

## The State of Oil & Gas Waste Management Facilities & Environmental Compliance in the Albertine Graben Region of Uganda



**CSCO Research Paper No.2, 2015**





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**Civil Society Coalition on oil and Gas in Uganda (CSCO) is hosted by  
Advocates Coalition for Development and Environment (ACODE)**

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CSCO Research Paper No.2, 2015

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**Cover Photographs:**

The cover photographs demonstrate both good and bad environmental practices of covered and uncovered oil waste pits. Covering the pits controls pollution.

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# LIST OF ACRONYMS

CSCO	Civil Society Coalition for Oil and Gas in Uganda
ACODE	Advocates Coalition for Development and Environment
ACCC	Action Coalition on Climate Change
CNOOC	Chinese National Offshore Oil Company
CSOs	Civil Society Organisations
DGF	Democratic Governance Facility
DWRM	Directorate of Water Resources Management
EHS	Environment, Health & Safety
EIAs	Environmental Impact Assessments
IFC	International Finance Corporation
ITCZ	Inter Tropical Convergence Zone
MEMD	Ministry of Energy & Mineral Development
MWE	Ministry of Water and Environment
NEMA	National Environment Management Authority
OAG	Office of the Auditor General
PEMO	Practicing Environmental Managers' Organization
PEPD	Petroleum Exploration and Production Department
PROBICOU	Pro-Biodiversity Conservationists in Uganda
PSAs	Production Sharing Agreements
TEP	Total E&P Uganda
UWA	Uganda Wildlife Authority
UWS	Uganda Wildlife Society
WCAs	Waste Consolidation Areas
WHO	World Health Organisation
WWF-UCO	World Wildlife Fund for Nature Uganda Country Office



# DEFINITION OF TERMS

CSCO	CSCO is a loose network of over 50 member organisations working on oil and gas related issues in Uganda. CSCO came into existence in 2008 to create, nurture and harness a shared civil society platform for promoting and strengthening CSO coordination, networking and advocacy in the oil and gas sector. The Network's shared Vision is "a well-managed oil and gas sector for the benefit of all Ugandans". The coalition is hosted by ACODE and managed by a steering committee elected by the General Assembly.
Albertine Graben	The Albertine Graben is situated in the northern part of the left arm of the East African Rift valley. It runs from south-western Uganda to north-western Uganda and is covered by water bodies (rivers and lakes). It is rich in natural resources (minerals, petroleum, fauna and flora) and has the largest number of protected areas in Uganda, including game reserves, Ramsar sites, and endemic species.
Drilling Waste	Drilling waste refers to waste generated as a result of drilling activities. It includes fluids / solids retrieved from the sub-surface during drilling operations, as well as the water/ chemicals used in the drilling process.
Hazardous Waste	This is waste that poses a risk to human health or the environment and needs to be handled and disposed of carefully. Examples include waste containing radio-active materials, heavy metals, used oil, used chemicals, etc.
Waste	"Waste" includes any matter prescribed to be waste by the National Environment Act, Chapter 153, and any radioactive matter, whether liquid, solid, gaseous or radioactive which is discharged, emitted or deposited into the environment in such volume, composition or manner as to cause an alteration of the environment.
Waste Consolidation	This refers to the containment of waste within a designated area intended as a temporary measure pending treatment and final disposal.
Waste disposal	This refers to the act of permanently getting rid of waste either by releasing it back into the environment, or permanently containing it in a designated area, with no plan of future treatment.
Waste Management	This refers to management of waste from the cradle (point of generation) to the grave (final disposal). It involves collection, handling, transportation, storage, treatment and disposal.
Waste Treatment	This refers to the activities required to minimize the ability of waste to impact on/ alter/pollute the environment.

# ACKNOWLEDGEMENT

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# EXECUTIVE SUMMARY

Drilling waste, generated by the oil and gas companies in the Albertine Graben, has for a long time been stored in Waste Consolidation Areas (WCAs) within the Graben. By 2014, Uganda's stockpiles kept by TUOP (Tullow) and TEP (Total) for solid and liquid drilling waste stood at 39,625 tons and 8227 cubic meters respectively<sup>1</sup>. Recently, a number of companies have been contracted by the oil companies to transfer the consolidated waste for treatment and safe disposal. Among the contracted companies include EnviroServe that was launched on the 23rd April, 2015 to treat and dispose of waste at the state of the art engineered landfill at Nyamasoga in Hoima district.

The removal or transfer of waste from the Waste Consolidation Areas (WCAs) to the Treatment and Disposal sites needs to be understood by seeking answers to the following questions;

- What is the current situation like at the WCAs?
- What is the nature and capacity of the trucks used for transportation and handling of the hazardous waste?
- What routes are used to transport the hazardous waste from the WCAs to treatment and disposal sites?
- Do the current waste management practices at both the WCAs and waste treatment and disposal sites comply with national and international standards, regulations, guidelines and good industry practice for increased environmental, social, and biodiversity protection?
- What natural and managerial factors are affecting and/or likely to affect the proper storage, transfer, treatment and final disposal of the wastes in the Albertine Graben?
- What needs to be done for proper and adequate management of the oil and gas wastes in the Albertine Graben?

Thus, the study sought to examine the status of the oil and gas waste management facilities using the cases of Kisinja, and Bugungu WCAs, and waste treatment and disposal site of Nyamasoga in the Albertine Graben of Uganda<sup>2</sup>. The study also sought to identify gaps that need to be addressed to ensure that the problems associated with the oil and gas waste are resolved so as to minimise chances of harm and inconvenience to humans and the natural environment in accordance with the National and International regulatory frameworks, and good industry practice.

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<sup>1</sup> OAG (2014): Environment Audit Report on Regulation and Monitoring of Drilling Waste Management in the Albertine region by National Environment Management Authority (NEMA)

<sup>2</sup> Kisinja and Nyamasoga sites are located in Hoima District, while Bugungu is situated in Buliisa District

## Main Findings

### The climatic conditions of Hoima and Buliisa and their influence on waste management

Results revealed that in Bugungu area, temperatures go up to 32.2°C during daytime and these high temperatures are associated with fire outbreaks which could affect the WCAs<sup>3</sup>.

However, in Hoima and Buliisa districts where Kisinja and Nyamasoga waste management facilities are located, temperatures are lower; the weather element of concern is rainfall. Climate records showed that the number of rain days annually varied between 80 – 130 days with much of the rain falling between 1.00 pm and 7.00 pm. These records imply that transfer of wastes from the consolidation sites to treatment and disposal facilities, as well as cleaning of the drainage channels and other site operations sensitive to rainfall are best done in the morning to noon hours in the rainy months of March, April, and May (MAM) as well as September, October, and November (SON).

### Existing waste management practices and compliance with National and International Standards, and good industry practice

The Bugungu and Kisinja WCAs did not comply with the National Environmental (Waste Management) Regulations that require a licensee to own or operate a waste treatment plant or disposal site and to ensure that such a site is located in a radius of at least 1,000 meters away from residential or commercial areas and from water sources. At both Bugungu and Kisinja WCAs the perimeter fences of the consolidation sites are located a distance of approximately 10m-20m from the nearest residential communities. While the operators contended that the regulation referred to above relates to operators of waste disposal sites and waste treatment facilities, the interpretation can be extended to waste consolidation areas depending on the time the waste will be contained in these areas. It was also noted that this concern had been raised in the previous environmental audits of the facilities.

The Erosion and Sediment control systems at both Kisinja and Bugungu WCAs were observed to be poor. At Kisinja, for instance, the drainage channels were narrow and clogged with sediments while at Bugungu, the drainage system has no channels in place. Similarly, despite the drainage channels being wide enough to handle big volumes of runoff water at the Nyamasoga treatment and disposal site, the team found that these were clogged with sediments, which raises environment, health and safety concerns.

However, all 3 sites visited were well labeled and had separate facilities/areas for receiving and handling hazardous and non-hazardous wastes. Also the 3 sites had waste burial cells clearly geo-referenced, indicating the source, type, and volume of waste contained at each of the containment cells. The other concern was about the inadequate covering of the

<sup>3</sup> Waste Consolidation Areas (WCAs)

waste pits, poor storage of waste (away from direct sunlight, wind and rain) and protection of animals and birds from accessing the facilities. For instance,

- At Kisinja WCA, one of the liquid waste containment pits had remained uncovered for at least 1 year since 2014, with overgrowing bush protruding towards the liquid waste.
- Bugungu WCA had no public emergency response kit or spill handling equipment readily installed at the site in case of an emergency at the site. Whereas the operators argued that Bugungu is not a public place and therefore a public emergency kit would not be relevant, it should be noted that harm can occur to human life, the environment and its components.

The Bugungu and Kisinja WCAs had neither smoke detectors nor fire extinguishers fixed within the facility as required by IFC World Bank Environment Health and Safety (EHS) Guidelines for Waste Management Facilities.

Also, Bugungu WCA did not have a first Aid box fixed within the facility for employee/visitor health and safety.

Apart from the “No smoking” signs, all the 3 facilities had no eating or drinking signs to remind and/or bar employees and visitors from eating or drinking from within the facilities. There is need (for as long as the WCA and/or any other waste management facilities are still in existence) to place the “No Eating or Drinking” signs at the facilities so as to avoid potential incidents and accidents associated with eating or drinking from the waste management facilities. While the operators argued that the no eating policy is not part of the overall Environment, Health and Safety (EHS) induction that is mandatory for all persons visiting or working at the facility, it was acknowledged that “No Eating and Drinking” sign posts were very important.

## **Challenges affecting compliance & best practice**

The challenges that seem to affect compliance with national and international best practices were noted during the study. These were related to managerial, coordination and supervision lapses on the side of the oil and gas waste management operators, and government lead agencies as indicated below;

- Poor maintenance of facilities and equipment at the sites: The study found that maintenance of facility equipment at the waste consolidation facilities was inadequate.
- Limited involvement of the District leadership in performing independent spot checks. It was noted that, district technical officers and leaders were only engaged in surveys and visits to the sites at the invitation of the oil and gas companies through the Joint Venture Partnership arrangements.

- Inadequate monitoring by NEMA<sup>4</sup> and independent verification of the results submitted by the project operators: It was noted through document review that NEMA was not carrying out independent verification of tests of solid and liquid waste samples generated from the drilling activities to corroborate the results they received from the self-monitoring tests carried out by the oil companies.
- Limited involvement of the Multi-Stakeholder Teams (MSTs)<sup>5</sup> in regular inspections of the oil and gas operations in the Albertine Graben. It was noted through document review<sup>6</sup>, that, out of the four (4) required annual inspections, only 2 multi-stakeholder inspections had been done in the financial year 2009/2010. In 2010/2011, only one (1) inspection had been carried out while in the period 2011/2012 and 2012/2013 no multi-stakeholder inspection had been done.
- Limited public access to information and disclosure. Both the oil waste management operators and the government lead agencies such as NEMA are not willing to provide important information such as site Environmental Impact Assessments (EIAs)<sup>7</sup>, and the status of the waste management situation in the Graben to the public. For instance, one of the limitations to this study is the fact that, although the team exhausted all formal channels to access the site EIAs from NEMA and other relevant government agencies, such agencies neither availed the required site EIAs nor provided any formal feedback on reasons why the requested EIAs could not be availed/accessed to the study team. There was no formal response to the letter that was delivered and received by NEMA requesting for EIAs. The physical visits to the Executive Director's office of NEMA, visits to NEMA library and the field monitoring office were not helpful either. The team therefore relied on its observations on the ground for analysis and recommendations.

## Recommendations

This report makes a number of recommendations, if adopted by the different players, will help improve the oil and gas waste management in the Albertine Graben, by increasing environmental and social compliance . These include:

- o Strengthening inspection and monitoring on the general waste management practices. That is:
  - (a) More vigilance and regular inspections by project operators, and all the concerned stakeholders including but not limited to NEMA, Petroleum Exploration and Production Department (PEPD) and the District Local Government Leadership; (b)

<sup>4</sup> National Environment Management Authority (NEMA)

<sup>5</sup> The Multi-stakeholder Team comprises officials from different Lead Agencies mandated to monitor different aspects of environmental management in the Graben, including but not limited to NEMA, MEMD, UWA, DWRM, MWE, Department of Fisheries Resources, MTWA, and District Environment Officers among others

<sup>6</sup> OAG (2014): Environment Audit Report on Regulation and Monitoring of Drilling Waste Management in the Albertine region by National Environment Management Authority (NEMA)

<sup>7</sup> Environmental Impact Assessments for Bugungu, Kisinja, and Nyamasoga waste management sites

## Enforcement of national and international regulations and guidelines for Environment and Health Standards(EHS)

- o Strengthening of the operational measures by the project operators to ensure health and safety of the residents near the waste management sites; particularly, the measures to control runoff from the facilities to the communities, and prevention of air pollution through adequate covering of all the waste pits.
- o Road safety and upgrading along the access routes and adjoining roads needs to be fast tracked for safe transportation of the hazardous waste.
- o Strengthening Coordination and sharing of information among the different stakeholders.
- o NEMA should prioritize and expedite completion of the review of Uganda’s Environmental legislation to incorporate oil and gas issues so as to promote better management of drilling waste.

## Possible topics for follow-up research

The study highlighted a number of areas where future research could be usefully carried out. There is need to establish the status and adequacy of the numerous and unannounced companies contracted by the oil operators to treat and dispose of wastes.

Although oil companies submit quarterly monitoring reports to NEMA, there is need for NEMA together with the Directorate of Water Resources Management to carry out routine independent studies on the quality of the environment, using sample collection and laboratory tests as one of the methods to verify pollution levels, especially on water and land resources.

# SECTION A

## 1.0 INTRODUCTION AND JUSTIFICATION OF THE STUDY

Good waste management can be especially challenging in areas where supporting infrastructure or regulatory frameworks are not well developed or are absent<sup>8</sup>. In Uganda, since the commencement of the drilling activities, waste from oil and gas activities have been confined in consolidation sites awaiting removal and transportation to areas of treatment and disposal.

A state of the art engineered facility was launched on the 23rd April, 2015, at Nyamasoga, Hoima to treat and properly dispose of the oil and gas wastes that are currently consolidated at the different sites in the Albertine Graben. According to the district leaders interviewed by the study team in Hoima and Buliisa, there are other little publicized waste treatment and disposal sites already existing in the Graben, all aimed at proper disposal of the oil and gas waste.

The removal and transfer of waste from the Waste Consolidation Areas (WCAs) to the Treatment and disposal sites must not compromise the quality of the environment and biodiversity of the area, neither should the process and removal plans conflict with national and international waste management facility standards, guidelines and good industry practice. This is in light of the operational guidelines for the oil and gas operations (2012) which recognize that, all reasonable measures and technologies will have to be instituted by operators to, as much as possible, come in favour of the national and internationally recognized best practices.

This study therefore, aimed at observing and documenting the current state of the oil and gas waste management facilities in relation to nationally and internationally recognized practices, guidelines, regulations, and standards.

### 1.1 PURPOSE OF THE STUDY

The overall aim of the study was to examine the current situation of the oil and gas waste management facilities at Kisinja, Bugungu, and Nyamasoga in the Albertine Graben of Uganda.

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<sup>8</sup> Republic of Uganda: Guidelines for Oil and Gas (E&P) Waste Management for Uganda: Draft 1, January, 2014



## 1.2 SPECIFIC OBJECTIVES

- i. Examining the extent to which the existing oil and gas waste management practices comply with national and international standards, regulations, guidelines and good industry practice for increased environmental, social, and biodiversity protection;
- ii. Identifying areas that need to be addressed to ensure that the problems associated with oil and gas waste shall be resolved with the least possible harm and inconvenience caused to humans and the natural environment.

## 1.3 SCOPE OF THE STUDY

The study was carried out in June, 2015, focusing on the existing oil and gas waste management facilities at two oil and gas waste consolidation sites and one waste treatment and disposal plant. The waste consolidation sites visited<sup>9</sup> included:

- (a) Kisinja in Hoima – managed by Tullow; and
- (b) Bugungu in Buliisa – managed by Total E&P.

The treatment and disposal plant visited was EnviroServe at Nyamasoga, where the consolidated waste is transferred. This treatment and final disposal facility was visited to observe key aspects such as:

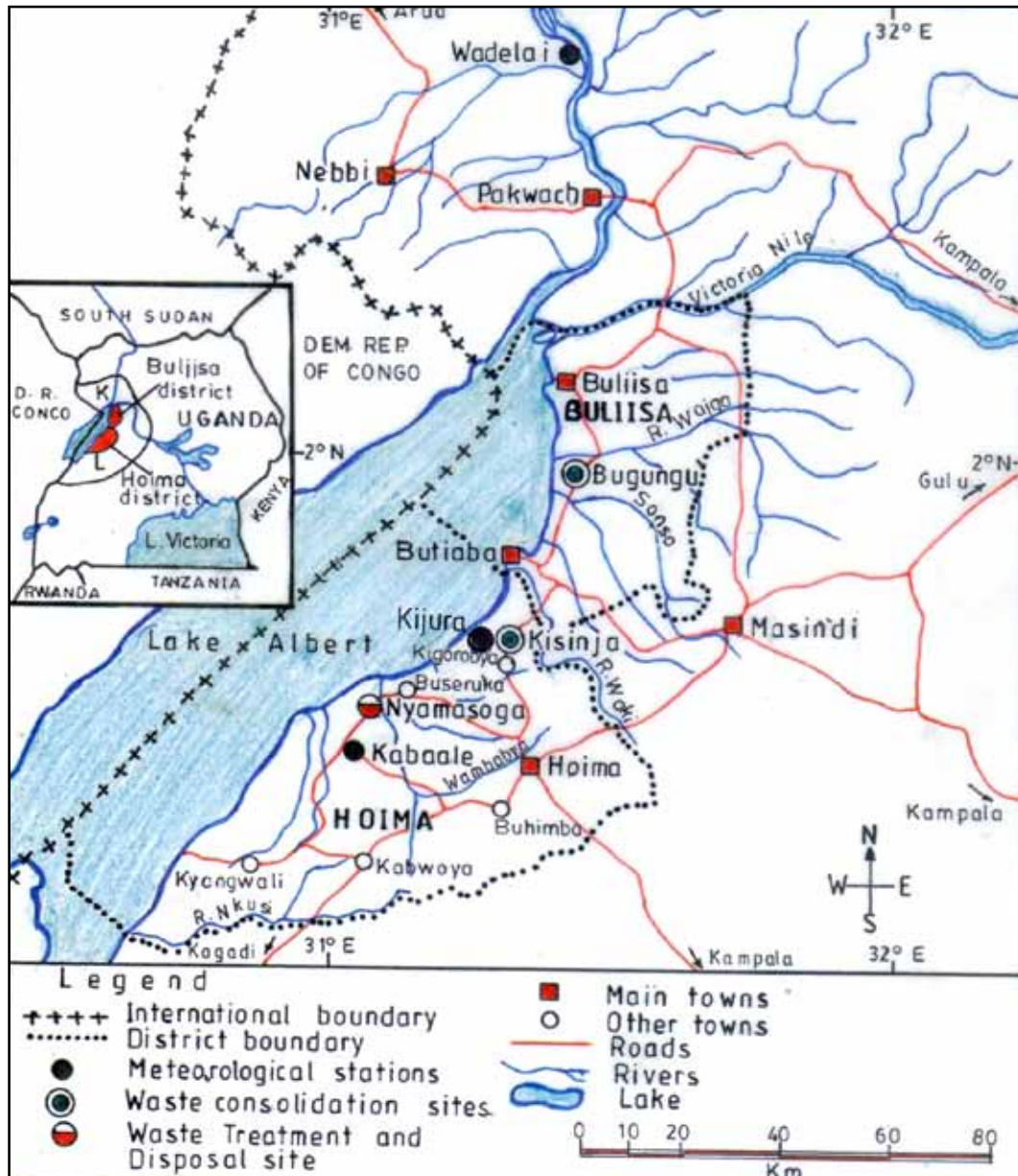
- (a) Its absorptive capacity,
- (b) Its erosion and sedimentation control system, and
- (c) The distance from the facility to the nearest community, among other aspects.

This study did not cover aspects related to laboratory assessment of the quality of environmental resources. This was due to ethical and procedural considerations at the time. The study therefore, relied on interviews, document reviews, and observations using a designed checklist.

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<sup>9</sup>By the time of this study, there existed a total of 6 oil and gas waste consolidation facilities in the Albertine Graben, out of these, 2 were visited in Hoima and Buliisa Districts.

Figure 1: Map showing the location of the sites visited and the access and adjoining roads in the Albertine Graben



CSCO, 2015

## 1.4 METHODOLOGY

This section provides an outline of the qualitative and analytical methods used to derive the results and recommendations made in this report. These methods include the development of a review guide, interviews with resource persons, site observation and photographic impressions to derive results.

## 1.4.1 Review of documents

Compliance evaluation is often concerned with the measurement of performance and existing situations, thus, the use of secondary data was critical in the execution of this study. The reason is that, the oil and gas industry is a highly delicate field with a number of national and international good industry practices, guidelines, regulations and standards. Most of these were reviewed to enable the team fully understand the monitorable parameters against which observation and recommendations have been based.

In effect, the team reviewed a number of documents and records related to the study including:

IFC World Bank Standards: From the international context, particular attention was paid to the IFC World Bank Standards because all the Oil Exploration & Production Companies including their sub-contractors in Uganda adopted among other standards, the IFC World Bank Standards. Although these standards are voluntary, they are generally accepted worldwide. The study focused on Waste Management & Pollution Prevention, performance Standard 3 which is about “Resource Efficiency & Pollution Prevention” alongside other related IFC performance standards which include Standard 1 (Assessment & Management of Environmental & Social Impacts, Standard 2 (Labour & Working Conditions), and Standard 6 (Biodiversity Conservation & Sustainable Management of Living Natural Resources).

WHO International Program on Chemical Safety Guidelines, and IFC Environmental, Health & Safety Guidelines for Waste Management Facilities were also reviewed.

The National documents that were reviewed include:

- The National Environmental Act (NEA), 1995
- The National Environmental (Waste Management) Regulations, 1999
- Operational Waste Management Guidelines for Oil & Gas Operations, 2012
- The Environmental Sensitivity Atlas for the Albertine Graben, 2009
- The Draft National Guidelines for Oil & Gas (E&P) Waste Management for Uganda, 2014; and
- The Environmental Monitoring Plan for the Albertine Graben, 2012-2017.

To ensure a well-focused document review, a checklist containing specific documents to be reviewed, as well as the data to look for, was developed by the team. The checklist that was used as a benchmark during the field study is attached as appendix II.

## 1.4.2 Interviews with resource persons

The study team developed and used a questionnaire for interviews. Face to face interviews were held with the project operators’ technical officers who provided information on waste management practices employed at the facilities. Interviews were also held with selected district officers who provided insights and perceptions on what they thought should

characterize a good process of oil and gas waste management. They also gave their views on what the administrative and technical role of the district local governments should be in ensuring environmental compliance and sustainability of oil and gas related projects. At each of the facilities, the site technical and management team responded to questions and explained the existing situation and future plans for enhancing environmental performance.

### **1.4.3 Field observation and photographic impressions**

Observation and photographic impressions were used to aid in identifying various aspects and providing visual imprints of the observed events on the existing situation at the sites. Some of the key issues focused on during the field visits included:

- (i) Suitability of the site in relation to size, distance from the nearest residential community and domestic water source,
- (ii) Erosion and sediment control practices,
- (iii) Hazards protection mechanisms and procedures,
- (iv) Employee health and safety, and
- (v) The general operations at the facility considering hazardous and non-hazardous waste handling and containment practices among other aspects.

# SECTION B

## 2.0 ANALYSIS AND INTERPRETATION OF FINDINGS

This section presents findings of the study basing on the observed events, the interactive sessions held with the waste management field officers at each of the sites visited, interviews of the district officials, and document reviews.

### 2.1 THE INFLUENCE OF THE CLIMATIC CONDITIONS OF HOIMA AND BULIISA AND ON WASTE MANAGEMENT OPERATIONS AND THE SURROUNDING ENVIRONMENT

The climatological elements considered for the study included precipitation, temperature and wind. This is because precipitation, temperature and wind are associated with environmental pollution implications, Enete (2010), Ahmed (2012) among others. Some of the risks are shown in table 1 below.

**Table 1: Implications of climatic elements on environmental pollution**

Climatic Element	Environmental Pollution Implications
a) Precipitation	Disruption of infrastructures e.g. roads
	Flood risk
	Impacts on ecological processes e.g. composting anaerobic digestion e.tc.
	Hydrological implications on pollution of ground water
b) Temperature	Fresh water sources
	Decline in air quality
	Increased risk of changes in distribution of vermin, pests, diseases, etc.
c) Wind	Increased odour nuisance
	Aerial distribution of virus and bacteria
	Odour nuisance

Source: Enete (2010), and Ahmed (2012)

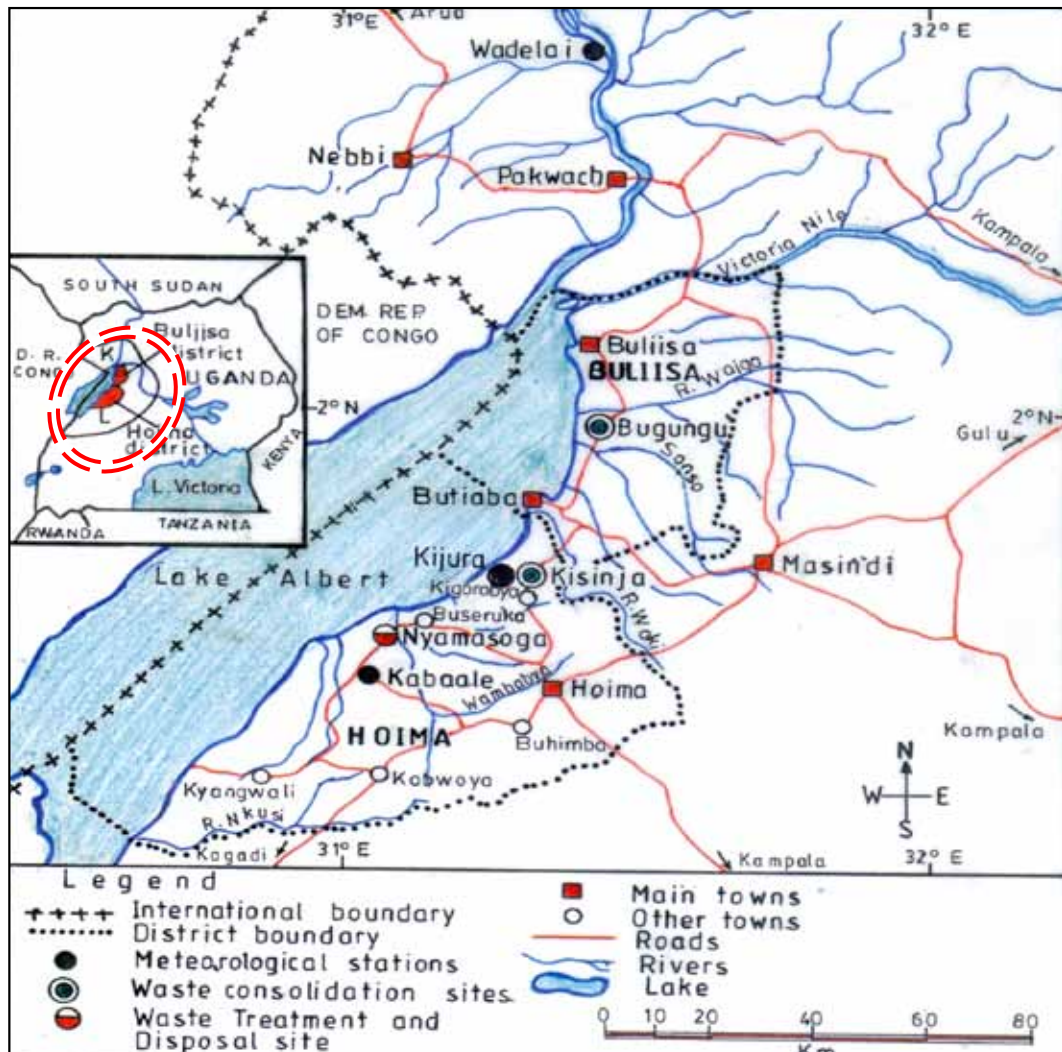
These climatic elements, among others, therefore, have a direct influence on the management of waste consolidation, treatment and disposal facilities, especially, in

ecologically sensitive environments such as the Albertine Graben which inhabits 70% of Uganda's Protected Areas.

### 2.1.1 The effects of rainfall climatology on the oil and gas waste management sites studied

The Oil and Gas waste management sites visited, lie in the western shoulder of the Albertine Graben Rift within the homogeneous rainfall climatological regions K and L delineated by Basalirwa (1995). Bugungu waste consolidation site lies in Region K of the rainfall climatological zones, while Kisinja WCA and Nyamasoga Waste Treatment and disposal sites are situated in Region L as illustrated in figure 2 below:

**Figure 2: Map showing rainfall climatological regions K and L and the location of the waste management sites in Hoima and Buliisa Districts.**



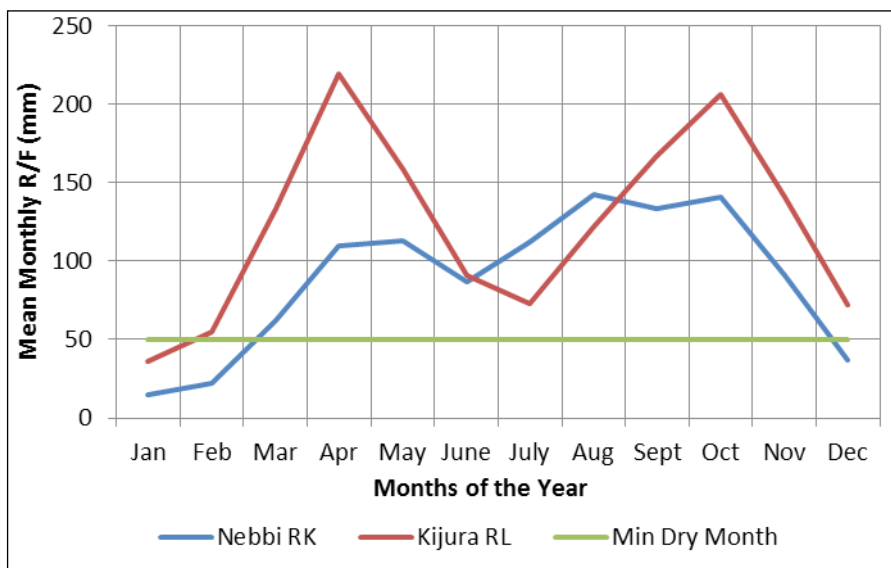
The rainfall in both these regions is mainly due to the movement of the Inter Tropical Convergence Zone (ITCZ) northwards and southwards. The rains occur as a consequence of the convergence of the monsoonal winds in the ITCZ during March to May (the long rains also known as MAM) and September to November (the short rains also known as SON).

Region K lies on the eastern and northern shores of Lake Albert. The air mass flowing in the region warms up on descent into the Lake Albert and deposit little moisture compared to that received in region L to the south of it (see figure 2).

However, for both these regions the rainfall distribution has only one significant dry season; that is, during the month of January in L, and the months of December and January in K. According to Griffiths (1972), a month with a rainfall total below 50 mm, is classified as dry.

Therefore, from June to August that are relatively drier period in both regions are not dry months (see figure 3). Thus, the difference of the rainfall climatology of these regions arises from region K to the north being drier with a longer dry spell from December to February while in the wetter region L, only the month of January is dry (see figure 3 below for Wadelai/ Nebbi Meteorological Station representing region K and Kijura representing region L).

**Figure 3: Mean monthly rainfall for two representative stations in the waste management areas in the Albertine Graben of Uganda**



*East african Meteorological Department (EAMD), 1975*

Notable feature of the rainfall distribution in region K, figure 3, is the apparent limited effect of the saturated south easterly monsoons during the “long rains” of March to May which

peak at about 110mm in April and May compared to the peak at more than 140 mm in October than that of drier north easterly monsoons during the “short rains” of September to November. This differs from the apparent effect of the south easterlies, of the “long rains” of March to May and “short rains” of September to November in L which peak around 200 mm in April and October.

**Table 2: Climatological characteristics of rainfall of the selected waste management areas in the Albertine Graben rift**

Mean Annual R/F (mm) over 50 years	Mean Annual Number of rain days (50 yrs. Data)	Max 24 hour R/F	Time of daily rainfall Occurrence
K= 1064 L= 1474	K = 81 days L=132 days	K=84.5mm (Est. Wadelai August L=124.7mm (Est. Butiaba in Feb.)	About 50% occurs from 1.00pm-7.00pm

Table 2 shows that average number of rain days in regions K and L vary from 80 to 130 days a year respectively. These rainfall patterns reveal that the Bugungu consolidation site in Region K, drainage problems may not be as high as those in Kisinja WCA and Nyamasoga waste treatment plant in the much wetter region L.

Table 2 also reveals that significant amounts of rainfall are experienced annually at over 1000 mm and 1450 mm in both K and L respectively. This implies transportation limitations (see table 1) especially during the “long” and “short” rainy seasons especially in Kisinja and Nyamasoga in region L. Thus, transportation precautions during the rainy seasons need to be adopted.

Finally, table 2 further shows that in both region K and L, about 50% of the rainfall occurs from 1.00pm to 7.00pm. Thus, transfer of wastes from the consolidation sites to treatment and disposal facilities, as well as, cleaning of the drainage channels and other site operations sensitive to rainfall is better be done in the morning to noon hours of the day during the MAM and SON seasons.

### 2.1.2 Findings on the effects of wind

Records reveal that only the daily wind runs have been recorded. However, in equatorial latitudes, surface winds are generally light and variable between 0-5kts. Wind roses for Hoima near the oil and gas waste management facilities show that indeed the winds are predominantly 5kts easterly at 0600 and 1200 GMT throughout the year, EAMD (1975).

The wind profiles of Butiaba station on the shores of Lake Albert (a small lake of about 160 km x 30 km with a mean depth of 51 m) (see figure 2) were predominantly southwesterly during February to May at both 0600 and 1200 GMT indicating land lake breeze connection. The rest of the year, the winds are about 5kts predominantly north easterly at 0600 to south westerly at 1200 GMT. These wind profiles indicate limited fears of strong gusts of wind



transporting pollutants over hundreds of Kilometer distances. Thus, the profiles of these winds means limited aerial transportation fears.

However, the team was informed through interviews with site technical officers at Kisinja, that wind is a major challenge during the rainy season. It blows off roofs from the Liquid waste containment cells. This suggests that the rainfall seasons in region L are characterized with thunderstorms which are usually accompanied by severe winds. Such winds affect (i) the transportation of waste materials and (ii) lead to air pollution from the sites to the surrounding areas. Therefore, measures need to be put in place for sites in region L to control pollution and guard against all possible effects of severe winds, especially during the rainy seasons (See picture below indicating wind barriers at one of the liquid containment cells at Kisinja WCA).

**Picture1: Showing materials used to prevent wind from blowing off roofs at one of the liquid waste containment cells at Kisinja WCA**



*Photo taken at Kisinja WCA on 11th/June/2015: Courtesy of CSCO*

The team further observed that apart from this one containment cell, the rest of the cells at Kisinja had no wind barriers while other liquid waste containment cells were inadequately covered. The uncovered cells pose a great potential for both surface and air pollution, especially, during the rainy season when winds at this site are intense.

## Picture 2: Showing an uncovered liquid waste pit at Kisinja WCA



*Photo taken at Kisinja WCA on 11<sup>th</sup>/June/2015: Courtesy of CSCO*

### 2.1.3 Findings on effects of temperatures

Climatological mean annual maximum and mean annual minimum temperature values in Wadelai in region K are 32.20 C and 18.60 C and at Butiaba station in region L, 29.30 C and 21.90 C respectively.

These temperature values indicate that Bugungu is very hot during daytime (max. temps 32.20 C). The region has a 3 months relatively dry period in December to February. These conditions can lead to fire outbreaks, especially, during the long dry season. This calls for care to be taken to limit fires particularly in the dry season of January & February.

However, this may not be exactly the case in Kisinja WCA, and Nyamasoga waste treatment plant where maximum temperatures are at least 30 C lower at 29.30 C than those of Bugungu (Wadelai station) in region K at 32.20. These lower maximum temperatures coupled with the wetness of the region imply less danger of fire outbreaks at Kisinja and Nyamasoga sites. Nonetheless, this should not mean neglect of vigilance of fire outbreaks.

## 2.2 EXTENT TO WHICH EXISTING PRACTICES COMPLY WITH NATIONAL AND INTERNATIONAL STANDARDS, AND GOOD INDUSTRY PRACTICE

According to Section 57 of the National Environment Act (1995), “No person shall pollute or lead any other person to pollute the environment contrary to any of the standards or guidelines prescribed or issued under the Act.” Also, The National Operational Waste Management Guidelines for Oil & Gas Operations (2012) provides that, all reasonable measures and technologies will have to be instituted by operators to avoid pollution and compliance with internationally recognised best practices.

Thus, the analysis presented in this section is based on a set of national and international parameters that were used during the study. The parameters included: (i) suitability of the site in relation to distance from the nearest residential community, (ii) erosion and sediment control system and practices, (iii) the general project operations at the facilities, (iv) the hazards protection measures and tools, (v) employee health and safety practices, and (vi) transportation and handling of the wastes.

## 2.2.1 FINDINGS ON SUITABILITY OF THE SITE

The National Environmental (Waste Management) Regulations require a licensee of a waste treatment plant or disposal site to ensure that the site: (i) is a radius of at least 1,000 meters away from a residential or commercial area and from water sources and (ii) avoids the emission of noxious smells from the plant or site to levels beyond a standard established under section 28 of the statute.

### (i) Kisinja waste consolidation site

The team noted through interviews with the Kisinja site technical officer that the nearest residential community is Kaiso which is about 3-5km away from the site. It was however observed that there exists a small residential community and a community school at a distance of approximately 10m and 500m respectively. This calls for urgent measures from the site operators to protect the nearby community and the school from any likely negative effects associated with waste consolidation<sup>10</sup>. There is also need to speed up the removal process of the consolidated wastes from Kisinja to designated treatment and disposal sites.

### Picture 3: Showing the nearest school to Kisinja WCA



*Community School near Kisinja consolidation site: inset is cattle patrolling the site in search of pasture*

<sup>10</sup> Waste consolidation is associated with bad odour, and dangerous gases such as hydrogen sulphide which often drift to the nearby communities by wind, hence, posing health problems to humans. Hydrogen sulphide gas has a rotten egg-smell. The gas is flammable, explosive and toxic to the environment.

The observed nearest usable water source from the facility is the borehole at Kisinja Base Camp. This water source is a distance of approximately 100m from the waste consolidation site contrary to the national operational waste management guidelines for oil and gas operations in Uganda which recommends a distance of at least 500m away from a usable underground or ground water source. There is therefore need for Tullow Oil to undertake regular monitoring of the water quality at this borehole and other nearby usable water sources to test for leachates infiltration and other pollutants.

### **(ii) Nyamasoga waste treatment and disposal facility**

The estimated distance from the Nyamasoga treatment and disposal facility to the nearest residential community is about 1km, while the largest water source in the area (lake) is about 2km from the facility. Although this is within the realms of good international industry practice, adequate measures need to be taken to mitigate impacts that may be accelerated by wind action, and rainfall intensity so as to protect the community members, animals, birds, and water sources from the potential adverse effects such as fumes, odor, particulate matter, and chemicals which may be drifted by wind, especially during the rain seasons (MAM and SON months).

### **(iii) Bugungu waste consolidation facility**

The observed distance from the perimeter fence at Bugungu waste consolidation facility to the nearest residential community is approximately 10m contrary to the recommended 250m<sup>11</sup> by the IFC World Bank standards and/or the 1,000m according to the Uganda National Waste Management Regulations, or even the 500m prescribed by the National Operational Guidelines for Oil and Gas Operations. While the regulations largely apply to waste treatment and disposal sites, the interpretation can easily extend to waste consolidation facilities given the length of time the waste is contained. It was noted that Totale E&P had embarked on the process of removing this waste to the treatment and disposal plant in Nyamasoga, but considering the time it would take to completely clear this site and as long as waste is still consolidated at this site, adequate measures and steps need to be put in place to safe guard the nearby community, domestic animals and wildlife from the potential adverse impacts associated with waste consolidation.

<sup>11</sup> IFC World Bank (2007): General EHS Guidelines for Environmental Waste Management.

## Picture 4: Showing the nearest residential community to Bugungu WCA



*Photo taken at Bugungu WCA on 12<sup>th</sup>/June/2015: Courtesy of CSCO*

It was further observed that H<sub>2</sub>S (Hydrogen Sulphide) is used on the liquid waste at Bugungu site, as such, there was an intense strange smell within and outside the site. Studies indicate that Hydrogen sulfide in the atmosphere can make breathing difficult and damage the nervous system<sup>12</sup>. The more concentrated the H<sub>2</sub>S, the more pronounced its effects. It can be deadly at high concentrations. Thus, nearby communities need to be relocated or otherwise, fast tracking the process of removing the wastes from this community is required.

### 2.2.2 EROSION & SEDIMENT CONTROL

Erosion and sediment controls are key aspects of consideration at waste management facilities. This is because, if erosion and sediments are not well managed at the site, the facility may be affected by floods and may increase the risk of sediment discharge to nearby streams, reduce access to pathways and roads (IFC EHS, 1998 Pp 1-2)<sup>13</sup>

<sup>12</sup> H<sub>2</sub>S often has a rotten egg smell at lower concentrations and a sickly sweet smell at higher concentrations. However, after an initial odor, there may be no smell at all. This is because the gas can deaden a person's sense of smell after they have been exposed to a high concentration for a short time or a low concentration for a long time. The smell may also be masked by the odor of other chemicals. Some people can detect the presence of H<sub>2</sub>S at lower concentrations than other people.

<sup>13</sup> International Finance Corporation (1998): Environment Health and safety Guidelines for Waste Management Facilities.

The team explored a number of aspects related to erosion and sediment control. The different aspects explored included:

- (a) Gradient/nature of slope at the site
- (b) Operational practices in place to control erosion and sedimentation

### (i) Kisinja waste consolidation site

The team noted, through observation, that the site had an erosion control system and a filter barrier to prevent sediment discharge into the nearby streams. However, the drainage channels at this facility were too narrow to adequately carry large volumes of storm water. The team further observed that the runoff-flow pipes and the filter barriers had been covered by sediments and overgrown grass. This limited the smooth flow of storm water to the settling basins which caused spillage and meandering of the runoff water to the different areas of the site as was evidenced by the erosion and sediment marks left at the different corners of the facility. See pictures 5 and 6 below;

**Picture 5: Showing sediments in the Drainage channels at Kisinja WCA**



*Photo taken on 11<sup>th</sup>/June/2015:  
Courtesy CSCO*

**Picture 6: Showing erosion marks at one of the solid waste bunds at Kisinja WCA**



*Photo taken on 11<sup>th</sup>/June/2015:  
Courtesy CSCO*

### (ii) Nyamasoga waste treatment and disposal plant

The team observed that both liquid and solid waste treatment was already taking place at the site. The drainage channels already in place were wide enough to adequately facilitate the flow of storm water to the settling basins even at a heavy downpour without causing back flow of the runoff to other areas of the site. By the time of this study, the settling basin for storm water was still under construction. Thus, some channels were clogged up with sediments, which called for regular monitoring and cleaning of all the drainage channels at the site to avoid problems associated with sedimentation.

## Picture 7: Showing the nature of the drainage channels at Nyamasoga site



*Photo taken at Nyamasoga waste treatment and disposal site on 11<sup>th</sup>/June/2015: Courtesy of CSCO*

### **(iii) Bugungu waste consolidation site**

The team observed that the erosion and sediment control system at Bugungu WCA was inadequate to control storm water from running to the nearby communities and surrounding environment. The only erosion control component observed at the facility was the settling basin which was isolated and not connected to any clear drainage system. In other words, the facility neither had a definite drainage channel system nor filter barriers to separate sediments from the storm water. As such, marks of erosion were observed almost everywhere within the facility.

As long as the Bugungu waste consolidation facility was still in use, the project operators need to establish a temporary but adequate drainage and sediment control system at the site to protect the nearby communities and surrounding environment from the negative effects of erosion and sediments running from the facility to the surrounding areas.

**Picture 8: Showing a storm water settling basin with no drainage channels or filter barriers at Bugungu WCA**



*Photo taken at Bugungu WCA on 12th/June/2015: Courtesy of CSCO*

**Picture 9: Showing erosion marks at Bugungu WCA**



*Photo taken at Bugungu WCA on 12th/June/2015: Courtesy of CSCO*



## 2.2.3 FINDINGS ON GENERAL PROJECT OPERATIONS

According to the IFC World Bank EHS Guidelines for Waste Management<sup>14</sup>, section 1.1 and 1.6, waste management operators are required to manage wastes in a manner that prevents the commingling or contact between incompatible wastes and allows for inspection between containers to monitor leaks and spills; store waste in closed containers away from direct sunlight, wind and air; labeling each container to identify its contents; and putting in place Operations and Public Emergency Response Programs (OPERPs) and equipment for handling spills and major accidents at the facilities.

The National Operational Waste Management Guidelines for Oil and Gas Operations require project operators to geo-reference all Burial sites at the waste management facility, and adequate covering of all containment cells to minimize odors and infringements. According to the National Waste Management Regulations<sup>15</sup>, the waste treatment plant or disposal site shall be enclosed and secure from scavengers; the operator shall ensure prevention of the breeding of rats, mosquitoes or other vermin at the site or plant<sup>16</sup>;

### 2.2.3.1 Common aspects of compliance on general project operations at the sites visited

The team noted, through observation that all the 3 sites were well labeled and demarcated with separate receiving and handling areas/equipment for hazardous and non-hazardous wastes. The sites had all the waste burial cells clearly geo-referenced, indicating the source, type, and volume of waste contained at each of the containment cells.

#### Pictures 10 and 11: Showing separate receiving and handling equipment for the different types of waste, and Geo-referencing of the burial cells



*Photo taken on 11/June/2015:  
Courtesy CSCO*



*Photo taken on 11/June/2015:  
Courtesy CSCO*

<sup>14</sup> IFC World Bank General Environmental, Health, and Safety (EHS) Guidelines, 2007: Environmental Waste Management. Pp 48-51.

<sup>15</sup> National Environmental (Waste Management) Regulations, S.I. No. 52/1999

<sup>16</sup> The National Environmental (Waste Management) Regulations, S.I. No. 52/1999: Section 14 (3) (d)

The team noted, through document review, that Uganda's stockpiles for the period kept by TUOP (Tullow) and TEP (Total E&P Uganda) for solid and liquid drilling waste stood at 39,625 tons and 8227 cubic meters respectively<sup>17</sup>. This has a direct economic effect on Uganda, since waste management according to the OAG<sup>18</sup> (2014) is part of the recoverable expenditures/ costs as per Uganda's Production Sharing Agreements (PSAs). From 2010 to 2013 alone, the total expenditure on drilling waste management operations by oil and gas production companies amounted to UGX26.263 billion (OAG, 2014). This cost is likely to increase since the consolidated wastes are now being transferred to final treatment and disposal sites (involving a new cost on labour, transportation, treatment and disposal). This calls for establishment of cost-effective measures in the management of oil and gas waste among the facility operators and concerned government lead agencies such as; NEMA<sup>19</sup>, and PEPD<sup>20</sup>, through regular and effective monitoring of the operations; The OAG needs to carryout frequent auditing of related costs to avoid inflation of such project costs.

### **2.2.3.2 Aspects of general project operations with compliance issues**

The team noted weaknesses in compliance on different aspects of the general project operations at Kisinja and Bugungu Waste Consolidation Areas (WCAs). The aspects noted include: (i) inadequate covering of the liquid waste containment cells, (ii) poor storage of waste away from direct sunlight, wind and rain; and (iii) gaps related to protection of animals and birds from accessing the facilities. The missing gaps and required actions for improvement are discussed as follows, under the particular site where observations were made.

#### **(i) Kisinja waste consolidation facility**

The team noted, through observation, that some of the liquid containment cells at Kisinja were inadequately covered. For instance, one of the containment cells had stayed uncovered for at least one year considering the previous CSCO's visit at this site in July, 2014.

The team further noted, through interviews with the Site technical officer, that there was another new liquid waste pit which, by the time of the study, had remained uncovered for at least 7 months (See photos: 12, 13 and 14 below).

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<sup>17</sup> Office of the Auditor General (OAG): Environment Audit Report on Regulation and Monitoring of Drilling Waste Management in the Albertine region by National Environment Management Authority (NEMA)

<sup>18</sup> Office of the Auditor General

<sup>19</sup> National Environment Management Authority

<sup>20</sup> Petroleum Exploration & Production Department

**Picture 12: Showing a poorly covered Liquid waste pit at Kisinja WCA, July, 2014**



*Courtesy of PEMO, 2014*

**Picture 13: Showing how the liquid waste pit looked by the time of the study visit, June, 2015**



*Photo taken on 11<sup>th</sup>/June/2015: Courtesy CSCO*

**Picture 14: Showing the new and uncovered emergency liquid waste pit at Kisinja WCA**



*Photo taken at Kisinja WCA on 11<sup>th</sup>/June/2015: Courtesy of CSCO*

Kisinja WCA is located in Region L of the rainfall climatological zones which receives an annual average rainfall of over 1400mm with over 130 days of rainfall associated with winds. The team established that, the uncovered liquid waste containment cells were affected by the intense rains and winds, hence posing both surface and air pollution threats to the surrounding environment, wildlife, and human communities. The operators of Kisinja waste consolidation site should therefore consider adequately covering all the

waste containment cells at this site or rather speed up the removal process of wastes from this site to final treatment and disposal facilities. This so as to avoid and/or minimize the potential environmental risks associated with poor management of hazardous waste.

## **(ii) Bugungu waste consolidation facility**

At Bugungu, waste containment cells were adequately covered, however, the settling basin for run-off water at this site was uncovered. This poses threats to the birds and reptiles which may accidentally fall and die in the run-off settling basin. The practice of leaving uncovered pits at the waste management sites is contrary to the NEMA operational guidelines for oil and gas waste operations which require operators to adequately cover all pits at the site so as to minimize odors and infringements. It is also contrary to section 14 (3) (d) of the National Environment Waste Management Regulations (1999) which recommend waste management operators to ensure prevention of the breeding of rats, mosquitoes or other vermines at the site or plant.

The above notwithstanding, no public emergency response kit or spill handling equipment were observed at Bugungu waste consolidation site. The team noted through interview with the site EHS officer, that these kits were kept at the Base camp which was about 500m away from the site. This would imply that in case of an emergency or fatal accident, there was no quick or rather spontaneous response at the facility; it would require either calling or running to the base camp to collect the emergency kit. This is contrary to several sections of the IFC EHS Guidelines for waste management facilities.

Thus, adequate measures need to be taken by the Bugungu site operators to:

- (i) Install a standby public emergency response kit and spill handling equipment within the facility;
- (ii) Cover the open storm water settling basin to prevent reptiles and birds from accessing the basin. This should be done using materials that allow evaporation to take place;
- (iii) Effectively monitor the removal and transfer process of wastes from the site to the treatment and disposal plant to ensure that potential waste spillages at the site are prevented.

## **2.2.4 FINDINGS ON HAZARDS PROTECTION**

According to the International Standards and Guidelines for managing waste facilities<sup>21</sup>, it is recommended that these are located, to the extent possible, to minimise potential risks from earthquakes, tidal waves, floods, and fires from surrounding areas.

The guidelines further stipulate a list of hazard protection requirements that should be installed at the waste management facility to aid the facility operators' response to hazard

<sup>21</sup> IFC (2007), Environment Health and Safety (EHS) Guidelines for Waste Management Facilities

incidents and accidents at the site. Among these requirements include:

- (a) Smoke Detectors and Alarms that are both audible and visible,
- (b) Fire Extinguishers that are visible,
- (c) First Aid Boxes that are visible at the site,
- (d) Lightening Arresters, among others.

Basing on the above requirements, the team made the following observations at Kisinja and Bugungu sites as discussed below:

### **(i) Kisinja waste consolidation facility**

It was observed that the facility had a First Aid Box, however, the facility had no smoke detectors and fire extinguishers stoked/fixes within the site. The team noted, through interview with the site technical officer at Kisinja WCA, that the existing smoke detector and fire extinguishers were only at the Base camp which is about 200km away from the consolidation site. This practice is contrary to the IFC World Bank EHS Guidelines which require waste management facility operators to stoke and fix fire extinguishers and smoke detectors within the facility for employee and visitor health and safety.

There is need for the facility operators to install fire extinguishers and smoke detectors within the facility for emergency purposes in case of an eventuality rather than having all these equipment kept at the Base camp. This should be the practice by the facility operators until all the consolidated waste is completely transferred to the final treatment and disposal sites.

### **(ii) Bugungu waste consolidation facility**

There was neither a first aid tool kit, nor fire extinguishers or smoke detectors observed at the premises of the Bugungu WCA. Like at Kisinja, by the time of the study (June, 2015), these equipment were only kept at the Base camp<sup>22</sup> which is about 500m away from the consolidation facility. Given that in Bugungu, temperatures go up to 32.20 C during the dry period, fire outbreaks and smoke are inevitable. The team's interview with the Bugungu site technical team revealed that incidents of fire breakouts were frequently registered at the site during the dry period. In the absence of smoke detectors, fire extinguishers and first aid tool kits readily installed at the facility, the lives of employees at the facility is greatly threatened and this raises serious compliance questions.

## **2.2.5 FINDINGS ON EMPLOYEE HEALTH & SAFETY**

Oil and Gas Waste Management Operators (OGMO) are required by the Uganda National Operational Guidelines for oil and gas operations to subject their employees to regular medical examinations, at least once every year. According to international standards

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<sup>22</sup> The team noted, through interviews with the Total E&P Uganda EHS officer, that the Base Camp was turned into a catering service place for Total E&P Uganda in the recent past.

and guidelines for EHS, waste management operators are required to provide protective sanitary and human health gears to their workers. Facilities are required to have the “No smoking” and “No Eating or Drinking” signs so as to ensure employee health and safety (IFC World Bank, 2007).

The team noted, through interviews with site technical officers at the 3 waste management facilities (Kisinja, Bugungu, and Nyamasoga), that all employees undergo regular medical examination at least once every year. The team further noted, through observation, that employees at all the 3 sites visited had protective sanitary and human health gears. This is a good practice that needs to be maintained as it ensures good health of the workers at the facility.

It was however observed that although facilities had the “No smoking” signs, there were no eating or drinking signs to remind and/or bar employees and visitors from eating or drinking from within the facility. While the operators argued that the no eating policy was not part of the overall mandatory EHS induction for all persons visiting or working at the facility, it was acknowledged that “No eating or Drinking” sign posts were very important. There is need (for as long as the WCA and/or any other waste management facilities are still in existence) to place the “No Eating or Drinking” signs at the facilities in order to avoid potential incidents and accidents associated with eating or drinking from within the waste management facilities.

## **2.2.6 FINDINGS ON TRANSPORTATION & HANDLING**

This parameter was only applied at Nyamasoga waste treatment and disposal plant. This is because by the time of this study, it was mainly containment of waste taking place at the waste consolidation facilities. Transportation was being handled by the waste treatment and disposal companies. This was confirmed by the site technical officers at Bugungu WCA and Nyamasoga waste treatment and disposal facility, who revealed that transportation of wastes from consolidation sites to treatment and disposal facilities, was handled by either the treatment or disposal companies.

The team further noted, through interviews with the site technical officers at Bugungu WCA and Nyamasoga waste treatment and disposal facility, that by the time of the study, it was only EnviroServe, a waste management company, that was engaged in the transportation of Total E&P’s wastes from Bugungu and Tangi WCAs to Nyamasoga waste plant treatment and disposal site in Hoima.

Thus, the findings on transportation and handling of hazardous wastes were gathered with inference to the international Guidelines on Environment, Health, and Safety for transportation and handling of hazardous materials (Hazmats), which require operators to pay attention to the following aspects while transporting hazardous materials:

- (a) Labeling of the trucks to indicate type of the truck and their carriage capacity/volume,

- (b) Consider the nature of the access roads for transporting wastes,
- (c) Labeling of the trucks to indicate associated hazards, and
- (d) Design of the trucks in relation to control of odors and waste losses during transportation.

The team noted through both observation and interviews with the site manager at Nyamasoga waste treatment and disposal plant, that heavy trucks with a carriage capacity of about 40 tones were used to carry wastes from Bugungu and Tangi sites<sup>23</sup> through Karuma-Bwengali-Kigumba-Kafu-Masindi-Hoima to the Nyamasoga site for final treatment and disposal.

Consistent with the above observation, the team established that, good condition roads – which are wide enough with no potholes, are needed to facilitate adequate transportation of the wastes (in view of the heavy nature of the transportation trucks). The road from Hoima to Nyamasoga (Kigoroby Road) seems to meet the above description. However, the marrum road from Bugungu WCA to Masindi is bad especially during the rainy seasons and needs to be upgraded as it limits the smooth transportation of the hazardous waste and other oil and gas materials that require the use of heavy load vehicles. Interview with the Bugungu site technical officers revealed that, indeed, by the time of the study, transportation activities of the waste from Bugungu had been halted due to bad roads and heavy rains in April and May.

There is need for Government to upgrade all the roads used for oil and gas transportation activities to adequately facilitate the easy movement and safe transportation of the wastes and other related oil and gas materials within the Graben.

### Picture 15: Showing heavy load trucks at Nyamasoga waste treatment plant



*Photo taken at Nyamasoga site on 11th/June/ 2015: Courtesy of CSCO*

<sup>23</sup> Bugungu and Tangi waste consolidation facilities are managed by Total E&P Uganda; which contracted EnviroServe to transfer the consolidated wastes from these facilities to Nyamasoga for treatment and final disposal.

**Picture 16: Road from Hoima to Nyamasoga. Transportation of waste will require such smooth roads to avoid waste dropping**



*Photo taken along Hoima-Kigoroby road on 11th /June/ 2015: Courtesy of CSCO*



# SECTION C

## 3.0 AREAS THAT NEED TO BE ADDRESSED FOR EFFECTIVE MANAGEMENT OF THE OIL AND GAS WASTES

The study identified areas that needed to be addressed to ensure that the problems associated with waste are resolved to cause negligible harm and inconvenience to humans and the natural environment.

This section therefore, discusses the key challenges affecting compliance and best practice in the management of the oil and gas waste at Kisinja, Bugungu, and Nyamasoga sites; and suggests recommendations that can be implemented by the different players for increased protection of the natural environment of the Albertine Graben.

### 3.1. CHALLENGES AFFECTING COMPLIANCE & BEST PRACTICE IN THE MANAGEMENT OF OIL & GAS WASTE AT KISINJA, BUGUNGU AND NYAMASOGA SITES

A number of challenges that seem to affect compliance to national and international best practices were noted during the study. These were managerial, coordination and supervision lapses on the side of the oil and gas waste management operators, and government lead agencies as described below:

#### **I. Poor maintenance of facilities and equipment at the sites**

The study found that maintenance of facility equipment at the waste consolidation facilities was inadequate. This was evidenced from a number of site equipment such as the containment cells, some of which had developed severe cracks with over grown grass protruding towards the open segment of the liquid waste. The materials contained in the public emergency response kit at some of the sites had started rusting as shown in the pictures below.

## Picture 17: Showing rusted material in the public emergency response kit at Kisinja WCA



*Photo taken at Kisinja WCA on 11th/June/2015: Courtesy of CSCO*

## Picture 18: Showing cracks at one of the liquid waste containment cells at Kisinja



*Photo taken at Kisinja WCA on 11th/June/2015: Courtesy of CSCO*

### **II. Limited involvement of the District leadership in monitoring**

Interviews with key informants revealed that the district leaders and technical staff, who would essentially be the first agents of government in monitoring the activities of the waste management facility operations within their specific areas of jurisdiction, were not empowered in terms of funding, hence limiting their involvement in meaningful monitoring of the sites. The study team noted that district technical officers were only engaged in surveys and visits to the sites at the invitation of the oil and gas companies through the Joint Venture Partnership arrangements. This limits and undermines the spirit of independent and objective monitoring.

### **III. Limited involvement of NEMA<sup>24</sup> in independent verification of the results submitted by the project operators**

Effective monitoring of the compliance with proper waste management involves sample collection and laboratory testing to ensure safety of the environment. The study team

<sup>24</sup> National Environment Management Authority (NEMA)

observed, through document review<sup>25</sup>, that NEMA was not carrying out independent verification of tests of solid and liquid waste samples generated from the drilling activities to corroborate the results it received from the self-monitoring tests carried out by the oil companies. There is need for NEMA to undertake independent monitoring, with sample collection and testing as one of the methodologies, so as to verify the oil companies/operators' results provided in the quarterly monitoring reports.

#### **IV. Limited involvement of the Multi-Stakeholder Teams<sup>26</sup> in regular inspections of the oil and gas operations in the Albertine Graben**

It was noted through document review<sup>27</sup>, that, out of the four (4) required annual inspections, only 2 multi-stakeholder inspections were done in the financial year 2009/2010. In 2010/2011, only one (1) inspection was carried out while in the period 2011/2012 and 2012/2013 no multi-stakeholder inspection was done. This lapse leaves the environment of the Graben at stake hence calling for more vigilance among the concerned government lead agencies, especially those in charge of the environmental management pillar under the oil for development program.

#### **V. Limited access to information and disclosure**

One of the strategies for ensuring optimum national participation in oil and gas operations, as stipulated in the National Oil and Gas Policy (2008)<sup>28</sup> is to encourage Civil Society to participate in the building of a productive, vibrant and transparent oil and gas sector in Uganda. However, this objective is often undermined when the CSOs<sup>29</sup> are denied the necessary information that would enable them execute this role in the oil and gas sector. One of the limitations of this study was related to the failure by NEMA to provide the site EIAs<sup>30</sup> to the study team, and denial of the team from taking photographs at some sites. Failure to share site EIAs, not only raises questions of transparency but also questions as to whether the EIAs for the sites visited actually do exist.

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<sup>25</sup> OAG (March, 2014): Environment Audit Report on Regulation and Monitoring of Drilling Waste Management in the Albertine region by NEMA.

<sup>26</sup> The Multi-Stakeholder Team comprises officials from different Lead Agencies mandated to monitor different aspects of environmental management in the Graben, including but not limited to NEMA, MEMD, UWA, DWRM, MWE, Department of Fisheries Resources, MTWA, and District Environment Officers among others

<sup>27</sup> OAG (2014): Environment Audit Report on Regulation and Monitoring of Drilling Waste Management in the Albertine region by National Environment Management Authority (NEMA)

<sup>28</sup> Uganda National Oil and Gas Policy (February, 2008): Pg. 25 Objective 7 strategy (e)

<sup>29</sup> Civil Society Organisations

<sup>30</sup> Environmental Impact Assessments

## 3.2 RECOMMENDATIONS

### **i) Strengthen inspection and monitoring to ensure compliance with the law and best waste management practices**

Field observation results indicated a lot of inadequacies related to the waste management practices at the waste consolidation facilities (such as poor erosion control systems, presence of uncovered liquid pits with over grown grass and cracks among others). This indicates lapses among the project operators and Multi-Stakeholder Teams in inspections on EHS.

A review of the OAG report (2014) on Regulation and Monitoring of the Drilled Wastes in the Albertine Graben, revealed that for the FYs<sup>31</sup> 2010/11, 2011/12, 2012/13 out of the expected twelve (12) self-monitoring reports, Tullow (TUOP) had submitted 7 reports while Total E&P and CNOOC were each expected to have submitted six (6) self-monitoring reports to NEMA but Total E&P submitted only 3 and CNOOC none (0). While CNOOC contested this finding at the validation meeting for this report that it had not submitted self-monitoring reports as required, it did not provide evidence to the contrary.

This calls for;

- a) More vigilance and regular inspections, by first of all, the project operators, and secondly, all the concerned stakeholders including but not limited to NEMA, PEPD/MEMD, UWA, Ministry of Water and Environment, DWRM, and the District Local Government Leaderships.
- b) Strengthening the enforcement of national and international regulations and guidelines for EHS

### **ii) Strengthen Operational measures to ensure the health and safety of residents near the waste management sites**

It was observed throughout the study, that most of the visited oil and gas waste management facilities are located close to residential communities at distances contrary to the set national and international standards. Therefore, there is need to strengthen the operational measures by the project operators to ensure health and safety of the residents who live near the waste management sites. In particular, measures to control runoff (erosion) from the facilities to the communities, and prevention of air pollution through adequate covering of all the waste pits.

### **iii) Fast track the improvement of access routes and adjoining roads**

The transportation of oil and gas wastes and other related heavy materials requires roads that can sufficiently accommodate the weight of the heavy load trucks and their frequent movement from the consolidation sites to treatment and disposal areas. Therefore, Road

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<sup>31</sup> Financial Years (FYs)

safety and upgrading along access routes and adjoining roads need to be fast tracked for safe transportation of the hazardous waste.

#### **iv) Strengthen coordination and sharing of information among different stakeholders**

Environmental compliance and sustainability cannot be realised in isolation of other actors/ relevant stakeholders in the sector. In order to ensure environmental compliance and environmental sustainability of the areas where oil and gas related operations are taking place, there is increased need for government agencies to meaningfully involve the civil society organisations working on oil and gas issues mainly through the sharing of relevant information such as EIAs, quarterly monitoring reports and other relevant information as may be requested by the CSOs from time to time. The coordinated involvement of CSOs by the government agencies and the project operators through information sharing, will increasingly aid in complimenting the effort of government, increasing accountability and transparency as opposed to mistrust and duplication of efforts, hence building a strong oil and gas sector with maximal benefits to society.

#### **v) Expedite the completion of the review of Uganda’s environmental legislation**

NEMA should prioritize and expedite completion of the review of Uganda’s Environmental legislation to incorporate oil and gas issues so as to promote better management of drilling waste. Particularly, NEMA should expedite the establishment of Petroleum Waste (Management) Regulations and Oil and Gas Waste Management Guidelines so as to regulate the management of oil and gas waste. This is because the operational guidelines for oil and gas operations<sup>32</sup> currently used by the waste management operators are silent about how the waste should be transported, stored and/ or treated.

#### **vi) Need for further research**

There is need to undertake research after the waste has completely been transferred from the consolidation sites to ascertain the up-to-date state of the environment at the WCA in relation to the baseline conditions provided in the site EIAs. Such a study should involve laboratory tests to keep track of changes in the quality of the environment (if any).

It was established during the study, that apart from the famous state of the art engineered waste treatment and disposal plant at Nyamasoga, there existed other waste disposal companies such as “White Nile” and “Always Waste Management Company” in Hohwa and Kyangwali respectively. There is need to interrogate the nature, capacity and state of these waste management facilities in relation to environmental and social compliance.

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<sup>32</sup> NEMA Operational Waste Management Guidelines for Oil & Gas Operations, 2012

### 3.3 CONCLUSION

The study revealed that although a number of national and international requirements were adhered to in terms of facility establishment, a good deal of the EHS practices had not been adequately complied with, especially at the Waste Consolidation Areas. Challenges affecting compliance to best practice in the management of oil and gas waste management facilities at Kisinja, Bugungu, and Nyamasoga were elicited and pointed out. Key recommendations and strategies that need to be adopted for improvement have been discussed and presented in this report. These should be put to use by the various stakeholders, especially the project operators and NEMA.

Implementation of the remedial measures proposed in this report should therefore take into account the site-specific problems of the facilities and the receiving environment. Closer cooperation and exchange of information between and among CSOs and the government lead agencies such as NEMA, PEPD, as well as the project operators is paramount for increased environmental compliance and environmental sustainability in the oil and gas sector. The District Local Governments too should be empowered to undertake compliance checks, especially, that waste management of the oil and gas sector is likely to become an unavoidable practice in the Albertine Graben.

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# APPENDICES

## APPENDIX – I: LIST OF THE STUDY TEAM MEMBERS

#	Name	Organisation / institution	Role
1	Julius Ssenyonjo	Practicing Environmental Managers Organisation (PEMO)	Team Leader
2	Dr. Isaiah Iowiunji	WWF-UCO	Team Member
3	Enock Nimpamya	Action Coalition on Climate Change (ACCC)	Team Member & representative of the Revenue tracking group
4	Edward Natamba	SOWIPA	Team member
5	Yiga Joel Kamoga	African Skills Development & Resource Centre (ASDRC)	Team Member
6	Twebaze Paul	Pro-biodiversity Conservationists of Uganda (PROBICOU)	Team member & steering committee representative on the team
7	Gerald Byarugaba	Citizens Concern Africa (CICOA)	Team member & representative legal & policy group on the team
8	Dr. Pricilla Nyadoi	Uganda Wildlife Society (UWS)	Team Member
9	Michael Mugume	Lake Albert Biodiversity Conservation (LABCA)	Representative of the Albertine Graben CSCO member Organisations
10	Hadad Kavuma	EMLI	Team Member and waste management specialist
11	Prof. CPK Basalirwa	Makerere University	Process facilitator and Adviser (Environmental pollution Control expert)
12	Joel Okao	CSCO Coordinator	Coordination
13	Onesmus Mugenyi	Advocates Coalition for Development and Environment (ACODE)	Host Institution Representation, Environmental Lawyer and provided process oversight

## APPENDIX – II: DOCUMENTS REVIEWED

### Summary of the Reviewed Documents

#	Document Reviewed	Purpose
1	National Oil and Gas Policy for Uganda, February, 2008	K=84.5mm (Est. Wadelai August L=124.7mm (Est. Butiaba in Feb.)
2	Operational Waste Management Guidelines for Oil and Gas operations (NEMA), June 2012	Obtain information on operational guidelines for the oil and gas waste management facilities in Uganda
3	Auditor General’s Report on Environmental Regulation and Monitoring of Drilling Waste Management in the Albertine Region by NEMA, March, 2014	Obtain information on the status of implementation of environmental regulations and the effectiveness of monitoring of the activities of oil and gas waste management by NEMA
4	Environmental Sensitivity Atlas for the Albertine Graben	Obtain background information on the nature and sensitivity of the Graben and likely impacts of oil and gas exploration and development activities
5	The National Environment Act, Cap.153 National Environment (Waste Management) Regulations Operational Waste Management Guidelines for Oil and Gas Operations – NEMA Draft Guidelines for Oil & Gas (E&P) Waste Management for Uganda, 2014 National Oil and Gas Policy for Uganda The EIA Regulations The Environmental Monitoring plan for the Albertine Graben IFC World Bank Standards; 1, 2, 3, and 6 IFC Environment, Health and Safety Guidelines for waste management facilities WHO International Program on Chemical Safety Guidelines	Obtain checklist information for assessment of compliance by the oil and gas waste management project operators
6	EAMD (1975): Climatological Statistics for East Africa, PART – II, UGANDA, <ul style="list-style-type: none"> <li>• Griffiths, J.F. (1972): Eastern Africa. In <i>Climates of Africa. World Survey of Climatology Vol.10 Elsevier</i> 604pp</li> <li>• Enete, I. C. (2010) Potential impacts of Climate Change on solid waste management in Nigeria. <a href="http://earthzine.org/2010/10/04/potential-impacts-of-climate-change-on-solid-waste-management-in-nigeria/">http://earthzine.org/2010/10/04/potential-impacts-of-climate-change-on-solid-waste-management-in-nigeria/</a></li> <li>• Ahmed, Y.A. (2012) Impacts of climate change on waste management in Ilorin city Nigeria. <i>Global Journal of Human Social Science</i>, Vol. 12 Issue 6 version 1.0, March 2012.]</li> </ul>	Obtain background information on the climatological conditions for Buliisa and Hoima districts Ascertain the impacts of climate on waste management in ecologically sensitive areas

## APPENDIX – III: Who is CSCO?

CSCO is a loose network of over 50 member organisations working on oil and gas related issues in Uganda. CSCO was formed in 2008 to create, nurture and harness a shared civil society platform for promoting and strengthening CSO coordination, networking and advocacy in the oil and gas sector.

### **Vision**

The Network's shared Vision is "a well-managed oil and gas sector for the benefit of all Ugandans".

### **Mission**

To promote maximal benefits for the people of Uganda from oil and gas industry by enhancing social, economic, and environmental sustainability.

### **Objectives**

The objectives for which the Coalition was formed and exists are:

To create a forum in which members can share information, plan, and strategize together for the purposes of conducting joint advocacy and engaging with government and other industry stakeholders, as well as facilitating access and exchange of information.

To advocate for an equitable, efficient & effective management and utilization of oil and gas resources - by pursuing strategic actions that seek to ensure sustainable development through proper management of oil and gas resources.

To strengthen the capacity of CSCO members to generate, analyze and disseminate oil and gas information.







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