG recommendation of consistently implement mitigation measures needed to meet EMP –GPS008 requirements, the Project has started to use barrier tapes around the pits. However the attempts made so far failed since all barrier tapes used were systematically stolen, unless in presence of permanent guarding.

At the time of the ECMG visit in November 2010, the Project has started to evaluate and implement the use of warning signs (such as the one shown in the following example picture). In addition the Project has committed to continue the local community awareness campaign on the potential hazards related to open pits in order to avoid potential incidents.

Figure 3.2: Warning Sign at Oil Well K907
Recommendation:

2. The Project shall ensure that the warning signs to be installed at the open pits providing not only multilanguage warning text but also images able to easily communicate the risk associated with accidental falls. In addition, while awaiting for drill rig mobilization, accumulation of rain water inside the pits shall be monitored and promptly removed to avoid creation of ponds as shown in the provided picture.
4 BIOPHYSICAL ENVIRONMENT AND ENVIRONMENTAL MANAGEMENT TOPICS – CAMEROON REVIEW

4.1 WATER RESOURCES PROTECTION

Water resource protection is a key requirement for the entire Project, which has developed a Water Monitoring Program (WMP) consisting of the components as presented in the following box.

**Box 2: Water Monitoring Program Components**

<table>
<thead>
<tr>
<th>Water Monitoring Program Components</th>
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</thead>
<tbody>
<tr>
<td>1. Surveying of local surface water and groundwater usage practices prior to the commencement of Project-related surface water and/or groundwater withdrawals;</td>
</tr>
<tr>
<td>2. Monitoring of local surface water and groundwater resources while Project-related construction phase water withdrawals are occurring;</td>
</tr>
<tr>
<td>3. Monitoring of water for human consumption obtained from Project-installed groundwater source wells/boreholes;</td>
</tr>
<tr>
<td>4. Regional groundwater monitoring program at Permanent Facilities;</td>
</tr>
<tr>
<td>5. Groundwater monitoring at the Project’s engineered solid waste landfill sites (PS3 Landfill in Bélabo);</td>
</tr>
<tr>
<td>6. Monitoring of liquid effluents discharged directly to onshore surface water bodies;</td>
</tr>
<tr>
<td>7. Monitoring of liquid effluents discharged directly from the Floating Storage and Offloading (FSO) vessel.</td>
</tr>
</tbody>
</table>

COTCO has consistently implemented the WMP in 2010.

In particular, during the site visit, the COTCO has provided the ECMG team with the following data relevant to the implementation of the WMP:

- 2010 monthly groundwater depth results at the piezometers located at the permanent facilities (PS2, PS3 and PRS);
- a summary table of the groundwater chemical analyses results for piezometers at PS2, PS3 and PRS and PS3 WMF (period 2001-2009);
- monthly groundwater consumption records at permanent facilities (2009-2010);
- testing results of potable water analysis at PS2 (2010);
- wastewater effluent analysis results at PS2 (2010);
- results of leachate analysis of Belabo Waste Management Facility (2009); and
- TPH analysis on OWS effluent samples (2009).

In addition, ECMG has been provided during the field visit at PS2 with the last analysis performed on the dried sludge from the wastewater treatment plant and with the photographic map of the PS2 showing groundwater and surface water monitoring points.

The observations relevant to the performed WMP activities are summarized in the following sections, for each separate component. Wastewater and liquid effluent monitoring activities are discussed under Section 4.3.

4.1.1 Component # 3 of WMP – Monitoring of Water for human Consumption obtained from Project-installed Groundwater Source Wells

Results of raw water monitoring used for drinking purpose have been spot checked through the analysis of summary tables reporting data collected in 2010 at PS2. Data refer to values of pH, free chlorine, turbidity, faecal coliforms and conductivity. Reportedly, free chlorine and pH are tested twice per week, while the other parameters are tested weekly. Same data have been provided for the drinking water of the kitchen and bathrooms of PS2 during 2010. All results provided show no exceedance of the applicable WHO standards for Drinking Water quality. Summaries tables presented in the EMP 3Q10 Report show the compliance with EMP requirements also for PS3 and FSO wells.

Potable water monitoring results for the PS2, PS3 and FSO, as shown in the EMP 3rd Quarter 2010 Report, do not exceed WHO limits for drinking water.
Monthly water consumption records at COTCO facilities (PS2, PS3, PRS and FSO) have been provided for the period between January and October 2010. Results appear to be in line with the measurements collected during the 2009, apart from PS3 which showed water consumptions almost doubled in comparison with the measurements taken during the same period in 2009.

4.1.2 Component # 4 of WMP – Regional Groundwater Monitoring Program

The results of the 2010 groundwater monitoring campaign have not been provided since the new campaign was not started yet at the time of the visit (scheduled in December 2010).

However, COTCO provided EGMG with baseline analyses recorded during the period 2003-2009 at PS2, PS3 and PRS. Overall, the results provided confirmed the good quality of the water samples tested with respect to the applicable WHO standards for Drinking Water quality and baseline data (showing for instance an overall low pH due to high laterite content in the soil), as documented in past reports.

Monthly groundwater depth results of piezometers at COTCO facilities (PS2, PS3, BWMF and PRS) for year 2010 have been provided showing seasonal changes in terms of groundwater levels according to the natural cycle of rainy and dry seasons.

4.1.3 Component # 5 – Groundwater Monitoring at the Project’s engineered Solid waste Landfill Sites

The 2010 monitoring campaign at BWMF is yet to be performed (scheduled in December 2010). However, similarly to Component #4 of WMP, COTCO provided EGMG with baseline analyses recorded during the period 2003-2009 at Belabo Waste Management Facility. The results provided confirmed the compliance with the WHO standards for Drinking Water quality, apart from pH and inorganic contamination referable to geological background effects, as documented in past reports.

Following the ECMG recommendation made under the previous report, COTCO groundwater monitoring data have been uploaded in the Project GIS database.

An additional observation made during the ECMG visit, concern the lack of a dedicated groundwater monitoring well at the innocuous solid waste landfill at PS2.

Recommendation:

3. The Project shall consider installing an additional monitoring well for monitoring the groundwater quality at the PS2 non-hazardous waste facility (as required by the Project EMP GPS-007) to enhance current monitoring program.

4.2 WASTE WATER MANAGEMENT

4.2.1 Component # 6 – Monitoring of liquid Effluents Discharged directly to Onshore Surface Water Bodies

The Project liquid effluents produced by Sewage Treatment Plants (STPs) and storm water runoff collection systems and Oil Water Separators (OWSs), are discharged using leach field systems or open drainage ditches not directly connected with surface water bodies. The observations relevant to the performed monitoring activities of the quality of the effluents produced by the OWS and STPs are discussed in the following sections.

4.2.2 Sewage Water

Sewage treatment units at permanent facilities consist mainly of primary aerobic digestion units. Treated effluent is disposed through leach fields. Drying beds are used for the exhausted sludge by the wastewater treatment process which is collected after drying and sent for disposal at the non-hazardous waste cells. Wastewater collected below the filtering unit of the drying bed is treated through septic tanks and disposed in the leach fields.

According to the field observations, the sewage treatment plants at PSs are adequately managed and monitored.

Waste water analysis results have been provided by COTCO for the Sewage Treatment Plant at the PS2 during 2010 showing compliance with EMP standards. Summaries tables in the EMP 3Q10 Report show the compliance with EMP requirements also for PS3.

The dried sludge is reportedly being analyzed before each disposal in the landfill. The last sludge analysis performed by COTCO for the dried sludge at PS2 is dated November 2008 and shows some low concentrations in
terms of content of metals. According to the information provided by COTCO personnel, next analysis will be done before the end of 2010.

4.2.3 Oil Water Separators

COTCO have developed an Oil Water Separator Monitoring Plan establishing the surveying and effluent monitoring criteria for all the OWS installed at the Project Facilities as follows:

**Box 3: OWS Monitoring Plan requirements**

<table>
<thead>
<tr>
<th>Oil Water Separator Monitoring Plan requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Effluent Oil and Grease Analysis: to be performed prior to each planned discharge;</td>
</tr>
<tr>
<td>2. Routine inspection: to be performed on a daily basis;</td>
</tr>
<tr>
<td>3. Documented inspection: to be performed on a weekly basis;</td>
</tr>
<tr>
<td>4. Soil and effluent analysis for Heavy Metals, Phenolic Compounds, Mercury Cadmium, TPH and pH: to be performed once every two years;</td>
</tr>
</tbody>
</table>

According to interview of the PSs personnel, regular inspections are performed, respectively daily and weekly, to check the proper functioning of the equipments.

Currently, OWS effluent analyses are conducted by COTCO twice per year in terms of TPH content. Results during 2009 for PS3, PS2 and PSR have been provided to ECMG showing no exceedance of the limit set in the Schedule 17 for Oil & Grease (20 mg/l).

Following the recommendation in the past report, COTCO has provided a more detailed analysis on the possible overflow scenarios interesting the main OWSs installed at the two PSs process areas. A detailed and satisfactory explanation of the design and functioning of the OWS has been provided to the ECMG in order to confirm the adequateness of the sizing of the containment system, as well as the adequateness of the monitoring system in place.

**Recommendation:**

4. Considering the OWS Monitoring Plan requirement for O&G analysis prior to each planned discharge, COTCO shall consider implementing the following corrective actions for the effluent testing at the OWS:

a. Provide both PSs with the needed testing equipment in order to promptly monitor the water effluent at the site, without requiring the analysis through off site laboratory;

b. Modify/increase the sampling collection frequency in order to sample and test the first flush effluent resulting from each rainfall event that is following a significant dry or no-rain period. Frequency may be increased based on evidence from daily inspection of the OWS.

4.2.4 Component # 7 – Monitoring of Liquid effluents Discharged directly from the Floating Storage and Offloading (FSO) Vessel

The system in place at the FSO consists of an automatic oil in water detection unit (Oil Detector Monitoring Equipment - ODME) connected with the main control room of the FSO.

The unit is continuously measuring the TPH content in the treated effluent water and it is connected with an emergency shutdown valve to be closed in case of detected concentrations higher than MARPOL reference limits. At the same time, after effluent discharge, the FSO personnel collect grab water samples for off site laboratory analyses aimed at counter-verifying the correct functioning of the ODME.

No oily water was reportedly discharged during 3rd Quarter 2010 from the FSO. In addition, no produced water was reportedly discharged in 2009 and 2010 (records available until October 2010) from the FSO.
4.3 WASTE MANAGEMENT

4.3.1 Waste Management at Pumping Stations (PS2 and PS3)

During the site visit, the team has been provided with a table summarizing updated data related to waste management during 2010 (till October). Moreover, the ECMG team visited the Waste Management Facilities at PS3 and PS2.

In the following table a summary of the non-restricted and restricted waste quantities produced and disposed of or temporarily stored by COTCO in 2010 is reported (period January to October).

<table>
<thead>
<tr>
<th>Non-Restricted Waste</th>
<th>Quantity (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic Garbage Incinerated on Site</td>
<td>8,644</td>
</tr>
<tr>
<td>Innocuous Solid Waste Buried On site</td>
<td>20,819</td>
</tr>
<tr>
<td>Recycled / Re-used by Local Communities</td>
<td>12,779</td>
</tr>
<tr>
<td>Sent to Approved Third Party Facilities for Disposal (Hysacam)</td>
<td>64,352</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Restricted Waste</th>
<th>Quantity (Kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted waste generated in 2010</td>
<td>19,412</td>
</tr>
<tr>
<td>Restricted waste disposed by BOCOM</td>
<td>10,446</td>
</tr>
<tr>
<td>Restricted waste remaining in storage</td>
<td>45,243</td>
</tr>
<tr>
<td>Restricted waste disposed at BWMF</td>
<td>0</td>
</tr>
</tbody>
</table>

According to data provided, no restricted waste has been land filled in the hazardous waste cell at PS3 in 2010 and approximately 20% of the restricted waste to be disposed has been incinerated at BOCOM in September 2010, while the remaining part is currently stored in dedicated drums and containers.

During the site visit, the ECMG team observed that both the waste management facilities at PS3 and the waste accumulation area at PS2 are very well maintained. No EMP related issue was observed.

At PS3, the non-hazardous waste cell will be reportedly expanded by increasing the elevation of the existing cell so that the construction of a new landfill can be avoided. However, for the time being, the capacity of the cell is evaluated sufficient for at least one more year.

The BWMF hazardous waste cell at PS3 has not been reopened since disposal of asbestos waste (done in 2007) and it is scheduled to be reopened in 2011. COTCO has plans for involving local authorities before reopening the hazardous cell in order to providing adequate technical background on waste disposal practices and characteristic of engineered cell.

The BWMF hazardous waste cell is provided with two pumps used for pumping out leachate to a holding tank. The leachate is treated through a mixed bed resin before being stored in a second holding tank. Analyses of treated leachate from the BWMF for the 2009 have been provided and show that tested parameters are below the Project adopted limits and can therefore be transferred to the wastewater treatment facility at PS3.

At PS2, the non-hazardous waste is managed in three different ways: 1) the non-hazardous waste cell is being used for land filling general domestic waste; 2) an incinerator is on-site to process the waste suitable for incineration and 3) waste suitable for donation programs to communities (e.g. wood) is stored in an appointed area. Hazardous waste is temporarily proper stored in sight of sending hazardous waste cell at PS3. Hazardous waste is sent by trucks (two days of travel towards PS3) approximately once per year depending on the amount of waste produced.

4.3.2 Oil Contaminated Soil Management - Proposed Waste Minimization Option

Oil contaminated soil at Pumping Stations and along the ROW (as well as at the OFDA in Chad) is generated by the oil spills occurring along the flowlines or at the valves and requiring clean up (by excavation) of the impacted soil.
It is underlined that the Project did not record in Cameroon any reportable oil spill (greater than 1 bbl) in 2010, except the one occurred at the FSO and covered under the Oil Spill Section, and that the latest significant oil spill event, which resulted in the recovery of oil contaminated soil, is the one occurred at blocking valve BV32 back in 2009.

EMP requirements for oil contaminated soil are set by the Volume 2 –Waste Management Plan –Section 2.1.9, as summarized in the following box.

**Box 4: Oil contaminated Soil Management**

<table>
<thead>
<tr>
<th>Waste management requirements – Contaminated soil by hydrocarbons:</th>
</tr>
</thead>
<tbody>
<tr>
<td>− interim storage by means of containers (drums) or by on bulk pad or plastic sheeting;</td>
</tr>
<tr>
<td>− prioritization of waste minimization option such as use for berm or road mix (if non-hazardous)</td>
</tr>
<tr>
<td>− use of applicable off-site remedial technologies according to Waste Management Plan: A) bioremediation; B) composting; and C) disposal at non-hazardous or hazardous landfill (whose design and construction requirements are defined by the project specification included in the EMP) depending on hazardousness of the contaminants of concern;</td>
</tr>
<tr>
<td>− Optimum TPH remediation goal 10,000 ppm (1% in weight).</td>
</tr>
</tbody>
</table>

At the present time, the oil contaminated soil collected from the BV32 spill event is stored inside the PS3 WMF through the use of bottom and cover lined wooden boxes.

The soil collected showed average concentrations already below the target level of 1% in weight immediately after excavation and therefore did not require any further contamination abatement. While visiting the PS3 WMF, the ECMG had the opportunity to visually confirm the low level of impact in the collected soil as well as the good status of preservation of the storage boxes.

The current plans from COTCO EMP are to use the contaminated soil to reinforcing the side berms at the landfill area for erosion control.

However, given the non urgency of this intervention, alternative disposal option, through the use of hazardous cell, is also being evaluated.

In terms of EMP requirements it is underlined that the use for berm is allowed only if the soil is proved to be non-hazardous, and specifically non-toxic, while the disposal through hazardous cell is instead allowed regardless the hazardousness of the material.

Since the same issue (evaluation of the hazardousness of HC contaminated soil) is presently being studied by the EEPCI EMP team for the use of impacted soil in road mix (see Section relevant to contaminated soil management in Chad), the ECMG suggested COTCO to coordinate with EEPCI in order to consistently adopt a common approach to contaminated soil management and before selecting any of the two above mentioned final disposal option.

### 4.3.3 Asbestos Waste Disposal (follow up)

The present section provides a follow up on the Asbestos disposal issue which was raised in 2007 following the disposal at PS3 Hazardous Waste Cell of approximately 2,100 kg of asbestos containing wastes derived from clean up operations conducted at the FSO (see past ECMG reports for background) and the concern born among the local population for the potential risks of exposure to the Asbestos. Following review of the technical documentation provided, the ECMG has evaluated the disposal process as in strict compliance with EMP requirements (Vol. 5 topic 2.1.36) and best international practice.

In response to the recommendations made to enhance public communication and disclose to the local communities the needed technical information able of to confirm the adequateness of the transport and disposal measures adopted for the asbestos wastes collected, and following CPSP request, COTCO has contracted the local universities of Yaoundé and Douala to conduct a study to evaluate adequateness of adopted disposal options.

Preliminary results of the study carried out by the Yaoundé University confirm that no risk for local communities is posed given the waste segregation measures adopted and the environmental protection measures in place at the engineered hazardous waste landfill cell in PS3.
Following the completion of the Douala University, the Project will start evaluating the needed disclosure means in order to finally provide adequate feedback and information to the local communities, especially those located in proximity of the PS3.

4.4 OIL SPILL PREVENTION AND RESPONSE

Routine Drills Conducted

Routine emergency drills are conducted at Project’s sites on a regular basis. According to the information gathered in the field, monthly oil spill response drills are monthly performed and drills at the control point in MA-2 along the Mbere Wakassao River (20 km from PS2) are quarterly performed.

The Project provided the ECMG with the overall records relevant to the drills and training conducted in 2010 at all Permanent facilities. The number and type of performed drills are considered adequate by the ECMG.

Also the oil spill response equipment storage areas at both PSs were visited and found very well maintained.

![Figure 4.1: Oil spill Drill (cascade booming)](image)

4.4.1 Reported Events and Mitigation Measures Adopted

Only one reportable oil spill (> 1 bbl) event occurred in 2010 at FSO. The ECMG has been provided with summary documentation providing the outcomes of the investigation conducted and the adopted oil spill response measures.

Based on the documentation provided the following dynamic of the incident was understood:

- during loading of an export tanker, the two mooring lines securing the FSO and the export tanker together, parted due to exceptionally adverse and unforecasted weather condition (strong wind and tropical stormy rain);
- the floating hose Marine Breakaway Couplings (MBC) installed on the export hose string released and sealed the ends of the hose as designed;
- a small amount of oil (< 1 barrel) was released when the MBCs activated;
- one tail hose, part of the floating hose string, was pulled off the loading manifold on the export tanker. This caused the release of some of the oil (<4 barrels) in the line and the manifold to spill them onto the deck of the export tanker and consequently, over the side of the tanker into the sea due to the severe weather conditions.

The response measure adopted consisted in the use of dispersant on the thin oil film. According to the information provided, after one day, no oil sheen was found on the water. Further monitoring actions have included the aerial survey of the sea portion around the FSO and of the shoreline and included involvement of Kribi local authorities’ representatives.

Corrective action identified following the investigation outcomes, will consist in the adoption of more reliable weather forecast services able to provide warnings when strong adverse weather conditions are forecasted.
4.5 AIR QUALITY PROTECTION

Air quality protection requirements relevant to the permanent facilities in Cameroon are provided by the EMP and the Schedule 17 of the Credit Coordination Agreement, which indicate the following routine monitoring activities to be performed starting from the Project Physical Completion Date (fixed at 28 October 2004 by the Project).

Box 5: Schedule 17 Air Quality Monitoring Requirements

<table>
<thead>
<tr>
<th>The Schedule 17 of the Credit Coordination Agreement defines the following routine air quality monitoring activities to be performed by the Project:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• stack emission monitoring campaign for sulfur dioxide, nitrogen oxides and particulates once every third year;</td>
</tr>
<tr>
<td>• update of the air dispersion modeling of emissions;</td>
</tr>
<tr>
<td>• a quarterly monitoring program of ambient air quality for sulfur dioxide and particulates by the mobile Ambient Air Quality Monitoring units available in Cameroon;</td>
</tr>
<tr>
<td>• a continuous monitoring program of ambient air quality for nitrogen oxides by the mobile Ambient Air Quality Monitoring units.</td>
</tr>
</tbody>
</table>

The ECMG team reviewed the data provided on ambient air quality monitoring. The relevant observations are presented in the following sections.

4.5.1 Ambient Air Quality Monitoring

Ambient air quality monitoring was carried out according to the required time schedule in 2010 and by using the PM10 monitoring equipment and Passive Air Sampling System for SO2 and NO2. Summaries tables have been provided showing no exceedances during 1st, 2nd and 3rd Quarters 2010 at PS2 and PS3.

Following the ECMG recommendation, COTCO is now consistently taking pictures during the Harmattan period when in presence of sand dust storms in order to provide evidence that potential PM10 exceedances are caused by natural factors.

Recommendation:

5. In addition to the collection of pictures during Harmattan period, COTCO shall coordinate with EEPCI on the planned monitoring of PM10 during sand storms in order to document the background PM10 values.

4.5.2 Stack Emission Testing

Stack emission testing at permanent facilities is planned to be conducted at the end of 2010 (in accordance to the Schedule 17 requirements, which set the stack emission testing frequency at once every three years).

It is noted that data collected during past conducted stack emission tests in 2004 and 2007 did not show any exceedance of the relevant Schedule17 limits at any of stacks monitored at the PSs.

At the present time, and in parallel to the planned testing event scheduled for December 2010, COTCO is evaluating the possibility of developing an MOC proposal that foresees for an indirect and continuous monitoring of the stack emissions through the process parameters routinely monitored at the PSs control rooms.

The rationale behind this MOC is to develop a process control procedure which, based on a selection of the process parameters directly linked to the stack emission levels and contaminants of concern concentrations, is able to continuously monitor for the compliance with the applicable emission limits and avoid the use of external contractors for periodical stack testing.

Based on this rationale, the upcoming stack emission campaign will be also devoted to the selection of the targeted process parameters and to the determination of the correlation between the recorded process parameters and the concentrations of targeted pollutants (NOx, Sox and PM10) measured at the stack.

Once available, the relevant MOC will be submitted for Lenders review and approval in accordance with the EMP requirements.
4.5.3 Updated Dispersion Models

Dispersion models are yearly updated by the Project based on latest stack emission tests and meteorological data in order to identify the maximum predicted fall out concentrations at the ground level and locate the AAQM monitoring devices accordingly.

Update of dispersion model, relevant to the 2010 activities, is currently being carried out through the support of the EEPCI Chad team. Simulation results were not available at the time of the ECMG visit. Once available, the results will be provided to the EMP teams to support the routine AAQM activities.

4.6 LAND RETURN AND DECOMMISSION OF CONSTRUCTION PHASE FACILITIES

4.6.1 Properties of the State and National Domains

The November 2010 ECMG visit further confirmed the slowness in completing the return process of the areas used during the construction phase to the Government of Cameroon. Basically, in the last three years and following the signature of latest dis-allocation decrees in 2007, no significant progress in the return process has been done. In the following table a summary of the outcomes of the ECMG visits in the last 4 years is reported.

It must be noted that, according to the last updates provided by COTCO and despite the formal closure of the transfer process to the Government of Cameroon, COTCO is still lacking of the signature of the protocol of agreement (for the Private Properties of the State) or the relevant decrees (for the National Domains), while some of the areas are reportedly being already used by the Government of Cameroon.

<table>
<thead>
<tr>
<th>Table 4.2: Follow up Table on Temporary Facilities Return</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of facility and property (not returned)</strong></td>
</tr>
<tr>
<td><strong>State Property – Storage Yards (9 sites in total)</strong></td>
</tr>
<tr>
<td><strong>Legal Process</strong></td>
</tr>
<tr>
<td><strong>State Property – Storage Yards (9 sites in total)</strong></td>
</tr>
<tr>
<td><strong>Protocol Agreement Process</strong></td>
</tr>
<tr>
<td><strong>National Domain - Camps/Roads/Airstrips (6 sites in total)</strong></td>
</tr>
<tr>
<td>Former construction camps in</td>
</tr>
</tbody>
</table>
Although the ECMG recognize the effort put in place by COTCO to expedite the final signature of transferring decrees and protocol of agreements, the temporary facilities return in Cameroon clearly appears to be at a standstill with no significant progress in the last 3 years. Additional concern is now raised by the reported use of some of these areas, which could potentially result in liabilities for the Project given the absence of a formal closure of the return process.

Recommendation:

6. The ECMG recommend expediting the decrees and protocols signature process in order to finally formalize the land transfer process (repeated recommendation).

4.6.2 Portacamps at Pumping Stations

Both Pumping Stations #2 and #3 are provided with camps used at the time of the construction phase but currently no longer in use.

These areas formally belong to the National Domain areas, but with restricted COTCO rights, given their location inside the pumping station land easement (e.g. within the permanent fences).

Similarly to the construction areas discussed under the previous section, the formalization of the relevant incorporation decrees is still pending since 2008, when the draft decree was reportedly delivered to the Office of the Prime Minister.
However, given the location of these camps and the fact that the occupied areas will not have to be returned to the Government of Cameroon till the pumping stations are operational, the main concern is actually related to the decommissioning of the lodging facilities, which have not been used further in the recent years and are progressively deteriorating.

Decommissioning of two Red Sea Camps at both PSs has been already completed in the past years, while, at the present time, only the former construction Porta Camps are still in place.

The ECMG had the opportunity to visit the Porta Camp located at PS3, confirming the advanced status of deterioration of the building infrastructures and the impossibility of efficiently recycling the Porta Camps buildings (since any attempt of removing the structures would possibly result in a permanent damages of the buildings themselves).

According to COTCO EMP and PS 3 Superintendent, plans are already in place for the demolition of the Porta Camp at PS3, while no plan is currently set to the PS2 camp.

Based on the preliminary information provided, the decommissioning will consist of the following phase:

- inventory and recover of all recyclable items (such as furniture);
- inventory of all waste streams to be produced during demolition activities;
- identification of the applicable disposal or recycling option (wooden waste will be reportedly sorted and dump on site);
- demolition and removal of all infrastructures.

At the present time the start up of decommissioning activities is planned for early 2011. During the visit it was positively recognized that the both the COTCO EMP and PS3 personnel is aware of the disposal or recycling options allowed by the EMP and that decommissioning activities will be reportedly conducted in accordance with EMP requirements.

**Recommendation**

7. Given the importance of the traceability of all waste streams produced, as well as of all decommissioning activities carried out, it is recommended to document, also in accordance with EMP requirements:

a. the results of both the planned preliminary inventory and waste stream sorting after demolition activities (types and quantities of waste streams produced, as well photographic records)

b. The demolition activities (log of activities done and photographic records);

c. The implemented final disposal options, through the use of the waste manifest, but also, in case of donation, through the collection of photographic documentation and by documenting the agreements signed with the villages’ representatives.

**4.7 EROSION CONTROL AND REVEGETATION**

**4.7.1 ROW Monitoring**

COTCO provided the ECMG with the erosion control and IAMA inspection records collected during 2009 and 2010. The records provided are consistently indicating the areas of erosion and unauthorized activities along the ROW together with corrective measures adopted.

Foot patrol and areal patrol are reportedly conducted respectively twice and once per month for monitoring the RoW status. Few unauthorized activity has been reported along the RoW during 2010.

At the present time, in consideration of the decreased logging activities recorded along the ROW, but also taking into account the poor effectiveness of the aerial patrol (which need in any case to be supported by ground inspections), COTCO is developing a draft MOC that foresees for the reduction of the frequency of ROW aerial patrol from monthly (current) to quarterly (proposed).

According to the proposed MOC rationale and in agreement with the newly developed ROW Integrity plan (see section 4.7.3), foot monthly patrol will therefore have a primary importance in monitoring the status of the ROW.

Foot patrollers, to be hired also among local communities, will be trained on erosion, unauthorized activities, damage of sign post, oil leak etc., so that aerial patrol will become a supplementary monitoring to be conducted quarterly.
In this sense, the newly proposed ROW monitoring practice may represent an additional employment opportunity for local communities, other than the simple grass cutting (which currently represent the only Project related job opportunity offered to the communities along the ROW).

4.7.2 Mbere Rift Valley

Since the time of the pipeline construction and reclamation of the soil along the ROW, the largest problems in terms of erosion control and revegetation in Cameroon have been caused by the M’bere Rift Escarpment located around the KP 255 in MA-2 (so called “Big W” pipeline section).

In November 2010, the ECMG team visited the outstanding zone of erosion along the ROW near PS2. Despite some signs of erosion at KP 254 and 255, which were documented by the Project, the ECMG team positively verified the improved conditions of the Big W in comparison with the observations made during previous missions.

It is noted that the latest revegetation campaigns conducted by the Project were carried out in 2009 between KP 257 and KP 285, and in June 2010 between KP 340 and 350, while the last campaign at the big W was conducted in 2007.

According to the field personnel, the next yearly maintenance campaign is scheduled to be conducted on December 2010.

4.7.3 ROW Integrity Plan

In 2010, COTCO has developed a new ROW Integrity Plan (IP) which incorporates all required maintenance and monitoring activities to be carried out by the Project along the ROW. Copy of the draft document has been provided to the ECMG and jointly reviewed during the visit.

The plan is properly addressing all components related to the ROW monitoring, such as routine maintenance activities (grass and tree cutting), control of erosion, river crossing inspections, revegetation program at eroded areas, check of blocking valves, etc.

Within one single document all the Project specification relevant to the ROW monitoring activities are therefore presented, including required frequency of monitoring, inspection checklists and reporting forms.

Recommendation:

8. While the ECMG positively commented the integration of all ROW monitoring components in one single plan, the key issue relevant to its implementation is now considered the involvement of the local communities in the ROW monitoring activities to be carried out. As the hiring process of local communities (currently conducted by appointed subcontractor) has been always a sensitive topic for the Project, it is recommended to strictly monitor this process posing particular attention on
   a. Criteria for equal employment opportunities;
   b. Provision of needed work and safety equipment;
   c. Salaries; and
   d. Responsibilities in correctly reporting the ROW monitoring results.

To this aim, COTCO will likely have to enforce the monitoring process at the local communities level which is currently conducted by the CROs.
5 BIOPHYSICAL ENVIRONMENT AND ENVIRONMENTAL MANAGEMENT TOPICS – CHAD REVIEW

5.1 WATER RESOURCES PROTECTION

Water resource protection is a key requirement for the entire Project, which has developed a Water Monitoring Program (WMP) consisting of the following components (see Cameroon review for details on EMP requirements).

According to the records provided, EEPCI consistently implemented the WMP in 2010.

During the site visit, ECMG collected and reviewed the following randomly sorted data relevant to the implementation of the WMP:

- summary presentation relevant to 2010 groundwater level and quality monitoring results at both OFDA project and traditional wells in the villages;
- average potable water testing results at the OFDA relevant to the between 3rd Quarter 2009 and 3rd Quarter 2010;
- average wastewater testing results at the OFDA relevant to the period between 3rd Quarter 2009 and 3rd Quarter 2010;
- complete weekly potable water analysis at OFDA for the week 12th-18th April 2010;
- complete weekly wastewater analysis at OFDA relevant to the period between 12th-18th April 2010;
- detailed piezometer and village traditional wells water levels for 3rd Quarter 2010;
- TPH groundwater testing results for 3rd Quarter 2010;
- Records on Komé 5 camp daily water consumption (relevant to October 2010);
- Detailed chemical quality monitoring data relevant to the ground water analysis at OFDA (period 19th – 25th July 2010);

The observations relevant to the performed WMP activities are summarized in the following sections, for each separate component. Wastewater and liquid effluent monitoring activities are discussed under Section 5.3.

5.1.1 Component # 2 of WMP – Surface Water and Groundwater Withdrawals at OFDA (Chad)

As reported under the past ECMG report dated December 2009, the groundwater levels at OFDA, during the period between 4th Quarter 2002 and 3rd Quarter 2010, showed an increasing trend of the water table depth, as presented in the following figure.

![Piezometer Water Levels in OFDA](image)

**Figure 5.1: Ground Water Level at OFDA**
As per ECMG recommendation, EEPCI started an in-house hydrogeological study to better understand the possible effects on groundwater monitoring due to the increased water level observed.

Scope of the study is to:

- to primarily improve the current knowledge of the hydrogeological setting of the site (by identifying the nature of shallow aquifer monitored); and
- to consequently understand if any modification to well installation scheme is needed (since most of the groundwater monitoring wells have been installed based on what is now obsolete ground water level measurement). Any change in installation scheme would focus on ensuring detectability of floating hydrocarbons in the groundwater.

At the time of the ECMG visit the study has not been finalized. As soon as available, the relevant outcomes, with specific focus on the ground water monitoring well installation schemes, will be provided to the Lenders and ECMG.

5.1.2 Component # 3 of WMP – Monitoring of Water for Human Consumption Obtained From Project-installed Groundwater Source Wells

All the results provided confirmed that the water samples comply with the applicable WHO standards for Drinking Water Quality.

As per the observations made under the previous reports, the only exceedances were found at traditional village wells where pH, turbidity, iron and fecal coliforms (due to poor hygiene conditions) exceed the reference limits. Testing results have been reportedly provided to Chadian Authorities in N’Djamena.

5.1.3 Component # 4 of WMP – Regional Groundwater Monitoring Program

The data provided by the Project and relevant to the 2010 monitoring activities did not show any exceedance of the WHO reference limits, with the usual exception of pH and turbidity and in few cases iron, which, as previously discussed are referable to geological background effects (presence of laterite).

During 2010, the Project installed 16 additional monitoring wells (8 in Komé, 2 in Bolobo, 2 in Miandoum, 3 at BV3 oil spill site and 1 at K223). In addition, an updated map showing the overall locations for groundwater monitoring in the OFDA was provided.

Given the increased number of monitoring wells, including sensitive locations such as the K223 site (where the installation of an additional well was recommended by the ECMG following the expansion of the facility), the overall coverage of the groundwater monitoring network at the OFDA is now considered adequate for monitoring purposes.

5.1.4 Component # 5 – Groundwater Monitoring at the Project’s Engineered Solid Waste Landfill Sites

Groundwater monitoring at the Project’s engineered landfill is performed in parallel to the monitoring of Project-installed groundwater source wells and the regional groundwater monitoring program. Results obtained did not show any exceedance of the reference limits.

5.2 WASTE WATER MANAGEMENT

5.2.1 Component # 6 – Monitoring of Liquid Effluents Discharged Directly to Onshore Surface and Water Bodies

According to Component # 6 of WMP, a chemical characterization of non-continuously discharged effluents shall be performed prior to discharging water to the surface water bodies for a set of parameters as listed in the WMP (pH, BOD5, COD, oil and grease, metals, etc.).

However, none of the Project wastewater effluents at the OFDA are discharged directly to surface water bodies. The observations relevant to the performed monitoring activities of the quality of the effluents produced by the OWS and Sewage treatment plants are discussed in the following sections.

5.2.2 Sewage Water

Sewage treatment units at permanent facilities consist mainly of a primary aerobic digestion unit. Treated effluent is disposed through leach fields or open lagoons for evaporation and transpiration (at Komé Base camp only).

A sludge drying bed is also present at the Komé 5 sanitary waste plant. The dried sludge is collected and sent for disposal at the Project waste management facilities (and in more recent time to the GER Norwest facility for
composting), while wastewater collected below the filtering unit of the drying bed is pumped and recycled upstream of the treatment unit.

Average records of the treated wastewater quality conducted in the period between 3rd Quarter 2009 and 3rd Quarter 2010 were provided. Only one exceedance was detected in April 2010 for the Oil and Grease parameter at Komé Base. The cause of this exceedance was mishandling (not emptied via vacuum truck at the appropriate maintenance interval) of the grease trap serving at the camp Kitchen. Corrective actions were promptly implemented by the Project by restoring the functionality of the grease trap.

According to the information gathered in the field through the interview of the sewage treatment unit superintendent, the portable units installed during the construction phase and still serving Komé 5 and Komé Base camps are no longer presenting the operational problems reported during the past visits. The improvement in the sewage treatment unit functionality is reportedly due to an enhancement of the operations and maintenance program carried out by EEPCI, and to some degree the progressive decrease of residents at the camps.

The Project is committed to strictly monitor the efficiency of the sewage treatment units through routine operations and maintenance monitoring and effluent testing activities in order to anticipate possible issues occurring in the future.

5.2.3 Oil Water Separators

EEPCI is complying with the same OWS Monitoring Plan requirements in place at the permanent facilities in Cameroon (see Cameroon review section for detailed requirements).

However, despite the same requirements in place, the effluents produced by the OWSs operating in the OFDA are not discharged, but are instead collected by vacuum truck and disposed of at K223 facility.

The only OWS connected with an offsite drainage ditch is the one serving the CTF at Komé 5. The effluent of the OWS at CTF is tested for Oil & Grease prior to each discharge and, in case of exceeding the applicable Oil and Grease limit (20 mg/l O&G); the effluent is collected by vacuum truck and disposed of at the K223 facility.

5.2.4 Produced Water

The Project is injecting the produced water (water recovered from crude oil treatment at the two Gathering Stations and CTF) through a high pressure water injection system (at a depth of approximately 1500 m below ground level). The injected water is used to maintain formation pressure and assist oil production (secondary recovery) in the oil producing formations. The produced water recovered from the K223 Well Testing Mud Management Facility, after drying the oily mud collected from wells development, is used for injection as well. The observations relevant to the K223 site are discussed under the Oil Contaminated Soil Management Section.

5.3 WASTE MANAGEMENT AT THE OFDA

During the site visit at the OFDA, the ECMG team collected data relevant to the waste management on amounts of waste produced and disposed of. Produced amounts of waste during 2010 have been summarized in the following figure:

![Waste Management Data 2010](image)
According to the information provided, the total amount of waste produced at the OFDA during 2010 (through October) is equal to 6,023 tons (hazardous waste represents the 10% of the total amount) while 5,042 tons of waste produced have been processed/recycled/donated during the same period.

The waste production values are in line with the 2009 data, while sensible improvement in the amount of waste processed has been recorded also thanks to the reactivation of all incinerators at the KWMF and due to newly established waste recycling programs.

Among these programs, a remarkable contribution to the amount of waste processed is given by the GER composting initiative which is collecting exhausted and dried sewage treatment sludge, vegetation cuttings, cardboards and food waste from the Project.

In addition, a contract was awarded to Quincaillerie Djarabe in Moundou to handle waste metal recycling. Quincaillerie will handle recycling of the metal out side of Chad.

Field visits were conducted at: the Komé Waste Management Facility (KWMF), the K223 reinjection facility, the GER composting facility and the Komé Base waste storage area. All surveyed facilities have been found in good conditions with the exception of the Komé Base where housekeeping seemed suitable of some further improvements (note that this is just a small area used as temporary storage before collection and disposal at KWMF).

During the November 2010 mission, the ECMG did not visit the facilities belonging to the company awarded the metal recycling program, however the EEPCI EMP personnel were requested to provide the EH&S requirements set within the bidding process. According to the information provided, the selected company has committed to comply with the EEPCI bidding requirements and demonstrated the proper capability to handle the metal waste stream.

A visit to this facility will be included in the next ECMG visit program.

5.3.1 Komé Waste Management Facility (KWMF)

The KWMF is the main Project central waste management facility operating at the OFDA. It consists of several units, including: a waste segregation area, a waste compaction area, two municipal waste incinerators (one designed for mixed municipal-plastic waste incinerator), a hazardous waste incinerator; a non-hazardous waste disposal cell, a hazardous waste disposal cell, two landfill leachate collection tanks, used oil storage tanks, and several unpaved storage areas.

During the site visit at the KWMF, the ECMG team positively acknowledged that all incinerators are now operational and, thanks also to the ongoing recycling program, less quantities of waste stored waiting for final treatment or disposal were observed at the site compared to past ECMG visits.

A spot check was also conducted for the waste tracking documentation (waste manifests).

In the following chart, the amount of waste processed by incineration during the period between April and September 2010 is presented:

![Figure 5.3: Amount of Solid Waste Incinerated](chart.png)
Concerning the use of the Penn Ram incinerator (acquired by the project in 2009 and capable of processing a mixed stream of cardboards and plastic materials up to 40% (plastic) with emissions guaranteed within the most stringent US EPA standards) EEPCI has started operating the incinerator in 2009 by feeding the minimum recommended quantities of plastic materials (e.g. up to 10%). However no stack emission test for the new incinerator has been conducted so far (although scheduled for December 2010).

Recommendation:

9. As recommended under 2009 ECMG report, and despite the guarantees offered by the incinerator manufacturer on the quality of air emission produced (reportedly able to comply with US EPA standards up with up to 40% of plastic content), the Project should conduct, under the next planned event, the stack emission tests for the Penn Ram incinerator to comply with Schedule 17 requirements. Stack emission tests will have to be performed by using the maximum allowable plastic load (or at least the operational maximum to be set and used by the Project if lower) and will have to be adequately documented with respect to the plastic amount loaded at the time of the tests.

5.3.2 External Waste Recycling Initiatives

5.3.2.1 GER

The GER Norwest (GER) is a commercial enterprise based in Mainani, which started, in fall 2009, to process waste streams such as vegetation cuttings, food waste, card board and paper, sewage sludge and shredded wood for the production of compost. At the present time the facility is still in the start up phase (with a limited number of employees) and it is processing only limited amount of wastes, to calibrate the composting process. All waste streams treated are entirely provided by EEPCI, which also supported GER with some laboratory testing conducted abroad (in the US) for the quantification of the optimum mixing rates of waste stream.

The GER facility was visited by the ECMG team and found in good condition. Health and safety measures are properly in place at the site and control of hygiene conditions is conducted by the GER management.

Health and safety measures for workers are reportedly in place. Particular care is devoted to prevent direct contact with sewage sludge which has a potential high content in pathogens and to the decontamination of work clothing. In addition, the Project is periodically visiting the facility to monitor the facility status and support the management in solving potential operational problems.

In terms of quality of the waste streams processed, a relatively poor segregation of incoming waste was observed, with high presence of plastic garbage bags mixed with the vegetation cuttings. However, according to the information provided, the plastic material not suitable for the composting process is properly segregated and returned to EEPCI for disposal at KWMF.

Following the ECMG recommendation, EEPCI provided a summary report on the study conducted about composting mixing ratio. Such a report provides guidance in identifying the soil condition present at a reclamation site, select an appropriate compost application rate and prepare the site for agricultural use.

It should be noted that EEPCI is reportedly planning to use compost within well pad reclamation due to lack of top soil in OFDA. Observations and recommendation relevant to the use of compost for land reclamation are reported in Section 5.6 of the present report.

Recommendation:

10. In order to facilitate the waste processing at the GER facility, it is recommended that segregation of waste streams is enhanced at the source (e.g. directly by EEPCI) in order to separate all waste materials not suitable for composting before delivering to the GER. In addition, the Project shall keep track, through the use of the waste manifest, of the quantities of plastic materials returned to the KWMF.

5.3.2.2 Bébéjia Distribution Services

Within the waste recycling program, the Bébéjia Distribution Services was appointed by EEPCI in 2008 to provide plastic and food waste recycling and composting services. The waste recycling facility is provided with a food waste collection and treatment facility, an area for vegetable waste food composting and a plastic recycling area. The main objectives of this initiative were (in the plans) to produce and sell on the local market, plastic pellets, compost and animal feed for chickens and pigs.
According to the data provided, the amount of food waste sent to Distribution Services from Komé Base, Drilling Camp and Komé 5 during 1st, 2nd and 3rd Quarters 2010 was on the order of 600 tons.

The ECMG visit did not visit the Distribution Services facilities in 2010; however no significant change has occurred over the last year and the facility is reportedly still struggling to establish a market for the products derived from waste processing.

5.3.3 K223 Site

The K223 Well Testing Mud Management Facility collects the first surge oily sand and drilling mud from the OFDA wells. Once dried into the double lined concrete pit, the mud is collected in a new temporary accumulation pit also double lined and side bermed. The oily water recovered is pumped and stored into several tanks, before being pumped through the disposal well at a depth of approximately 1600 m below ground surface.

In 2009, due to the limited capability by the Project of handling oil contaminated soil and the continuous production of impacted mud from the newly developed wells, the K223 facility has been expanded by acquiring an adjacent area to host up to three additional drying/sedimentation basins.

Following ECMG recommendation, the Project has installed a new groundwater monitoring well to cover the front downstream the facility expansion and to be included within the list of wells to be periodically monitored according to the Water Monitoring Plan.

During the ECMG visit, the facility was found in a good status, although oily contaminated mud is still accumulating in the area while no dedicated solution for final disposal or treatment has been identified (see the following sections on oil contaminated soil management). In addition the accumulation pits were observed in some cases to be almost full with a very limited freeboard that could potentially result in an overflow in the case of heavy rain event (it is noted that the site is permanently guarded and surveyed and that rain water from accumulation pits is pumped out during rain events).

5.3.4 Oil Contaminated Soil Management at the OFDA

The EEPIC EMP requirements for the disposal/treatment of contaminated soil can be summarized as 1) waste minimization options by using contaminated soil for road mix or berming (if non hazardous) or 2) treatment through bioremediation or 3) disposal through landfill (depending on the hazardous waste determination).

Differently from Cameroon, the EEPIC is dealing with a larger production of oil contaminated soil, which is constituted by:

- oil contaminated soil derived from oil spill occurred at the OFDA (see section 5.4.2 for detailed record of oil spills occurred in 2010); and
- oily mud recovered at the K223 facility following separation and pumping the liquid to the disposal well.

The two soils have different physical and chemical characteristics and of course pose different kind of problems in terms of management according to the EMP requirements: while the oil contaminated soil from oil spill is in general light contaminated soil (with concentrations of TPH often below the target level of 1%) suitable to be disposed through simple waste minimization options, the K223 mud is an heavy contaminated material with TPH concentration often above the 1% in weight.

As reported under previous ECMG reports, the Project has struggled to find in the past years a suitable solution for the abatement of the TPH concentration within the EMP recommended target concentration and all the attempts of conducting bioremediation as recommended by EMP have failed due to the presence of heavy petroleum compounds which are not suitable to be abated through simple bioremediation processes.

The Project is currently evaluating alternative solutions for treating or disposing off of the high contaminated mud presently stored at the K223 site, which may include techniques such as grind and injection in the K 223 disposal well, chemical extraction, and/or incineration at an authorized hazardous waste facility (likely Bocom in Douala, Cameroon). Results of this study will be disclosed by the Project as soon as available.

Concerning the lighter contaminated soil coming from past clean up operations conducted at the oil spill sites (as well as from the attempted land farming and bioremediation treatment), the soil collected is now temporarily stored at the Komé 5 batch plant area in two soil piles (approximately 5000 m³ in total) double lined on the bottom and covered with impermeable liners. Their preservation status appeared good as also observed during ECMG 2009 visit.
Following the analytical verifications conducted on the soil stored, showing an average concentration of TPH below the target concentration of 1%, the Project has started to evaluate, as a waste minimization option, the use of the soil for road sub grading, as shown in the following schematic cross section of the proposed road paving design (where the light yellow sub base course will be made of oil impacted soil).

![Figure 5.2: Proposed Use of Oil Contaminated Soil for Road Paving - Schematic Cross Section](image)

**Figure 5.2: Proposed Use of Oil Contaminated Soil for Road Paving - Schematic Cross Section**

Road paving through DBST has been extensively adopted by the Project as dust production mitigation option along the main OFDA spine road. The section of road to be paved through the use of oil spill impacted soil and DBST is the one (approximately 8 km long) running north of the Komé WMF up to the conjunction with the N’Djamena – Doba National Road.

The ECMG had the opportunity to survey the targeted road observing that the sections to be paved according to the above scheme are all located outside the villages crossed by the road (where the road is already paved with DBST).

In addition the ECMG was provided with the analytical results relevant to the soil sampling activities conducted at the two soil piles, as well as the proposed road paving design features.

Based on the data provided, it is recognized that:

- soil sampling and testing activities conducted on the soil piles were adequate (both for density of sampling points and analyzed parameters). It is noted that some values were found to exceed target level of 1%, however average concentration was found to comply with the EMP target level;
- although the contaminated soil will not be mixed with the DBST (e.g. the proposed practice is not strictly in line with the EMP requirements), but encapsulated under a DBST layer, the proposed scheme for road paving, with a laterite sub grade and a DBST cover should reportedly guarantee sufficient impermeability to avoid any migration of contaminants to the subsoil as well as any potential exposure for the public;
- the Project is planning to conduct the subject road paving in order to optimize the road compaction process in agreement with Exxon Chad Specifications (ECS) 4-3-1 and 4-100-1 and to enforce quality control on the contractor for compaction density testing and verification.

At the time of the visit plan for application or oil spill impacted soil for road paving is planned for the current 2010-2011 dry season.

**Recommendations**

11. While the use of oil impacted soil for road mix is allowed by the EMP, the evaluation of non-hazardousness of the oil impacted soil is needed before using it for road paving purposes per requirement of the EMP – Waste Management Plan. Such evaluation is reportedly being carried out by EEPCI which has indicated that the waste is non-hazardous. The relevant results, which were not available at the time of the visit, will be reviewed by the ECMG during the next mission;
12. The integrity of the DBST surface and the protection from its deterioration (which is likely to occur during each rainy season) represent the key issues to be focused on throughout the lifetime of the paved road section, in order to prevent potential migration of contaminants to the subsurface, as well as potential exposure of impacted soil encapsulated between the DBST surface and the laterite subgrade. To this aim and in accordance to the design specifications provided it is recommended to:
   a. ensure an adequate level of impermeability of the media encapsulating the impacted soil core;
   b. monitor the integrity of the road sections where the oil impacted soil will be used in order to prevent core exposure and ensure repairing works and maintenance as needed.

13. Consistent with the Project Waste Management Plan requirements, tracking of the soil quantities used for road paving should be kept by the Project.

14. Finally, the EEPCI should continue the effort ongoing in identifying and evaluating feasible treatment and/or disposal alternatives of oil impacted wastes at the OFDA. As per ECMG recommendation made under 2009 report, a dedicated study should be carried out in order to fill the current EMP procedural gaps (as observed in the past, the Waste management procedure reported in Vol 5, Section 2.1.9 indicates solutions that were proved to be not efficient or successfully applicable for the Project).

5.4 OIL SPILL PREVENTION AND RESPONSE

5.4.1 Routine Drills Conducted
The Project provided the records relevant to the drills conducted at OFDA during 2009 and 2010. The number and type of drills performed appeared to be adequate.

5.4.2 Reported Events and Mitigation Measures Adopted
According to the information provided, two reportable (> 1 bbl) spills occurred in 2010.

One chemical spill concerning 2 barrels of L64 Clay stabilizer at 0.03% occurred during transfer operation at K984. The spill was reportedly caused by overfilling of the tank. Corrective action adopted was to clean up immediately the spilled chemical has been and to store the contaminated soil adequately. Response actions appeared to be adequate.

A second oil spill occurred during the maintenance of the TOTCO pipeline at Block Valve 4 due to mishandling of the equipment. A total of approximately 40 barrels of crude oil was reportedly spilled. Response actions adopted included:
   – clean up of the spill site and excavation of the impacted soil (currently temporarily stored at the Komé 5 Batch Plant area);
   – collection and testing of soil samples from the excavated soil and at the bottom of the excavation for verification of the clean up measure (concentrations of the tested samples were in the range of 80 and 765 mg/kg);
   – monitoring of TPH in the downstream groundwater well (sample tested below detection limit).

Recommendations:

15. With reference to the L64 chemical spill and more in general to any possible spill of chemicals not hydrocarbon based (e.g. chemicals which cannot be detected in the soil by simply testing the TPH), the Project shall consider to integrate the EMP requirements by adding, to the set of parameters to be tested in the impacted soil, all the chemicals of interest based on the chemical properties of the liquid spilled and with reference to the chemical’s Material Safety Data;

16. Since migration of contaminants from the subsoil to the shallow aquifer and then downstream may occur, depending on geological features, over a medium to long term period, the Project should consider to extend the monitoring activities at the groundwater wells located downstream a spill site for a longer period of time (in the order of weeks to months). This recommendation specifically refers to the BV4 spill event where testing of TPH in groundwater has been performed only once after the event.
17. EEPCI reviewed with ECMG the procedures for sampling excavation side walls and floors for oil spills of this side. ECMG supports the current procedures in place. ECMG suggested that when dealing with bottom excavation testing, to verify the effectiveness of the clean up operations conducted, the Project may wish to consider alternatives in order to optimize the soil sampling activities by adopting the collection of composite samples from the bottom and side wall in order to understand if further excavation activities are needed.

5.4.3 Emulsion Release at CTF

An additional incident occurred in July 2010 at the CTF causing the release of almost 4,000 barrels of oil in water emulsion from one of the storage tanks into the tank’s secondary containment.

At the time of the ECMG visit, the Project was still investigating the root cause of this incident; however preliminary data provided indicated that the release occurred due to the failure of the valve serving the piping system connecting the storage tanks during an emulsion transfer operation.

Due to the large amount released, the liquid reportedly overflowed the tank’s primary containment however was contained in the secondary containment. Some of the liquid released reached the storm water drain and sewer. The OWLS/OWS serving the process areas for the collection and treatment of storm water captured the released liquids. Reportedly none of the released liquids were discharged to the external drainage ditch (downstream the OWLS/OWS unit). As a precautionary measure, the quality of the water at the Loulé River (which is located downstream the drainage outlet) was sampled and tested for TPH and found to be not contaminated.

The ECMG visit included a survey at the incident site where cleanup operations were still ongoing. The Project is committed to prepare a detailed report on the incident including presentation of emergency response and corrective actions implemented once all clean up operations and root cause investigation activities are completed.

5.5 AIR QUALITY PROTECTION

Air quality protection commitments relevant to the permanent facilities in Chad are provided by the EMP and by the Schedule 17 of the Credit Coordination Agreement, which indicate the following routine monitoring activities to be performed starting from the Project Physical Completion Date (refer to Cameroon review section for detailed requirements).

The main four datasets routinely checked during the ECMG field missions are:

− the records relevant to the Ambient air quality monitoring;
− the stack emission testing results;
− the update of the dispersion models; and
− the recorded flaring volumes.

The outcomes relevant to the conducted review of the records provided in presented in the following sections.

5.5.1 Ambient air Quality Monitoring

During the visit, EEPCI provided the ECMG with results on ambient air quality monitoring in the form of summaries tables for NOx, SO2 and PM10 collected during 1st, 2nd and 3rd Quarters of 2010. The measured data complied with the limits set by the Schedule 17.

The only parameter exceeding the Maximum 24-hour Average Limit is represented by the PM10 measured during the Harmattan period (March 2010).
At the present time, the EEPCI EMP team is evaluating a modification to the current PM10 monitoring procedure in order to better document incremental effects on PM10 measurements during dust storms (Harmattan). According to the proposed rationale, blank samples will be collected at non impacted-blank areas during the Harmattan period and logged to document the background effects on measurements conducted in the OFDA.

In addition to the AAQM data, a map showing the current location of the AAQM stations was provided to the ECMG. A comparison with the latest available maps (dated 2008) elaborated through the air dispersion model (ISC), apparently showed some discrepancies between the actual monitoring locations and the predicted maximum concentrations at the ground level. While predicted maximum concentrations are interesting, according to the model outputs provided, the nearby villages, all the monitoring points are located, reportedly for security reasons, inside the camps at a closer distance from the stacks.

Recommendation:

18. The Project should consistently use the dispersion modeling outputs to locate, in correspondence of the maximum predicted concentration, the AAQM tools. If security problem exist, the Project could consider the involvement of local villagers or the use of permanent guard for the time needed to collect the needed measurements in order to ensure that the AAQM results are representative.

5.5.2 Stack Emission Testing

Stack emission testing is requested to be performed once every three years from project completion date (28 October 2004) or any time following start up (including long term outages such as those occurred at the KWMF HW incinerator).

New stack emission tests are reportedly scheduled at the end of 2010. Recommendation relevant to the stack emission test on the Penn Ram incinerator is reported under the previous waste management section.

5.5.3 Updated Dispersion Models

As per EMP requirements, Dispersion Modeling Update shall be performed on a yearly basis after project completion date (28 October 2004).

The Project provided ECMG with summary information on the initial air modeling study for 2010. Draft data of the 2010 modeling were calculated using 2007 meteorological data, 2007 stack data and 2010 emission results. Final update of the dispersion model is scheduled for the end of 2010.

5.5.4 Flaring Volumes

Updated data on the flaring volumes of natural gas associated with the produced crude oil in 2010 were provided. Since 2009, the Project has not exceeded the target level of 1.1 MCFD/day, a significant increase of volumes of gas flared in 2010 was observed according to the data provided due to an outage of the compressor at the Miandoum Gathering Station (see following graphs). The data indicate exceedances during four (4) of the nine (9) months reported of the target level however the annual average is below the reference limit.
5.5.5 Dust Control at the OFDA

Following the ECMG recommendation, EEPCI develop a summary report to integrate past PM10 dust emission studies. EEPCI main conclusions are that DBST adequately mitigates road dust and PM10 emission exceedances are not the result of the project although it is recognized that road traffic is a Project impact in terms of PM10 emissions.

As described in the Oil Contaminated Soil Management chapter, a further plan for road paving is already under development for the remaining 8.6 km of road to be paved from the OFDA up to the north junction with the National road between N’Djamena and Doba. Relevant observations and recommendations are presented under the Contaminated Soil Management Section.

5.6 LAND RESOURCE PROTECTION

5.6.1 Well Pads Restoration

During the November 2010 visit, the ECMG conducted the usual spot checks of well pad reclamation status in order to:

− visually evaluate the quality of the reclamation status;
− countercheck the consistency of the data collected through the GIS system used for the monitoring of the land use and restoration process at the OFDA.

The visit focused on a total of approximately 10 wells, confirming the good reliability of the GIS system in place, as well as the effective use by locals of the reclaimed portion for agricultural purposes.

No major issue was therefore highlighted other than those relevant to the community safety made under previous section.

5.6.2 Borrow Pits Restoration

Similarly to well pad restoration, the ECMG spot checked the conditions of selected borrow pits in the OFDA (including the two Maikeri borrow pits, KBP12 and KBP6 and BBP7). Given the fact that no further borrow pit restoration activity was performed by the Project in 2010, the visit was mainly focused on the comparison of the reclamation status with the observation made in previous years.

The visit allowed confirmation of observations made during the 2009 visit such as:

− the apparently good reclamation status of more recently reclaimed pits (such as the Maikeri BP) or at those borrow pit areas promptly used for agricultural purposes after reclamation;
− the quick deterioration of the top soil occurring instead during the rainy season at borrow pits reclaimed areas where no cultivation was implemented after reclamation;
− a possible loss of fertility of the reclaimed and subsequently cultivated areas where a first harvest was already completed (this observation also applies to the reclaimed well pads.

As already observed during the past visits, the major issue when dealing with land restoration and return at the borrow pits is due to the reported cultural constraints by local population in using land parcels which are...
considered to be not productive (regardless the quality of the restoration) due to the former presence of laterite. This lack of prompt reuse of the land is resulting in a progressive compaction and erosion of the top soil and uncovering of the bottom laterite soil.

In order to further evaluate the fertility of the soil at reclaimed areas, the Project has conducted a soil fertilization and erosion control experiment in portions of the KBP 6 and MBP 8 borrow pits that were reclaimed and provided with additional top soil as part of the reclamation work in 2008.

The Project worked with a local contractor, the Deli Nursery and farmers from the two villages to plant *Mucuna pruriens* in 26 hectares of land (approximately 16 hectares in KBP 6 and 10 hectares at MBP 8). The good results obtained from the experiment carried out are shown in the following picture.

![Figure 5.4: Mucuna Cultivation Experiment at KBP6 Reclaimed Area](image)

In addition to the observations made on reclamation status, during the ECMG visit it was observed that some of the returned land parcels at borrow pits have been recently re-acquired by the Project for drilling purposes.

**Recommendation:**

19. Since the Project, through the GIS system and the LUMAP EMP team, is continuously tracking the land use at the OFDA in order to consistently evaluate the cumulative impacts in the area due to the infilling program and in order to evaluate the mitigation measures needed, the ECMG recommend that further improvement in the land use quantification are done adequately taking into account, as separate quantities, for:

a. Land reclaimed, returned and effectively used by locals;

b. Land reclaimed and returned by not exploited by local villagers;
c. Land reclaimed and returned which, after an initial cultivation, now appears to have lost its fertility and it is no longer cultivated;

d. Land reclaimed and returned that is re-acquired by the project within the infilling program.

5.6.3 Water Ponds at Reclaimed Borrow Pits

During past ECMG visit a concern was raised regarding the presence of water ponds inside reclaimed borrow pits. The creation of water ponds in reclaimed borrow pits evolved from requests made by village chiefs. An unintended consequence of these water ponds is the attraction of cattle and other livestock to the water which is often resulting in the destruction of the crops located on the way to the ponds. There have also been community and livestock safety issues raised by the villages with respect to the ponds over the years.

During the December 2009 visit the ECMG positively acknowledged that the Project has discontinued the practice of creating water ponds, and a practical example was provided by Maikeri borrow pit restoration where restoration was done avoiding creation of depressed areas (although it must be noted that Maikeri borrow pit was characterized by a very surficial laterite exploitation with a limited excavation of materials which allowed to restore the site in an efficient way).

During the November 2010 visit a draft proposal for an MOC concerning the borrow pit restoration was briefly introduced to the ECMG by EEPCI EMP.

This MOC is defining a basic technical specification for borrow pit restoration, whenever in presence of unavoidable depressions in the restored areas (e.g. where exploitation of laterite interested deep layers of the pit to be restored), in order to avoid, through the installation of drainage ditches and the ground sloping, the accumulation of water in the depressed areas and the creation of water ponds.

Final version of the MOC, when ready, will be submitted for dedicated review. However, the ECMG agree in principle with the rationale adopted, also recognizing the technical difficulties in restoring a deep excavated area of low permeability soils and not leave areas of water accumulation.

5.6.4 Use of Compost for Land Restoration

Land restoration at the OFDA has always been challenged by the scarcity of top soil to be spread over the reclaimed surface and to allow for cultivation of the land.

Since the construction phase, the Project has adopted a surface scraping practice, whenever starting exploitation of borrow pit or constructing a new well pad, in which the top soil already present is gathered first, then stockpiled to the side of the areas and stored there until the time for reclamation.

This practice has allowed, particularly at the well pads, to obtain good results in terms of reclamation.

In order to improve the reclamation process by extending the existing top soils to provide more coverage of the borrow pit land area, the Project has started in recent years, to evaluate the use of compost as a supplement to the existing stockpiled top soil when reclaimed.

In this sense the GER initiative, described under the Waste Management Section, was launched thanks to the support of the Project in order to obtain the double goal of recycling some waste streams produced in a more efficient way, and to provide a top soil in put that may possibly extend the top soil distribution over the land area and provide nutrients to the top soil.

At the present time the composting initiative is still in the starting phase (GER is now working with a limited number of employees) while the use of compost is being studied by EEPCI (also through the testing of compost samples sent to laboratories based in the U.S. in order to obtain the optimum waste mixing rates to optimize the composting process).

It is understood that a dedicated MOC on well pad reclamation using compost will be prepared and submitted for final review and approval.

Recommendation:

20. The ECMG recognize that the use of compost for revegetation purposes is in line with the EMP and Waste Management Plan requirements, however, considering the proposed use of compost for restoration of land parcels to be dedicated to agricultural purposes, the following key issues should be addressed in the MOC documentation:
a. as the compost is derived from Project camps sewage sludge processing, chemical analyses (including pH, organic matter, N, P, heavy metals\(^1\) and residual pathogens) of the produced compost should be made performed before reuse in order to demonstrate the efficiency of the composting process and the absence of residual toxic compounds in the final product;
b. an evaluation of the possible cultural constraints in the use of compost shall be also conducted through the help of the EMP Socioeconomic team or through the support of experts in the local agricultural sector, in order to understand before the application of compost, if the use of compost is acceptable for the local communities.

5.7 EROSION CONTROL AND REVEGETATION

The Project has consistently implemented the erosion control/revegetation management and monitoring measures in accordance with the Operations phase ROW Plan.

Monitoring and implementation of erosion mitigation measures appeared to be adequate. According to the information provided by EEPCL, sediment traps in the ditch to Loulé and Pende River are in place and in good condition. In addition, erosion previously identified in Moundouli field has reportedly been repaired and upgraded.

\(^1\) Typically Cadmium, Copper, Nickel, Lead, Zinc and Mercury.
6 SOCIO ECONOMIC TOPICS – CAMEROON REVIEW

6.1 COMMUNITY ENGAGEMENT

Update

Ongoing consultations are carried out by Community Relations Officers (CROs) and, for specific purposes, by the Socio-Economic coordinator and COTCO contractors. Since last ECMG visit (April 2009 - September 2010) COTCO carried out 724 consultations concerning: follow-up of grievances; hiring for ROW maintenance; information and awareness; donations. Consultations are properly logged.

The new ROW Integrity Plan (ROWIP) put in place by COTCO involves local population in protecting and maintaining the ROW integrity. The ROWIP includes a revised grass cutting organization and the recruitment and training of local workers to carry out regular ROW integrity inspections. A public awareness campaign on ROW Integrity Plan has started in 2010. During the campaign, COTCO staff gives information on the activities that are authorized and unauthorized in the ROW and how to get the necessary authorizations to implement the allowed activities; distributes gadgets with messages; and explains the employment criteria and procedures for grass cutting and inspections. An important feature of the ROWIP is that it fixes rules on the wages and the payment procedure: the wages will be calculated in advance and agreed by all parties and the money will be paid at the end of the campaign after the validation of the work done. Since July 2010, the ROWIP information campaign has touched several communities and is presently ongoing.

Observations

The ECMG team visited a number of villages along Maintenance Area (MA) 3 and around Pump Station (PS) 2. Overall, the relationship between the CROs and the communities appears good in most cases, and CROs’ frequency of visits is judged sufficient by communities.

Donations of recycled material (wood) in villages around PS2 do not seem to raise major issues.

Villages concerned by the upcoming Lom Pangar Dam project and relative Pipeline Modification Project (PMP) expressed frustration relative to the delays in satisfying their employment expectations and concerns for impacts such as dust and traffic (see also section 8).

Main issues raised during the ECMG’s visit were related to bush-cutting employment and community compensation. According to villagers met, in some cases the payment for grass-cutting works was not done even three months after the completion of the works (in the case of Biboko). In Mbamba, villagers claimed that the contractor did not give a complete PPE (which include a long sleeve coverall) to workers and dismissed those who did not own a long sleeve shirt. In Ebaka, according to villagers, the coveralls supplied to local workers were dirty. Generally, the main concern and complaint raised were relevant to the low wages paid compared to the effort and workforce needed for the bush-cutting works.

In some of the villages visited by the ECMG team, villagers complained about community compensation. ECMG found that the complaints were relevant to the type of community compensation selected and/or the adequacy of their implementation, although conducted back in 2002-2003 in compliance with EMP requirements and with the support of local NGOs. In Biboko, the compensation consisted in upgrading a small health center; however the center was never operational because the local NGO who built it eventually left. In Ebaka, a tense situation was met because of the status of the selected regional compensation (village electrification) that could not yet be fully realized, possibly due to potential lack of clarity and misunderstanding with the community on the power supply contractual requirements and cost to be sustained, which is now resulting in missing connections from the main power supply line (installed) with each house. Another case of pending regional compensation was reported by COTCO: seven villages in Akongo area (MA4) decided to put together their regional compensation money for an electrification project. The amount, although supplemented by a donation of the rural council, was not enough to complete the project and, since, the communities have not yet decided what else to do with it.

The villages concerned by the PMP are expecting further compensations to mitigate impacts. In Belobo village, women complained their needs were not taken into consideration in the planning stage of the compensation (the village received a public building and a football field) and now are asking that their priorities be considered (a nursery school, toilets, water management and a place to dry cassava away from the dust of the road). This finding was similar in Biboko, where women complained they received no advantage from the project and are waiting to be compensated for the rock they use for drying cassava that will be destroyed by the access road planned by the project.
Some villagers also asked for the continuation of COTCO campaigns on health, particularly the distribution of mosquito-nets and HIV-AIDS screening.

Recommendations

21. COTCO should verify that the ROW maintenance contractors provide adequate safety equipment to ROW laborers, that wages are adequate compared to the effort and workforce needed, and that payment is done at the end of the campaign, once the verification of the quality of the work done is complete. Any possible controversy arising should be documented by the CROs or EMP representative in order to adequately follow up with corrective actions if needed.

22. The project should consider hiring specialized assistance (NGO or consultant) to conduct participatory planning exercises and assist communities (i) in identifying priorities for community compensations and (ii) in managing the investments. The planning should include women in the decision making process.

23. The project should consider to complement the community compensation in the most affected villages (mainly villages around pump stations), wherever compensation measures were not found to be carried out in an effective manner and to mitigate specific negative impacts on women.

24. COTCO should consider hiring external expertise to improve its communication tools and materials and adapt them to the targeted public. Reportedly this will be done through the newly created position embedded in the Public Affair to enhance communication.

25. The CRO should contact the local NGO responsible for the health center in Biboko to see if it is possible to re-open the center or find alternative solution.

6.2 SOCIAL PLATFORM

Update

The tripartite social platform was established in 2008 as a common framework for the project, the Government of Cameroon (through the CPSP, Pipelines Steering and Monitoring Committee) and civil society (through NGOs’ associations monitoring the project) to review the status of grievances received from impacted communities and persons and generally address social issues relative to the project activities. The platform carries out regular joint field visits to investigate grievances and discuss with concerned parties.

From February to October 2010, the NGOs participating to the social platform suspended their participation arguing the following: COTCO refuses to share information on compensated people and compensations they received; COTCO has a general distrust of communities; delays in closing the issues are excessively long; there are cases of COTCO negotiating directly with local authorities and communities bypassing the platform.

In November, COTCO and NGOs met and found an agreement to re-launch the collaboration. COTCO accepted to share more information on compensated people but only a case by case (when a grievance is received), in order to respect affected people's privacy. COTCO committed itself to write a letter of receipt as soon as any letter of grievance is received; and to share all documentation of grievances received and closed in the period between the platform meetings. Next platform meeting is scheduled for January 2011.

Observations

ECMG held a joint meeting with representatives of two of the NGOs’ associations (FOCARFE and RELUFA) participating to the social platform and COTCO. Presently, according to COTCO, all original 456 grievances have been closed, and 8 new grievances have been received, while the NGOs have a list of 15 grievances still pending and other cases unsatisfactorily solved. Other issues raised by NGOs during the meeting were:

- COTCO construction sub-contractors in some cases did not pay the social insurance fee to the National Social Insurance Fund (CNPS): some of the workers checked and their names were not registered;
- the NGOs have no updated information about the PMP and the follow-up of the asbestos disposal in Ebaka;
- an evaluation of the artificial reef project in Kribi is needed;
EXTERNAL COMPLIANCE MONITORING GROUP (ECMG)
SEVENTH POST-PROJECT COMPLETION VISIT OF THE D’APPOLONIA ECMG, NOVEMBER 2010

- an independent evaluation of the pipeline project's impact on communities should be carried out;
- the situation of Bakola Pygmies in the Campo Ma'an Park should be monitored.

ECMG acknowledge with satisfaction the re-launch of the social platform collaboration. ECMG support the idea of conducting an independent evaluation of the impact of the pipeline project, which can give a balanced view of the project and limit speculations. The evaluation could also provide recommendations for action and a baseline for future monitoring of project impacts.

Concerning the impact of the artificial reef, the artificial reef project was developed as compensation to Kribi fishermen for the destruction of part of the natural reef during pipeline construction and had the objective to provide a sanctuary for aquatic life and enhance fisheries in the vicinity of offshore pipeline. The reef was sunk by COTCO 4 km out of Kribi in July 2006. COTCO conducted an inspection of the artificial reef on January 2009. A team composed of divers located the reef and a video was shot that shows the reef is well colonized by fishes. The video of the reef was presented to Kribi local authorities, the fishermen community as well as to the NGOs. According to the Project, after the video presentation no complaint or issue was raised by the community.

Recommendations

26. While the Project is restarting the social platform activities, high priority should be given to the closure of the oldest pending grievances. If any grievance was closed that was not in conformity with the EMP, the project should implement corrective actions as soon as possible.

27. The project should facilitate the information flow between parties. In particular, information on environmentally sensitive issues like asbestos disposal should be communicated to the public in a timely way (see also Waste Management Section).

28. The project should include cases flagged by NGOs in the upcoming ECMG visits, in coordination with NGOs in order to include a significant number of cases during the next ECMG visit agenda.

29. COTCO should consider launching an independent socio-economic impact assessment of the pipeline project in Cameroon. The Terms of Reference should be agreed by IFC, COTCO and the Platform and the assessment should be carried out by an independent consultant.

6.3 FOUNDATION FOR ENVIRONMENT DEVELOPMENT IN CAMEROON (FEDEC)

Update

Since last ECMG visit, the Foundation for Environment Development in Cameroon (FEDEC) continued its activities notwithstanding the crisis of funding. The 2009 donation from COTCO was employed to fund the three implementing organizations' (IO) activities, which are managing the three offsets put in place as an environmental compensation of the pipeline project, in compliance to World Bank’s Operational Policies related to Natural Habitats (OP 4.04) and Indigenous Peoples (OP 4.20):

- the Campo Ma’an National Park which is managed by WWF (World Wildlife Fund). Funds coming from FEDEC represent around 10% of overall budget and are mainly employed in anti-poaching activities. FEDEC funds have been reduced by 20% in 2010;
- the Mbam and Djerem National Park managed by WCS (Wildlife Conservation Society). FEDEC funds around 30% of activities. The funding was decreased by 5%; and
- the Indigenous People Plan (IPP) for the Bagyeli/Bakola Pygmies in the Atlantic Littoral forest between Lolodorf and Kribi, which is implemented by RAPID (Réseau d’Actions Participatives aux Initiatives de Développement). FEDEC funds the totality of the activities. The funding was kept at the same level this year as the preceding years.

During the period, the joint inspections by FEDEC/COTCO of IO activities have being continued:

- April 2009 in Kribi;
- July 2009 in Kribi/Lolodorf and Campo Ma’an;
- November 2009 in Mbam-Djerem;
- April 2010 in Kribi;
- July 2010 in Kribi and Campo Ma’an.
During these inspections, COTCO and FEDEC trained the RAPID accountants and the BB focal points to improve the administrative system; met the local authorities to promote collaboration and synergy; give recommendations to improve implementation of programs.

The Action Plan proposed by IFC in 2008 and consisting in studies intended to evaluate and improve the programs the Foundation manages (parks and IPP) and to strengthen the Foundation capacities with the support of consultants with expertise in Conservation Trust Funds/Foundations, has not yet been launched because of ongoing discussion on TORs and funding, and is now planned for 2011.

FEDEC board, and particularly its president, has been active and carried out a number of initiatives:

- FEDEC ensured SNH (National Hydrocarbons Society) economical support for i) a training in fund raising for FEDEC president and accountant, and ii) communication activities, such as the improvement of the website and the production of a documentary video;
- FEDEC obtained a donation from Nestlé to supply food to the boarding school of Ngoyam, in the Pygmies' area;
- FEDEC submitted a proposal in collaboration with RAPID to manage the compensation scheme in the frame of the Lom Pangar Dam project and is discussing a possible collaboration in relation to the Deng Deng National Park management to be done with WCS;
- FEDEC has also continued to keep contacts with relevant Ministries (Social Affairs, Environment, Fauna and Forests) and other stakeholders.

**Observations**

ECMG held a joint meeting with FEDEC, IO and COTCO management. The issues discussed concerned the general future of the Foundation and the IOs' activities since last ECMG visit, including effects of the decrease of funds.

As mentioned earlier, IO's activities have been pursued; however the national parks' programs activities have been impacted by the decrease of funds: in Mbam-Djedem WCS had to limit the number and scope of community programs; in Campo Ma’an WWF had to reduce the number of anti-poaching patrols. The activities of the IO are presented with more details in the following sections.

WCS and WWF informed the mission of the increasing threats to the parks, consisting in upcoming infrastructure projects (dams, mines, railway, port) causing major population influx and other environmental impacts, in addition to ongoing legal or illegal natural resources exploitation activities (timber exploitation, poaching, agribusiness).

There is a general agreement of COTCO, IO and IFC that FEDEC could in principle play a role in pooling resources given as environmental compensations for these investments that pose a high environmental risk, but apparently the Government and other stakeholders (private sector actors and financing institutions) have not yet agreed or have a different point of view.

ECMG commend the activism of FEDEC in looking for new opportunities and finding economic support for training, however acknowledge that the structural problem concerning the Foundation's financial situation and institutional role is not yet solved. ECMG also recognize the ongoing intense activities carried out by IOs notwithstanding financial limits.

### 6.3.1 Indigenous People Plan

The Indigenous People Plan (IPP) for the Bagyeli/Bakola Pygmies started in 2006 in 26 settlements situated within 2 km at each side of the Lolodorf-Bipindi-Kribi pipeline corridor and includes the following components:

- **education**: facilitation and support to schooling for Bagyeli-Bakola (BB) children in 12 schools, sensitization of parents and children, construction of toilets in schools and supply of equipment and uniforms. Of note that most of the support to schools benefits both the BB and Bantu children;
- **health**: provision of free-of-charge health care, emergency transport and drugs, follow-up of sick people, training of young BB as health focal points and training of midwives, preventive medicine, sensitization for the vaccination campaigns;
- **agriculture**: supply of tools, trees and seeds through a network of BB focal points, seeds production, beekeeping, chicken raising, technical assistance and follow up;
The number of BB children attending school in the year 2009-2010 has been of 209 children (gender proportion not specified). A slight decrease is noted in relation to previous year (284 in 2008-2009, including 130 girls). However more children were admitted to the next class in 2010 primary school (68% versus 59% in 2009). Two out of four candidates were admitted to CEP (primary school certification) examinations and seven BB students are following in secondary school. In 2009-2010 FEDEC re-launched the support to the boarding school of Ngoyang, and put in place a joint Pygmy-Bantu managing committee. Main challenges, according to RAPID, are the irregular frequency at school because of continual involvement of BB children in economic activities of the family (hunting and wild fruits gathering) in some months of the year. In addition, many young BB boys and girls still drop out of school very early as they traditionally marry and set up their home at a very young age.

In 2009 the IPP facilitated the vaccination for 19 BB women and 63 children, and trained 4 health focal points and 13 midwives; in 2010 the IPP signed a collaboration agreement with local hospitals and health centers and discussed with the local health authorities how to improve the outreach of the vaccination campaign to the project area.

In the frame of the agriculture program, in 2009 one agronomist, one forester and one expert in bee-keeping have collaborated for technical assistance; 136 farmers (138 in 2010) have been surveyed and supported with tools and other inputs; and 6 bee-keepers assisted. As the individual palm trees plantations have not been very successful because of lack of maintenance and destruction by Bantu neighbors, the project started a community plantation program in a few motivated villages. Chicken rising began to show some results, as BB families began to eat the chicken when lacking game meat. However animals rearing is limited by the mobility of the BB settlements.

In 2010 FEDEC recommended RAPID to discontinue the distribution of identity cards because it overlapped with other similar program. Consequently the project focused on sensitization on citizenship rights and duties. The IPP also launched a census of the BB population in the project area with the further objective of creating a database and a mapping of the area. Among complementary activities, in 2009 the project supported the building of three houses and the training of 11 young people and provisioning of equipment of off-farm economic activities. RAPID has begun to discuss with Social Affairs Ministry the possibility of establishing an affirmative action program in response to discrimination towards the BB in employment.

In 2009 the IPP received funds from the Human Right Commission in Cameroon to sensitize BB children on human rights and peace keeping; and another funds from the United Nations Development Program (UNDP) to sensitize BB communities on natural resources and endangered species preservation. RAPID prepared also a proposal for a survey and commercial exploitation of Non Timber Forest Products (NTFP) to be conducted with the collaboration of BB communities.

The joint inspections carried out by COTCO and FEDEC reported a general positive feedback from the field, but identified the following main issues:

- RAPID administrative system and financial follow-up to be improved;
- uneven collaboration from local schools and health centers;
- delay in the supply of tools and drugs to health centers;
- delay in completing some infrastructures (houses and toilets).

ECMG support the initiatives of the BB population census and mapping and the proposed NTFP project. ECMG recommend giving results of BB children schooling in percentage of all the BB children in schooling age and disaggregated by gender.

6.3.2 Mbam And Djerem National Park

WCS (Wildlife Conservation Society) has been implementing the Mbam and Djerem National Park (MDNP) management support project since 2003. A Master Plan was validated by the Ministry of Fauna and Forests (MINFOF) in March 2008. According to the Plan, the budget for the park has been calculated between 700 million FCFA per year (best option) and 200 million FCFA (minimum option), while actually the park management is implemented with 160 million FCFA per year, one third from FEDEC, one third from MINFOF and one third from WCS. The project is implemented around four axes, as follows:

- protection and public sensitization, which include park boundaries demarcation, anti-poaching activities and eco-guards mobilization;
- research and ecological monitoring;
natural resources co-management with local population, which includes the support of fishing and beekeeping activities (funded also by British High Commission and USFWS);

- coordination and capacity building.

Since last ECMG visit (May 2009), an agreement for anti-poaching activities has been signed between the MINFOF and the economical operators of the park area, and the first monitoring committee on anti-poaching activities was held. In addition, WCS established three regional councils of traditional authorities. The coordination with the Gorillas Conservation Project in Deng Deng Park (also implemented by WCS and funded by AFD) allowed the organization of joint anti-poaching activities and training in the sensitive South-East perimeter of the park. In 2009, 72 patrols were organized that seized 5,273 kg of bush meat, 4 elephant tusks, weapons and other poachers' equipment. A program of controlled bush-fires is ongoing. As for awareness rising, 32 consultations and sensitization meetings were organized with local communities in 2009/mid-2010 and an education program was launched in two schools. Training of eco-guards is ongoing, including specific training in MIST (management system against poaching), use of GPS, maps and compass, fauna management, legal aspects and safety.

Regarding the ecological monitoring, more than 10 field missions were organized in 2009 and a survey of chimpanzee and elephant population carried out; collaboration with Cameroonian and foreigner universities is ongoing and concerns researches on fauna, flora and non-timber forest products, The University of Leeds carried out a survey on behaviors and attitudes of local population after the sensitization campaign.

In the frame of co-management activities, the project established 15 GICs (community associations) active in cattle rearing, bee-keeping and fisheries. The project distributed 48 improved beehives in 4 villages. The income from this activity was 500,000 FCFA in 2009. Fishing licenses are given to local fishermen. Notwithstanding the decrease in catches, in 2009 the fishing season (April to June and September to December) resulted in an income of 75,000 FCFA per month to each fisherman, while the fishing fees contributed to the fishermen's common fund that reached 1 million FCFA. Other income generating opportunities relative to the park (guides, porters, paddlers for various missions) generated around 3.5 million FCFA.

In their reports, WCS identify a number of problems in managing the park, which have been confirmed by the joint inspection carried out by COTCO and FEDEC in August 2010:

- absenteeism of eco-guards who are public functionaries and precarious status of local temporary guards;
- lack of monitoring by the conservation service;
- insufficient equipment, including very old vehicles;
- the prosecution and punishment of the poachers meet administrative obstacles; and
- trafficking of hunting permits.

The park is also threatened by infrastructure projects that are at the design stage or were already approved, including:

- a dam on the rivers Missere and Djerem in the northern part of the park;
- a bauxite mine at the North-East of the park;
- the Lom-Pangar dam in the south-east.

6.3.3 Campo Ma’an National Park

WWF (World Wildlife Fund) has been managing the Campo Ma’an National Park (CMNP) since 2003. A five-year Management Plan had been approved by MINFOF in April 2006. FEDEC's contribution represents 10% of the overall park's budget. Main funding comes from the Dutch Government, the European Commission and WWF.

FEDEC funds one of the four components of WWF program in Campo Ma’an, the bio-diversity conservation program. The other three components are community forestry, livelihood development, and research on the great apes. According to the Management Plan, the cost of the biodiversity conservation activities financed by FEDEC was calculated at 160 million FCFA per year, while FEDEC's funding amount at 50 million FCA per year. The bio-diversity conservation program includes the following activities:

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2 United States Fish and Wildlife Service
3 French Agency for Development
− protection: anti-poaching activities, eco-guards mobilization, park boundaries demarcation, sensitization;
− co-management: developing a collaboration platform with authorities, private sector, local communities and indigenous people;
− ecological monitoring;
− developing a collaboration platform with the Rio Campo National Park in Equatorial Guinea.

The financial difficulties limited the number of patrols. In 2009, 390 man/days of road patrols and 449 man/days of forest patrols were carried out (against 1000 and 25000 man/days respectively planned). WWF managers met by ECMG reported that, for the first time, an elephant has been killed by poachers. Eco-guards were trained in anti-poaching techniques, ecological monitoring techniques and legal aspects of anti-poaching activity. An incentive system has been established consisting in topping up the salary of the Conservator and Post Chiefs.

General surveys on large mammals’ distribution were completed and two fauna monitoring missions were carried out in 2009. One study on potential vision tour of gorillas was also conducted, including training of eco-guards, identification of a site and approach tests.

CMNP signed a memorandum of understanding with one agro-business company (Hevecam) and other agreements with agri-business and timber exploitation companies are upcoming. A strategy of co-management involving the BB Pygmies has been developed and approved by relevant authorities but not yet implemented. In 2010, the collaboration with Equatorial Guinea authorities and Rio Campo Park advanced: a steering committee was established and a project of collaboration drafted.

According to WWF, main challenges facing the future of CMNP and the project funded by FEDEC are:

− demographic pressure and other environmental impacts due to upcoming big infrastructure investments in the surrounding area: the Memvele dam, the industrial port complex of Kribi, the iron mine of Les Mammelles, and the construction of a mineral terminal and railway along the entire northern border of the National Park. WWF has been involved in the relevant impact assessment and environmental management plans and is following the situations;
− insufficient logistic means for the eco-guards, particularly vehicles, weapons and radios;
− half of the eco-guards are more than 40 years old;
− the difficulty in controlling the road that crosses the park East-West and in materializing the park’s boundaries;
− no compensation scheme for the damages done by animals (especially elephants) to communities is envisaged by the law;
− the international economic crisis impacted the park in two ways: less availability of funds from the private sectors; timber exploitations abandoned by operators leaving settlements of demobilized workers in the forest, who reversed to the exploitation of forest resources, particularly hunting.
7 SOCIO ECONOMIC TOPICS – CHAD REVIEW

7.1 LAND IMPACT MANAGEMENT

Update

According to the information received from the project team, the balance of wells as of November 2010 is as follows:

<table>
<thead>
<tr>
<th>Type of well</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Producer</td>
<td>624</td>
</tr>
<tr>
<td>Injector</td>
<td>61</td>
</tr>
<tr>
<td>Supply</td>
<td>1</td>
</tr>
<tr>
<td>Observation</td>
<td>6</td>
</tr>
<tr>
<td>Waiting the drill</td>
<td>28</td>
</tr>
<tr>
<td>Under construction</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>728</strong></td>
</tr>
</tbody>
</table>

The recently drilled wells include those drilled in the infill field (Komé and Bolobo) following the "fault block" approach, and wells developing the crest of the east and west structures at the Miandoum main oil field. More wells are currently being drilled or planned for the immediate future based on the production needs arising.

The overall footprint of the project in the three fields area (Komé, Bolobo and Miandoum) reached 2,700 ha in third quarter of 2010 (including around 1,000 ha temporary acquired and not yet returned). The trend shows a slight but steady increase since June 2008.

To limit the impact of drilling on village land, the Project adopted a number of measures:

- overlapping well pads;
- use of a smaller rig to reduce the size of well pads;
- a faster pace of land reclamation and return;
- expediting the quitus process.

In the frame of the Land Use Mitigation Action Plan (LUMAP), the project has developed sophisticated tools to monitor and manage impacts: (i) the Village Land Use Survey; (ii) the maps prepared on the basis of the survey, where all impacted households and land are shown together with project facilities; (iii) a compensated and non-viable persons database that permit the team to follow the evolution of land take, land return and household status in those villages where a Village Land Use Survey was conducted.

The planned baseline Village Land Use Survey on the fifteen most impacted villages is complete (30,000 fields and 14,500 individuals surveyed in three years). The team is working in parallel with the EMP Construction Land Acquisition Team on Impact surveys: the Village Land Use Survey data is updated when land is taken for further drilling, and changes in household members in fill villages. The EMP Socioeconomics and EMP Construction (Land Acquisition Team) developed a work process to allow an expedited process to speed up the process of impact assessment and resettlement eligibility determination. As the land is compensated, the team updates descriptive and spatial information and identifies resettlement eligibility. This process improvement ensures that

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4 Fault Block approach: carrying out construction oil-bearing block by block that permits i) to minimize the land required for access roads, flow lines and electrical lines and ii) to predict who in the villages will be impacted.
5 Non-viability is assessed on the basis of agriculture viability: less than 2/3 Corde per household member.
6 Alternative livelihood options.
resettlement eligible households are enrolled in the next available resettlement promotion and reduces the potential of these eligible households being “lost” in the process. The time to access an option of resettlement is reduced to around two months from the time of land identification.

More staff from EMP-IS have been working in the quitus process and in integrating the compensated parcels update in EMP-IS. This made it possible to expedite the process and log in 70 out of 96 land return units from August to November 1st 2010 for a total of 51 hectares of land.

Observations:

ECMG acknowledge the effort of the LUMAP team - now referred to as Synergy Team (the team that works with the EMP Construction Land Acquisition team) - and the IMPACT Team (conducts the IMPACT Assessments to determine resettlement eligibility of land compensatees) - to keep the pace with drilling program.

However ECMG remarks that the drilling of wells is increasing beyond what was foreseen during the 2008-09 EIA for the infill project7, and is not limited to the fault block area where the impact study was carried out. The project has not yet provided a specific impact assessment of the drilling program extended outside the infill drilling area. In addition, in spite of the large amount of information collected during the surveys, ECMG is of the opinion that some of the direct and indirect effects of the drilling at the village level are somehow lost. These impacts include issues observed during the ECMG field visit during a joint visit with EEPCI team and CPPL (a consortium of NGOs based in Moundou) at Maikeri village:

− "Enclavement": some of the villages are surrounded by project facilities for part of their perimeter. Works are ongoing and more wells, access road and flow lines are under construction all around the village. Villagers feel enclosed in their own homeland and in a situation of uncertainty. Villagers, and particularly women, complain of difficulties of access and hindrance to free movement, especially during the night, because of the security measures implemented on the project facilities (see also implication for community safety and security in Section 7.4). Villagers surrounded by project facilities and who see works ongoing feel in a precarious situation and wonder whether their village will eventually be compelled to resettle;

− in some cases, the ECMG team noticed that some of the wells are very close to settlements and, for example, to one school in Maikeri. In Maikeri, villagers alleged that a school was resettled because it was too near to a new pad working area. According to EEPCI, the school was not designated as a school at the time of the compensation. The "new" school was rebuilt using the same material of the old one (straw matting with simple wood frame) with no fence even if the school is closely surrounded by well pads. According to the community, the school is officially registered and attended by 360 school children. EEPCI should ensure that all project facilities respect the minimal distance according to best industrial practice/EMP and consider fencing schools close to project facilities;

− in the project area, the availability of farm land for heavily impacted land losers is problematic. Moreover, not all the land returned is actually exploitable by the farmers. The project's count of land return includes borrow pits that are lateritic and only partially exploitable for agriculture. Top soil is very scarce in the area and, according to many farmers, the fertility of reclaimed land rapidly deteriorates (one or two years of good crops);

− farmers continue to complain because of the fragmentation of land, and claim they cannot exploit some of the parcels because they are too small or too enclosed among project facilities. According to Project's team, these allegations contrast with farmers' habit of rotation and exploitation of large land area and are opportunistic. EEPCI should monitor contractors’ restoration procedure that has been reported as uneven and sometime not adequate and further check restoration at old reclaimed areas (for example old borrow pit near Maikeri) implementing corrective measures where needed;

− some farmers (in Ngalaba) complained that contractors do not advise them in time of the start of the works on their land. However, according to the Project's team, farmers know very well when to expect the works to start (usually shortly after compensation is received). ECMG understand that, since the compensation for a parcel of land is given, that parcel is at the disposal of the project which can start works at its convenience. However, out of a 'good neighbors' approach, ECMG suggest to give a notice of some days before the planned start of the works to the concerned farmer(s).

7 “Focused Environmental and Social Assessment – Incremental Impacts of the Infill Drilling Program for the Komé and Bolobo Oil Fields”, ENVIRON February 2010
The project is working on alternatives to improve the availability of farming land. These initiatives are discussed in the following section (7.2).

Recommendations

30. ECMG recommends that EEPCI review and update, as needed, the tools developed in the frame of LUMAP and the surveys outcomes to evaluate the impact on households and villages of the new wells drilled outside the infill program of Bolobo and Komé oilfields and implement mitigation measures as needed. Adequacy of these tools and relevant mitigation measures shall be reviewed in the light of the additional number of wells to be drilled, with particular focus on the assessment of cumulative impacts and in order to identify relevant corrective actions to mitigate involuntary displacement, as needed.

31. EEPCI should highlight and follow the impacts of oilfield development at village level (including "enclavement" and land fragmentation) taking also into consideration the perception of villagers. The information should be presented at least for the high and approaching high impact villages (including all infill villages) in the respective Site Specific Plans, to be updated each year.

32. EEPCI, after having identified impacts at village level (also through the MARP exercise, if relevant) should develop mitigating measures in consultation with the affected communities. In particular, EEPCI should consider what can be done to facilitate free movements in the Maikeri area surrounded by project facilities (for example: walking paths, extension of the project road to reach the village)

7.2 LIVELIHOOD RESTORATION

Update

The training and support to the eligible persons in finding livelihood alternatives is ongoing. According to data supplied by the Project, the total number of resettlement training program graduates is 837 persons (251 Off-farm Training and 586 Improved Agriculture Training). EEPCI updated their analysis of the resettlement program graduates using the Village Land Use Survey data and Red Flag Survey data and determined that 418 of the 837 graduates were not resettlement eligible (False Positives).

At the time of the ECMG November 2010 visit there were 25 resettlement eligible people that have requested land replacement. EEPCI reported that the final list of At Risk households (HH), qualifying Marginal HH, and previous land replacement requestors for the 2011 resettlement promotion total 116. These people are currently going through the Five Days of Reflection to make their decision on resettlement benefit option.

In 2010 on-farm training concerned rice growing, vegetables gardening, fruit trees, livestock raising, fishing and fish farming, transformation of agricultural products.

The Basic Business Skills (BBS) training continues to be given to eligible persons. The training is provided at the village level and non-eligible interested villagers are welcome to attend and participate. (134 eligible persons and spouses and 120 non-eligible attended the 2010 promotion). Data provided by the implementing agency (CEDIFOP) shows interest and good performance of attendees.

In 2010 new contractors were involved with the Community Compensation and Resettlement management: ISM Consult is the new contractor management firm and APROFODEL is the sub-contractor NGO that teaches the Improved Agriculture Training.

In addition, the project launched a number of pilot initiatives to increase the land availability and reclaimed land top soil productivity improvement:

− the Generate New Farm Lands from Riverine Lowlands Project, or Rice Pilot Project, using riverine lowlands in villages near OFDA rivers to intensify and improve the cultivation of rice, a commodity locally valued both for consumption and sale (see box);
the Soil Fertilization and Stabilization Experiment, consisting of the use of the *Mucuna pruriens* as a soil fertilization and stabilization improvement technique. The *mucuna* was planted in some 26 hectares of KBP 6 and MBP 8 (borrow pits that were reclaimed in the first quarter of 2008 and were provided with additional top soil to improve the land) to demonstrate to the farmers the possibility of improving the fertility of reclaimed sites. According to the project team, the *mucuna* experiment was a success from the technical point of view, however the farmers so far have not embraced the complete farming technique; and

- the compost initiative (see Waste Management Section), still at a testing phase, the acceptability to the farmers is still to be verified

**Box 6: Pilot Initiatives for Land Availability**

The Generate New Farm Lands from Riverine Lowlands Project's objective is to help the farmers learn how to prepare the land for rice plantation and then test a number of rice varieties provided through the AfricaRice center and ITRAD (research institute). The idea being that the farmers learn new techniques, prove to themselves the efficacy of different rice varieties (expand their seed horizon), and most importantly demonstrate success to the other villagers. An agreement has been reached with the local authorities about the neutrality of these riverine lands and their availability for most impacted farmers. Three sites were selected in Madjo Bero, Madana Nadpeur and Kagroue. In addition, a rice seed bed and plot for market garden vegetables' seed production was built by EEPCI at unused well pad K 744 for a cooperative of 15 female Improved Agriculture Training graduates from Madjo village. Male farmers received a per diem to work on the plots, while the women cooperative did not ask for any per diem. Main positive conclusions from the experience so far are: the transfer of knowledge and skills; selection of seed varieties by the farmers themselves; and the dynamism and organization of the women’s cooperative. Main issues concerned: the exclusion of the Kagroue site as village chiefs claimed that only Kagroue village residents could use the riverine lands; the per diem approach did not achieve its intended goal of improving (male) farmers' participation; lack of facilities to store the seed properly after harvest.

In 2010 the Project prepared a number of Management of Change (MOCs) to update procedures relating to the livelihood restoration activities:

- Resettlement Option of Households Demonstrating Specific Vulnerability, describing the vulnerability assessment for “Marginal” households;
- Reinforcement Training Option, describing process to select, train and monitor resettlement training graduates that have not restored livelihood however would likely do so with extra training and equipment grant;
- Resettlement and Economic Glossary of Terms for inclusion in the Land Management Manual;
- Basic Business Skill Training Prerequisite for Resettlement Training Option Resettlement Eligible People, formalizing the BBS prerequisite (i.e., must take the course and pass).

**Observations**

ECMG acknowledges the constant effort of the EEPCI team to improve the effectiveness of the livelihood restoration measures. The new contractors for Resettlement Management are introducing improvement in the overall management and in the implementation of the training: regular and more frequent meetings between management and the implementing agencies; realignment of trainings with BBS; more practical and applied teaching technique; the trainers live in the trainees' villages, and can respond in a timely way to problems and questions.

The quality of equipment received after training has been raised again by some of the villagers as an issue. They complained because of low quality animals (oxen) and carts. Some of the activities developed after the training as well has been unsatisfactory for the trainees, for example chicken rearing and sorrel wine production. According to other villagers met by ECMG, some of the off-farm training received in the past have been useful (for example masonry), while the outcome of other trainings has been questionable (for example, not enough equipment received with the training in motorbike repairing). The ECMG acknowledges the efforts of EEPCI, JMN and now ISM Consult to find a definitive solution to ensure timely delivery of quality equipment and repair or replace the defective equipment when relevant. However ECMG encourage EEPCI to ensure that the quality of equipment given to eligible persons is adequate and assist them in proper use and/or replacement as needed.
Concerning the pilot projects, they are relevant and technically effective, but, according to the Project team own analysis, they are still to be embraced by the farmers. For the moment, most of the farmers (at least, of the male farmers) have been motivated by per diem to work on these projects. The male farmers are traditionally used to extensive agriculture, with large amount of low fertility land to be exploited for two or three crops. Availability of fallow and bush land is therefore important and it is what the presence of the project has decreased overall, according to farmers. However according to EEPCI survey and analysis indicate that villages have plenty of fallow land. Anyway, the proposed intensification and improvements in agriculture methods ask for a cultural change that will not be reached in a short period. In addition, other factors such as the availability of agricultural inputs, stocking and storage facilities and market outlets can also be problematic. However ECMG agree with the EEPCI team that experimenting new techniques and convincing a small number of leading farmers are the right ways to promote change over time.

The tenure issue is also an important aspect that can limit the benefits of the new projects on the targeted households (the most affected ones), as demonstrated by the experience in Kagroue (see box). Notwithstanding that, according to the Project, the Kagroue riverine flood plain is immense, villagers are not readily disposed to share its use with "outsiders" identified by the project without a clear exchange of benefits. As already remarked, the traditional land management process transforms itself at a low pace and with its own dynamics, that are influenced but cannot be directed by the project.

Following the field visits, ECMG recognize that promising aspects are particularly evident in women farmers’ groups experience and in the on-farm intensive agriculture training. Positive feedback was received from the COFEMAB (Madjo women cooperative) who has participated in the pilot rice project at K744 and from farmers who received and applied training in improved agriculture techniques. EEPCI could consider the partial funding of agricultural infrastructures (such as storehouses) to encourage groups of dynamic and dedicated farmers.

ECMG commend the various pilot initiatives taken by the project and will follow their development and adjustment according to the lessons learned in this first phase.

Recommendations

7.3. EEPCI could consider the partial funding of agricultural infrastructures for groups of dynamic and dedicated farmers (for example storehouses).

COMMUNITY COMPENSATION

Update

Over the past two years, EEPCI conducted a first time Community Compensation campaign in 25 villages in the Nya and Moundouli oilfields and a Supplemental Community Compensation campaign in the 15 highly impact villages in the original three oil fields (Komé, Bolobo and Miandoum). The selection of the type of community compensation was done according a catalogue of possible infrastructure/projects by the community through a participatory planning (MARP) process implemented by contracted NGOs.

At the moment of ECMG visit, 20 of the Nya-Moundouli compensations and 13 of the most impacted villages' compensations were delivered. The new Resettlement and Community Compensation management contractor (ISM consult) will finalize the construction of the remaining 5 projects in Nya-Moundouli. The two high impact villages in the Komé oil field still waiting for their supplemental compensation have asked for rice projects as compensation, the design of which will be re-worked as a result of the experience of the rice pilot projects (see section 7.2).

Maikeri Oil Field area has one high impact village (Poutougouem), one approaching high impact (Maikeri) and four low impact villages. Maikeri village in the Miandoum oil field is planned to begin Supplemental Community Compensation in 2011.

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10 The level of impact is established on the basis of the percentage of village land used by the project (high is equal or more than 10%) and the percentage of non-viable affected households in the village (high is equal or more than 15%). Villages are classified as highly impacted when they reach either of these values. Classification changes as land is returned and non-viable households are "resettled" (i.e. succeed in restoring their livelihood).
ISM together with the EMP Socioeconomic team will implement the MARP exercises in these villages. The MARP will be modulated according to the importance of investment and will be expedited in order to deliver results in one year or less versus the current two years.

Further Supplemental Community Compensation is envisioned for villages impacted the most by the continued in fill drilling program.

ISM is also revising the catalogue on the basis of village and market surveys to propose a list of more effective investments and improve their design. ISM is also working with CEDIFOP to develop training modules to help villagers manage their Community Compensation projects.

Observations

Even in the case of community compensations, ECMG recognize the ongoing effort of the Project to improve the adequateness of the investments and the rapidity of the delivery. ECMG agree with the project team that the MARP exercise should be adapted to the various situations and the process expedited.

ECMG acknowledge that the project is working on a number of problems related to the effectiveness of the community investments, such as poor planning, bad quality and/or inadequate management from the part of the community. Measures to improve their performance include: the revision of the catalogue, the improvement in design and the training in investments’ management are steps in the right direction.

During fieldwork, the ECMG team met the case of Maikeri village (approaching high impact category) who received a water tower powered by solar panels as a first time community compensation several years ago. The tower was built on the only pump well of the community (paid by the community itself). Later, the solar panels were stolen and presently the villagers rely only on traditional open wells. Now Maikeri is on the list for a supplemental compensation. ECMG opinion is that first community compensation was not adequately planned and that the present situation should be rapidly redressed considering the level of impact in Maikeri (see also section 7.1).

Recommendations

34. ECMG recommends that the Maikeri Site Specific Plan and the Participatory Rural Appraisal process (MARP) include review of the water well issue. The project should also check for other similar situations particularly concerning high and approaching high impact villages and find solutions as relevant.

7.4 KEYPERFORMANCEINDICATORMONITORING

ECMG has been presented with the results of Key Performance Indicators (KPI) statistics developed on the basis of the village survey database and on a specific KPI sample survey for some indicators. Among the most interesting indicators identified are: ability to cope with the soudure period\(^\text{11}\); unemployment for young men; saving capacity; school attendance; literacy rate; capacity to face health expenses; meat consumption. The indicators will be followed every 3 years.

It would be interesting to compare the data recently collected during the village and KPI surveys with the data collected during the baseline carried out during the preparation of the project, if at all possible.

ECMG understand that the project is waiting for the appointment of a new socio-economic advisor to analyze the data. ECMG recommend EEPCI to include the data set as provided to ECMG as an annex in the upcoming 2010 Annual Individual Report.

Recommendations

35. ECMG suggests presenting the statistics analyzed also in a narrative analytical and including the data set as provided to ECMG as an annex in the upcoming 2010 Annual Individual Report.

36. The project should consider retrieving available information collected in the area at the beginning of the project or in neighboring areas to be compared with the data.

\(^{11}\) Period of the year when households may have depleted all their food reserve and have not yet collected the new harvest.
7.5 CONSULTATION AND COMMUNICATIONS

Consultations with communities are ongoing through the EMP Socioeconomics Local Community Contacts (LCC), Socioeconomics Monitors and Supervisors as well as the contractors and subcontractors implementing the livelihood restoration activities. Between end 2009 and June 2010 the project held 316 public meetings attended by 20,745 persons\textsuperscript{12}. Regular consultations with civil society representatives (national NGOs monitoring the project) are also ongoing.

According to the field visit, the interactions between the Project field staff and communities seem overall adequate and LCCs' visits sufficiently frequent in the visited villages. ECMG team found a tense situation in Ngalaba village, partly due to villagers' fatigue for data gathering and expectations for the solution of issues raised (see below).

The ECMG team had a common meeting with NGOs, EEPCEI managers and a coordination of NGOs monitoring the project (Commission Permanente Pétrole N'djamena, CPPN and NGO local office) in the village of Maikeri, also attended by the village chiefs and local population. The meeting permitted a discussion of some of the villagers' main concerns, but also to identify some wider issues on project's impacts at village level (see section 7.1).

Some of the issues raised by communities during the ECMG visit have been discussed in section 7.3 (community compensation) and in section 7.1 (quality of land returned). Other issues include:

- security issues;
- delay in payment for damages;
- effects on health of the population by the oil operations.

ECMG is concerned by the repeating complaints about alleged abuses by the local security. Incidents reportedly happen especially in the evening, both on the public roads and around villages. As discussed in section 7.1, some of the villages are very close to project facilities and sometime closely surrounded by them. Villagers feel hindered in their free movements from one village to another during the evening. Cases of villagers travelling for health emergencies being stopped, threatened and having to pay a bribe to pass through the barrier were reported. Women particularly complain the lack of privacy as meeting security men in the bush is very likely (most houses do not have toilets).

In the meantime, thefts of project properties increased (577 in 2010) notwithstanding the sensitization campaign and the strict security. However the Project team reported that during 2010 EEPCEI appealed to the government, who changed out the gendarme leadership and gendarmes assigned to the OFDA area. According to the Project team, the new gendarmes were able to halt the transformer oil thefts in the OFDA.

ECMG acknowledge that not all security forces deployed in the area are under the project control. However it recommends again the sensitization of local/national authorities and developing a strategy to limit both phenomena involving the communities (i.e. the thefts and the abuses).

One of the village chiefs alleged that the compensation for damages are not adequate and arrive late. In particular, according to them, the price of oxen, when compensated, is low in comparison to what is asked by local traders (Ngalaba). As for the timing of damage compensation, according to Project team damages are presently compensated in around two weeks.

The concerns on public health have been raised in the villages of Maikeri and Ngalaba. Villagers remarked a number of "new illnesses" that they impute to oil operations: anemia in children and new born; miscarriages; malformations in new born. Animals' and plants' health is perceived at risk as well. According to some villagers, fruits are smaller; plants do not produce seeds; animals are weaker and die. The villagers also claim that water from open wells is oily. During the ECMG visit, some oxen allegedly drank water nearby a construction site died and the Project compensated the owner for the loss.

ECMG opinion is that these suspicions of negative effects on human and animal health pose a reputational risk on the Project and should be counteracted. The project should use the data and information available to correctly inform the population and launch a communication campaign with the support of independent experts and involving the NGOs. The project should consider the possibility of conducting further investigations, if needed.

\textsuperscript{12} Esso, Chad/Cameroon Development Project, Project Update 28, August 2010
In addition, ECMG suggest that the Project start evaluating the possibility of launching health programs in the villages (maternal health, nutrition, health awareness), which may improve some of the issues the population is concerned for, as they could be a problem of lack of sanitation, poor health and nutrition.

Recommendations

37. EEPCI should consider the possibility of conducting a dedicated investigation, if needed, on potential health effects and impacts on human and animal health due to the Project, also taking advantage of the routinely environmental monitoring activities carried out, followed by a communication campaign with the support of independent experts and involving the monitoring NGOs.
8 LOM PANGAR PIPELINE MODIFICATION PROJECT

8.1 PROJECT BACKGROUND

In view of the upcoming, and currently planned by 2013, construction by the Government of Cameroon of a dam and creation of a water reservoir in the Lom Pangar Area, the Project has started in 2010 the Front End Engineering Design (FEED) activities related to of the installation of two pipeline sections (each 13.3 km long) in the future reservoir area and decommissioning of ancient sections.

Scope of the Pipeline Modification Project (PMP) will be therefore to modify the pipeline sections to be flooded in order to comply with the technical requirements for underwater operations.

COTCO being one of the third parties affected by the construction of the dam and creation of the water reservoir, the PMP is a project entirely funded by the Government of Cameroon; however, as part of the main Chad Export Project, all the permitting, design, construction and operational activities carried out will be subject to the compliance with the environmental and social standards established by the main Project EMP.

All infrastructures needed to access to the PMP site, including upgraded roads, river crossing bridge and camp site creation, will be in charge to the Government of Cameroon, being the same infrastructures primarily needed for the dam construction. In addition to the pipeline modification itself, construction activities to be carried out by COTCO will consist in the installation of the lodging and supporting facilities (inside the dam project camp boundaries) needed for PMP workers.

The key steps achieved in 2010, with respect to the EMP monitoring and compliance, were:

- the preparation by COTCO of a Specific Environmental Impact Assessment (SEIA) and FEED for the PMP through appointed engineering consulting firms;
- the review of the SEIA by the ECMG, which included the submittal of several letter reports from April to July 2010 and included one site visit in May 2010 to survey the future project location;
- the restitution by COTCO of SEIA package to the Government of Cameroon through a dedicated workshop in July 2010;
- the preparation and submittal of a Gap Analysis Report by the ECMG to respond to the Lenders concerns regarding the possible gaps in terms of social and environmental standards proposed by the IFC Equator Principles and the Project EMP and functional to support the Lender in the upcoming request of non objection from COTCO before entering into the project financing process.

All the above documents, including comments and recommendations made by the ECMG, have been provided to the Project Lenders under separate covers. However in the following sections a brief summary of the criticalities highlighted during the SEIA review and visits conducted by the ECMG are reported in order to adequately follow up on the EMP related topic during the upcoming visits and Project activities review.

It is underlined that all design and construction activities to be carried out by COTCO within the PMP will be subject to the external and independent EMP compliance evaluation by the ECMG similarly to any other routine Project activity.

8.2 CURRENTLY SET PROJECT SCHEDULE

At the time of the ECMG visit in November 2010, and subject to the advancement of discussions with the Government of Cameroon, the PMP team is planning to submit to the Lenders the required MOC package relevant to the PMP by beginning of December 2010.

In addition, the Project is working on the conclusion of an Interface Agreement (IA) with the Electricity Development Corporation (EDC – the company in charge of the Dam Construction Project) in order to establish a common framework in terms of technical, environmental and social standards to be adopted by the two companies (EDC and COTCO) and with the scope of guaranteeing the respect by COTCO of all applicable EMP standards and requirements during the PMP activities.

Subject to the advancement of discussions with Government of Cameroon, the request for the non objection statement from the Lenders is planned for mid December, while detailed engineering and procurement is scheduled for the first half of 2011.
According to the provided schedule, site mobilization is planned for October-November 2011. However, it is underlined that the PMP schedule is strictly linked to the dam construction schedule and changes in the planned time frame may occur in the next months.

8.3 EMP COMPLIANCE RELATED ISSUES

In terms of EMP compliance, the SEIA package, in its final version, has been positively evaluated by the ECMG, being all the key biophysical and socioeconomic topics properly addressed.

Particular care has been devoted to the identification of EMP requirements applicable to PMP, with focus on sensitive topics such as the Oil Spill Response, the impact of traffic along the project road, the related dust production, the land use (with reference to all kind of land requirements for both camp facilities, pipeline modification works, and borrow pits) and the interface with local communities.

In this sense, the environmental and social mitigation measures indentified in the SEIA are properly aligned with the EMP requirements, with the addition of few minor corrective actions that will be consistently adopted by COTCO both during the design and field work activities.

The key area of concern at the present time is therefore mainly represented by the possible interactions between the PMP and the dam construction project, in order to consistently guarantee the respect by COTCO of the EMP requirements.

Interactions with EDC will be needed with regard to several sectors, including the management of the impacts related to the heavy trucks traffic, the management of the camp site, the borrow pit exploitation (where and if needed), the used land restoration and return (at the end of the field activities) and the interactions with the affected local communities.

The IA package, currently being prepared by COTCO, is correctly aimed at addressing all these topics and will therefore represent a key step for the establishment of a common framework of environmental and social standards, but also to address the needed corrective actions to be implemented whenever difference in adopted standards should exist.

It is underlined however that key documents needed for the definition of the IA are represented by the Dam Project SEIA and by the relevant Environmental Management Plan. At the present time, these documents are reportedly only partially available or not finalized, while only a draft version of the Lom Pangar Dam SEIA dated July 2010 has been disclosed so far through the World Bank web site.

8.4 OUTCOMES OF THE ECMG VISIT

In November 2010, the ECMG focused the visit on the survey of the latest alternative proposed by EDC and Government of Cameroon for the access road to the dam construction site. The ECMG team also visited the village of Biboko situated in the northern part of the planned pipeline modification.

The newly proposed road access, which is shorter than the previous alternative, runs from Belabo up to the villages of Ebanka and Mbamba. Immediately before reaching the Satando village, the proposed road turns right, crosses the pipeline, and run south of the Deng Deng Park (no section of the road is therefore running inside the protected areas) till the conjunction with the Bertoua – Deng Deng Road.

During the conducted visit it was possible to verify that:

− the road section from Lom Pangar village to the river crossing (close to the future dam site) has been already upgraded by the Government of Cameroon, enlarging the previous existing section up to approximately three times the former size and by installing drainage ditches on the road side;
− a first camp site is already being constructed by EDC close to Lom Pangar village in a approximately 10 ha area that will host around 15 permanent houses;
− the Lom Pangar village is finally planned for relocation at a new site located about 20 Km in the direction of the Deng Deng Village, but the schedule for resettlement is still not known by local villagers;
− the road, especially in the section between Belabo and Satando, is largely used by local villagers as a walking way, especially by schoolchildren to reach the school located in Ebaka.

In terms of impacts due to the PMP related traffic, there is no substantial difference from those already properly addressed in SEIA. Mitigation measures identified in SEIA are therefore considered still valid and adequate.
By conducting interviews with local villagers it was also possible to confirm the expected concerns about the increase of heavy traffic along the project road and expectations in terms of compensation measures and/or employment opportunities.

Additional ECMG and COTCO concerns are related to the pipeline crossing, which will have to be evaluated in terms of structural characteristics to meet the increased weight due to heavy traffic.

8.5 ECMG RECOMMENDATIONS

Based on the information collected during the site visit and joint discussion with COTCO EMP, the following recommendations are made:

38. The Project shall consistently update the SEIA package related documentation in order to correctly reflect the latest project settings and in particular the newly proposed access road to the dam construction and PMP site.

39. As soon as the Dam Project EMP will become available in its final version, the Project shall consistently review the proposed environmental and social mitigation measures by the EDC in order to finalize the IA. However, for the purpose of the request of statement of non objection by the Lenders, the ECMG recommends that at least a draft version of the IA is included in the MOC package being prepared by COTCO for December 2010;

40. Within the already ongoing surveying activities carried out by COTCO through the CROs, it is recommended to enforce the monitoring at the local villages in order to:
   a. Anticipate possible issues or critical areas related with the overlap or interaction with EDC in the area (to be reflected in the IA agreement);
   b. Properly inform the local villagers on the PMP activities especially in terms of impacts, mitigation measures and possible employment opportunities at the PMP site;
   c. Regularly update the information on timing and scope of planned construction activities to local villagers, as the uncertainty of timing seems to create negative impacts in terms of lost opportunities and excessive expectations.

41. With reference to the additional, although minor, mitigation measures to be adopted within the PMP, the ECMG recommends that COTCO, before starting any field activity, proceed with a systematic sorting and integration of the measures required to the main Project EMP in order to facilitate their application as well as the monitoring by the EMP team. To this aim the use of a specific addendum related to the PMP activities (such as a dedicated monitoring plan) may represent the most suitable solution.
ANNEX A

DAILY ACTIVITY SUMMARY
<table>
<thead>
<tr>
<th>DAY</th>
<th>ACTIVITY</th>
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<tbody>
<tr>
<td>7 November 2010</td>
<td>Flight to N’Djamena</td>
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| 8 November 2010  | Flight from N’Djamena to Komé  
EEPCI EMP meetings in Komé, including  
• Follow up on ECMG May 2009 Report recommendations  
• Biophysical topics  
• Socio-economic activities  
Community meeting in Dildo and visit of the women cooperative of Madjo Bero on K744 field (socioeconomic team)  
Meeting with LUMAP and socio-economic team  
Visit at GER composting Facility (biophysical team) |
| 9 November 2010  | Visit of:  
• Komé Waste Management Facility (biophysical team)  
• Komé 5 Batch Plant contaminated soil storage area (biophysical team)  
• Road from KWMF to N’Djamena – Doba NR conjunction (biophysical team)  
• Selection of well pads and borrow pits including: BBP7, KBP6, KBP12 K410, K526, K602, K911, K605 (biophysical team)  
• K223 reinjection facility (biophysical team)  
• Komé 5 WWTP (biophysical team)  
• Community meeting at Maikeri with monitoring NGOs and visit of the village and surrounding project facilities (biophysical team)  
Meeting with LUMAP and socio-economic team |
| 10 November 2010 | Visit of:  
• Maikeri BP (biophysical team)  
• Komé Base WWTP and waste accumulation areas (biophysical team)  
• Komé 5 CTF (biophysical team)  
• Rice Farming experiment in Madana Nadpeur (biophysical and social team)  
• Community meetings in Ngalaba and Potouguem (socioeconomic team) |
| 11 November 2010 | Close out meeting in N’Djamena                                                                                                           |
| 12 November 2010 | Flight to Douala  
COTCO EMP kick off meetings, including  
• Follow up on ECMG May 2009 Report recommendations  
• Biophysical topics  
• Socio-economic activities |
| 13 November 2010 | Visit of PS3 and annex PS3 Waste Management Facility (biophysical team)  
Travel to Bethare-Oya (socioeconomic team) |
<table>
<thead>
<tr>
<th>DAY</th>
<th>ACTIVITY</th>
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<tr>
<td>14 November</td>
<td>Visit of road to Lom Pangar dam site through new proposed road and visit of impacted villages (biophysical team)</td>
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<tr>
<td>2010</td>
<td>Community meeting at Biboko (socioeconomic team)</td>
</tr>
<tr>
<td>15 November</td>
<td>Visit PS2 (biophysical team)</td>
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<tr>
<td>2010</td>
<td>Community meeting at Belabo (socioeconomic team)</td>
</tr>
<tr>
<td>16 November</td>
<td>Visit ROW along MA-2 and in the Mbere Rift Valley</td>
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<tr>
<td>2010</td>
<td>Meetings in Yaoundé with FEDEC and WWF, WCS and RAPID (biophysical and social team)</td>
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<td></td>
<td>Meeting with NGOs belonging to Social Platform (biophysical and social team)</td>
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<tr>
<td>17 November</td>
<td>Close out preparation and transfer to Douala</td>
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<tr>
<td>18 November</td>
<td>Close out meeting in Douala</td>
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