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Chad Export Project: Environmental Management and Monitoring Process and Systems¹

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Abstract

Over its 25-30 year life, the \$3.5 billion Chad Export Project will produce ~1 billion barrels of crude oil from three Chadian oilfields for export to world markets. Oilfield area facilities encompass ~250 wells, produced fluids separation and processing units, and supporting infrastructure including a 120 MW power plant. The Project's export system includes a 1070 kilometer onshore pipeline traversing the southern part of Chad and much of neighboring Cameroon, three pump stations and a near shore pressure reducing station, a 12 kilometer subsea pipeline, and an offshore marine terminal (Floating Storage and Offloading vessel). Major construction was preceded by the Project's upgrading of significant portions of the transportation infrastructure in north central Cameroon and southern Chad. The participation of the Republics of Chad and Cameroon in the Project as equity partners in the export system was made possible by loans furnished by the World Bank. During the Project's six-year planning period, extensive integrated engineering, environmental, socioeconomic, and health studies were undertaken, with a special emphasis on issues/impacts identification and avoidance, alternatives analyses, and site selection/optimization. The development of the Project's Environmental Assessments and twenty volume Environmental Management Plan (EMP) featured a high degree of transparency and embodied extensive public consultation. An assortment of systems and processes were developed and implemented to ensure that the Project was

constructed in a manner that featured a high level of compliance with EMP-related obligations and requirements. EMP implementation, performance, and compliance results have been made widely available to global civil society *via* the posting of Project-related reports and other information on the Internet.

Project Description and Background Information

The \$US 3.5 billion Chad Export Project (the Project) is currently the largest private sector investment in sub-Saharan Africa. Over the Project's anticipated 25-30 year life, approximately one billion barrels of crude oil will be produced from three oilfields in the Doba basin region of southern Chad for export to world markets, with peak production being 225,000 barrels per day.

A map providing some geographic context for the Project is provided in Figure 1.

Historical and Socioeconomic Background. The Republic of Chad, with a population of approximately 9 million, is a landlocked African country, bordered by Libya to the north, Cameroon and the Central African Republic to the south, Sudan to the east, and Niger and Nigeria to the west. Much of Chad is characterized by a challenging (arid) Saharan or Sahelian climate. It is one of the poorest countries in the world, with just 450 kilometers of paved roads, an average per capita income of less than \$US 200 per year, an average infant mortality rate of 96 deaths per 1000 live births, and an average life expectancy of 48.5 years. The vast majority of Chadians live a subsistence agricultural lifestyle in small pre-industrial villages. Cotton is the only significant export of Chad.

The Republic of Cameroon, a west central African country of 16 million to the southwest of Chad, is also a poor country. However, its economy is much larger and more extensive *versus* Chad, buoyed by petroleum resources, shipping, timber, and a diverse climate that allows for the production of high value agricultural commodities such as cocoa, coffee, bananas, rubber, and palm oil. Like Chad, the majority of Cameroonians live a subsistence agriculture-based lifestyle.

Crude oil was first discovered in Chad in the mid-1970s. Various seismic and exploration drilling campaigns were conducted in the 1980s and early 1990s to define the nature and extent of the reserves. A protracted post-independence civil war and a volatile political climate hindered exploitation of the discovered hydrocarbon resources.

¹In this paper, the term "environmental" often encompasses socioeconomic and/or health topics/considerations/issues.

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Figure 1. Geographic Context for the Chad Export Project

Planning for the Chad Export Project began in 1993, with construction beginning in October 2000. The first crude oil (from the Miandoum oilfield) was produced in July 2003, and the first sale of oil to international markets occurred in October 2003. Completion of the Project's Central Treating Facility (CTF) in the oilfield development area is anticipated by year-end 2003, with full production commencing in 2004.

Oilfield Development Area Project Components. Key Project components in the oilfield development area in southern Chad are as follows:

- Komé, Miandoum, and Bolobo oilfields. Approximately 250 wells will be drilled to develop and recover the hydrocarbon reserves in these oilfields.
- Gathering system to collect and transport produced fluids.
- Central Treating Facility to produce export quality crude oil.
- Operations Center located in the Komé field, consisting of the CTF, an airstrip, housing for 200 individuals, and a 120 MW power plant to serve Project needs.

Photographs of several oilfield development area facilities can be found in Figures 2A-B.



Figure 2A. Aerial view of a portion of the Komé oilfield area showing drilling pads and the CTF. An active drilling rig appears in the foreground.



Figure 2B. Aerial view of the CTF. The four power generation units and Pump Station #1 are in the upper middle portion of the photograph.

Transportation System Components. Key components of the Project's transportation system are as follows:

- 1070 kilometer long 760 mm diameter buried export pipeline from Komé, Chad to Kribi, Cameroon.
- Three pump stations - Pump Station #1 adjacent to the Central Treating Facility in the Komé oilfield, Pump Station #2 near Dompta, Cameroon, and Pump Station #3 near Bélabo, Cameroon.
- Pressure reducing station near Kribi, Cameroon.
- Floating Storage and Offloading vessel (the Komé Kribi 1), a 2 million barrel converted tanker fixed in place approximately 12 kilometers offshore *via* a single point mooring structure.

Export tankers call on the Floating Storage and Offloading vessel to offload crude oil for transport to refineries around the world.

Photographs of the transportation system's components are provided in Figures 3A-D.



Figure 3A. Construction of the export pipeline.



Figure 3B. Aerial view of Pump Station #2 near Dompta, Cameroon.



Figure 3C. Aerial view of the Pressure Reducing Station near Kribi, Cameroon.



Figure 3D. The Floating Storage and Offloading vessel mated to its single point mooring structure.

Infrastructure, Logistics, and Communications. The Project repaired or upgraded over 600 kilometers of roads in north central Cameroon and southern Chad and built a modern, all-weather bridge over the M'Béré River at the Chad/Cameroon border to facilitate the movement of approximately 480,000 tonnes of freight from the port of Douala, Cameroon to construction sites in the oilfield development area and along the export pipeline route. This freight was transported *via*:

- Approximately 200 ocean-going vessels.³
- 13,669 rail car loads.
- 15,635 truck loads.
- 82 air shipments by large cargo aircraft (e.g., Antonov An-124-100, An-22, An-12).

Since rail transportation was a key component of the Project's freight shipment strategy, the Project financed the refurbishment of some of the Cameroon national railroad company's rolling stock (175 railroad cars, 4 locomotives).

Photographs of Project-upgraded roads and the M'Béré River Bridge appear in Figures 4A-C.



Figure 4A. Project-upgraded rail cars laden with pipes destined for storage yards.



Figure 4B. A convoy of pipe-hauling trucks crossing the new bridge over the M'Béré River at the Chad/Cameroon border.



Figure 4C. A Project-upgraded road in northeastern Cameroon.

The Project installed a fibre optic cable in the export pipeline trench to allow for the effective control and monitoring of all the facilities associated with the export system. Additional fibres and connection points for the Republics of Chad and Cameroon were installed at the same time.

Project Participants. The oilfield development portion of the Project is being undertaken by a Consortium made up of Esso Exploration and Production Chad Inc. (Esso) {40%}, Petronas Carigali (Chad EP) Inc. (Petronas) {35%}, and Chevron Petroleum Chad Company Ltd. (ChevronTexaco) {25%}. Esso is the operator on behalf of the Consortium.

Shareholders in the transportation system portion of the Project include the Consortium, the Republic of Chad, and the Republic of Cameroon. Two transportation system operating companies have been created:

- In Chad: Tchad Oil Transportation Company S.A. (TOTCO) {Consortium 92.0%, Republic of Chad 8.0%}.
- In Cameroon: Cameroon Oil Transportation Company S.A. (COTCO) {Consortium 91.8%, Republic of Cameroon 5.5%, Republic of Chad 2.7%}.

The equity participation of the Republics of Chad and Cameroon in the transportation system operating companies was made possible by IBRD loans provided by the World Bank.^{4,5}

- \$US 39.5 million provided to the Government of Chad.
- \$US 53.4 million provided to the Government of Cameroon.

The World Bank has also provided IDA credits totaling nearly \$US 47 million to finance three projects aimed at building capacity in the governments of Chad and Cameroon in order to ensure the successful implementation of their aspects of the Project.

⁴ The Board of Directors of the World Bank Group approved the IBRD loans to the Governments of Chad and Cameroon on 6 June 2000.

⁵ International Finance Corporation (IFC) "A" commercial loans (\$US 100 million; directly funded by the IFC) and IFC "B" commercial loans (\$US 100 million; syndicated through commercial banks) to TOTCO and COTCO were also approved by the Board of Directors of the World Bank Group on 6 June 2000. Additional loans (syndicated through commercial banks) were provided to COTCO and TOTCO by the United States Export/Import Bank (\$US 200 million) and the French Export/Import Bank [Compagnie Française d'Assurance pour le Commerce Extérieur - COFACE] (\$US 200 million). The entities providing financing to the Project are collectively referred to as the Lender Group.

³ Not all of these vessels transported 100% Project cargoes.

Revenues and Revenue Management. Over its 25-30 year life, the Project is expected to provide nearly \$US 2 billion⁶ in revenues for Chad and \$US 500 million for Cameroon due to the payment of royalties, dividends, taxes, and pipeline tariffs.

The World Bank assisted the Republic of Chad in preparing a unique piece of legislation that commits the government to using its revenues derived from the Project for poverty reduction. This law, which was passed by the National Assembly in December 1998 and signed by the President in January 1999, specifies the following allocation of revenues:

- 10% held in trust for future generations.
- Of the remaining funds:
 - 5% are earmarked for regional development in the oilfield area.
 - 80% are devoted to education, health and social services, rural development, infrastructure, and water management.

The revenue management law also created a committee that includes representatives of the public, the National Assembly, the Supreme Court, and the government to oversee the expenditures of these funds. The role of this committee is to authorize expenditures in the above-listed priority sectors from the (offshore) Special Oil Revenue Account. Annual audits of this account will be published, and the World Bank and the government of Chad have committed to carrying out regular petroleum revenue expenditure reviews.

Environmental Regulatory Regime

As is the case in many developing countries, environmental regulations in the Republics of Chad and Cameroon in the mid-1990s were limited. A summary of the applicable environmental legislation *ca.* 1997 is provided below:

- Chad
 - Water Code.
 - Forest Code.
 - Laws regarding land use.
- Cameroon
 - Forest, Wildlife, and Fishing Code.
 - Law regarding waste management.
 - Law regarding use of water resources.
 - Various statutes regarding land use.
 - Various statutes regarding public health and sanitation.

In addition to complying with the above-listed legislation, certain environmental requirements were incorporated into the legal agreements negotiated between the Project and the Republics of Chad and Cameroon.

Owing to the participation of the World Bank Group, the Project was required to comply with the following applicable World Bank Group environmental and social safeguard policies:

- Operational Directive 4.01 (Environmental Assessment)
- Operational Policy 4.04 (Natural Habitats)
- Operational Policy 4.09 (Pest Management)
- Operational Directive 4.20 (Indigenous Peoples)
- Operational Directive 4.30 (Involuntary Resettlement)

⁶ This World Bank revenue estimate is based on a crude oil price of \$US 15 per barrel.

- Operational Policy 4.36 (Forestry)
- Operational Policy 7.50 (International Waterways)
- Operational Policy Note 11.03 (Cultural Property)

Environmental Documentation

The Chad Export Project meets the World Bank Group's criteria for a Category "A" project. Detailed Environmental Assessment (EA) and Environmental Management Plan (EMP) documents were therefore produced that met the requirements of the above-listed applicable World Bank Group environmental and social safeguard policies. The EA and EMP documents were also prepared to comply with the World Bank's *Industrial Pollution Prevention and Abatement Handbook*.

The Project's environmental documentation was developed as a collaborative effort involving the Consortium and the Republics of Chad and Cameroon and was extensively reviewed by the World Bank Group and other members of the Lender Group.^{7,8,9} Moreover, this documentation was generated in a manner that transparently and repeatedly engaged and involved civil society. In the six-year period (1993-1999) during which the Project's environmental documentation was developed, over 1000 consultation sessions took place in Chad and Cameroon. Participants in these sessions included citizens of the two nations (most notably the inhabitants of communities anticipated to be most affected by the Project), a wide range of local, national, and international NGOs, and an assortment of other interested stakeholders. The Project's comprehensive public consultation program is discussed in more detail later in this paper.

Environmental and Socioeconomic Issues/Impacts Management Approach and Preliminary Surveys and Reconnaissance Missions. The Project adopted the following strategy with regard to the management of environmental and socioeconomic issues/impacts:

- Identify (key) issues/impacts early.
- Avoid issues/impacts where/when practical.
- Appropriately mitigate unavoidable issues/impacts.

The integration of environmental and socioeconomic considerations into the Project's design and execution plan was essential in securing buy-in and alignment at all levels in the Project team regarding the significance and importance of SHE/EMP topics.

Environmental and socioeconomic issues/impacts identification began at the outset of the planning period (1993) and continues to this day. Central to this process is the Project's comprehensive public information and consultation program (see below).

⁷ Effective participation of the Republics of Chad and Cameroon in the environmental documentation development process was assisted in part by a World Bank-funded three person Expert Panel.

⁸ The Consortium contracted with Dames & Moore (now URS Corporation) to produce the EAs. Exxon Production Research Company (now ExxonMobil Upstream Research Company) produced the initial EMPs. Dames & Moore and Exxon Production Research Company collaborated to produce the final suite of environmental documents.

⁹ The 1997 EAs and the initial EMPs for Chad and Cameroon as well as the final suite of environmental documents were produced in both English and French

A number of preliminary surveys and reconnaissance missions to Chad and Cameroon took place in 1993 and 1994 prior to commencing more detailed and focussed EA-related investigations. The purpose of these studies was to identify the key environmental, socioeconomic, and health issues that the Project would or potentially could face.

Project design, construction, and operations engineers participated in these early surveys and reconnaissance missions along with environmental and socioeconomic specialists. In so doing:

- Certain facility siting/design modifications and construction procedures were identified that allowed some issues/impacts to be avoided.
- Effective issues/impacts mitigation strategies were able to be more readily developed.

Environmental Assessment-Related Studies. Following the preliminary surveys and reconnaissance missions, approximately thirty five environmental-, socioeconomic-, and health-related studies were undertaken by an assortment of Chadian, Cameroonian, and international experts and consulting firms.¹⁰ These studies dealt with a variety of topics including:

- Flora and fauna along the pipeline route and in the oilfield development area.
- Hydrology and hydrogeology in the oilfield development area.
- Marine environment near Kribi, Cameroon.
- Socioeconomic conditions in Chad and Cameroon.
- The Bagyeli/Bakola people.¹¹
- Healthcare services conditions and disease prevalence.
- Environmental economics.

Alternatives Analyses. An important aspect of the Project's environmental assessment process was the identification and evaluation of a broad range of alternatives for developing and transporting Chadian crude oil to world markets, including the following:

- Crude oil transportation alternatives (pipeline *versus* trucking *versus* trucking/rail *versus* pipeline/rail).
- Onshore *versus* offshore marine terminal.
- Location of the marine terminal (i.e., Limbé *versus* Kribi).
- Routing of the export pipeline.¹²

¹⁰ A listing of the experts and consulting firms that participated in the preparation of the Chad Export Project's environmental documentation can be found in Volume 1 of the Supporting Documents component of the final 20 volume suite of environmental documents that was published in mid-1999 (see Figure 5). It is worthy to note that scientists and subject matter experts contracted by Dames & Moore expended in excess of 200,000 hours performing EA- and EMP-related surveys, studies, and analyses over the period 1993-1999.

¹¹ The Bagyeli/Bakola have been referred to in the past as "Pygmies".

¹² An overview of the alternatives analyses undertaken by the Project related to the routing of the export pipeline can be found in "Chad Export Project - Environmental Protection Measures"; Paper No. 86683; Seventh SPE International Conference on Health, Safety, and Environment in Oil and Gas Exploration and Production; Calgary, Alberta, Canada; 29-31 March 2004. A more detailed account of the Project's alternatives analyses can be found in Volume 2 of the Supporting Documents component of the final 20 volume suite of environmental documents that was published in mid-1999 (see Figure 5).

The alternatives analysis that was undertaken resulted in a project that:

- Best satisfied the World Bank Group's above-referenced operational policies and directives.
- Represented the best balance between the environmental, socioeconomic, and cultural needs of the Republics of Chad and Cameroon and the engineering and economic requirements of the Consortium, COTCO, and TOTCO.

Initial Environmental Documentation. The studies and analyses that began in 1993 culminated in late 1997 with the publication of EA documents for both the Chad and Cameroon portions of the Project. Initial EMPs were generated during the latter portion of the EA preparation period, with the initial EMP for Chad being published in late 1997 and the initial EMP for Cameroon being published in early 1998.

The EAs and initial EMPs were made available for public review and comment *via* a network of reading rooms established by the Project in Chad and Cameroon as well as through the World Bank's Info Shop.¹³ The reading rooms received over 13,000 visitors, and over 9000 comments concerning the documents were recorded.

Final Environmental Documentation. Taking into account the comments received during the public review period as well as data obtained from additional environmental and socioeconomic studies and surveys¹⁴, certain Project design features were modified (e.g., several re-routes of the pipeline easement in identified ecologically sensitive areas) and a number of environmental, socioeconomic, and health mitigation measures were altered or added. These changes and mitigation measures were documented in a final 20 volume suite of texts that was published in mid-1999 (see Figure 5).

¹³ Reading rooms were situated in key administrative centers and in larger communities anticipated to be most affected by Project-related activities (i.e., communities near to the proposed pipeline alignment and in the oilfield development area).

¹⁴ During the period between the publication of the EAs (late 1997) and issuance of the final 20 volume suite of environmental documents (mid-1999), the Project undertook a number of additional studies and surveys. These included detailed investigations dealing with birds, amphibians, reptiles, freshwater fish, mammals, greenhouse gases emissions, and the Bagyeli/Bakola people.

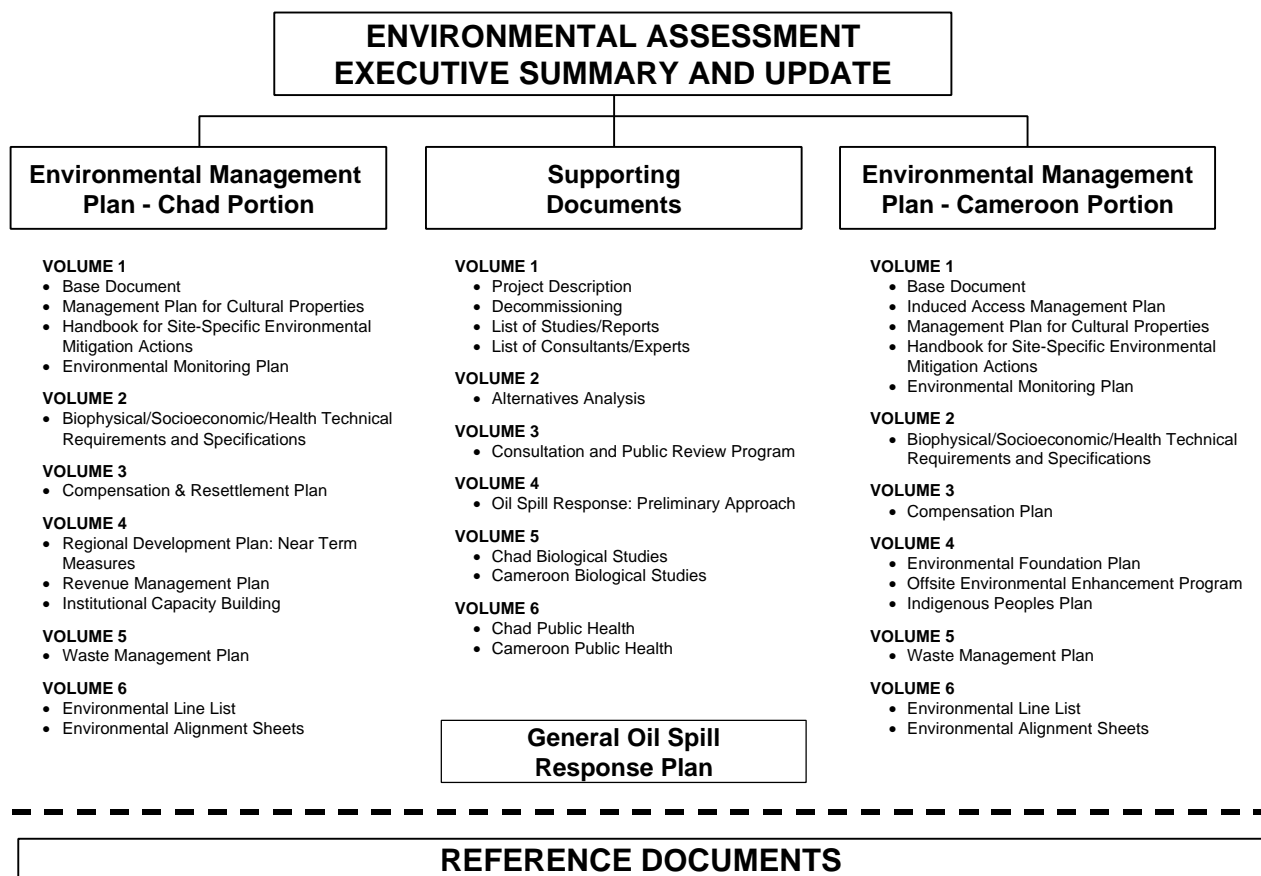


Figure 5. Schematic of the Project's Final (1999) Suite of Environmental Documents

As can be seen, the Project's final (1999) environmental documentation (approximately 5200 pages in total) consists of the following components:

- **Environmental Assessment - Executive Summary and Update** - Intended to function in part as a bridge between the 1997 EAs/initial EMPs and the final set of environmental documents. In particular, this document highlights those areas where changes brought about due to consultation and negotiations had been incorporated into the scope of the Project and its environmental-, socioeconomic-, and health-related mitigation measures. This document was written in a manner that provides the lay reader with a more easily comprehensible overview of the Project.
- **Supporting Documents** - Six volumes that present background, technical, and reference information related to the Project. Volumes are devoted to the extensive alternatives analyses performed by the Project (see above) as well as the comprehensive and far-reaching consultation and public review program associated with the preparation of the initial and final environmental documents (see the Section in this paper entitled "Transparency and Public Consultation").
- **Environmental Management Plan (Chad) and Environmental Management Plan (Cameroon)** - Six volumes for each country that present the commitments and responsibilities of the Consortium and the Republics of Chad and Cameroon with regard to implementing

specific environmental-, socioeconomic-, and health-related mitigation measures, initiatives, and interventions. Compliance monitoring plans and responsibilities are also included along with environmental-, socioeconomic-, and health-related technical specifications and plans for managing wastes.

- **General Oil Spill Response Plan** - A foundation and precursor document for six operations phase Area Specific Oil Spill Response Plans.
- **Reference Documents** - In Volume 1 of the Supporting Documents, the Project provided a listing of all the studies and reports generated during the development of the environmental documentation as well as key publications consulted/analyzed during this effort. These reference materials, while not reproduced in the final suite of environmental documents, are publicly available upon request from the Project.

Noteworthy specialty topic inclusions in the two Environmental Management Plan components are as follows:

- **Revenue Management Plan** - Enacted by the National Assembly of the Republic of Chad and signed by the President, this proactive piece of legislation specifies how revenues from the Project are to be utilized for the benefit of the populace. (See the Section in this paper entitled "Project Description and Background Information" for additional information regarding Chad's revenue management legislation.)

- **Compensation and Resettlement Plan (Chad) and Compensation Plan (Cameroon)**
- **Indigenous Peoples Plan** - Outlines programs aimed at providing development opportunities for the Bagyeli/Bakola people.
- **Offsite Environmental Enhancement Program** - A program to provide for habitat preservation and enhancement in two new National Parks (Mbam and Djérem; Campo-Ma'an) established by the Republic of Cameroon in January 2000.
- **Environmental Foundation Plan** - A plan to establish an independent not-for-profit foundation to support activities and programs related to the Indigenous Peoples Plan and the Offsite Environmental Enhancement Program.¹⁵
- **Induced Access Management Plan** (incorporated into Volume 1 of the Cameroon EMP) - Outlines measures to be undertaken in three defined environmentally sensitive areas in Cameroon to inhibit voluntary resettlement, vehicular access, wildlife poaching, and timber harvesting.
- **Management Plans for Cultural Properties** (incorporated into Volume 1 of the Chad and Cameroon EMPs).
- **Environmental Alignment Sheets** - Present in a visual form the specific environmental mitigation measures to be implemented along the pipeline right-of-way during the construction period on a kilometer-by-kilometer basis.

The final 20 volume suite of environmental documents, most often collectively referred to as "the EMP", was posted on the Project's web site (www.esso Chad.com) so that the public could readily access the documents. In addition, >1000 CD-ROMs containing the documents in electronic format have been distributed.

Since the publication of the final environmental documents in 1999, several other EMP-related documents focussed on the operations phase of the Project have been generated. For example, six Area Specific Oil Spill Response Plans have been developed - one plan for the oilfield development area, four plans corresponding to the export pipeline (each covering a specific geographic region), and one plan for the marine terminal. As was the case for the environmental documents published in 1999, the oil spill response plans were prepared in a manner that included a public review and comment period. In addition, the oil spill response plans were certified by an independent entity as being consistent with international oil spill response standards.

Development of Environmental Management Plan-Related Systems and Processes

A number of systems and processes were developed to "operationalize" the EMP, including the following:

- Education of the workforce regarding the EMP.
- Institution of a management of change process.
- Development of major contractor environmental, socioeconomic, and health plans.

- Implementation of a multi-layered compliance monitoring system.
- Definition of key performance indicators and reporting procedures.

Workforce Education. All individuals associated with the Project (i.e., Consortium and contractor personnel) were provided with an overview that emphasized the integration of the EMP into the Project. In the training sessions, attendees were informed about key EMP policies, expectations, and obligations. Overall, this training initiative was effective in aligning the Project workforce with regard to the significance, importance, and pervasiveness of the EMP.

Management of Change. During the planning period, it was determined that the effective management of change was critical to the overall success of the Project. Therefore, a comprehensive, rigorous change management process was developed and implemented during the construction phase to deal with the anticipated numerous implementation and design changes.

A Change Review Board that included a representative from the EMP organization (see below) evaluated all proposed changes during the construction period. Proposed changes were analyzed to ensure that they would not result in a lessening in the level of protection required by the EMP.

Major Contractor Environmental, Socioeconomic, and Health Plans. The Project's major (i.e., engineering, procurement, and construction [EPC]) contractors were contractually obligated to produce the following plans for Project approval that were consistent with the Project's EMP:

- Environmental Management Plan.
- Waste Management Plan.
- Spill Response Plan.
- Socioeconomic Action Plan.
- Training Plan.
- Health Plan.

Key objectives of these documents were to:

- Gain alignment with the EPC contractors regarding the nature and importance of the Project's EMP.
- Record the contractors' detailed execution plans to ensure compliance with contractual requirements and the Project's EMP-related obligations.

Comprehensive outlines were produced by the Project to assist the contractors in producing acceptable plans. In addition, Project personnel worked closely with contractor personnel during an iterative production and editing process to facilitate and accelerate the production of acceptable plans. Recognizing that the production of the contractor plans took place in a serial manner for the most part, the process benefited from significant continuous improvement.

Monitoring. A unique multi-layered monitoring system was instituted for the construction phase to assess and steward the Project's compliance with its EMP-related obligations.

¹⁵ COTCO provided a \$US 3.5 million donation to the Foundation once it was officially established.

Layer 1 Self-Monitoring by Contractors: The Project's major (EPC) contractors were contractually obligated to have in place a group to oversee the implementation of the above-mentioned (six) contractor plans and to assess compliance with the plans' obligations. As such, contractors employed an assortment of environmental, socioeconomic, and health specialists and trained a significant number of Chadian and Cameroonian nationals to function as compliance monitors.

Layer 2 Monitoring by the Project: The Project put in place an autonomous EMP organization to assess the compliance of the major construction contractors with their approved plans as well as the overall implementation of and compliance with the EMP. In addition, the EMP organization had a mandate to proactively work with Project and contractor construction groups to:

- Foster a deeper understanding of the EMP and its expectations and obligations.
- Assist in the development of actions to ensure the proper implementation of and compliance with the EMP.
- Devise appropriate actions when shortcomings were identified.

During the construction period, the Project's EMP organization consisted of in-country groups in Chad and Cameroon and a small Houston-based technical support team. At the peak of construction activity, approximately 100 individuals were associated with the in-country EMP Groups, >75% of whom were Chadian and Cameroonian nationals.

Members of the EMP organization were provided with specialized training to allow them to effectively perform their job duties. This training dealt with a number of topics including effective monitoring techniques, environmental sampling procedures, the use of field water analysis kits, cultural property site reconnaissance and management procedures, waste management, and air quality monitoring. A particularly useful tool developed as part of this training program was a field monitoring manual that included an assortment of compliance assessment checklists.

Layer 3 Monitoring by the Republics of Chad and Cameroon: Both the Republic of Chad and the Republic of Cameroon established multi-ministerial bodies to supervise and monitor the EMP aspects of the Project.

- In Chad: Comité Technique National pour le Suivi et le Contrôle des aspects environnementaux (CTNSC), with the Ministry of Environment and Water being the lead agency.
- In Cameroon: Comité de Pilotage et de Suivi des Pipelines (CPSP), with the Cameroonian national oil corporation (Société Nationale des Hydrocarbures) being the lead agency.

The World Bank provided loans to the Republics of Chad and Cameroon to build capacity in the CTNSC and the CPSP so that these regulatory agencies would be better able to evaluate and manage EMP compliance. Training programs were arranged for the oversight committees as well as the CTNSC and CPSP monitors stationed at Project construction sites. In addition, CTNSC and CPSP field monitors were included in training sessions developed for the Project's in-country EMP organization staff (see above).

Layer 4¹⁶ External Monitoring: Two entities, the External Compliance Monitoring Group (ECMG) and the International Advisory Group (IAG), monitor the Project's implementation of and compliance with the EMP on behalf of the Lender Group.

The role of the External Compliance Monitoring Group^{17,18} is to assess and report directly to the Project's Lender Group on the Project's compliance with its EMP obligations. The base ECMG team (six individuals) consists of engineering and safety, environmental, socioeconomic, capacity building, and health experts. Additional experts (e.g., archaeologist, ecologist) are added to the team for specific missions. During the construction period, the ECMG team conducted quarterly EMP compliance monitoring missions to Chad and Cameroon.^{19,20} The ECMG's mission reports are made available to global civil society *via* the World Bank's web site (www.worldbank.org).

The mandate of the International Advisory Group is to advise the President of the World Bank Group and the governments of Chad and Cameroon, through its observations and advice, with respect to the implementation of petroleum development projects (in particular the Chad Export Project) and in the achievement of their social, environmental, and poverty reduction roles, as well as the broader goals of poverty reduction and sustainable development in Chad and Cameroon. The IAG team consists of five renowned individuals appointed by the President of the World Bank Group. Reports summarizing the IAG's twice-per-year missions to Chad and Cameroon are made

¹⁶ Excluded from this layer is the external monitoring related to the engineering aspects of the Project. During the construction period, the Lender Group contracted Stone & Webster of Houston, Texas to serve as the Independent Technical Consultant (ITC). The Project pays for the costs related to the monitoring conducted by the ITC.

¹⁷ The Lender Group contracted D'Appolonia S.p.A. of Genoa, Italy to serve as the External Compliance Monitoring Group (ECMG). The Project pays for the costs of the ECMG related to EMP compliance monitoring.

¹⁸ The ECMG was also contracted by the World Bank to monitor the implementation and performance of two Technical Assistance/Capacity Building projects - the Petroleum Sector Management Capacity Building Project in Chad and the Petroleum Environment Capacity Enhancement Project in Cameroon.

¹⁹ During the operations phase, the ECMG will conduct monitoring missions on an annual basis.

²⁰ The ECMG is also able to conduct one additional in-country mission per calendar year if warranted by a particularly important/noteworthy issue, incident, or development.

available to the public *via* the IAG's web site (www.gic-iag.org) and the World Bank's web site (www.worldbank.org).

Layer 5 Monitoring by World Bank Group Technical Staff: Environmental and socioeconomic experts from the World Bank and the International Finance Corporation undertook several missions to Chad and Cameroon during the construction period in order to assess the Project's implementation of various environmental, socioeconomic, and public health safeguard programs. These individuals also monitored the implementation and performance of the World Bank-funded technical assistance/capacity building programs.

Monitoring Topics. The wide-ranging nature of the Project's multi-layered EMP monitoring system is illustrated in the (partial) list of items that were monitored during the construction phase:

- Surface water and groundwater withdrawals.
- Surface water and groundwater quality.
- Pipeline hydrotest water discharges.
- Wildlife protection measures (anti-bushmeat policy enforcement).
- Waste management practices and facilities.
- Land clearing and removed vegetation management.
- Management practices of well clean-up and testing fluids.
- Aggregate mining (e.g., laterite, gravel).
- Erosion and sedimentation control.
- Worker recruitment and hiring procedures.
- Utilization of local/national businesses.
- Payment of compensation.
- Population changes in spontaneous settlements.
- Construction camp potable water quality.
- Worker housing conditions and sanitation.
- Food services (catering) sanitation.
- Worker wellness.
- Disease types and prevalence.

Key Performance Indicators and Environmental Management Plan-Related Data Reporting System. The Project defined a number of key parameters to serve as indicators with regard to EMP implementation, performance, and compliance.²¹ Stewarded indicators include the following:

- Numbers and types of EMP non-compliance situations.
- Recordable spills.²²
- Waste generation.
- Employment statistics.
- Local business utilization statistics.
- Consultation statistics.
- Payment of compensation.
- Disease cases (especially malaria and infectious diseases such as tuberculosis).

A system for reporting EMP implementation, performance, and compliance data was developed and disseminated to the Project's prime construction contractors. Special databases were developed to gather and analyze non-medical and medical EMP-related data.

EMP Compliance Performance

The Project developed the following system for classifying EMP non-compliance situations.

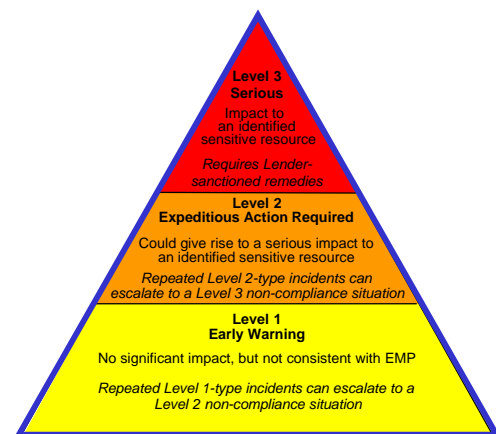


Figure 6. Classification System for EMP Non-Compliance Situations

This system was adopted to ensure the early identification of non-compliance situations (i.e., at the Level 1 stage). In so doing, appropriate corrective actions are able to be rapidly developed and implemented, thereby avoiding serious impacts/situations. The Project-wide reporting of non-compliance situations also facilitated the identification and targeting of systemic deficiencies and the application of lessons learned.

The Project's major contractors are required to self-declare identified EMP non-compliance situations. In addition, the Project's EMP monitors are empowered to record non-compliance situations associated with the activities of the contractors as well as the Project as a whole. Finally, the World Bank Group, on behalf of the Lender Group, is able to assert non-compliance situations.

²¹ The Project's safety program fell outside the realm of the EMP. Therefore, safety statistics were acquired and stewarded separately from the EMP's key performance indicators.

²² Project-recordable spills are defined as all spills (irrespective of volume) of hydrocarbons (e.g., diesel fuel, lubricating oil, crude oil) or dangerous materials (e.g., acidic or caustic solutions) into a waterbody or wetland and spills >150 litres in volume of hydrocarbons or dangerous materials onto a land surface

The following diagram depicts the non-compliance situations recorded by the Project during the construction period:

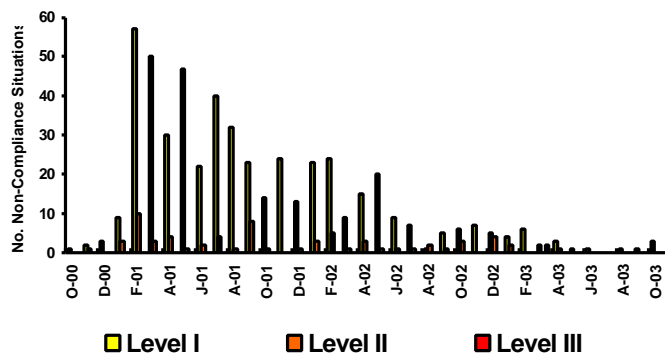


Figure 7. Summary of EMP Non-Compliance Situations - October 2000 - September 2003

Key features of the Project's compliance record are as follows:

- There is a steady downward trend in the number of EMP non-compliance situations recorded throughout the construction period. Higher numbers of non-compliance situations were experienced during the early part of the construction phase for the following reasons:
 - Multiple contractors were beginning their work.
 - Contractors did not fully appreciate the nature and extent of their EMP-related obligations and the actions required to ensure compliance.
- The number of more serious (i.e., Level 2 and 3) non-compliance situations that have been recorded (through the third quarter of 2003) is a fraction of the number of less serious (i.e., Level 1) situations (478 Level 1, 66 Level 2, 2 Level 3²³). This indicates that the "early warning" strategy regarding the identification and rectification of non-compliance situations was successful.

Considering the Project's complexity, multiple widely-separated construction work fronts, and challenging geographic setting, the overall level of EMP compliance has been outstanding. This conclusion is substantiated by a statement made by the ECMG in a report summarizing their May 2003 in-country mission:

"... the ECMG acknowledges that the Project EMP organization in charge of this (construction) phase has been able to consolidate a remarkable standard for the implementation of the EMP and its environmental commitments."

Transparency and Public Consultation

The Project demonstrated a high degree of transparency during the planning and construction phases. The long-standing and on-going public consultation program (see

below) is perhaps the most visible manifestation of the Project's commitment to transparency.

The Project established a web site (www.essochad.com) in October 1997, and since its inception, an assortment of information related to the Project as well as key documents (e.g., the final 20 volume suite of environmental documents, draft Area Specific Oil Spill Response Plans for public review and comment) have been posted for global access. Prior to the establishment of the web site, reading rooms were used extensively in Chad and Cameroon to make information about the Project more readily available to the local populace and to enhance the public's participation in the review and comment process for key Project documents (e.g., the EAs and EMPs). Reading rooms were also used during the construction period to make available to the public a variety of Project-related documents (e.g., the final 20 volume suite of environmental documents, Quarterly/Annual Reports, assorted pamphlets) and to facilitate the public review of the Area Specific Oil Spill Response Plans.

The Project's Quarterly and Annual Reports have been posted on the Project's web site to assist the public in keeping abreast of the Project as it unfolds.^{24,25} Each Quarterly Report also contains a synopsis of the Project's compliance record (i.e., number of recorded EMP non-compliance situations) for the period covered by the report as well as Project-recordable spills.

Transparency has also been a fundamental premise of the Project's individual and community/regional compensation programs. Procedural details (including valuation methodology, payment options [cash and/or in-kind goods], payment mechanics, and the grievance management mechanism) were publicly disclosed and explained (oftentimes numerous times in a community), and all individual compensation payments occur at public ceremonies. Additionally, all micro-development projects associated with the regional/compensation program were agreed upon *via* multiple consensus-building public consultation sessions held in each eligible community. Transparency of the Project's compensation programs was also enhanced by the active participation of a number of Chadian and Cameroonian NGOs.

The public consultation program for the Chad Export Project, which has been active since 1993, has been one of the most extensive public engagement efforts ever undertaken in Africa. Rather than conduct a few formal hearings, the Project adopted a public consultation approach that has been spread over the entire planning and construction periods and that will persist into the operations phase. In addition, the Project took the consultation process to the people as opposed to organizing a small number of large meetings in major urban centers. In so doing, the Project has been and continues to be able to continuously receive and act upon issues and concerns, especially at the grassroots level.

In the period 1993-1999, nearly 900 village-level public meetings were held in Chad and Cameroon. These consultation sessions took place in communities in the oilfield

²³ Two Level 3 non-compliance situations were asserted and recorded by the World Bank Group in early 2003 regarding the Project's management of two discovered archaeology sites in Cameroon. In accordance with the Project's loan agreements, several remedies were developed and implemented by the Project. These remedies were accepted by the World Bank Group.

²⁴ Annual reports are typically combined with the fourth quarter Quarterly Report for a given year.

²⁵ During the production phase, the Project will publish reports on a semi-annual (i.e., twice per year) basis.

development area, along the roads upgraded by the Project in north central Cameroon and southern Chad, and along the length of the export pipeline route. Translators fluent in the particular local (native) language were utilized in village-level meetings so as to optimize participation and information exchange. In addition to the village-level meetings, almost 150 sessions were held with over 250 local, national, and international NGOs. The following topics were the most often raised during the Project's planning stage public consultation campaign:

- Hiring/employment/job opportunities/training (19%).
- Compensation/resettlement (12%).
- Environmental impacts/pollution/oil spills (9%).
- Project schedule (8%).
- Project revenues (6%).

During the construction period (beginning in October 2000), the Project conducted over 4500 public information and consultation sessions, involving over 170,000 participants. A significant proportion of the construction phase public information and consultation program was devoted to high priority topics such as recruitment and employment procedures, involvement of Chadian and Cameroonian businesses, individual and community/regional compensation, and Area Specific Oil Spill Response Plan reviews. As was the case during the planning period, these meetings took place throughout Chad and Cameroon, most notably in those communities most affected by construction activities.

The effectiveness of the Project's construction phase public consultation program was greatly enhanced by the hiring of 34 well-educated and respected individuals in key Project area communities to serve as Local Community Contacts (LCCs).²⁶ These individuals, who are fluent in the major local languages in their assigned region, were specially trained so that they were knowledgeable about all aspects of the Project, especially those topics of greatest interest to the local population (e.g., construction schedule, employment and recruiting procedures, payment of compensation, spill response procedures, etc.). By making frequent visits to communities in their designated regions, the LCCs provided an important and continuous line of communication between the Project and the local population.

Noteworthy Socioeconomic Benefits of the Chad Export Project

Employment of Chadians and Cameroonians. The Project made a commitment to provide fair employment opportunities to Chadians and Cameroonians, to reasonably distribute jobs among qualified citizens of the two host countries, and to implement transparent recruitment and hiring practices.

An extensive public information campaign was launched by the Project, its prime construction contractors, and the governments of Chad and Cameroon in an attempt to help the populace develop realistic employment expectations and to avoid a large scale migration of job seekers and other opportunists to the Project area. The key messages of this campaign were as follows:

- There are only a limited number of construction phase jobs.
- Most jobs will be of a limited duration (i.e., temporary).
- Permanent residents of communities in the immediate vicinity of construction sites would be preferentially hired to fill unskilled positions.²⁷
- Hiring would take place at designated recruiting centers only - no hiring at work sites or construction camps would occur.

In spite of this campaign, which persisted throughout the design and construction periods, the employment expectations of local inhabitants remained excessively optimistic and unrealistic. However, the campaign was effective in limiting in-migration.

The Project's construction phase employment statistics are provided in Figure 8.

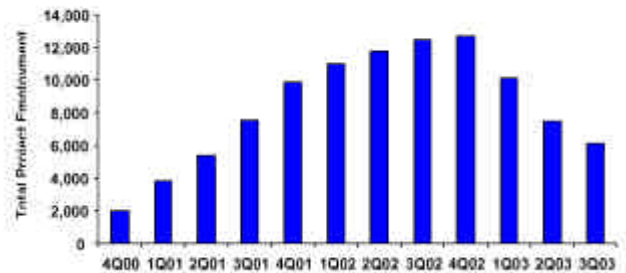


Figure 8. Project Employment Statistics - Construction Phase

Project employment peaked at over 13,000 in November 2002. At all times during the construction phase, Chadians and Cameroonians made up at least two thirds of the total work force - in many months, national workers exceeded 90% of the total. In addition, over two thirds of the national work force was employed during construction in skilled, semi-skilled and supervisory positions.²⁸

During the course of construction, over 35,000 Chadians and Cameroonians were employed by the Project for varying lengths of time.

Wages paid to Chadian and Cameroonian workers during the construction period exceeded 55 billion FCFA (*Franc Communauté Financière Africaine*, or the African Financial Community Franc) [equivalent to approximately \$US 85 million].

Purchases of Goods and Services from Chadian and Cameroonian Suppliers. The Project made a commitment to preferentially purchase goods and services from qualified Chadian and Cameroonian suppliers provided they were competitive with foreign businesses with regard to safety, price, quality, reliability, availability, and deliverability.

The Project actively and proactively engaged the Chadian and Cameroonian business communities to make them aware of the goods and services requirements of the Project as well

²⁷ An innovative lottery procedure was developed via a consultative process to equitably distribute the hiring for unskilled positions among eligible villages.

²⁸ Examples of semi-skilled positions include food service assistants, welders' helpers, and drivers. Examples of skilled positions include archaeologists, radio repair technicians, and welders.

²⁶ During the construction period, the Project employed 19 LCCs in Chad and 15 in Cameroon.

as expectations/specifications related to quality, reliability, availability, and deliverability. This was done by organizing numerous information sessions, one-on-one discussions with local businesses, and the periodic publication of upcoming goods and services needs in the local press and broadcast media. In some instances, contracts were split in order to allow local businesses to be better able to tender competitive bids.

The Project's construction period statistics related to the purchase of goods and services from Chadian and Cameroonian suppliers are presented in Figure 9.

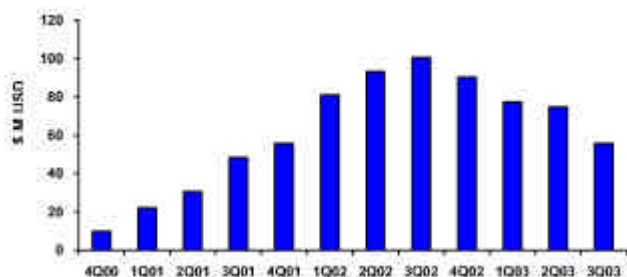


Figure 9. Project Purchases of Goods and Services from Chadian and Cameroonian Suppliers - Construction Phase

During the construction period (through the third quarter of 2003), the Project spent approximately 480 billion FCFA (\$US 740 million) purchasing a wide range of goods and services from more than 2200 Chadian and Cameroonian businesses. This figure represents 21% of the Project's \$US 3.5 billion budget. Excluding items from this overall budget that the industrial sectors of Chad and Cameroon are currently not capable of producing (i.e., engineered/technical materials and equipment such as the pipe for the pipeline, electricity generating turbines, high voltage electricity cables, electricity switching equipment, fibre optic cable, drilling rigs and subsurface tubulars, heavy construction equipment), Project purchases from Chadian and Cameroonian businesses approaches 30% of the budget.

Compensation Programs. Compensation was paid to all land users along the final pipeline trace, in the oilfield development area, and adjacent to Project-upgraded roads for damages to crops and improvements, temporary land use during construction, and permanent land needs. Through the end of the third quarter of 2003, the Project has paid 7.6 billion FCFA (\$US 12 million) in cash and/or in-kind goods to individual land users. The in-kind option was necessary because banking facilities are rare or non-existent outside of the major population centers in Chad and Cameroon and because the economy at the village (subsistence) level is not typically cash-based. The list of in-kind goods selected by some villagers eligible for individual compensation includes galvanized roofing panels, cement for house building/upgrading, cereal grinding machines, plows, bicycles, push carts, and cooking utensils.

In a limited number of cases in the oilfield development area, the Project's temporary and/or permanent land use requirements caused a household to have insufficient land for crop growing and/or livestock rearing. These households (216

in total) were deemed to be eligible for the Project's resettlement program.²⁹ Four resettlement options were available for eligible households:

- Relocation to another community.
- Training in improved agricultural techniques.
- Training in an off-farm trade (e.g., masonry, carpentry, food services).

Training in a technical trade associated with a Project-related job (e.g. maintenance, security guard, welder).

In addition to the individual compensation program, the Project instituted a community/regional compensation program to address more diverse and geographically dispersed impacts not dealt with under the land user (individual) compensation program. This supplemental program compensates for inconveniences caused by the construction and operation of the pipeline, the pump stations and the Pressure Reducing Station, and the oilfield development area facilities as well as impacts to communal wild resources (e.g., fruit bearing trees, edible insects, mushrooms, medicinal plants, etc.). Each community and region eligible for the program was provided with an allowance to fund a sustainable micro-development project (e.g., improvements to existing schools and clinics, new clinics and school classrooms, markets, meeting halls, etc.). Communities selected their micro-development projects *via* a consensus-building participatory consultation process.

An assortment of Chadian, Cameroonian, and international NGOs were contracted by the Project to implement the compensation and resettlement programs.

Photographs showing various aspects of the Project's compensation programs are provided in Figures 10A-E.



Figure 10A. A recipient of individual compensation in the form of cash.

²⁹ The breakdown of these 216 households is as follows: 28: resettlement to a different community; 38: improved agriculture training; 27: off-farm training; 5: on-the-job training; 118: undecided (as of 3Q2003).



Figure 10B. Some of the goods chosen by people opting for in-kind payment of individual compensation.



Figure 10C. A new classroom building built in the village of Begon I as part of the Project's community compensation program in Chad.



Figure 10D. Medical equipment chosen by the village of Meiganga, Cameroon under the community compensation program.



Figure 10E. A new potable water well installed in the village of Kanga, Cameroon as part of the community compensation program.

Conclusion

The environmental management and monitoring process for the Chad Export Project began in 1993 at the outset of the planning period. Over the ensuing years:

- Design, construction, and operations engineers and SHE specialists successfully integrated appropriate environmental, socioeconomic, and health safeguards into the Project's design and procedures.
- The Project and the Republics of Chad and Cameroon worked collaboratively over a multi-year period to prepare a comprehensive suite of documents that adequately addressed all of the applicable World Bank Group environmental and social safeguard policies.
- Systems and processes were developed and implemented to ensure that the Project was constructed in a manner that featured a high degree of compliance with EMP-related obligations, as verified by a unique multi-layered compliance monitoring system that included external monitoring.

In addition, the Chad Export Project has developed innovative/noteworthy approaches in a number of areas, including:

- Transparency.
- Public consultation.
- Benefits to the host countries associated with employment and the purchases of goods and services.
- Compensation of impacted individuals and communities.
- The protection of natural habitat and wildlife.
- The management of revenues generated from oil production in Chad.

Acknowledgements

This paper is dedicated to the thousands of men and women who participated in the planning and construction of the Chad Export Project. In particular, the outstanding efforts and accomplishments of the individuals associated with the Project's EMP organization are gratefully acknowledged.