

EGYPTIAN REFINING COMPANY
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ERC HYDRO-CRACKING COMPLEX PROJECT AT MOSTOROD

APPENDIX 12.7 – CONTRACTOR SPECIFICATION: ENVIRONMENTAL PHILOSOPHY

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

ERC Hydro-Cracking Complex Project at Mostorod
FINAL VERSION

Appendix 12.7 – Contractor Specification: Environmental Philosophy

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**EGYPTIAN REFINING COMPANY
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
ERC HYDRO-CRACKING COMPLEX PROJECT AT MOSTOROD**

APPENDIX 12.7 – CONTRACTOR SPECIFICATION: ENVIRONMENTAL PHILOSOPHY

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SPECIFICATION

ENVIRONMENTAL PHILOSOPHY

CONTRACTOR JOB NO. : 7T04
PROJECT NAME : ERC Refinery Project
COMPANY : Egyptian Refining Company (ERC) S.A.E.
SITE : Mostorod, Arab Republic of Egypt

									
0	21 NOV, 2008	For Review	Y.H. Bang	-	Y.Y. Rhee	J.B. Kim			
REV.	DATE	DESCRIPTION	PREPD	CHKD	CHKD	APPR	REVD	DATE	
			CONTRACTOR				CLIENT		





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1.0 PURPOSE

The purpose of this document is to outline the environmental design criteria to be used in the design of facilities for the ERC Refinery Project of Egyptian Refining Company. The aim is to preserve clean environment during the beneficial operation of the facilities.

2.0 SCOPE



The criteria and requirements of this document are applicable to the normal operation of the facilities installed for ERC Refinery Project. The requirements of this document shall be implemented by all parties executing engineering and design including the Contractor, Subcontractors and Suppliers.

3.0 DEFINITIONS

- ◆ Company Egyptian Refining Company (ERC) S.A.E.
- ◆ Contract Contract between Company and Contractor, for the ERC Refinery Project
- ◆ Contractor GS Engineering & Construction Corp. and Mitsui & Co., LTD
- ◆ EHS Environmental, Health and Safety
- ◆ ER Executive Regulations
- ◆ ESIA Environmental and Social Impact Assessment
- ◆ IFC International Finance Corporation
- ◆ Project ERC Refinery Project
- ◆ Subcontractors Company/organization subcontracted by the Contractor for the design or construction phase
- ◆ Suppliers Company/organization awarded a purchase order to supply equipment, materials or services

4.0 REFERENCES

- ◆ Egyptian Law 4 of 1994 'Environmental Law'
- ◆ Egyptian Law 48 of 1982 'Protection of the River Nile'
- ◆ World Bank Guidelines 'IFC General Environmental, Health, and Safety (EHS) Guidelines' (April 30, 2007)
- ◆ World Bank Guidelines 'IFC Environmental, Health, and Safety (EHS) Guidelines for Petroleum Refining' (April 30, 2007)
- ◆ Environmental Impact Assessment Report for the Egyptian Refining Company (January 2007)
- ◆ Design Basis for Wastewater Treatment Package (Unit 39) (7T04-PR-39-DB-001)

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5.0 EMISSIONS TO AIR

Typically gaseous emissions from the facilities will arise from:

- ◆ Sources of combustion (e.g. flares, fired heaters)
- ◆ Process, and instrument vents (used during zeroing and calibration), storage tank vents, oily water sump vents, etc.
- ◆ Fugitive emissions from leakage of seals in valves, flanges, pumps and floating roof tanks.
- ◆ Vapors from process waste water drainage systems

The engineering design approach shall be to minimize emissions to the atmosphere to a level that is as low as reasonably practicable. Where emissions are unavoidable, stacks of adequate height shall be used to provide good dispersion, or the vent gas shall be sent to the flare for disposal.

5.1 General Requirements

The general Project engineering design approach to avoid/ minimize emissions to the air from facilities is as follows:

- a) When amine fluid requires renewal it shall be returned to the manufacturers for recycling.
- b) Hydrogen & hydrocarbon gases shall not be depressurized or vented directly to the atmosphere.
- c) Valves and flanges shall be designed and operated to limit fugitive losses.
- d) Stacks associated with combustion equipment (e.g. fired heaters and flare) shall be of an adequate height to disperse any pollutants discharged and to maintain accepted ground level heat radiation levels. Stack heights shall be determined by air quality modeling.
- e) Sampling systems for process fluids shall be designed to limit the loss of Volatile Organic Compounds (VOCs)

5.2 Air Pollution Criteria

The Refinery shall be designed not to emit air pollutants more than the limits specified in Egyptian Law and World Bank Guidelines.

5.2.1 Emission Limits for Stationary Sources

According to Annex No.(6) in the ER of the law 4/1994 and IFC EHS Guidelines for Petroleum Refining, concentration of pollutants from individual emission sources shall not exceed the emission limits described in Table 5.1 below.



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Table 5.1 Air pollutants emission limits for stationary sources

Pollutant ¹⁾	Egyptian Law (mg/Nm ³)	World Bank Guidelines (mg/Nm ³)
Carbon Monoxide	250	-
Sulfur dioxide	2500 (burning coke & petroleum)	150 for sulfur recovery units; 500 for other units
Nitrogen oxides	300	450
Total particulate	100	50
Hydrogen sulfide	10	10

Note

- 1) Only representative air pollutants from petroleum refining industries are provided here. For other pollutants, Annex No.(6) in the ER of the law 4/1994 and IFC EHS Guidelines for Petroleum Refining should be referred to.
- 2) The reference condition for reporting concentration of pollutants emitted to the atmosphere is dry, 0 °C, atmospheric pressure and 3% oxygen.



5.2.2 Ambient Air Quality Criteria

According to Annex No.(5) in the ER of law 4/1994 and IFC General EHS Guidelines, vents, stacks and emission sources shall be designed such that ground level concentrations of contaminants shall not exceed ambient air quality standards described in Table 5.2.

IFC General EHS Guidelines requires that emissions do not result in pollutant concentrations that reach or exceed relevant ambient quality guidelines and standards by applying national legislated standards, or in their absence, the current WHO Air Quality Guidelines, or other internationally recognized sources. The Project ESIA Report summarize the applicable standards and guidelines as Table 5.2.

Table 5.2 Ambient air quality criteria for protection of human health

Pollutant Species	Egyptian Law	International Guidelines or Standard	Averaging Period	Reference to International Guideline or Standard	Maximum Number of Exceedances
Carbon Monoxide (CO)	10,000 µg/m ³	10,000 µg/m ³	8 hours	WHO, UK	Not specified
	30,000 µg/m ³	30,000 µg/m ³	1 hour	WHO	Not specified
		60,000 µg/m ³	30 minutes	WHO	Not specified
		100,000 µg/m ³	15 minutes	WHO	Not specified
Nitrogen Dioxide (NO ₂)	400 µg/m ³	200 µg/m ³	1 hour	WHO, EU, UK	8 per year (EU)
		40 µg/m ³ (21 ppb)	1 year	WHO, EU, UK	Not applicable
	150 µg/m ³		24 hours		
Sulfur Dioxide (SO ₂)		500 µg/m ³	10 mins	WHO	Not applicable
	350 µg/m ³	350 µg/m ³	1 hour	EU	24 per year (EU)
	150 µg/m ³	125 µg/m ³	24 hours	WHO, EU	3 per year (EU)
	60 µg/m ³	20 µg/m ³	1 year	WHO, EU	Not applicable

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Pollutant Species	Egyptian Law	International Guidelines or Standard	Averaging Period	Reference to International Guideline or Standard	Maximum Number of Exceedances
Particulate Matter <10mm (PM10)	150 µg/m ³	50 µg/m ³	24 hours	EU, UK	35 per year (EU)
	70 µg/m ³	20 µg/m ³	1 year	EU	Not applicable
Benzen		16.25 µg/m ³ (5 ppb)	1 year	UK	Not applicable
		5 µg/m ³ (1.5 ppb)	1 year	EU	Not applicable
Toluene		260 µg/m ³	1 week	WHO	Not applicable
Xylenes (m/p)		260 µg/m ³	1 week	Based on Toluene	Not applicable

5.2.3 Air pollutants inside places of work

Maximum limits of air pollutants inside work premises are indicated in the following table T.3 as per Annex No.(8) in the ER of law 4/1994. Only representative air pollutants from petroleum refining industries are provided here. For other pollutants, the Annex No.(8) in the ER of law 4/1994 should be referred to.

Table 5.3 Maximum limits of air pollutants inside places of work

Pollutants ^{a)}	Permissible limit – 8 hours		Permissible limits – 15 minutes	
	ppm	mg/m ³	ppm	mg/m ³
Carbon Monoxide	25	29		
Sulfur dioxide	2	5.2	5	13
Nitrogen dioxide	3	5.6	5	9.4
Hydrogen sulfide	10	14	15	21



The permissible limits are the concentrations of chemical substances in the air, to which the workers may be exposed day after day without the occurrence of health harms. Where,

♦ **Permissible limits – 8 hours:**

It is the pollutants average concentration during an ordinary workday (8 hours), to which the worker may be exposed 5 days a week throughout the period of his work without health harms.

♦ **Permissible limits – 15 minutes:**

It is the pollutant concentration to which workers may be exposed continuously for a short period of 15 minutes, and which may not be exceeded in any case during the period of work. This shall not be repeated more than four times during the same day. The period between each short exposure and the one next thereto shall at least be sixty minutes.

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5.3 Guidelines for Stack Height

According to article 42 Elevation of Chimneys in the ER of Law 4/1994, Stack heights shall meet the following guidelines;

- ◆ Chimneys producing a total emission of exhaust reaches 7000 – 15000 kg/hour, their heights shall range between 18 - 36 meters.
- ◆ Chimneys producing a total emission of waste reaches 15000 kg/hour, the height of the chimney shall be at least two and a half times the height of surrounding buildings, including the building served by the chimney.
- ◆ Chimneys serving public places such as offices, restaurants, bakeries, hotels and other commercial purposes, the height of the chimney shall not be less than 3 meters high on top of the building, along with the speed of gas emission from the chimney to be accelerated.

In addition, according to the IFC General EHS Guidelines, stack heights shall not be less than the Good International Industry Practice stack height defined as follows;

$$H_G = H + 1.5L$$

Where

H_G = GEP stack height measured from the ground level elevation at the base of the stack

H = Height of nearby structure(s) above the base of the stack

L = Lesser dimension, height (h) or width (w), of nearby structures



“Nearby structures” = Structures within/touching a radius of 5L but less than 800m.

5.4 Flare

The emission from the flare stack should not exceed the maximum permissible values stated in Table 5.1.

Hydrocarbon vapors from pressure safety valves and blow-down valves shall be directed to the flare system. No routine flaring and no automatic equipment blowdown are allowed. Operators in Central Control Room shall manually initiate blowdown.

Flare stack is designed to achieve smokeless capacity of 10% of maximum flare load and include automatic flame detection and ignition systems.

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6.0 AQUEOUS EMISSIONS



The effluent from the Refinery will be discharged to the River Nile. For treatment of its wastewater, the Refinery will build a new wastewater treatment unit. The Design Basis for Wastewater Treatment Package (Unit 39) (7T04-PR-39-DB-001) can be referred to for details.

6.1 Effluent Quality Limits

Effluent water quality shall comply with wastewater quality parameters described in local legislative requirements and World Bank Guidelines as described below. The most stringent specification has to be followed for each parameter.

Table 7-2: Effluent Quality Limits



Pollutant	Egyptian Law (mg/ l) (Note 1,3)	World Bank Guideline (mg/ l) (Note 2,3)
Temperature	35°C	< 3 °C (Note 4)
pH	6-9	6-9
Color	Free of Coloring materials	-
Biochemical Oxygen Demand (BOD5)	20	30
Chemical Oxygen Demand Dichromate (COD)	30	150
Total Dissolved Solids (TDS)	800	-
Fixed (Ash-of) Dissolved Solids	700	-
Total Suspended Solids (TSS)	30	30
Sulfides	-	1
Sulphate (oil cake)	1	-
Oils and Grease and resins	5	10
Phosphates (inorganic)	1	-
Total Phosphorus	-	2
Nitrates (N36)	30	-
Phenol	0.001	0.2
Fluorides	0.5	-
The remaining chloride	1	-
Total heavy metals	1	-
Total Nitrogen	-	10 (Note 5)
Mercury	0.001	0.02
Lead	0.05	0.1

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Pollutant	Egyptian Law (mg/ l) (Note 1,3)	World Bank Guideline (mg/ l) (Note 2,3)
Cadmium	0.01	-
Arsenic	0.05	-
Chromium (total)	-	0.5
Chromium (Hexavalent)	0.05	0.05
Copper	1	0.5
Nickel	0.1	0.5
Iron	1	3
Manganese	0.5	-
Zinc	1	-
Silver	0.05	-
Cyanide (Total)	-	1
Cyanide (Free)	-	0.1
Vanadium	-	1
Benzene	-	0.05
Benzo(a)pyrene	-	0.05
Industrial detergents	0.05	-
Estimated Fecal Coliform Count (No. in 100 cm3)	2500	-

Notes

- 1) As per Article 61, Executive Regulations of Law. 48/1982, Egypt. Maximum Permissible Limits and Specifications of water quality (discharge into Nile branches / canals)
- 2) As per Table 2. Effluent levels for Petroleum Refining Facilities, EHS Guidelines for Petroleum Refining, IFC, World Bank Group
- 3) Units are mg/l unless otherwise specified
- 4) Temperature Increase. At the edge of a scientifically established mixing zone that takes into account ambient water quality, receiving water use, potential receptors and assimilative capacity.
- 5) The effluent concentration of nitrogen (total) may be up to 40 mg/L in processes that include hydrogenation.

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7.0 LIQUID, SLUDGE AND SOLID WASTE

7.1 Sources of Wastes

Sources of liquid waste generated are likely to include:



- ◆ Transformer and lubricating oil
- ◆ Waste chemicals
- ◆ Paint, solvents and cleaning fluids

Sources of sludge and solid waste are likely to include:

- ◆ Domestic garbage
- ◆ Excess biological sludge from Waste Water Treatment Plant
- ◆ Oily sludge from periodic cleaning of oily water drains and oily water separators
- ◆ Process wastes such as activated carbon, coke, molecular sieves, filter cartridges, air drier desiccant, catalyst for reactors and process sludge
- ◆ Industrial refuse, such as bead blast, scrap metals, scrap wood, paper, cardboard, waste drums, chemicals, oily rags, miscellaneous maintenance wastes, and spent batteries

7.2 General Requirements

- ◆ Where possible liquids, sludge and solid waste will be recycled/reused concentrated or digested to minimize the volume for disposal.
- ◆ Any hazardous wastes shall be collected and stored in suitable containers. Containerization and proper storage of materials shall ensure that soil and groundwater contamination is avoided. Containers shall be properly labeled, stored, segregated based on compatibility and routinely inspected for damage or leaks.
- ◆ Storage areas for solids and sludge resulting from operation shall be designed with appropriate hard standing and bunds in order to protect the soil and groundwater. Storage areas for different types of waste shall be segregated.
- ◆ A register of all hazardous wastes produced shall be prepared.

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8.0 NOISE

The Refinery shall be designed to comply with applicable local legislative requirements (Annex No.(7) in the ER of Law No.4/1994) and World Bank Guidelines (IFC General EHS Guidelines) whichever is more stringent.

8.1 Work Area Noise Control

Noise levels inside the plant boundary shall comply with the following tables.

Table 8-1 Intensity of sound inside places of Work and Indoors places as per Egyptian Law



No.	TYPE OF PLACE AND ACTIVITY	MAXIMUM PERMISSIBLE NOISE (dBA)
1.	Places of work with shifts up to 8 hours, with the aim of limiting noise hazards to the hearing sense.	90
2.	Places of work which require hearing sound signals, and good hearing of speech.	80
3.	Work rooms for computer, typewriters or the like.	70
4.	Work rooms to follow up, measure and adjust operation.	65
5.	Work rooms for activities requiring routine mental concentration, and control rooms	60

Table 8-2 Noise limits for different working environments as per World Bank Guidelines

No.	TYPE OF PLACE AND ACTIVITY	Equivalent level $LA_{eq,8hr}$ (dBA)	Maximum $LA_{max,fast}$ (dBA)
1.	Heavy Industry (no demand for oral communication)	85	110
2.	Light industry (decreasing demand for oral communication)	50~65	110
3.	Open offices, control rooms, service counters or similar	45~50	-
4.	Individual offices (no disturbing noise)	40~45	-
5.	Classrooms, lecture halls	35~40	-
6.	Hospitals	30~35	40

According to World Bank Guidelines, the Refinery shall be designed meeting the following design guidelines.

- ◆ No employee should be exposed to a noise level greater than 85 dB(A) for a duration of more than 8 hours per day without hearing protection. In addition, no unprotected ear should be exposed to a peak sound pressure level (instantaneous) 140 dB(C).

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- ◆ The use of hearing protection should be enforced actively when the equivalent sound level over 8 hours reaches 85 dB(A), the peak sound levels reach 140 dB(C), or the average maximum sound level reaches 110dB(A). Hearing protective devices provided should be capable of reducing sound levels at the ear to at least 85 dB(A).
- ◆ Although hearing protection is preferred for any period of noise exposure in excess of 85 dB(A), an equivalent level of protection can be obtained, but less easily managed, by limiting the duration of noise exposure. For every 3 dB(A) increase in sound levels, the 'allowed' exposure period or duration should be reduced by 50 percent.
- ◆ Prior to the issuance of hearing protective devices as the final control mechanism, use of acoustic insulating materials, isolation of the noise source, and other engineering controls should be investigated and implemented, where feasible.
- ◆ Periodic medical hearing checks should be performed on workers exposed to high noise levels.

8.2 Environmental Noise Limits

Noise levels outside the plant boundary shall comply with the following tables.

Table 8-3 Maximum limit of noise intensity in the different areas as per Egyptian Law

KIND OF AREA	Maximum limit of equivalent noise intensity LAeq (dBA)		
	All DAY	EVENING	All NIGHT
	(7 am – 6 pm)	(6 pm – 10 pm)	(10 pm – 7 am)
Rural residential areas, and hospitals and gardens areas	45	40	35
Residential suburbs, with the existence of little movement	50	45	40
Town residential areas	55	50	45
Residential areas having some workshops or commercial activities or commercial activities, or on the public road	60	55	50
Trading and administrative areas, and downtown	65	60	55
Industrial zones (heavy industries)	70	65	60

Table 8-4 Maximum limit of noise intensity in the different areas as per World Bank Guidelines

TYPE OF AREA	PERMISSIBLE LIMIT (dBA)	
	DAY & EVENING	NIGHT
Residential; institutional; educational areas	55	45
Industrial; commercial	70	70



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TRANSMITTAL

PROJECT : ERC Refinery Project PAGE 1 OF 1

TRANSMITTAL NO. : GH-EZ-T-0585

JOB NO : 7T04 ISSUED DATE : 24/11/08

TO : ERC in Egypt (1C)
-Attention : Mr. Tom Thomason / Chief Executive Officer

CC :	1.ERC in GS E&C's H/O	Attention :	Mr. Tarek Salah/ Managing Director
	2.PMC in GS E&C's H/O	Attention :	Mr. Monty Long/Project Director (3C)
	3.PMC in Egypt	Attention :	Mr. Monty Long/Project Director (1C)
	4.Licensor	Attention :	Mr.
	5.Mitsui	Attention :	Mr.Seung-Yup, Yu / Manager
	6.ETC		

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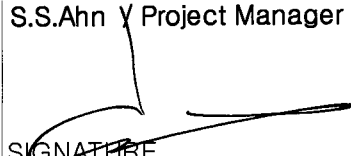
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NO.	DOCUMENT NO.	REV.	TITLE	COPIES	SHEETS
1	7T04-SE-00-TS-002	0	Project Specification for Environmental Philosophy	1 (C)	12

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