

# Inspection Checklist

Reference:
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## 1. FACILITY INFORMATION

[Also see the Facility FERA Questionnaire and Assessment]

Site Visit Date:			
Inspector(s) Name(s):			
Facility Name			
Facility Registration Number			
Address			
Site Contact			
Contact's Phone		Fax:	
Contact's Email			
Facility FERA Rating (if already assigned)			
Summary of site activities / processes (including products produced and support activities)			
Year the site was occupied by the current operator			
Prior site usage (include dates and relative locations of key activities if known):-			

*[Summary notes of main findings and recommendations to be completed following the inspection].*

01. The purpose of this inspection checklist is to assist PME Inspection Teams to conduct a general facility environmental inspection. The checklist focuses on assessing a facility's general level of environmental risk management and compliance with the KSA General Environmental Regulations (GER) including the standards held in Document 1409-01. The checklist does not address in any detail the inherent level of environmental risk associated with the facility processes, location and historical performance as this is assessed through the Facility Environmental Risk Assessment (FERA) Questionnaire and Assessment.
02. The overall inspection's conclusions will take into account both the FERA rating (the inherent risk level) and the extent to which the risks are being effectively managed by the facility (information gathered using this checklist).
03. The FERA Questionnaire contains useful background information about the facility which is not duplicated in this checklist. The FERA Questionnaire and Assessment must have been completed before the Inspection and therefore the Inspection Team should have reviewed these and familiarised themselves with them. If the FERA Assessment has not been carried out, the Inspection Team should complete the FERA Questionnaire, in addition to using this checklist, during the Inspection.
04. Information documented on this checklist will be prepared at the time of the visit and will be used to form the information contained within the final report. Evidence collected on site will be stored with this checklist for inclusion into the inspection report.

## 2. ENVIRONMENTAL SETTING

Where the FERA Questionnaire has already been completed, questions 2.2- 2.6 do not require completion. However, the opportunity should be taken during the inspection to validate the information provided in the FERA Questionnaire.

### 2.1 Complete adjacent land use

Adjacent land use	North	
	East	
	South	
	West	

**2.2** What is the distance from the facility boundary to the nearest human-occupied area (e.g., place of worship, domestic housing, schools, hospitals or other sensitive human receptors)? **This question is also in the FERA Questionnaire.**

- 0 to 50 metres
- 50 to 300 metres
- More than 300 metres

<i>If so, describe:</i>	

**2.3** What is the distance from the facility boundary to the nearest protected environmental area? This includes areas utilised as nature reserves protected under statutory designations for example due to the presence of key species of flora and fauna or for landscape value. **This question is also in the FERA Questionnaire.**

- 0 to 100 metres
- 100 metres to 2 kilometres
- More than 2 kilometres
- Don't know

<i>If so, describe:</i>	

2.4 Does the facility discharge to or and/or abstract water from a water resource classified as an eco-sensitive, recreational or potable water usage zone? **This question is also in the FERA Questionnaire.**

Yes  No

<i>Please provide a description:</i>

2.5 How far is the facility boundary from the nearest water resource classified as an eco-sensitive, recreational or potable water usage zone? **This question is also in the FERA Questionnaire.**

- 0 to 500 metres
- More than 500 metres

<i>Please provide a description:</i>

2.6 What ambient noise zone is the facility located in? **This question is also in the FERA Questionnaire.**

- Quiet
- Residential
- Mixed
- Industrial

2.7 Is the facility located in an area of poor ambient air quality and/or is the prevailing wind direction such that emissions from the facility could affect an area of human occupation? **This question [may also need to go) in the FERA Questionnaire, [once air quality zones are defined].**

Yes  No

<i>Please provide a description</i>

**2.8** What are the geological conditions underlying the site?

<i>Please provide the best available description of geological conditions (please list reference sources):</i>

**2.9** Are any neighbouring sites known to have environmental problems or be causing a nuisance to the subject site?

Yes       No       Don't Know

<i>If so, describe:</i>	

**2.10** What is the nature of the site boundary? Do the facility boundary and entry controls appear adequate to prevent unauthorised access?

Yes       No

<i>If so, describe:</i>	

### 3. EMISSIONS TO AIR

<b>Inspection Objectives</b>	<ul style="list-style-type: none"> <li>▪ To identify plant, processes and activities giving rise to point and fugitive sources of air emissions</li> <li>▪ Where relevant, to assess whether specific activities are being controlled in line with the requirements set out within GER Appendix 1, Article 11).</li> <li>▪ To evaluate the level of facility awareness about emissions to air and control methods for these</li> <li>▪ To evaluate whether facilities have sufficient controls in place to limit emissions to air (point source and diffuse)</li> <li>▪ To evaluate whether facilities have sufficient air emissions monitoring programs in place</li> <li>▪ This section does not address nuisance emissions including odour, dust, noise and visual plumes.</li> </ul>
<b>Relevant GER Provisions</b>	<p>Article 12.2 - All smoke, gases and vapours resulting from the burning of any kind of fuel or alike for industrial purposes and power generation e.t.c. must be within allowable limits as permitted in the environmental standards.</p> <p>Article 12.2.1 - When burning any kind of fuel or other substances... persons shall use the appropriate means and technologies so that gaseous...wastes generated by burning in stationary or mobile sources are within the permitted environmental standards and criteria in Appendix 1.</p> <p>Article 12.2.2 - When burning any kind of fuel or other substances...persons shall employ the most appropriate means, technologies and suitable alternatives to minimize adverse environmental impacts to the lowest level.</p> <p>Appendix I, Environmental Protection Standards: Article 10, Ambient Air Quality Standards and Article 11, Air Pollution Source Standards</p>
<b>Facility Indicators of Potential Concern</b>	<ul style="list-style-type: none"> <li>▪ Facility is located in an area of known poor ambient air quality</li> <li>▪ Facility is located close to an area of human occupation that may be affected by emissions from the facility due to the prevailing wind direction</li> <li>▪ Facility and/or emissions-producing plant is/are &gt;10 years old</li> <li>▪ Plant engineers do not appear to be aware of the sources of air emissions or methods to control them</li> <li>▪ Poor or absence of preventive maintenance programmes</li> <li>▪ No measures taken to meet applicable standards in the GER (Appendix 1, Article 11) including lack of suitable abatement equipment for significant emissions sources</li> <li>▪ No monitoring of significant air emissions</li> </ul>

**3.1 What sources of emissions exist at the facility?**

a) Do the facility activities fall into any of the sectors listed in Appendix I Table 1 of the GER? If so, complete table below.

Yes  No

EMISSION SOURCE (PROCESS/ACTIVITY)	POLLUTANT(S)

b) Are the facility activities included in Appendix I Table 2? If so, complete table below.

Yes  No

PROCESS/ACTIVITY	POLLUTANT(S)

c) Does the facility undertake one or more of the processes listed below? If yes, answer question 3.2

- Combustion facilities (fossil fuel fired boilers and furnaces having a heat input capacity equal to or greater than 30 MW)
- Storage vessels for petroleum liquids with a capacity >1000 barrels (5614 cubic feet)
- FCC Unit Catalyst Regenerators
- Fuel Gas Combustion Processes
- Claus Sulphur Recovery Plants
- Fertiliser plant
- Cement Kilns
- Clinker Coolers

- Primary aluminium reduction plants
- Aluminium reduction pot lines
- Anode Bake Plants
- Iron and Steel plants: Electric Arc Furnaces
- Lime Manufacturing Plants; Rotary Kilns

d) What **point** sources of emissions exist at the facility; what, if any abatement is used to limit emissions limits and what if any monitoring of emissions is carried out (complete **table overleaf**)? Appendix 2: Examples of commonly used Abatement Equipment

SOURCE/ PROCESS	POLLUTANTS	ABATEMENT EQUIPMENT/ MEASURES? Identify type	EMISSIONS MONITORING CARRIED OUT BY FACILITY? Provide brief description (including whether monitoring is continuous or intermittent, and the method used)

e) What **fugitive** sources of emissions exist at the facility?

PROCESS/ACTIVITY	POLLUTANT(S)

**3.2 Assessment of activities specifically regulated in GER, Appendix 1, Article 11 (Only complete the sections which are relevant to the activities identified in 5.1c)**

a) Are emissions from ..... (process) controlled so as states in the GER and are the emissions limited to no more than the specified limits? Appendix 3.

- Not Applicable*
- Yes, based on valid monitoring data*
- Probable, based on design and operation of plant and emissions control devices*
- Unlikely, based on design and operation of plant and emissions control devices\**
- Not possible to determine\**
- No, based on valid monitoring data\*\**

*\* This should result in the inspection team requiring that the facility undertake emission monitoring to enable determination of compliance.*

*\*\* This is a material finding in the inspection and should result in remedial action being required.*

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

**3.3 Monitoring and control of point source emissions (not addressed through question 5.2)**

a) Where monitoring programmes are in place (see section 5.1d); are appropriate monitoring techniques used?

- Yes       Yes, with room for improvement   
 No       Not assessed (state why below)

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Are emissions control devices for point sources considered sufficient?

- Yes       No   
 Not assessed (state why below)   
 Not possible to determine (state why below)

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

c) Are there point source emissions which are not currently being monitored, that should be subject to monitoring?

- Yes       No       Not assessed (state why below)

<i>Comments (identify emissions source(s) and reason that monitoring is recommended/required)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

**3.4 Monitoring and Control of Fugitive Emissions Sources**

a) Have significant sources of fugitive emissions been evaluated (for example, through mass balance)?

Yes       No       Not assessed (state why below)

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Is there evidence that fugitive emissions are occurring unnecessarily due to poor management practice?

Yes       No       Not assessed (state why below)

<i>Comments (include nature of evidence collected and relevant findings)</i>

<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

#### 4. DISCHARGES TO WATER

<p><b>Inspection Objectives</b></p>	<ul style="list-style-type: none"> <li>▪ To identify plant processes and activities giving rise to industrial wastewater discharged from the facility</li> <li>▪ To evaluate the level of facility awareness about wastewater emissions and control methods for these</li> <li>▪ To evaluate whether facilities have sufficient controls in place to limit wastewater emissions</li> <li>▪ To evaluate whether facilities have sufficient wastewater monitoring programs in place</li> </ul>
<p><b>Relevant GER Provisions</b></p>	<p>Article 13.1 Prevent direct or indirect contamination of surface, ground and coastal waters that may be caused by solid or liquid residues.</p> <p>Article 13.1.1 Comply with the environmental standards and criteria set forth in the appendices to these Rules and coordinate with the Public Agency to ensure their implementation.</p> <p>Article 13.1.2 To employ the best available technologies and means and take the necessary precautions to avoid contamination of surface, ground and coastal waters; and control and minimise pollution in accordance with the approved environmental criteria.</p> <p>Article 13.1.4 Prevent the discharge, in any quantity, of any type of solid or liquid wastes, substance, element, organic or inorganic compound that may be classified as hazardous into surface, ground or coastal waters.</p> <p>Appendix I, Environmental Protection Standards:          Article 12, Receiving Water Guidelines;          Article 13, Performance Standards for Direct Discharge;          Article 14, Pretreatment Guidelines for Discharge to Central Treatment Facilities          Article 15, Implementation Obligations (starting on p. 64 of English translation).</p> <p>AND KSA National Environmental Standard 003 – Industrial and Municipal Wastewater Discharge Standards (currently in draft and not reflected in this checklist at the current time)</p>
<p><b>Facility Indicators of Potential Concern</b></p>	<ul style="list-style-type: none"> <li>▪ Facility discharges wastewater (treated or untreated) to sensitive water usage zones (e.g. where water is abstracted for potable use).</li> <li>▪ Facility discharges untreated wastewater directly to the environment</li> <li>▪ Facility and/or on-site wastewater treatment plant is/are &gt;10 years old</li> <li>▪ Plant engineers do not appear to be aware of the sources of wastewater emissions or methods to control them</li> <li>▪ Poor or absence of preventive maintenance programmes</li> <li>▪ No measures taken to meet applicable standards in the GER</li> </ul>

	(Appendix 1, Article 12, 13 & 14) including lack of the best practical controls for wastewater sources. <ul style="list-style-type: none"> <li>▪ No monitoring of wastewater discharges from the facility, as required in KSA-003, Part III, Section 4, Sampling and monitoring (?)</li> </ul>
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**4.1 Guidance on pollutants and sectors of concern**

a) Do the facility activities fall into any of the sectors listed in Appendix 4 Table 1?

Yes       No

*Please identify relevant sector/activities and associated pollutants.*

WASTEWATER EMISSION SOURCE (PROCESS/ACTIVITY)	POLLUTANTS

b) Are the facility activities included in Appendix 4 Table 2?

Yes       No

*Please identify relevant sector/activities and associated pollutants.*

WASTEWATER EMISSION SOURCE (PROCESS/ACTIVITY)	POLLUTANTS

## 4.2 Sources of Industrial Wastewater at the Facility

a) Is water utilised in the main manufacturing process?

Yes  No

<i>If so, describe:</i>	

b) Are wastewater (pre) treatment plant(s) present on site

Yes  No  Don't Know

<i>If yes, describe processes (e.g. oil separation, settlement, flocculation or anaerobic)</i>

c) Complete the wastewater discharge inventory below:

<b>WASTE WATER SOURCE</b>	<b>PRESENT</b> (Yes, No, Don't Know)	<b>PRE-TREATMENT</b> (Yes or No? & method?)	<b>DISCHARGED TO</b> (e.g. Central treatment works, environment (including coastal waters), septic tank, soakaway, dry wells on site, etc.)	<b>DISCHARGE VOLUME</b> (average m <sup>3</sup> per 24 hours, if known)
Process water (water from main manufacturing activities)				
Sanitary wastewater (e.g., other contaminated wastewater from site processes like cleaning, etc.)				
Surface water runoff	If yes, then respond to 5.5.7			
Cooling water				

Other (describe)				
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### 4.3 Monitoring

a) Where monitoring programmes are in place, are appropriate monitoring techniques used?

	Finding	Comments
<input type="checkbox"/>	Yes	
<input type="checkbox"/>	Yes, with room for improvement	
<input type="checkbox"/>	No	
<input type="checkbox"/>	Not assessed (state reason at right)	

*Note nature of evidence collected and relevant findings:*


*Required/Recommended Actions (state whether each action is required or recommended):*


### 4.4 Discharges to a Central Treatment Facility (Section 14 of Environmental Protection Standards)

a) Does the facility discharge industrial wastewater to a Central Treatment Works?

Yes       No       Don't Know

*If no, proceed to Section 6.5*

b) Are waste waters of different characteristics segregated?

	Finding	Action
<input type="checkbox"/>	Yes, wastewaters of different characteristics are segregated to the	No breach and no further action required.

	maximum extent possible.	
<input type="checkbox"/>	Some wastewaters of different characteristics seem to be segregated, but not all.	Observation. Improvement action required.
<input type="checkbox"/>	No wastewaters are segregated.	Major breach and of particular concern if the facility is releasing untreated contaminated wastewater along with its sanitary wastewater to the central treatment works

c) Are there any industrial wastewaters discharged from the site directly to the Central Treatment Works that are not treated prior to release from the site?

Yes       No       Don't Know

<i>If so, describe:</i>	

*If yes, proceed to 6.4 d) If no, proceed to 6.4 e)*

d) Is there a method to ensure industrial wastewaters discharged from the site directly to the Central Treatment Works meet the specific pre-treatment guidelines in Section 14 – Pre-treatment Guidelines for Discharge to Central Treatment Facilities?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, industrial wastewaters discharged directly to the Central Treatment Works are monitored to ensure they meet the specific pre-treatment guidelines.	No breach and no further action required.
<input type="checkbox"/>	Industrial wastewaters discharged directly to the Central Treatment Works are <b>periodically</b> monitored to ensure they meet the specific pre-treatment guidelines.	Observation. Improvement action required.
<input type="checkbox"/>	There is no monitoring of industrial wastewater released directly to the Central Treatment Works. .	Major breach and of particular concern if the facility is releasing contaminated wastewater to the central treatment works

e) Review the monitoring and sampling data for wastewater discharged to the Central Treatment Works. Is it readily accessible to the competent authority? (Reference: Environmental Protection Standards, Section 15.4, Implementation Obligations.)

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, the data is readily accessible.	No breach and no further action required.
<input type="checkbox"/>	No, the data is not readily accessible, but it does exist	Observation. Improvement action required.
<input type="checkbox"/>	No, the data is not readily accessible, and there is no evidence of its existence. PROCEED TO SECTION 6.5	Major breach. Action required.

f) Fill in the table below based on the monitoring and sampling data and discussions with facility operators. (Reference: Environmental Protection Standards, Section 14D, Pre-treatment Guidelines for Discharge to Central Treatment Facilities.)

<b>Pollutants</b>	<b>Guidelines *Maximum limit</b>	<b>Note level of highest measurement in last 3 years</b>	<b>Note date of this measurement</b>	<b>Exceedance in the last 3 years?</b>
<b>Pollutants</b>				
Total suspended solids	2000 mg/liter (max)			
pH	5-10 pH units			
Temperature	60C (max)			
<b>Organic Pollutants</b>				
Chemical Oxygen Demand	1500 mg/liter*			
Total Organic Carbon	1000 mg/liter*			
Oil and Grease	120 mg/liter*			
Phenols	150 mg/liter*			
Total Chlorinated Hydrocarbons	0.5 mg/liter*			
<b>Inorganic Pollutants</b>				
Arsenic	1.0 mg/liter*			
Cadmium	1.0 mg/liter*			
Chromium (Total)	1.0 mg/liter*			
Copper	1.0 mg/liter*			
Cyanide (Total)	1.0 mg/liter*			
Lead	1.0 mg/liter*			
Mercury	1.0 mg/liter*			
Nickel	1.0 mg/liter*			
Zinc	1.0 mg/liter*			

#### **4.5 Discharges Directly to the Environment (Sections 12 & 13 of Environmental Protection Standards)**

a) Does the facility discharge any industrial wastewater directly to the environment?

Yes       No       Don't Know

*If no, please proceed to section 6.6*

b) Are waste waters of different characteristics segregated?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, wastewaters of different characteristics are segregated to the maximum extent possible.	No breach and no further action required.
<input type="checkbox"/>	Some wastewaters of different characteristics seem to be segregated, but not all.	Observation. Improvement action required.
<input type="checkbox"/>	No wastewaters are segregated.	Major breach and of particular concern if the facility is releasing untreated contaminated wastewater along with its sanitary wastewater to the environment.

c) Does the facility release any industrial wastewater to the environment without pre-treatment?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	No, the facility pre-treats all of its wastewater prior to release to the environment.	No breach and no further action required.
<input type="checkbox"/>	The facility releases only uncontaminated surface runoff and/or once-through cooling waters to the environment without pre-treatment. All other industrial wastewaters are pre-treated.	No breach and no further action required.
<input type="checkbox"/>	Yes, the facility releases industrial wastewater to the environment without pre-treatment. However, all of the wastewater is monitored and tested prior to release, and meets all regulatory requirements without requiring pre-treatment.	No breach and no further action required.
<input type="checkbox"/>	Yes, the facility releases industrial wastewater to the environment without pre-treatment.	Major breach and of particular concern if the facility is releasing untreated contaminated wastewater to the environment.

d) Has the facility the ability to divert the effluent stream to the Central Treatment Work or to a storage tanker of the specified size at the Waste Water Standards for offsite treatment in case of failure in the pre-treatment system?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, they can divert the effluent to the Central Treatment Work.	No breach and no further action required.
<input type="checkbox"/>	No, they can't divert the effluent to the Central Treatment Work but they have	No breach and no further action required.

	storage tanker of the required size.	
<input type="checkbox"/>	Yes, they have storage tanker but it does not comply with the required size.	Breach. Improvement action required
<input type="checkbox"/>	No, they can't divert the effluent to the Central Treatment Work and they don't have storage tanker of the required size.	Major breach and of particular concern if the facility releasing untreated contaminated wastewater in case of failure in the system.

e) Has the company prepared a spill prevention, control and clean up plan? (Reference: Environmental Protection Standards, Section 12, Receiving Water Guidelines, B-1, Physiochemical pollutants.)

	Finding	Action
<input type="checkbox"/>	The facility does not use, transfer, or store oil and petroleum hydrocarbons.	No breach. No further action required.  <b>Guidance:</b> Facilities which do not use, transfer or store oil and petroleum hydrocarbons are not required to prepare, maintain and update as spill prevention, control and clean up plan.
<input type="checkbox"/>	The facility uses, transfers and/or stores oil and petroleum hydrocarbons. The facility regularly maintains and updates a spill prevention, control and clean up plan.	No breach. No further action required.
<input type="checkbox"/>	The facility uses, transfers and/or stores oil and petroleum hydrocarbons. The facility has prepared a plan, but it has not been maintained or updated in the past 12 months.	Observation. Improvement action required.
<input type="checkbox"/>	The facility uses, transfers and/or stores oil and petroleum hydrocarbons. The facility has not prepared a spill prevention, control and clean up plan.	Major breach.

f) Review the monitoring and sampling data for wastewater discharged to the environment **at the outfall**. (Reference: Environmental Protection Standards, Section 13D, Performance Standards for Direct Discharge.) Is it readily accessible to the competent authority? (Reference: Environmental Protection Standards, Section 15.4, Implementation Obligations.)

	Finding	Action
<input type="checkbox"/>	Yes, the data is readily accessible.	No breach and no further action required.
<input type="checkbox"/>	No, the data is not readily accessible, but it does exist	Observation. Improvement action required.
<input type="checkbox"/>	No, the data is not readily accessible, and there is no evidence of its existence. PROCEED TO SECTION 6.5 i)	Major breach.

g) Where are the samples taken?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Samples are taken at the end of the outfall, but before discharge to the wastewater channel	No breach and no further action required.
<input type="checkbox"/>	Samples are taken from a point inside the facility before the outfall.	Observation. Improvement action required.
<input type="checkbox"/>	Samples are taken at a point in the wastewater channel that is not directly at the end of the outfall.	Major breach. Improvement action required.
<input type="checkbox"/>	No samples are taken	Major breach. Improvement action required.

h) Fill in the table below for releases to the environment based on the monitoring and sampling data and discussions with facility operators. (Reference: Environmental Protection Standards, Section 13D, Performance Standards for Direct Discharge.)

<b>Pollutants</b>	<b>Guidelines</b> <b>*Allowable Effluent Level (30 day average)</b>	<b>Note level of highest measurement in last 3 years</b>	<b>Note date of this measurement</b>	<b>Exceedance in the last 3 years?</b>
<b>Pollutants</b>				
Floatables	None			
Total suspended solids	15 mg/liter (maximum limit)			
pH	6-9 pH units			
Temperature	PME will determine the thermal properties of the discharged water to fit the properties of the receiving water on a case-by-case basis			
Turbidity	75 NTU (maximum limit)			
<b>Organic Pollutants</b>				
Biological Oxygen Demand	25 mg/liter*			
Chemical Oxygen Demand	150 mg/liter*			
Total Organic Carbon	50 mg/liter*			
Total Kjeldahl Nitrogen	5 mg/liter*			
Total Chlorinated Hydrocarbons	0.01 mg/liter			
Oil and Grease	8 mg/liter* (not to exceed 15 mg/liter in any individual discharge)			
Phenols	0.1 mg/liter*			
<b>Inorganic Pollutants</b>				
Ammonia (as	1.0 mg/liter			

nitrogen)				
Arsenic	0.1 mg/liter*			
Cadmium	0.02 mg/liter*			
Chlorine (residual)	0.5 mg/liter			
Chromium (Total)	1.0 mg/liter*			
Copper	0.2 mg/liter*			
Cyanide (Total)	0.05 mg/liter*			
Lead	0.001 mg/liter*			
Mercury	0.2 mg/liter*			
Nickel	1.0 mg/liter*			
Total Phosphate	1.0 mg/liter			
Zinc	1.0 mg/liter*			
<b>Biological Pollutants</b>				
Total Coliform	100 most probable number (MPN) per 100 ml*			

i) Review the **receiving waters** monitoring and sampling data for wastewater discharged to the environment. (Reference: Environmental Protection Standards, Section 12, Receiving Water Guidelines.) Is it readily accessible to the competent authority? (Reference: Environmental Protection Standards, Section 15.4, Implementation Obligations.)

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, the data is readily accessible.	No breach and no further action required.
<input type="checkbox"/>	No, the data is not readily accessible, but it does exist	Observation. Improvement action required.
<input type="checkbox"/>	No, the data is not readily accessible, and there is no evidence of its existence. DONE WITH THIS SECTION	Major breach.

j) Where are the samples taken?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Samples are taken from the edge of the mixing zone.	No breach and no further action required.
<input type="checkbox"/>	Samples are taken from another location that is not at the edge of the mixing zone.	Major breach. Improvement action required.
<input type="checkbox"/>	No samples are taken	Major breach. Improvement action required.

k) Fill in the table below based on the monitoring and sampling data and discussions with facility operators. (Reference: Environmental Protection Standards, Section 12D, Receiving Waters.) Unless otherwise stated, each guideline refers to a 30 day average.

<b>Pollutants</b>	<b>Guidelines</b>  <b>*Allowable Effluent Level (30 day average)</b>	<b>Note level of highest measurement in last 3 years</b>	<b>Note date of this measurement</b>	<b>Exceedance in the last 3 years?</b>
<b>Pollutants</b>				
Floatables	Non-attributable to the discharge			
Total suspended solids	5% (all percentages referred to in this and the following paragraphs indicate the maximum allowable variations in comparison with local baseline conditions)			
pH	0.01 pH units (maximum change from typical local baseline conditions)			
Temperature	1 degree C (maximum variation from typical local baseline conditions)			
Oil and grease	Management measures required			
Dissolved Oxygen	5%			
Turbidity	5%			
<b>Organic Pollutants</b>				
Chemical Oxygen Demand	5%			
Total Organic Carbon	5%			

Total Kjeldahl Nitrogen	5%			
Total Chlorinated Hydrocarbons	5%			
Oil and Grease	5%			
Phenols	5%			
<b>Inorganic Pollutants</b>				
Ammonia	5%			
Arsenic	5%			
Cadmium	5%			
Chloride	5%			
Chlorine (residual)	5%			
Chromium (Total)	5%			
Copper	5%			
Cyanide (Total)	5%			
Lead	5%			
Mercury	5%			
Nickel	5%			
Phosphate	5%			
Zinc	5%			
Dissolved oxygen	5%			
<b>Biological Pollutants</b>				
Total Coliform	70 most probable number (MPN) per 100 ml*			

## 5. WASTE MANAGEMENT

<p><b>Inspection Objectives</b></p>	<ul style="list-style-type: none"> <li>▪ To determine whether the facility carries out any waste related activities that require certificates or licences under the KSA GER and evaluate whether these have been properly obtained</li> <li>▪ To evaluate whether the facility has properly characterized and quantified its wastes</li> <li>▪ Where relevant, to assess whether hazardous waste management is being controlled in line with the requirements set out within GER Appendix 4, Articles I –X.</li> <li>▪ To evaluate the level of facility awareness about the wastes it generates and appropriate control methods for these</li> <li>▪ To assess whether the facility has taken proactive measures to minimise, re-use and/or recycle wastes as a preferred alternative to disposal.</li> </ul>
<p><b>Relevant GER Provisions</b></p>	<p>Article 4-1-4 Public, licensing and concerned agencies shall ensure that environmental works related to their projects are carried out by contractors qualified for such works according to the criteria specified by the Competent Agency in Appendix 3 (see Appendix 3.2 for waste services requiring certification).</p> <p>Article 13-1-4 [Persons shall] Prevent the discharge, in any quantity, of any type of solid or liquid wastes, substance, element, organic or inorganic compound that may be classified as hazardous into surface, ground or coastal waters.</p> <p>Article 13-2-4 Persons shall be fully responsible, as part of their activities and projects, for incidents of environmental pollution with chemical, toxic, hazardous or radioactive wastes and materials during the stages of production, transportation, storage or recycling and for immediately reporting such incidents to the public, concerned and licensing agencies. The party that caused such pollution incident shall bear all the costs of pollution control, abatement, treatment and rehabilitation of the polluted environment as well as and compensation for damages caused by such incidents of pollution.</p> <p>Article 14.2 Persons in-charge for the production, transportation, storage, recycling, treatment and final disposal of poisonous, hazardous or radioactive materials must comply with the procedures and controls set forth in the rules for implementation.</p> <p>Article 14-2-2 Individuals in-charge of the production, transportation, storage, recycling, treatment or final disposal of chemical, toxic, hazardous and radioactive materials shall comply with the licenses issued to them by the concerned agencies and the Competent Agency. In case there is any change in the type of activity, volume or owner, coordination shall be made with the concerned, licensing agencies and the Competent Agency to obtain the approval required for such change.</p>

	<p>Article 14-2-6 No persons or agencies may dispose of chemical, toxic, hazardous or radioactive materials without a license from the Competent Agency in accordance with the procedures and requirements indicated in Appendix 4.</p> <p>Appendix 4, Hazardous Waste Control Rules and Procedures (p. 124 of English translation)</p> <p>Appendix 3, Guide to Environmental Accreditation Procedures (p. 102 of English translation)</p>
<b>Facility Indicators of Potential Concern</b>	<ul style="list-style-type: none"> <li>▪ Facility has not characterized or quantified its wastes and determined whether it produces hazardous waste or has done so incorrectly</li> <li>▪ Facility requires a certificate or licence from PME for its waste-related activities but this has not been obtained</li> <li>▪ Facility is operating outside the conditions specified in its certificates or licences for waste management</li> <li>▪ Wastes are inappropriately stored and transported leading to actual or potential pollution</li> <li>▪ No or insufficient measures taken to meet applicable standards in the GER (Appendix 4)</li> <li>▪ Lack of awareness about waste requirements and control measures</li> </ul>

## 5.1 Waste Management Activities

a) Which of the following is carried out by the facility?

Tick if 'yes'	Activity	Answer questions:
<input type="checkbox"/>	Generation of hazardous waste	7.2, 7.3, 7.4, 7.5 and 7.8.
<input type="checkbox"/>	Hazardous waste collection and transport (excluding internal transport at the facility which generated the waste)	7.6
<input type="checkbox"/>	Storage of hazardous wastes generated by another party/at another facility and/or storage of hazardous wastes at any location for longer than 6 months	7.1b) and 7.7.
<input type="checkbox"/>	Hazardous waste treatment and/or disposal (excluding closed internal treatment and wastewater treatment operations)	7.1b) and 7.7.
<input type="checkbox"/>	Generation of solid non-hazardous waste	7.8
<input type="checkbox"/>	Municipal solid non-hazardous waste management (collection, transportation, storage of waste)	7.1b)*

	generated by another party, recycling and re-use and/or final disposal)	
<input type="checkbox"/>	Medical waste management (collection, transportation, storage of wastes generated by another party, treatment and/or final disposal of medical waste)	7.1b)*
<input type="checkbox"/>	Used oil management (collection, transportation, storage of used oil generated by another party and/or treatment, disposal, recycling, export)	7.1b)*
<input type="checkbox"/>	Export of hazardous wastes outside the Kingdom of Saudi Arabia	7.8
<input type="checkbox"/>	Generation of non-hazardous waste	7.9

\* possible specific questions required but no apparent specific Environmental Standards in the GER for operation of the facility – specifics are related to requirements to be submitted before certification is achieved).

<i>Describe the relevant activities</i>

b) Has the facility received Certification (required under GER Article 1-4-4 and Appendix 3) from PME for its waste related services?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, unconditional certification obtained	No breach and no further action.
<input type="checkbox"/>	Yes, conditional certification obtained	No breach. Inspectors should review the conditions and check that these are being met by the facility.
<input type="checkbox"/>	Application is in progress. Activity is not being undertaken.	No breach and no further action.
<input type="checkbox"/>	Application is in progress. Activity is being undertaken.	Major breach and required action (stop activity until certification received)
<input type="checkbox"/>	Certification has not been sought for an activity which requires it.	Major breach and required action (stop activity until certification applied for and received)

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

**5.2 Hazardous Waste Classification**

a) Has the facility classified its wastes and determined whether any of these are 'hazardous waste' as defined in the GER?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, hazardous wastes have been properly classified and described	No breach and no further action required
<input type="checkbox"/>	Yes, but one or more waste types appear to have been incorrectly classified	Breach. Improvement action required.
<input type="checkbox"/>	Yes, but physical, chemical and biological descriptions have not been documented for one or more hazardous waste types	Breach. Improvement action required.
<input type="checkbox"/>	No	Major breach and of particular concern if the facility is known or appears to generate hazardous waste. Improvement action required.
<input type="checkbox"/>	Other finding (please describe)	

<i>Comments (include nature of evidence collected and relevant findings; also include a brief description of the hazardous waste types generated)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Is the facility a minor generator of hazardous waste?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes (only check yes if all criteria outlined in the guidance box are satisfied)	No breach and no further action required. Go to question 6.2d
<input type="checkbox"/>	No (because waste is stored for longer than 6 months)	Address question 6.7 as part of the Inspection.
<input type="checkbox"/>	No (because >100kg waste is generated per month)	Go to question 6.2c.
<input type="checkbox"/>	No (because extremely hazardous waste is generated)	Go to question 6.2c
<input type="checkbox"/>	Insufficient information is available to determine whether the facility is a minor generator	Observation (-ve). Facility should be requested to evaluate quantities of hazardous waste generated.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings; also include the monthly amount of the hazardous waste generated)</i>

<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

c) Has the facility confirmed with PME that it generates hazardous wastes?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, proper confirmation has been obtained	No breach and no further action required
<input type="checkbox"/>	Yes, but the procedure was not properly followed	Observation and recommended improvement.
<input type="checkbox"/>	No	Breach. Improvement action required. NOTE: facilities which have not carried out the confirmation MUST NOT remove waste from the site until the confirmation has been completed.
<input type="checkbox"/>	Other finding (please describe)	

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

d) Has the facility obtained an exclusive identification code from PME?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	No breach and no further action required
<input type="checkbox"/>	No	Breach – required improvement action
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings; and note identification code if obtained)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

e) Does the facility store hazardous waste at the site where it is generated for longer than 3 months?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	The facility is deemed a waste management facility under the GER. Question 6.7 should be addressed as part of the inspection.
<input type="checkbox"/>	No	No further action required.
<input type="checkbox"/>	Other finding (describe)	

### 5.3 Use of licensed contractors for hazardous waste removal and disposal

a) Has the facility confirmed that its hazardous waste transporter(s) has or have an appropriate licence to operate from PME?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes & facility carries out audits of contractors	No breach. Evidence of Good Practice.
<input type="checkbox"/>	Yes	No breach and no further action.
<input type="checkbox"/>	No or insufficient evidence of checks having been made	Breach and required improvement action.
<input type="checkbox"/>	No or insufficient checks have been made and investigation through PME reveals that unlicensed contractors are being used.	Major breach and required improvement action
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings; and identify contractors involved)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Has the facility confirmed that its hazardous waste disposal contractor(s) has or have appropriate licence(s) to operate from PME?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	No breach and no further action.
<input type="checkbox"/>	No or insufficient evidence of checks having been made	Breach and required improvement action.
<input type="checkbox"/>	No or insufficient checks have been made and investigation through PME reveals that unlicensed contractors are being used.	Major breach and required improvement action

<i>Comments (include nature of evidence collected and relevant findings; and identify contractors involved)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

#### 5.4 Storage and internal transportation of hazardous wastes

a) Are wastes stored and transported (within the facility) in an environmentally sound manner that does not cause their dispersal or detrimental effect on man's health, safety and welfare or the environmental and natural resources?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	All storage facilities are considered satisfactory	No breach and no further action.
<input type="checkbox"/>	At least one of the criteria (but not the majority) from the guidance box are not met but this has not resulted in significant environmental risk.	Breach and required improvement action.
<input type="checkbox"/>	The majority of the criteria are not met and/or there is visible evidence of leaks/releases of hazardous waste and/or there is a significant environmental or health and safety risk from current storage arrangements	Major breach and required improvement action

*Comments (include nature of evidence collected and specific findings)*

*Required/Recommended Actions (state whether each action is required or recommended)*

#### 5.5 Shipping of hazardous wastes from the facility (standards for waste generators)

a) Are hazardous waste transportation documents adequately completed?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, all transportation documents were found to be accurately completed	No breach and no further action.
<input type="checkbox"/>	Isolated incidences of missing documents and/or incorrect completion and/or lack of safety data sheets	Observation (-ve) and required improvement action.

<input type="checkbox"/>	The majority of transport documents are found to be inaccurately completed.	Breach and required improvement action
<input type="checkbox"/>	No copies of transport documents available on-site and/or facility has not completed any hazardous waste transport documents	Major breach and required improvement action
<input type="checkbox"/>	Other finding (please describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Does the facility have adequate record keeping for its hazardous wastes?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, signed transport documents and analysis documents (if applicable) are being kept for the minimum required time	No breach and no further action.
<input type="checkbox"/>	Isolated incidences of documents not being kept for the minimum required time	Observation (-ve) and required improvement action.
<input type="checkbox"/>	The majority or all documents are not being kept for the minimum required time.	Breach and required improvement action
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents and dates as applicable)</i>

<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

c) Has the facility made necessary arrangements with the receiving facility for the hazardous waste?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	No breach and no further action.
<input type="checkbox"/>	Arrangements have been made, but these are considered insufficient to enable the waste facility to take proper measures	Breach and required improvement action.
<input type="checkbox"/>	Facility has failed to provide adequate information about its wastes and this has led to an incident at the facility	Major breach and required improvement action.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents and dates as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

d) Has the facility submitted annual reports on the hazardous waste generated?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	No breach and no further action.
<input type="checkbox"/>	Reports are being submitted	Breach and required improvement

	but do not contain sufficient information about the hazardous wastes generated	action.
<input type="checkbox"/>	Facility submits reports but does not keep copies for the minimum period	Breach and required improvement action.
<input type="checkbox"/>	Facility does not submit reports	Major breach and required improvement action.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

**5.6 Hazardous waste transporters (this excludes internal transportation of hazardous waste within the facility where the waste is generated)**

a) Has the transporter obtained an identification code and a work permit from PME?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, identification code and work permit have been obtained	No breach and no further action.
<input type="checkbox"/>	Application is in progress and submitted information meets the requirements (no hazardous waste transportation should take place until the code and permit have been received)	No breach and no further action.
<input type="checkbox"/>	No application submitted or identification code and/or work permit have not been received, but hazardous waste transportation is carried out	Breach and required improvement action.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

b) Does the transporter carry out necessary checks to ensure that it does not collect hazardous waste from generators without an identification code and does not deliver hazardous waste to a waste management facility that does not have a work permit from PME?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes	No breach and no further action.
<input type="checkbox"/>	No or insufficient evidence of checks having been made	Breach and required improvement action.
<input type="checkbox"/>	No or insufficient checks have been made and investigation through PME reveals that unlicensed contractors are being used.	Major breach and required improvement action
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>



<input type="checkbox"/>	Transport documents are not kept by the transporter	Major breach and required improvement action.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings including references to specific documents as applicable)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

e) Do transporters comply with delivery conditions and hazardous waste transportation instructions identified in the transportation documents?

	<b>Finding</b>	<b>Action</b>
<input type="checkbox"/>	Yes, sufficient evidence to indicate compliance	No breach and no further action.
<input type="checkbox"/>	Insufficient evidence of compliance and/or evidence to suggest non-compliance	Breach and required improvement action.
<input type="checkbox"/>	Other finding (describe)	

<i>Comments (include nature of evidence collected and relevant findings)</i>
<i>Required/Recommended Actions (state whether each action is required or recommended)</i>

e) Does the transporter store documented shipments of hazardous wastes for longer than 5 days?

- Yes  If yes, answer question 6.7. In addition, if hazardous waste is currently being stored by the transporter (regardless of how long it has been stored for) – answer question 6.4a).
- No  No further action required.

## 6. EXPLANATIONS

### 6.1 EMISSIONS TO AIR

a) and b) What sources of emissions exist at the facility?

**Guidance:** *This question will help you to identify the significance of the facility for known air pollutants, based on its sector and the activities undertaken. You may wish to review and complete a) and b) in advance of the inspection as it will help you to prepare; and validate the answers when on-site.*

c) Does the facility undertake one or more of the processes listed below?

**Guidance:** *This question assesses whether the facility is specifically regulated for air emissions in the GER Environmental Standards, Appendix 1, Article 11. The information may have already been collected through the FERA Questionnaire. If the facility does carry out one or more of the listed processes, its compliance with the applicable GER Standards should be assessed during the inspection, using the referenced questions.*

d) What **point** sources of emissions exist at the facility; what, if any abatement is used to limit emissions limits and what if any monitoring of emissions is carried out (complete **table overleaf**)?

**Guidance:** *This question is intended to identify point sources (if any) which have not already been identified in 5.1c). Discuss processes with Plant Engineers, including by-products and outputs to air; review any process maps, emissions monitoring records, emissions inventories, visually check for stacks, flues, chimneys and other emissions outlets, visible plumes, and abatement equipment (see box below the table for a list (not-exhaustive) of abatement devices and a web-link to further guidance). Do not assess the effectiveness of abatement and monitoring at this stage; just identify what is in place.*

e) What **fugitive** sources of emissions exist at the facility?

**Guidance:** *. Discuss processes with Plant Engineers, including by-products and outputs to air; review any process maps, emissions monitoring or mass balance records, emissions inventories, visually check for leaking valves, open containers for volatile substances, and venting tanks and equipment. Check for fugitive emissions occurring under normal and abnormal operating conditions.*

f) Assessment of activities specifically regulated in GER, Appendix 1, Article 11 (Only complete the sections which are relevant to the activities identified in 5.1c)

E.g. Are emissions from cement kilns controlled so as to limit particulate emissions to no more than 0.15kg per metric ton of product? (GER Environmental Standards reference 11-D-1)

**Guidance:** *The preferred means for evaluating this question is to review documented results of emissions self-monitoring undertaken by the facility and/or independent monitoring carried out by an external agency within the last 12 months. Where such programmes are in place, inspectors should check that appropriate methods and techniques have been used for calculating emissions.*

*Where valid emissions data is not available, inspectors should check the nature of the plant used and that suitable devices are installed to limit emissions. Kilns with preheating and precalcination are the best fit to meet the standard. Suitable abatement devices to limit emissions (whether or not pre-heating and precalcination are in place) include electrostatic precipitators (ESP) and fabric filters. However, these must be properly maintained and operated in order to work effectively. Inspectors should discuss the plant design and devices with process engineers; review manufacturer operating and maintenance manuals and check that appropriate procedures are in place and are being implemented in line with the manufacturers' specification. This will involve discussion with plant engineers and review of relevant documentation and records. If inspectors have cause to believe that insufficient control is in place to limit emissions to within the acceptable levels, or that insufficient information is available to complete the assessment they can require/recommend (?) that the facility carries out emissions monitoring to determine actual emissions levels.*

g) Where monitoring programmes are in place (see section 5.1d); are appropriate monitoring techniques used?

**Guidance:** *The primary purpose of this question is to establish the likelihood that accurate emissions data is being generated. If inappropriate techniques are being used; then it is less likely that the data will be accurate. The evaluation should consider parameters such as the frequency of monitoring (e.g. continuous or intermittent), the type of equipment used, the location of equipment, calibration, emissions logging methods, calculation techniques, maintenance of equipment, validation techniques.*

h) Are emissions control devices for point sources considered sufficient?

**Guidance:** *The purpose of this question is to establish whether, (particularly in the absence of adequate monitoring data) emissions control measures are sufficient to limit emissions. The evaluation should take into account the type and design of any abatement equipment being used and whether it is suitable for the pollutant type and loading and whether it is being operated and properly maintained in accordance with the manufacturer's specification. Inspectors should discuss these issues with Plant Engineers, review operating manuals and procedures and maintenance schedules and records.*

i) Are there point source emissions which are not currently being monitored, that should be subject to monitoring?

**Guidance:** *Monitoring may be required where inspectors have reason to believe that current emissions control devices are not effective (this may involve a one-off emissions monitoring exercise) or where a monitoring programme is a requirement of the KSA Environmental Standards.*

j) Is there evidence that fugitive emissions are occurring unnecessarily due to poor management practice?

**Guidance:** *Many fugitive emissions only arise due to poor management practices; for example, evaporation of VOCs from solvent containers left open and poor or absent preventive maintenance procedures for equipment, including valves and pipes, leading to leaks. Use visual observation, combined with a review of facility procedures (including maintenance schedules and records) and discussions with plant engineers to evaluate this issue.*

## 6.2 DISCHARGES TO WATER

**Guidance:** This section is intended to provide an overview of the sources of wastewater generated at the facility. Discuss the processes with Plant Engineers, review process maps. Visually check areas for wastewater outputs.

a) Complete the wastewater discharge inventory below:

**Guidance:** When completing the table below, respond to the following questions through discussions with Plant Engineers, examinations of process maps, and ground-truthing.

*Guidance questions:*

To identify **process wastewater**, determine if water is utilised in the main manufacturing process.

To identify **sanitary wastewater**, determine if water is utilised in other site processes that could potentially result in a contaminated wastewater stream, e.g. aqueous cleaning, water from steam cleaning or equipment wash down or power generation (if not part of the main process).

For each of the wastewater sources listed in the column at left, ask the following questions:

a. Does this type of wastewater source exist at this facility?	If yes, continue to b. If no, continue to the next wastewater source.
b. Is the wastewater pre-treated?	If yes, continue to c. If no, continue to d.
c. How is the wastewater pre-treated?	Note method in Pre-treatment column
d. Where is process water discharged?	Note location of discharge in "Discharged To" column
e. How much discharge is released?	If known, note average m <sup>3</sup> per 24 hours in "Discharge volume" column.

b) Where monitoring programmes are in place, are appropriate monitoring techniques used?

**Guidance:** The primary purpose of this question is to establish the likelihood that accurate discharge data is being generated. If inappropriate techniques are being used, then it is less likely that the data will be accurate. The evaluation should consider parameters such as the frequency of monitoring (e.g., continuous or intermittent), the type of equipment used, the location of equipment, calibration, emissions logging methods, calculation techniques, maintenance of equipment, validation techniques.

c) Are waste waters of different characteristics segregated?

*Guidance: KSA Environmental Protection Standards Pretreatment Guidelines (Appendix 1 Part 14) require waste waters of different characteristics to be segregated to the maximum extent possible. Sanitary wastes may be sent to a central treatment facility without pre-treatment. Contaminated waste waters other than sanitary waste shall be treated on site to meet applicable pre-treatment requirements (see Table below for specific requirements).*

d) Discharges Directly to the Environment (Sections 12 & 13 of Environmental Protection Standards)

*Guidance: Discharges directly to the environment include discharges to surface water, land, wadi or coastal waters. They apply to sanitary sewage, surface runoff (including fire control water), cooling water discharges, boiler water blow-down, process wastewater and any other wastewater.*

e) Are waste waters of different characteristics segregated?

*Guidance: KSA Environmental Protection Standards Pretreatment Guidelines (Appendix 1 Part 13) require waste waters of different characteristics to be segregated to the maximum extent possible. Uncontaminated surface runoff and once through cooling waters may be discharged into receiving waters without treatment.*

f) Has the company prepared spill prevention, control and clean up plan? (Reference: Environmental Protection Standards, Section 12, Receiving Water Guidelines, B-1, Physiochemical pollutants.)

**Guidance:** *Facilities using, transferring or storing oil and petroleum hydrocarbons are required to prepare, maintain and update a spill prevention, control and clean up plan.*

g) Where are the samples taken?

*Guidance: The performance standards in the table below apply to wastewater at the end of the outfall but before discharge to coastal waters or to any wastewater channel. (Reference: Section 13.D, Performance Standards for Direct Discharge.)*

h) Where are the samples taken?

*Guidance: The performance standards in the table below apply to **receiving water guidelines** (Section 12). The guidelines for receiving water quality apply at the edge of the mixing zone and beyond for the discharge from any facility to the coastal waters.*

## 6.3 WASTE MANAGEMENT

a) Which of the following is carried out by the facility?

**Guidance:** *This question will help inspectors to identify which waste related activities are undertaken by the facility and therefore which of the Environmental Standards and associated Inspection Checklist questions are applicable. The question will also help inspectors to identify whether the facility requires an Environmental Accreditation from PME under Appendix 3 of the GER.*

b) Has the facility received Certification (required under GER Article 1-4-4 and Appendix 3) from PME for its waste related services?

**Guidance:** *Application to PME is required for certain waste related activities. The first stage is that the company seeking accreditation notifies PME of this fact. PME forwards a letter and the Environmental Accreditation Application Form to the company. When this has been submitted and PME has verified the activity to be undertaken, the applicant is required to submit an Accreditation Requirement Form. Following audit of the information by PME, PME issues a list of accreditation requirements that have to be completed before the activity can be undertaken. Once these have been completed, PME conducts a site visit to validate this. Following the site visit, PME may issue unconditional or conditional approval, both of which lead to registration of the activity in the applicable commercial register and a requirement that the operator meet all relevant standards and obtains Certification from PME prior to undertaking the activity. Conditional approval also requires the applicant to confirm in writing that he will comply with all conditions related to the proposed activity. Alternatively, PME may deny the application at this stage. Following approval, the applicant must write to PME once all requirements of the accreditation stage have been met and PME will conduct a site visit to validate this. PME may then unconditionally or conditionally issue an Environmental Accreditation Certificate. Conditional approval means that the Certificate is issued with specific conditions related to the activity which must be met by the operator. Inspectors should review a copy of all correspondence and certificates held by the facility. If a facility states that an application is in progress, it should provide documented evidence of its application and Inspectors may also validate this with the relevant PME agency. If a facility has an application in progress, it should carry out the activity for which it has applied for certification, until such time as it has received the Certificate.*

c) Has the facility classified its wastes and determined whether any of these are 'hazardous waste' as defined in the GER?

**Guidance:** Facilities are required to assess their waste types to determine whether any and which of them are hazardous wastes as defined in GER Appendix 4, Article IVb. They should have a physical, chemical and biological description and analysis for all hazardous waste types. Prior to the inspection, the list of waste streams from Appendix III to Appendix 4 of the GER should be reviewed to determine the likelihood that hazardous wastes will be produced. Inspectors should discuss the types of wastes generated and the way in which these have been classified with reference to the GER standards with facility representatives; they should review the aforementioned documented hazardous waste descriptions and use the site walk over to visually look for hazardous wastes being generated at the facility. Certain waste types may require laboratory analysis to determine whether they are hazardous. Inspectors should check that appropriately accredited laboratories have been used to carry out such analysis, as an indicator of correct classification.

d) Is the facility a minor generator of hazardous waste?

**Guidance:** Facilities that produce <100kg or less than half a barrel of hazardous waste per month (30 days) are considered minor producers and are exempt from certain GER requirements. The threshold value of 100kg must not be exceeded in any month, or the facility will no longer be considered a minor producer. Generators of extremely hazardous waste (as defined in the GER) are never considered minor producers. Also note that if the producer stores any hazardous waste for longer than 6 months they are deemed a waste storage facility operator and subject to additional requirements (as defined in 6.7). Inspectors should use visual observation combined with discussions with facility representatives and a review of hazardous waste transport documents to assess how much hazardous waste is generated and for how long it is stored.

e) Has the facility confirmed with PME that it generates hazardous wastes?

**Guidance:** Under GER Appendix 4, Article VIII a), producers (other than minor producers) of wastes from commercial, industrial and occupational facilities are required to confirm with PME that they produce hazardous waste by submitting information contained within the aforementioned article. Inspectors should review site documentation related to this submission against the requirements of the Article and may also validate that the submission was properly made with the relevant PME department. Proposed facilities under construction are required to provide the information to PME within 60 days of receiving a licence by the relevant government agency.

f) Has the facility obtained an exclusive identification code from PME?

**Guidance:** The facility should be able to provide documentation from PME to demonstrate that it has acquired an identification code.

g) Does the facility store hazardous waste at the site where it is generated for longer than 3 months?

**Guidance:** *Facilities that store hazardous waste for longer than 3 months are deemed an operator of a storage facility and required to meet specific requirements under the GER. Under GER Appendix 4, Article VII, minimum environmental protection standards applicable to hazardous waste storage are defined. Inspectors should compare the facility's operations with the facility's records, including, but not limited to: the type, quantity, method of storage, treatment and disposal of each shipment of hazardous waste received at the facility and its date; the location and quantity of each hazardous waste shipment in the facility; and copies of waste transport documents and related reports (Section d.1, Reporting & Recordkeeping). The inspector should also verify the annual activity report submitted to the Presidency, as required in Section d.4)*

h) Has the facility confirmed that its hazardous waste transporter(s) has or have an appropriate licence to operate from PME?

**Guidance (for a) and b):** *The facility should be able to provide documented evidence that it has carried out checks that the contractor(s) is or are appropriately licensed. This may include copies of correspondence with the transportation company and/or copies of the actual licences themselves. Checks should be carried out whenever an arrangement for waste removal is made with a new contractor and then on a routine, periodic basis (ideally annually) thereafter. Inspectors can validate whether a contractor is properly licensed through the relevant PME department. In line with good practice, facilities may carry out periodic audits of their hazardous waste contractors (although this is not a legal requirement).*

i) Are wastes stored and transported (within the facility) in an environmentally sound manner that does not cause their dispersal or detrimental effect on man's health, safety and welfare or the environmental and natural resources?

**Guidance:** *Inspectors should check the following through visual observation, supplemented by discussions with plant representatives:*

- *that hazardous wastes are stored in an enclosed, primary container which is constructed of materials that are compatible with the waste stored within*
- *for liquid hazardous wastes, the primary container is located within secondary containment which is of a sufficient capacity to hold at least 110% of its contents or if there is more than one container within the system, of not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater*
- *for liquid hazardous waste, that spill clean up material is available in close proximity to the storage area*
- *that all primary containers are labelled to show that they contain hazardous waste, the type of wastes stored, and relevant hazard)*
- *that primary and secondary containers are in good condition without evidence of corrosion or other damage which could lead to a release*
- *that different waste types are not mixed together*
- *that incompatible wastes (e.g. acids and bases) are not stored next to each other due to the risk of chemical reactions in the event of mixing*
- *for evidence of actual leaks from hazardous waste containers (including stains on the ground)*
- *that bulk liquid storage facilities are adequately ventilated*
- *that flammable hazardous wastes are stored in a specially designed flammable store.*
- *storage areas are not overfilled and containers are not over-stacked (no more than 2 drums high is recommended)*
- *that waste is sufficiently contained and packaged prior to removal from site, so as to minimize the potential for accidental releases during transportation that, prior to shipping, containers are properly labelled.*
- *methods of internal transport of hazardous wastes at the facility are safe and do not present significant potential for accidental release (this should include minimal manual handling, use of transport routes which are away from drains or bare soils, avoiding transport of over-stacked containers)*

**Guidance:** *Inspectors should check plant representatives' knowledge of the transportation document requirements and review copies of hazardous waste transportation documents at the facility. They should check specifically for:*

- *Whether the product data section of the document has been properly filled out*
- *That safety data sheets are provided along with the transport document*
- *That the hazardous waste transportation instructions in the document are followed.*

*Inspectors should sample multiple transportation documents to assess whether non-compliances are isolated incidences or are recurring. As an approximate rule, 10-20% of the transportation documents should be sampled.*

j) Does the facility have adequate record keeping for its hazardous wastes?

**Guidance:** Hazardous waste generators are required to keep one copy of each transport document pending receipt of the signed copy from the receiving facility. The signed copies must be kept by the generator for at least 5 years after the date of receipt of the waste by the facility. Generators are also required to retain records of all testing and analysis of hazardous waste for at least 5 years following the last date of handling of the waste. Inspectors should review site documentation to gather evidence of record keeping. When sampling the documentation, inspectors should review records from previous years to check that records are being kept for the minimum required time.

k) Has the facility made necessary arrangements with the receiving facility for the hazardous waste?

**Guidance:** Inspectors should check through discussion with facility representatives and a review of documented correspondence with the hazardous waste facility (if available) that the facility has provided full and detailed information about the waste and where requested by the facility, samples for analysis. Samples should be provided in particular where a mixture of wastes or new types of waste have been generated. This is to enable the hazardous waste facility to take the correct measures to appropriately store and treat the waste when they take receipt of it. If inspectors have reason to believe that this has not happened sufficiently, they may validate this through discussions with the hazardous waste facility.

l) Has the facility submitted annual reports on the hazardous waste generated?

**Guidance:** Annual reports should contain information about the types and quantities of hazardous waste generated during the year and copies should be kept by the generator for at least 5 years. Inspectors should check site documentation as evidence for this requirement. In the event that facilities state that they do submit reports but are unable to provide copies, inspectors can validate this with the relevant PME department to ascertain whether reports are indeed being submitted.

m) Has the transporter obtained an identification code and a work permit from PME?

**Guidance:** Under GER Appendix 4, Article VIII b), hazardous waste transporters are required to submit a written application providing certain information as specified in the Article. On receipt of a properly submitted application, an identification code and work permit is issued by PME. Inspectors should ask the facility to show them written evidence of the identification code and work permit from PME; or where the application is reportedly in progress, the facility should provide a copy of the written application.

n) Does the transporter carry out necessary checks to ensure that it does not collect hazardous waste from generators without an identification code and does not deliver hazardous waste to a waste management facility that does not have a work permit from PME?

**Guidance:** The transporter should be able to provide documented evidence that it has carried out checks that waste generators and waste management facilities have the proper codes and permits from PME. This may include copies of correspondence with the facilities it deals with, and/or information provided on hazardous waste transportation documents. Inspectors should discuss with representatives of the transporter, what their procedures are for making these checks and taking action in the event that they find that a company does not have the appropriate code or permit.

o) Has the transporter prepared a contingency plan to respond to emergencies and hazardous waste leakage incidents during delivery/transportation?

**Guidance:** The contingency plan is required to be submitted to PME for approval. Inspectors should review the contingency plan and request documented evidence that it has been approved by PME. Inspectors should also assess whether the contingency plan is being implemented by checking the awareness of drivers and other representatives of actions to be taken in the event of emergencies and leakages, and that any equipment (e.g. spill kits) referenced in the contingency plan are available in the locations that they may be needed (likely to include vehicles)

p) Do transporters ensure that hazardous waste shipments are accompanied with signed transport documents and a safety information sheet for each type of waste?

**Guidance:** Inspectors should question representatives about this requirement and the company's procedures; and should also look for documented evidence by sampling for properly signed transport documents and safety information sheets. Inspectors may consider attending a waste collection by the transporter to assess compliance. In addition, if the transporter has recently collected a consignment that is being temporarily stored at his facility; inspectors should ask for copies of the relevant transport document and safety information sheet for that consignment. Transporters are required to keep a copy of each transportation document signed by himself, the hazardous waste generator and the hazardous waste receiver.

q) Do transporters comply with delivery conditions and hazardous waste transportation instructions identified in the transportation documents?

**Guidance:** *Inspectors should evaluate the awareness of transporter representatives about these instructions and procedures in place to ensure compliance with them; through discussions with a sample of the employees and a review of any written procedures.*

r) Does the transporter ever store documented shipments of hazardous wastes for longer than 5 days?

**Guidance:** *Transporters who store hazardous wastes for longer than 5 days are deemed a waste storage facility and are required to comply with additional requirements. Inspectors should use visual observation to check for consignments which appear to have been stored for a longer period than 5 days and if these are found, should ask to see the transport document to validate when the consignment was collected by the transporter. Inspectors should also review transport documents for the dates on which consignments were picked up and delivered at a waste management facility and should discuss company procedures for temporary storage.*

## APPENDIX I: AIR EMISSIONS

Table 1: Key Air Pollutants in Saudi Arabia, and contributing Sectors (source: Classic Pollutant Data Sheets for CA)

Air Pollutant	Key Sectors	Other contributing Sectors (not exhaustive)
Sulphur dioxide (SO <sub>2</sub> )	Desalination plants Petroleum plants Power plants	Industrial processes such as wood pulping, paper manufacture, petroleum and metal refining and metal smelting, particularly from sulphide containing ores, e.g. lead, silver and zinc ores all emit sulphur dioxide to air.
Nitrous oxides (NO <sub>x</sub> )	Road traffic Desalination plants Power plants Agriculture	
Particulate Matter (PM)	Cement industry Use of diesel and heavy oil as fuel in industry, power and desalination plants Transport sector	Releases from industrial processes through bulk material handling, combustion and minerals processing. Industries include brickworks, refineries, iron and steel making, quarrying
Volatile Organic Compounds (VOCs)	Petrochemical industry Road traffic	Any industrial processes involving the use of solvents

Table 2: Other Air Pollutants (not exhaustive) and contributing Sectors/Activities

Contributing Sectors/Activities (not exhaustive)	Air Pollutant
<b>Organic Pollutants (source: Organic Pollutant Data Sheets for CA)</b>	
Combustion and evaporation of benzene-containing petrol (up to 5% benzene), petrochemical industries, and other combustion processes.	Benzene
Released during the combustion of fossil fuels	1,2 - Dichlorethane
Point sources: Include emission from petroleum refineries, fossil fuel power plants (coal, oil,), coal-tar production plants, asphalt production plants, paper mills, aluminium production plants and industrial machinery manufacturers. Diffuse sources: Include emissions from asphalt roads, road and road tar and fires of all types (bush, forest, agricultural, home heating, cooking, etc).	Polycyclic aromatic hydrocarbons (PAH)
Combustion and incineration sources such as: incineration of	Polychlorinated

solid waste, sewerage sludge and hospital wastes; high temperature steel production, smelting operations and scrap metal recovery furnaces and the burning of coal, wood petroleum products and used tires for energy generation all result in emissions to air. Chemical manufacturing and process sources such as manufacture of chlorine and chlorinated organic compounds may result in emissions to air.	dioxins and furans
Point sources Include emissions from industries that manufacture it or use it in production. Some of the industries that use it in production are dry cleaners, the chemical industry, rubber manufacturers, heavy equipment manufacturing (degreasing), electroplating facilities (degreasing), pulp and paper manufacture (for de-inking paper), the manufacturers of inks. T	Tetrachloroethylene
Industrial emissions from companies producing and manufacture polyurethane product.	Toluene
<b>Inorganic Pollutants</b>	
Fertilizer plants	Ammonia
Point sources: Coal fuelled power plants and copper and lead smelters are the largest point sources of arsenic. Diffuse Sources: pesticides, fungicides, weed killers, wood treatment products	Arsenic
Point sources: coal and oil burning power plants may emit cadmium compounds to air. Mobile sources: from the exhaust of motor vehicles	Cadmium
Point Sources: may result from leather tanning industries, chemical manufacturing industries (e.g. dyes for paints, rubber and plastic products), metal finishing industries (e.g. chrome plating), manufacturers of pharmaceuticals, wood, stone, clay and glass products, electrical and aircraft manufacturers, steam and air conditioning supply services, cement producing plants (cement may contain chromium), incineration of council refuse and sewage sludge, and combustion of oil and coal.	Chromium
Point Sources: industries that manufacture it or use it in production.(Includes the production are aluminium industry, oil drilling and refining, the chemical and plastics industries, agricultural and pesticide chemical manufacturers, dye manufacturers, manufacturers of metal parts.	Flouride
Electric power plants (burning coal or fuel oil containing sulphur), oil and gas extraction operations, oil refineries, pulp and paper mills, sewage treatment plants, confined animal feeding operations, municipal waste landfills, coke ovens, sulphur products and hydrogen sulphide production, asphalt production and storage and geothermal power plants.	Hydrogen sulphide
Point sources: Lead ore extraction and processing, industrial production (lead is present as a secondary constituent in many minerals and sediments) and coal combustion (domestic combustion and heating and electricity plants). Mobile sources: Motor vehicles (alkyl-lead additives in petrol) are an important mobile source of lead released into the air in countries where leaded petrol is used. As this source is near	Lead

the population and widely distributed, road traffic is a major source of exposure.	
Mining, crushing, and smelting of ores, steel production, and battery factories	Manganese
Fossil fuel power plants, metal smelters, cement manufacture.	Mercury
Combustion of coal and other fossil fuels. Mining and refining operations, steel production, nickel alloy production, electroplating, and municipal waste incineration.	Nickel
Air conditioning, refrigeration and cooling equipment (CFCs/HCFCs), foam blowing and fire fighting (halons)	Ozone depleting substances (including CFCs, HCFCs, Halons)

## APPENDIX 2: EXAMPLES OF COMMONLY USED ABATEMENT EQUIPMENT

***Abatement Equipment (this box provides examples of commonly used abatement equipment)***

- *Cyclones (PM)*
- *Elutriators (PM)*
- *Mechanically-aided Separators (PM)*
- *Momentum Separators (PM)*
- *Settling Chambers (PM)*
- *Condensation scrubbers (PM)*
- *Fiber-bed scrubbers (PM, VOCs and inorganic liquid aerosols)*
- *Impingement plate/tray-tower scrubbers (sometimes called acid gas scrubbers) (PM, inorganic fumes, vapours and gases, VOCs)*
- *Mechanically aided scrubbers (PMs, hydrophobic VOCs)*

***E.t.c.***

**APPENDIX 3: PROCESSES SPECIFICALLY REGULATED IN GER,  
APPENDIX 1, ARTICLE 11**

NOTE: All the specified limits are **maximum** limits.

**A) COMBUSTION FACILITIES**

a) Combustion Facilities (GER Environmental Standards reference 11-a)

	TOTAL SUSPENDED MINUTES	SULFATE OXIDE	NITROGEN OXIDIZERS FOR BURNING OIL FACILITIES	NITROGEN OXIDIZERS FOR BURNING GAS FACILITIES
Fossil fuel fired boilers	1-43 nanogram/gol (0.1 pound/MBTU)	2-1 nanogram/gol (2.3 pound/MBTU)	3-130 nanogram/gol (0.3 pound/MBTU)	4-86 nanogram/gol (0.2 pound/MBTU)
Furnaces having a heat input capacity equal to or greater than 20 MW				

**B) PETROL AND PETROCHEMICAL FACILITIES**

b-1) Storage vessels for petroleum liquids with a capacity >1000 barrels (5614 cubic feet) (GER Environmental Standards reference 11-b-1)

VAPOR PRESSURE	METHOD TO CONTROL VAPOR LEAKAGE
Reservoirs of organic compounds whose vapor pressure is <b>more than 570 mm. mercury</b> (11 PSI)	Vapor retrieving systems or similar systems;
	Tanks of swimming roofs suitable for crude oil storage provided that the owner shall provide a fixed inspection system for sealants and in consideration of the availability of a permanent program to prepare the related reports.
Reservoirs of organic compounds whose vapor pressure is <b>more than 78 mm. mercury</b> (PSI 1.5), and those which are <b>less than 570mm. mercury</b> (11 PSI)	Double sealant swimming roofs or with any other similar systems.

- b-2) FCC Unit Catalyst Regenerators (GER Environmental Standards reference 11-b-2)

UNIT	CO	LEAKING SUSPENDED MINUTES
Carbon oxide boilers of high temperature	500 ppm	-
Air cleaners	-	1 Kg/metric ton of coke coal

- b-3) Fuel Gas Combustion Processes (GER Environmental Standards reference 11-b-3)

“Ammonia washers or any other suitable operation for gas cleaning must be used in order to limit the percentage of Hydrogen sulphide in the exhausted gases to 230 mg. In every 1m<sup>3</sup> (150 part of a million)”.

- b-4) Claus Sulphur Recovery Plants (GER Environmental Standards reference 11-b-4)

“Regarding sulphur retrieval establishments Klawz operation shall be used for two or three stages to get 95% at least of the whole sulphur quantity”.

**C) FERTILIZER FACTORIES**

- c) Fertilizer Factories (GER Environmental Standards reference 11-c)

“Gas leakage outlets in fertilizer factories must be controlled through burning or through another suitable cleaning method to ensure removal of 99% of the evaporating organic components”.

**D) CEMENT FACTORIES**

- d-1) Cement Kilns (GER Environmental Standards reference 11-d-1)

UNIT	PARTICULATE MATTER
ANY unit (Electrostatic electrical precipitator, Fibre filters, etc)	0.15 Kg/metric ton

d-2) Clinker Coolers (GER Environmental Standards reference 11-2)

CLINKER COOLERS CONTROLLED THROUGH:	PARTICULATE MATTER
Fibre filters	0.05 Kg/metric ton
Any Other	

**E) ESTABLISHMENT PRELIMINARY REDUCTION OF ALUMINIUM**

e-1) Aluminium reduction pot lines (GER Environmental Standards reference 11-E-1)

REDUCTION CONTAINERS CONTROLLED THROUGH:	FLUORIDES
Suitable air cleaner instrument	1.25 Kg/metric ton

e-2) Anode Bake Plants (GER Environmental Standards reference 11-e-2)

HEATING ESTABLISHMENT OF ELECTRIC POLE CONTROLLED THROUGH:	FLUORIDES
Suitable air cleaner instrument	0.05 Kg/metric ton

**F) IRON AND STEEL FACTORIES**

f-1) Iron and Steel plants: Electric Arc Furnaces (GER Environmental Standards reference 11-f)

ELECTRIC FURNACES CONTROLLED THROUGH:	PARTICULATE MATTER
Suitable gas cleaner instrument	12 mg/m <sup>3</sup> of dry measurement

**G) LIME MANUFACTURING PLANTS**

g-1) Lime Manufacturing Plants; Rotary Kilns (GER Environmental Standards reference 11-g)

<b>ROTARY KILNS CONTROLLED THROUGH:</b>	<b>PARTICULATE MATTER</b>
Suitable gas cleaner instrument	0.2 mg/metric ton of crude used limestone <sup>3</sup> of dry measurement

## APPENDIX 4: WASTE WATER

Table 1: Key Water Pollutants in Saudi Arabia, and contributing Sectors (Source: World Bank Report, Parameters Worksheets)

Water Pollutant	Key Sectors	Other contributing Sectors (not exhaustive)
BOD (Biochemical Oxygen Demand)	Sewage treatment plants	Discharges from wastewater treatment plants, industrial effluents and agricultural run-off
Residual chlorine	Desalination plants Petrochemical industry	Released to the environment through accidents, as releases from industries, or as by-products from commercial or private uses, especially following use of the chemical for sterilisation and disinfection.
COD (Chemical Oxygen Demand)	Sewage treatment plants	Industries with a large amount of organic waste.
Contaminated cooling water (e.g., discharged to sea containing low levels of oil)	Petrochemical industry	
Cooling water heat load	Desalination plants Petrochemical industry	Industrial effluents, power plants, metal foundries and sewage treatment works.
Heavy metals (*see Table 2 for list of heavy metals and other sources)	Tanneries Electroplating	
Nitrates	Sewage treatment plants Agriculture	Discharges from industrial processes, motor vehicles and intensive agriculture
Oil and grease	Sewage treatment plants	
Phosphates	Agriculture	
Phosphorous	Sewage treatment plants	Animal wastes, fertilizers
Suspended solids	Sewage treatment plants Petrochemical industry	

Table 2: Other Water Pollutants (not exhaustive) and contributing Sectors/Activities (Source: Parameters worksheets)

<b>Contributing Sectors/Activities (not exhaustive)</b>	<b>Water Pollutant</b>
Released by some industrial processes (e.g. ammonia-based pulp and paper production) and also as a component of municipal or community waste.	Ammonia (as nitrogen)
Occurs from industrial effluents, including mining wastes, and via atmospheric deposition.	Arsenic*
Fertilizers produced from phosphate ores constitute a major source of diffuse cadmium pollution, however spills from waste disposal constitute an other source.	Cadmium*
the use of inorganic fertilizers, landfill leachates, septic tank effluents, animal feeds, industrial effluents, irrigation drainage, and seawater intrusion in coastal areas.	Chloride
Largely through spills and discharges and through use as a solvent in some pesticides can be leached.  Release occurs from its production and use as a chemical intermediate, evaporation from solvent, aerosol, and anesthetic applications, stack emissions from plastics and refuse combustion, leaching from landfills, and formation via microbial degradation of other chlorinated solvents.	Chlorinated Hydrocarbons
Leather tanning and textile industries as well as those that make dyes and pigments can discharge both chromium(III) and chromium(VI) into waterways.	Chromium*
Sewage treatment works and agricultural waste / runoff. Storm water.	Faecal Coliforms
Released through mining, farming, and manufacturing operations and through waste water releases.	Copper*
Discharges from some metal mining processes, organic chemical industries, iron and steel plants or manufacturers, and publicly owned wastewater treatment facilities, vehicle exhaust, burning of municipal waste, and the application of cyanide-containing pesticides.	Cyanide
Floating screenable solids >1cm	Floatables
Lead can be released from industrial processes and solid waste combustion.	Lead*
Important sources of mercury release include the combustion of fossil fuels, metal smelters, cement manufacture, municipal landfills, sewage, metal refining operations as well as from chloralkali plants.	Mercury*
Nickel may be released from industrial wastewater, from the stacks of large furnaces used to make alloys, from power plants and waste incinerators.	Nickel*
From waste materials and effluents	Organic Carbon (TOC)
Phenol occurs through accidents, as releases from industries, or	Phenols

as by-products from commercial or private uses	
Variety of sources, an indicator rather than specific pollutant	Total Kjeldahl Nitrogen (TKN)
As the result of mining, purifying of zinc, lead, and cadmium ores, steel production, coal burning, and burning of wastes	Zinc*