



**Supplementary Information Package
to the Environmental and Social
Impact Assessment (ESIA) for a
50 MW Power Plant Project in
Conakry
Republic of Guinea**

Revision 2

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Supplementary Information Package to the Environmental and Social Impact Assessment (ESIA) for 50 MW Power Plant Project –Commune de Matoto- Conakry-Republic of Guinea

Endeavor Energy

Revision 2

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Approved by: Camille Maclet



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1 CONTEXT

1.1 GENERAL OVERVIEW OF TÈ POWER PROJECT

This supplementary information package (SIP) presents a set of information supplementing the Environmental and Social Impact Assessment (ESIA) report for the Tè Power project in Conakry, Republic of Guinea.

The Tè Power project consists of the development, construction and operation of a 50 MW fuel-fired power plant in the district of Matoto, in the city of Conakry. The Project will be developed on a brownfield site owned by the Ministry of Defense of Guinea, and previously occupied by a temporary power facility made of containerized power units.

The Project is being developed by Tè Power Company, a majority owned subsidiary of Endeavor Energy, an international independent power producer.

The ESIA for the Tè Power Project was issued in July 2016 and submitted to the Bureau Guinéen des Etudes et Evaluations Environnementales (BGEEE) in line with Guinean regulations on environmental permitting.

This SIP was developed in response to a series of comments issued in July and August 2016 by the Overseas Private Investment Corporation (OPIC), in anticipation of proposed financial support to the Project.

1.2 SUMMARY OF OPIC'S INFORMATION REQUEST

OPIC issued to Endeavor two sets of question regarding the ESIA report of the Tè power plant on 25 July 2016 and 17 August 2016. Both sets of comments were addressed during teleconferences held with OPIC on 26 July and 19 August 2016. The comments are summarized in the following table.

Table.1 Summary of OPIC's comments received

Comments received on the 25th of July 2016

1. Noise impacts	Section 2.1
2. Monitoring plan for air quality	Section 2.2
3. Ambient air quality impacts, wind rose, MEI	Section 2.2
4. Solid waste disposal, lack of engineered landfill	Section 2.3
5. Oily waste disposal	Section 2.3
6. Oil spill containment and spill response measures	Section 2.4
7. T & D line, right-of-way, land acquisition/ government permission etc.	Section 2.5

8. Fuel quality needed for selective catalytic reduction (SCR)	Section 2.6
9. Effluent treatment	Section 2.3
10. BGEE and community feedback	Section 2.7
11. Fire safety, emergency response	Section 2.4
12. Occupational health and safety/training	Section 2.4
13. Site contamination	Section 2.8
14. Other issues, cultural finds	Section 2.9
15. ESMP, ESMS, Organizational set-up (E & S), community liaison officer	Section 2.4

Comments received on the 17th of August 2016

a. Resettlement: The project does not plan to conduct any resettlement as the power plant site is now vacant; however the ESIA states that the corridor connecting the power plant to the EDG sub-station is currently illegally occupied by houses and businesses. Will this require people to be moved during the construction phase for the transmission line?	Section 2.5
b. Security: the project site is protected by armed guards from the national military. Will the project employ security guards, or will the site continue to be under military protection?	Section 2.10
c. Community engagement: the containerized power units which previously operated on this site faced strong opposition from the community. What is being done to engage the community on concerns such as noise, air pollution, and traffic around the site? Was the previous plant closed in part because of community opposition, or only because of cost/technical issues?	Section 2.7
b. How does the project plan to address community expectations for benefits such as local access to electricity, jobs, health facilities, or other new community amenities?	Section 2.7

2.1

NOISE IMPACTS

As presented in the ESIA report in *section 5.6 Impact on ambient noise levels*, baseline noise conditions already exceed IFC and Guinean daytime and night time guidelines for residential and commercial areas. The ESIA report highlighted the fact that, although in exceedance of IFC and Guinean noise emissions guidelines, the increase of noise levels due to project's activities would be unnoticeable during the daytime with emergence ranging between 0.1 and 0.8 dB(A). It was slightly noticeable in one location at the site boundary with increase in noise levels above background ranging between 0 and 3.5 dB(A).

Endeavor and its contractors have developed a set of mitigation measures to abate noise emissions at the source. These may include:

- the erection of double Paroc walls and a low noise roof for the engines room;
- the installation of silencers 45 dB(A) on the engines' exhaust stacks;
- the installation of silences 1400mm on the ventilation outlets; and
- the installation of ultra-low noise cooling radiators with noise levels of 19 db(A) at 40 m.

In order to assess the efficiency of these abatement measures, a noise modeling exercise has been performed. The modeling results are presented in *Table.2.1*.

Table.2.1 Predicted noise levels following implementation of noise abatement measures

ID	Receptor	Period	Predicted Noise Level prior to mitigation measures Operat. Phase LAeq [dB(A)]	Predicted Noise Level after mitigation measures Operat. Phase LAeq [dB(A)]	Monitored Noise Level LAeq [dB(A)]	Sound pressure level difference LAeq [dB(A)]
N1	Residential buildings to the south-west	Daytime	58.5	35.4	75.3	- 39.9
N2	Site boundary (representative of houses to the north-east)	Daytime	63.0	55.1	70.2	- 15.1
N2	Site boundary (representative of houses to the north-east)	Night time	62.0	55.1	70.2	- 6.9
N3	Residential buildings to the east	Daytime	63.5	60.8	75.2	- 14.4
N4	Residential buildings to the north-east	Daytime	46.5	55.5	60.7	- 5.2
N5	Residential buildings to the south-east	Daytime	43.0	44.0	73.6	- 29.6

The modeling results show that, although IFC and Guinean noise emissions limits are marginally exceeded at three locations, noise emissions are well below baseline noise levels and will not lead to emergence above baseline noise levels greater than 3 dB(A).

Endeavor will also implement a grievance mechanism to keep an open line of communication between local communities and the Project and ensure community grievances are received and taken into consideration during Project activities in a timely manner.

2.2

AIR QUALITY MONITORING

Air quality monitoring for PM_{2.5}, PM₁₀, NO_x, NO₂ and SO_x has been carried out at the Project site as part of the ESIA process. The results of these monitoring exercises are presented in the ESIA report *section 4.3.4 Air quality*. In addition, Endeavor is undertaking 4 more months of monitoring for NO_x, NO₂ and SO_x from April to September 2016. Only results during May and June are available so far, but results for July to September will be provided as they become available as part of supplemental memos. Endeavor has also undertaken one additional week of monitoring for particulate matter (PM_{2.5} and PM₁₀) between the 3rd and 9th of June 2016.

Endeavor will implement seasonal air quality monitoring. Monitoring characteristics will be determined considering OPIC requirements and associated costs.

2.2.1 *NO₂ and SO₂ Monitoring results*

The results of these monitoring exercises are presented in *Table.2.2* and *Table.2.3*.

Table.2.2 *NO₂ monitored concentrations*

Site	Guinean and IFC standards set on NO ₂ annual average concentration [µg/m ³]	May		June	
		[µg/m ³]	% of AQS	[µg/m ³]	% of AQS
AQ1	40	23.38	58%	33.64	84%
AQ2	40	31.79	79%	17.63	44%
AQ3	40	17.46	44%	25.32	63%
AQ4	40	25.15	63%	30.68	77%
AQ5	40	26.22	66%	NA	NA
Airshed status		Undegraded		Undegraded	

Note: June diffusion tubes at location AQ5 were removed or stolen and no results can be presented for this monitoring period.

Table.2.3 *SO₂ monitored concentrations*

Site	Guinean and IFC standards set on SO ₂ annual average concentration [µg/m ³]	May		June	
		[µg/m ³]	% of AQS	[µg/m ³]	% of AQS
AQ1	50	2.80	6%	6.03	12%
AQ2	50	5.21	10%	6.11	12%
AQ3	50	3.05	6%	3.23	6%
AQ4	50	3.70	7%	2.33	5%
AQ5	50	5.38	11%	N/A	N/A
Airshed status		Undegraded		Undegraded	

Note: June diffusion tubes at location AQ5 were removed or stolen and no results can be presented for this monitoring period.

2.2.2 *PM Monitoring results*

Monitoring for PM_{2.5} and PM₁₀ has been conducted between the 3rd and 9th of June 2016. Monitoring results over this period are presented in *Table.2.4*.

Table.2.4 June PM monitoring results

Parameter	unit	IFC air quality standard		Averaging period	Monitored concentration	Airshed Status
PM _{2.5}	µg/m ³	25	Guideline	24 hour average	12,9	Undegraded
PM _{2.5}	µg/m ³	75	Interim target 1	24 hour average	12,9	Undegraded
PM ₁₀	µg/m ³	50	Guideline	24 hour average	16,0	Undegraded
PM ₁₀	µg/m ³	150	Interim target 1	24 hour average	16,0	Undegraded

2.2.3 *Maximum exposure individual*

Figure 2.1 shows the maximum exposure individually for hourly NO₂ predicted concentrations.

Figure 2.2 shows the maximum exposure individually for annual NO₂ predicted concentrations.

Figure 2.3 shows the maximum exposure individually for 24 hour NO₂ predicted concentrations.

Note that for all modeling runs, predicted maximum concentrations are well below the limits as specified by Guinean regulations as well as the International Finance Corporation EHS guidelines.

For particulate matter (PM₁₀ and PM_{2.5}), predicted maximum concentrations are less than 2% of the Guinean and IFC guidelines across the entire modeling domain, both for short-term and long-term average concentrations. Therefore, Project-related impacts are negligible and the predicted PM concentration contours have not been mapped.

Figure 2.1 Maximum exposed individual concentration contour maps for NO₂, 1hr average

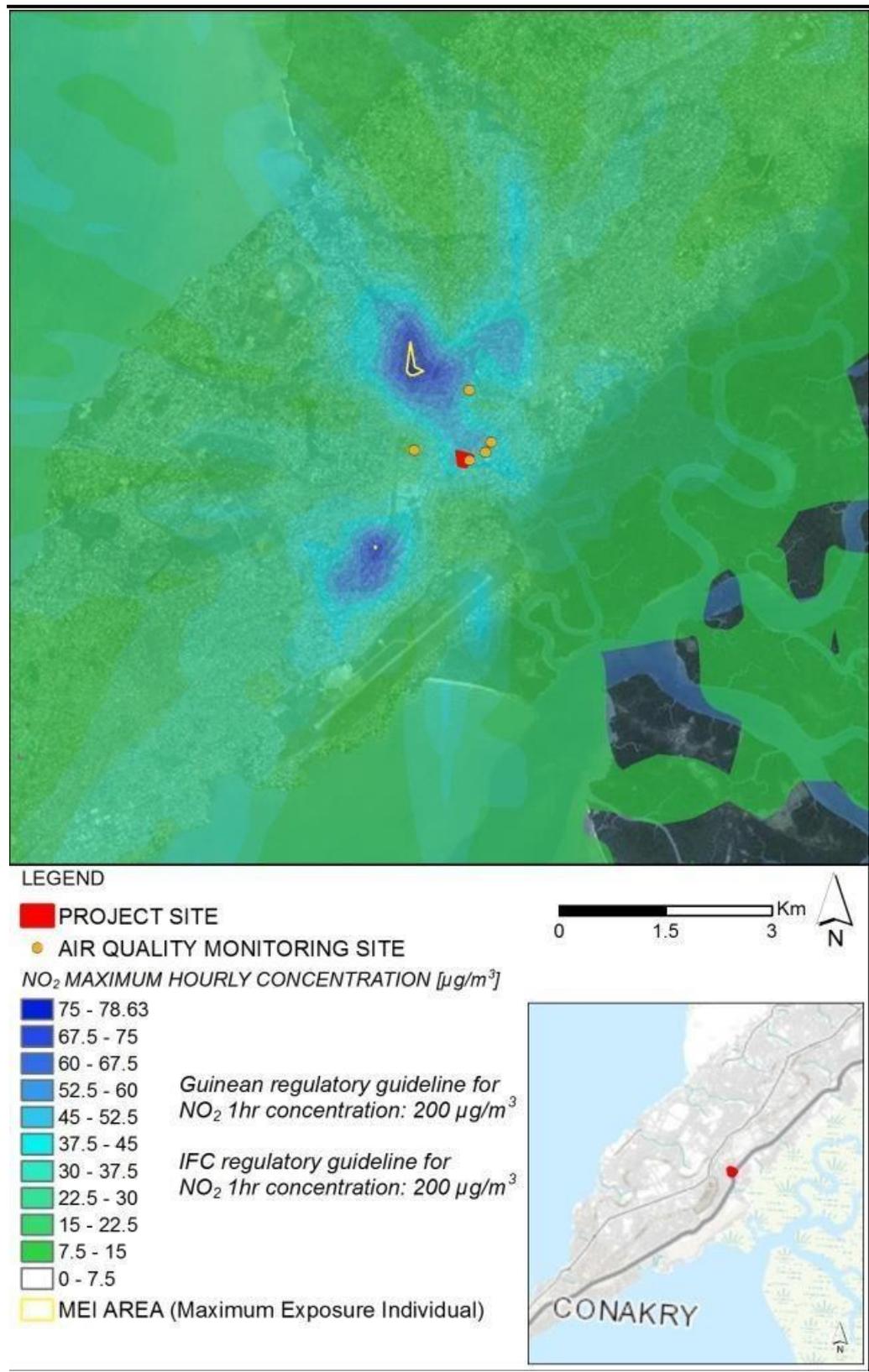


Figure 2.2 Maximum exposed individual concentration contour maps for NO₂, annual average

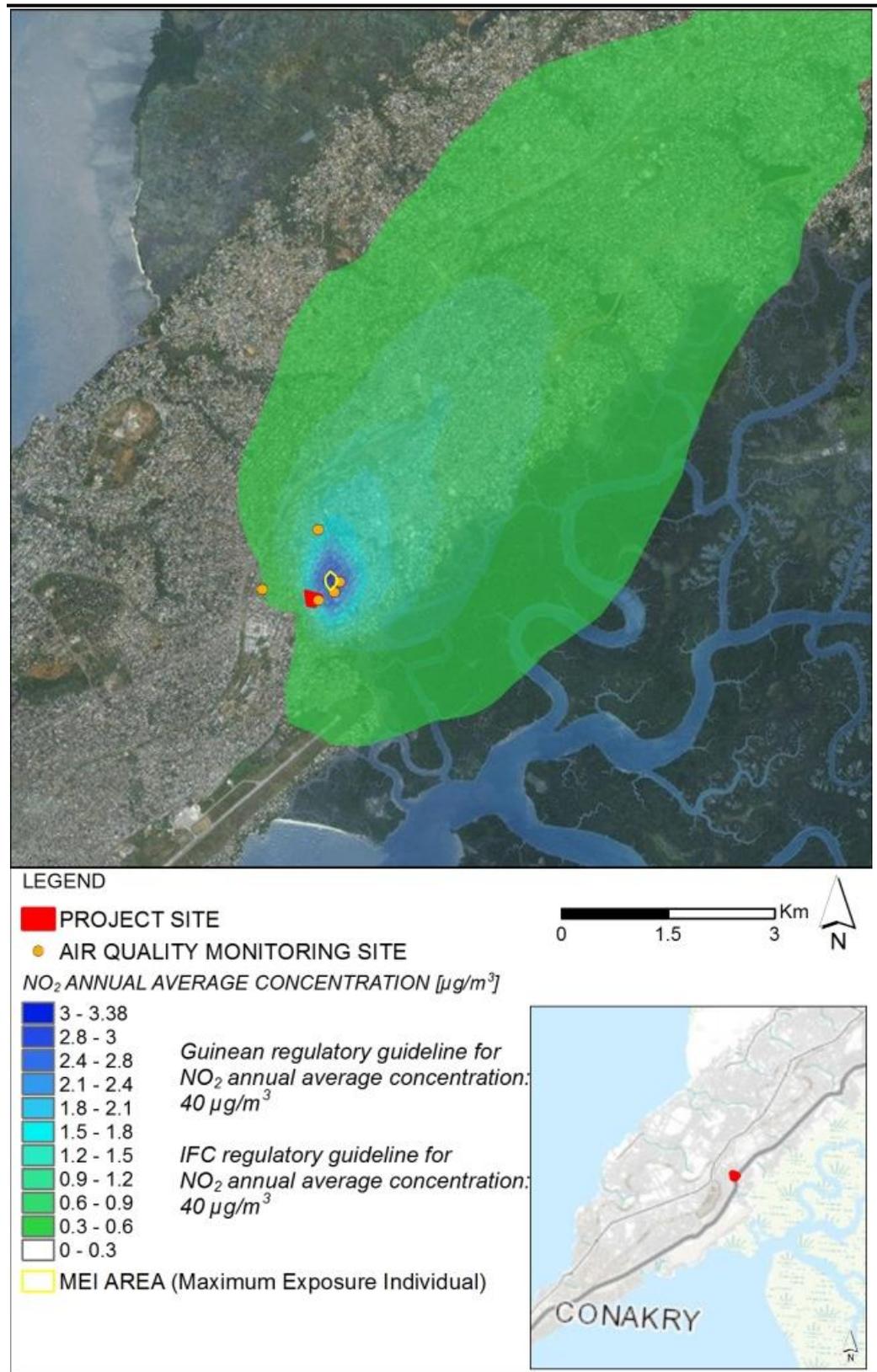
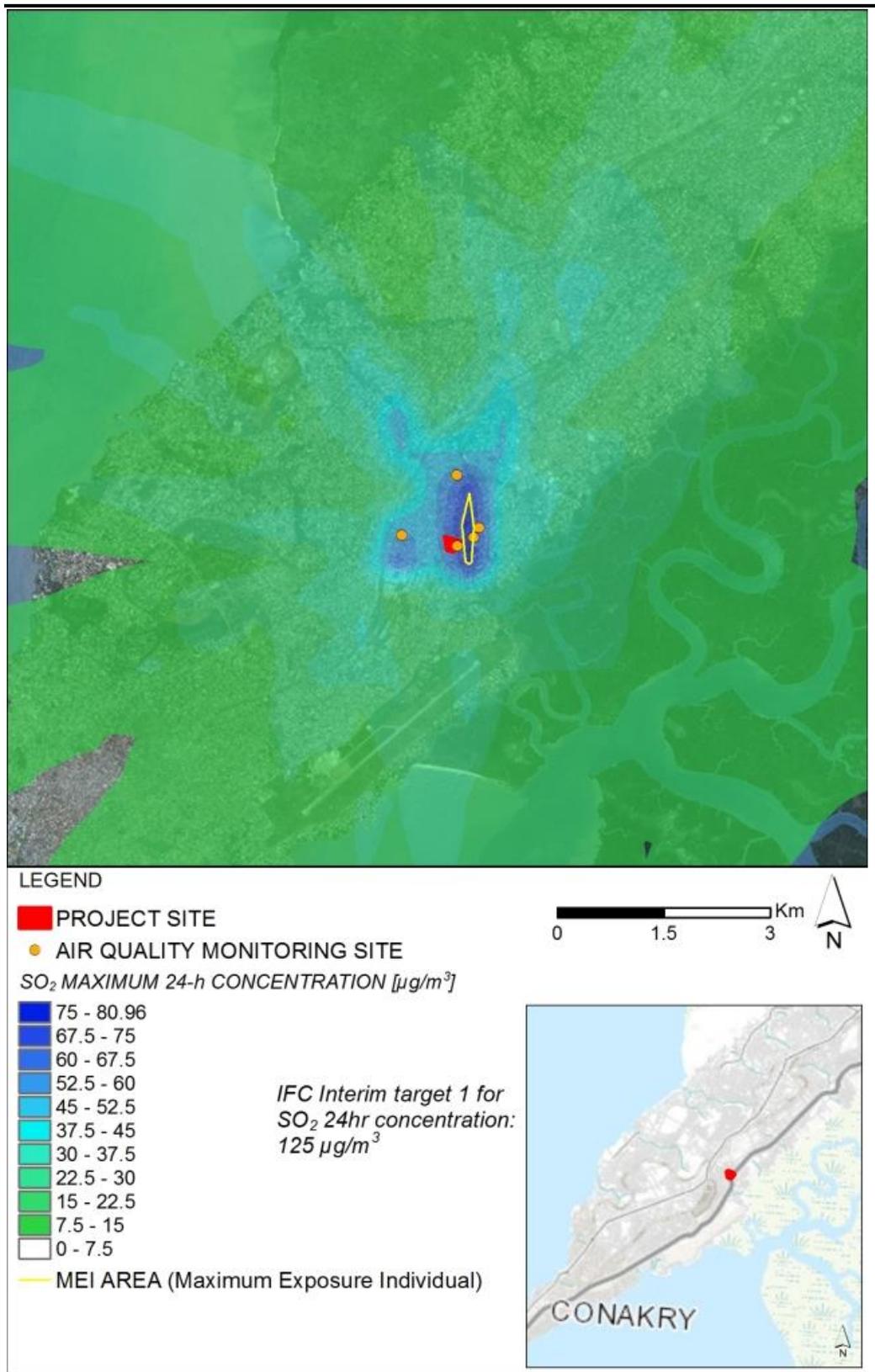


Figure 2.3 Maximum exposed individual concentration contour maps for SO₂, 24hr average



2.3 WASTE AND EFFLUENT MANAGEMENT

2.3.1 *Solid waste disposal*

As discussed in the Environmental and Social Management Plan in the ESIA report, the Project will manage waste according to the waste mitigation hierarchy (in order of priority: Avoid generating waste, minimize generation of wastes, reuse waste material, recycle waste material, treat waste material, and dispose of wastes).

Limited quantities of solid waste are expected during the operations phase (mostly consisting of packaging of lube oil and other maintenance products, most of which are typically recovered by suppliers for recycling or elimination). During the construction phase, hazardous waste production will be minimal. Non-hazardous waste, including packaging, plastics, scrap metal, and rubble, will be managed according to international best practices.

The Project's environmental and social management system will include a dedicated waste management plan which will define processes applicable for waste avoidance, storage, reuse/ recycling and disposal.

Waste will be handled and stored on-site according to international best practices, including sorting / separation by type, recyclability, ease of treatment and hazard class, as well as safe and secure storage and transportation.

Waste produced will be monitored and recorded. A waste manifest will be maintained to account for waste generation, storage, and removal for off-site treatment and elimination.

Waste transportation and management contractors will be selected on the basis of good practice, including health, safety, environment and labour conditions. The Project will undertake periodic audits of waste management contractors to ensure that the agreed level of waste management, treatment and disposal performance is maintained.

2.3.2 *Effluent treatment and oily waste disposal*

Construction Phase

In the construction phase, liquid effluents will mostly result from the cement production unit on site, domestic wastewater from construction workforce.

All sanitary effluents will be collected and treated in a mobile wastewater treatment plant and the treated water will be used for watering vegetated areas, or discharged into the nearby sewage canal (subject to confirmation of acceptability in the ESIA and approval by the authorities).

There may also be some construction-site runoff, during the rainy season, which will be handled as a normal part of good practice construction site management (site drainage system including sediments traps to abate suspended sediments load / turbidity of the site run-off effluent).

Operation phase

In the operational phase, the only sources of liquid effluents will be:

- domestic wastewater from the workforce (approximately 50 people) to be treated on the on-site wastewater treatment plant and discharged in the sewers canal;;
- site run-off, which will be separated between run-off from non-contaminated and contaminated areas; and
- industrial wastewater (essentially consisting in limited quantities of purge water from the closed-circuit cooling system, and site run-off from contaminated areas).

Industrial wastewater will essentially consist in potentially oily runoff from contaminated areas such as fuel offloading bays, and the secondary containment of HFO and DFO storage tanks. Oil & water separators will be installed in the vicinity of the HFO/DFO storage and handling areas.

Oily waste management

Oily waste, including tank sludge, oily rags and other oily packaging, will be collected, stored and recorded as part of the waste management plan described above.

Ultimate disposal of oily waste will depend on the availability of disposal contractors in Conakry. The selection of the disposal contractor will be made in liaison with the Ministry of Environment. Licensing by the Ministry of Environment will be a critical selection criterion of the disposal contractor.

2.4

HEALTH, SAFETY AND ENVIRONMENTAL MANAGEMENT

Endeavor or its Contractor, prior to the start of construction activities will develop a comprehensive Health, Safety, Environment and Social Management System (HSES MS). This management system will cover all aspects of safety management such as oil spill management, emergency preparedness and response, and fire safety procedures. The Project HSES MS will also cover Occupational Health and Safety (OHS) issues. Endeavor will review the Project HSES MS to ensure it is appropriate for this Project and will oversee its implementation. Endeavor will retain overall responsibility for the appropriate implementation of the HSES MS.

The Project HSES MS will define clear roles and responsibilities for the implementation of the HSES procedures and plans. The Project will allocate appropriate financial and human resources to ensure an efficient implementation of the HSES MS.

2.4.1 *Oil spill containment and response measures*

The principles of oil spill prevention are included in the ESIA and ESMP at *section 7.3.3 Environmental emergency response plans* including the principles of the oil spill response plan. The Project will develop detailed oil spill prevention & emergency response procedures as part of its implementation activities.

2.4.2 *Fire safety, emergency response measures*

Endeavor will prepare a fire emergency response plan as part of the implementation phase. This plan will include appropriate coordination with civil security and Guinean authorities. Ultimately, authorization to operate the plant will be dependent on the validation of the emergency response plans by Guinean authorities.

In accordance with Guinean regulations, the plant will seek and obtain authorization to operate under the Classified Installations for the Environment legal regime.

2.4.3 *Occupational health and safety/training*

The HSES MS will include provisions for training and management of Occupational Health and Safety procedures (OHS). It will provide that all staff will receive an OHS training prior to start of activities. Training programs will insist on the appropriate use of Personal Protective Equipment and a stop card system will be put in place to ensure all staff members are complying with the OHS procedures outlined in the management system.

Endeavor will ensure a high level of H&S awareness and leadership is applied right from the start of the construction phase and throughout the operational phase.

2.5 *T & D LINE, RIGHT-OF-WAY, LAND ACQUISITION/GOVERNMENT PERMISSION ETC.*

The transmission line will be buried in a trench under the public road, in agreement with local authorities in charge of public transport infrastructure. No Project-specific land acquisition will be required for the Project. As mentioned in the ESIA report *section 3.2 Construction phase*, no economical or physical displacement of individuals will occur due to the Project.

2.6 FUEL QUALITY NEEDED FOR SCR

The use of Selective Catalytic Reduction systems requires the utilization of specific HFO. The updated specifications of HFO compatible with the use of SCR are presented in *Table 2.5*

Table 2.5 2% Sulphur HFO specifications

Parameter	Limit	Specification
Density at 15°C	max	0.995 Kg/l
Total existing sediments of old fuel oil	max	0.10% of weight
Ash	max	0.05% of weight
Conradson residue	max	15% of weight
Flash point	min	+60°C
Pour point	Max	+21°C
Viscosity at 50°C	max	380 Cst
Water	max	0.5 %
Sulphur	max	2% of volume
Hydrogen sulphide	max	2 ppm per liquid phase
Asphaltenes	max	10% of weight and ≤ 66% Conradson
Vanadium	max	300 ppm
Sodium	max	100 ppm and ≤ 33% Conradson

The sourcing of SCR compatible HFO will be the responsibility of the government and no issues were raised on its availability in Guinea.

2.7 BGEEE AND COMMUNITY FEEDBACK

2.7.1 Stakeholder engagement

As summarised in the ESIA report *Section 6 Stakeholder engagement*, the main expectations raised during the ESIA stakeholder engagement process relate to reliable power production and potential jobs. The main concern is around potential nuisances associated with the Project operations especially noise and air emissions. These concerns are mainly due to a negative perception of noise and air emissions from the previous Aggreko project.

During meetings held with BGEEE, no specific concerns were raised on the Project.

An additional round of stakeholder engagement has been carried out by Endeavor between the 21st and 26th of July 2016. The key expectations and concerns raised by local stakeholders are consistent with the previous round of consultations. Concerns relate mainly to potential nuisances such as noise and air emissions. Local stakeholders are also worried that

employment procedures will not be fair and transparent. The key expectation of local stakeholders relate to access to unskilled employment.

The key next stakeholder engagement steps expected as part of post ESIA activities include:

- public enquiry as per local legislation led by BGEEE; and
- Endeavor regular follow up with BGEEE and local communities during and after the permitting process, in anticipation of the construction phase.

Once the permits are secured, the Project will move forward into the site preparation and construction phase. Endeavor will continue to engage with stakeholders during this phase and throughout the lifetime of the Project, in line with a Project-execution level Stakeholder Engagement Plan (SEP) to be defined as part of the Project pre-construction activities.

As part of this SEP, Endeavor will develop and implement a grievance mechanism to formally receive and address stakeholders' complaints in good faith and through a transparent and impartial process.

2.7.2 *Endeavor's corporate initiative strategy*

Endeavor Energy will plan to actively integrate various social and environmental concerns in its various corporate social initiatives. This may include pre-identification of the stakeholders of the project as well as issues importation to these stakeholders. The implementation of the corporate social initiatives will consist of identifying projects of importance and then implementing these projects, both internally and externally.

In general, an action plan is expected to be developed, targeting the usual sections of importance, including employment, education, health, private sector support, etc. Projects to the surrounding community can then be identified on the basis of consultations with stakeholders. The intent will be to implement projects that are sustainable and create a "win-win" situation for external and internal stakeholders.

A specific example of a corporate social initiative could be an employment workshop targeted towards the youth of the surrounding communities. This could be a venue for communicating to the job seekers what type of jobs will be generated through the Project as well as the type of qualifications required for such jobs. In addition, the same forum can be utilized for the purpose of mentorship and skill development so that the youth can take advantages of opportunities around their communities.

2.8 *SITE CONTAMINATION*

Groundwater and soil samplings were carried out by Fugro between the 11th and 23rd of June 2016 and laboratory analysis for soil and groundwater contaminations were performed.

2.8.1 *Groundwater*

Analysis of samplings results showed that chromium and lead concentrations in groundwater were above the threshold of the standard⁽¹⁾ used for the analysis. These concentrations are not considered as significant as they are globally in the same order of magnitude than the threshold (chromium concentrations ranging from 16 to 59-g/L with one well at 220-g/L. threshold of 30-g/L; Lead: max. 400 -g/L . threshold of 75-g/L).

It should nevertheless be noted that locally the groundwater is used for drinking purposes in the wider district of Matoto. The sampling was conducted in June at the beginning of the rainy season, the monitored concentrations in the water regime could be different during dry and rainy seasons (leaching of chromium from the soil to the groundwater may vary because of the rains regime variation).

Taking these results on board and given this risk of historic groundwater contamination, Endeavor proposes to engage with local authorities to recommend that they envisage a groundwater monitoring campaign in the vicinity of the site, to assess potential historic groundwater impacts and assess the resulting risk on public health.

2.8.2 *Soil*

The results of the analysis showed significant diffuse impacts in chromium levels (2000 -15 000 mg/kg for a threshold of 380 mg/kg) and some elevated concentrations in Nickel (210.2200 mg/kg for a threshold of 210mg/kg). Both impacts, especially Cr, are likely associated with historic activities at the site (tannery).

In order to mitigate the health and safety risks associated with contaminated soil, Endeavor shall ensure that its EPC contractors will provide dust masks and protective goggles to all workers participating in excavation works. Endeavor's EPC contractors will also provide overall clothes to these workers that will have to remain on site and be washed following specific processes. Endeavor's EPC contractors will provide shower facilities to construction workers and recommend that workers shower before leaving the construction site. Endeavor will ensure the EPC contractors comply with these requirements which will be included in the EPC contract if necessary.

⁽¹⁾The Environmental Guidelines and Standards for the Petroleum Industry in Nigeria
ENVIRONMENTAL RESOURCES MANAGEMENT

Excavated soils will be covered (over and under the soil mound) in order to prevent water run-off. The excavated soils will be used as much as possible on site for backfilling preferably below impervious circulation pathways.

Endeavor will perform additional soil sampling at future excavation areas to optimize excavated soils management.

2.9 *CULTURAL HERITAGE*

Cultural heritage / archaeology has been eliminated as a concern, since (1) the site is brownfield (used to host an Aggreko power plant) and (2) cultural aspects have not been raised by local community during the stakeholder engagement process.

Contractor will have a chance find procedure in place to manage any unsuspected subsurface find or obstruction.

2.10 *ONSITE SECURITY*

Endeavor will contract with a private security company to provide security on the Project site. Project security guards will be unarmed and trained in complying with the United Nation's Voluntary Principles on Security and Human Rights.

Considering the Tannerie site is the property of the ministry of defense and that the power plant will represent a strategic asset, Guinean military will be present at the project site during the construction and operational phase.