PART I: INSTITUTIONAL & ADMINISTRATION REQUIREMENTS

In the year 1992, and following the world summit on environment and sustainable development in Rio de Janero, the Government of the Hashemite Kingdom of Jordan signed the Agenda-21.

The Agenda-21 sets out the major policy recommendation instrumental to global environmental protection and sustainable development.

The adherence of Jordan to the objectives and aims of this Agenda-21 determines since, the national policy and strategies for the protection of the environment within the Kingdom and sustainable development in order to guarantee economic and social progress and secure worthy quality of life for all future generations in Jordan.

The environment protection law No.12 for the year 1995 provides definition, frame and dimension to this new environmental and social policy.

According to article # 15 of the environmental protection law GCEP is entitled with the implementation of E.I.A system within Jordan.

In order to ensure efficient application of EIA, GCEP has to set up the appropriate institutional requirements needed to be in place for an effective (E.I.A) system.

Ideally, an EIA management system would include elements from combination of successful systems. Documentations for such systems have been checked out by the committee which is responsible for setting up an EIA system for Jordan including those systems for U.S,Canadian, Germans and others.

The common factors among these operable systems include the following:

Responsibility for EIA review rests with one agency in a given region.

The responsible agency is set up in such away as to facilitate the entire EIA process, from submission of project back grounds to final approval of EIAs.

The organizational structure must necessarily be able to coordinate with relevant private and public sector agencies in all its operations.

The organization must follow the exact laws and procedures and conduct all work in a transparent manner.

Based upon the experiences of successful organizations and taking into account the above mentioned factors, an ideal situation for an organization like the GCEP would include a senior manager (within a known management system) and researchers and administrators.

These would be the minimum numbers of levels required to ideally manage a successful project.

The senior manager or the director of the environmental impact assessment directorate.

This individual would have the primary responsibility for work progress and development and be in a position to make decisions regarding any EIA process for any project. The EIA director is
responsible for the overall management of the department in terms of personnel and resource administration. The director facilitates and handles all requests for project EIAs.

The director will be the lead reviewer of all EIAs submitted to the General Corporation for Environment Protection and will have the authority to appoint persons on the EIA review committee.

PROJECT COORDINATORS:

These individuals would be involved in directing separate divisions within the EIA system, from EIA development and EIA operations to EIA review.

These individuals will have a basic engineering background with some background on environmental management.

ENVIRONMENTAL RESEARCHERS:

These individuals would be involved in day-to-day operations for projects, either as part of a review team to facilitate the work or part of operations to monitor scoping session.

These individuals could also be a part of the review department where actual analysis, review and monitoring activities are required.

Given the personnel requirements above, an ideal situation for organizational system for EIA management could be seen as follow:

EIA Directorate
(EIA director)

EIA DEVELOPMENT:

It is the division responsible for facilitating and handling requests for around the initiation process and initial consultation along with legal affairs. Thus public relations are essential in this division.

THE EIA OPERATIONS DIVISION:

Is responsible for ensuring scoping session are adequately conducted. In a situation where not much development work exists, this division could be easily attached to the EIA development division.

EIA REVIEW:

Involves reviewing the technical would necessarily involve
experienced individuals who have no conflicts of interest of any kind.

The EIA review committee would include personnel from GCEP and from other governments departments as well as from the private sector, if necessary.

The disciplines required for each Environmental Impact Assessment will vary with the general features of the projects, therefore this committee will be an ad-hoc committee established for each Environmental Impact Assessment.

This ad-hoc committee is headed by the EIA Director and deputized by the head of the EIA review division.

In order for the General Corporation of Environment Protection to carry out its responsibilities and duties concerning Environmental Impact Assessment in an efficient way it has first of all to start building up the capacity of its own staff, secondly it has to bear the responsibility of raising the awareness of the different parties involved in the EIA process.


PROCEDURE FOR EIA

LEVEL 1

I. INITIAL FILING

The Proponent applies to the General Corporation for Environment Protection (GCEP) of his/her intention to undertake a development project using the application form, Project Information Form (PIF), shown in Annex (1.1).

The PIF instructs the Proponent on the information required by GCEP, for due consideration and decision.

The required information includes the following:

General information on the location of the planned project supported by a site map.

A brief description of the planned project, purpose and nature, capacity, major components and facilities, and future expansion plans.

Expected water, energy, lands and labor requirements.

Expected emissions into the environment and proposed control and treatment methods.

Implementation schedule for the proposed projects at different phases (planning, construction, operation, etc.)

The PIF forms are available at GCEP.

GCEP, upon receipt of the PIF, evaluates the data submitted by the Proponent and consults the Inclusion List, included in Annex (2), to determine whether or not the proposed development project is subject to formal Environmental Impact Assessment (EIA) procedure.

GCEP files its decision and notifies the Proponent in writing, within two weeks of the time the PIF is received, giving clear and precise reasons. The statement of decision and the PIF are then made available for public information by posting on the public notice board at GCEP for two weeks.
Where the decision indicates that EIA is not required for the proposed development project, the Proponent may seek approval immediately from the appropriate regulatory authorities and proceeds with normal licensing application and procedures, as this decision does not replace or override the normal requirements for permits or licenses.

Where GCEP rules that EIA is required for the proposed development project, the Proponent proceeds with the implementation of EIA.

II. DIRECTIVES AND ISSUES SCOPING

GCEP provides the Proponent with sector-specific Directives to assist the Proponent in identifying issues to be covered in the EIA (i.e. SCOPING).

The Directives constitute a legal binding guidance to the Proponent, containing the minimum requirements for the elaboration of EIA and the Environmental Impact Statement (EIS).

The Directives are sector-specific and may provide in most cases, supplement information and instructions related to various sub-sectors.

The aims of the Directives are:

To inform the Proponent of the most suitable approach to arrive at the information and data required by GCEP.
To provide the Proponent with general explanation and instructions for the implementation of EIA and preparation of EIS.

To indicate sector-specific issues, emphasizing on the most important impacts on the environment and sustainable development.
To facilitate the elaboration of specific Terms of Reference (TOR) for EIA to be drafted by the Proponent.
To ascertain pertinent and complete EIA.

The Proponent shall, when required, recur to public participation when setting up the Terms of Reference (TOR) and working plan for EIA and EIS, as part of the scoping process. Annex (3) contains explanatory notes on scoping and TOR.

GCEP disposes of the capacity to:

Provide technical advice in cases of persisting queries.
Draw, together with the Proponent, procedural guidelines for scoping, if needed.
Advise the Proponent on the level of public participation, if needed.

III. TERMS OF REFERENCE

GCEP reviews the proposed TOR submitted by the Proponent, modifies, and approves final TOR.

LEVEL 2

I. EIA AND EIS

The Proponent, upon approval of the TOR by GCEP, proceeds with conducting EIA for the proposed project. The Proponent shall seek technical support from qualified, independent specialists approved by GCEP.

The benefits of EIA are:
GCEP obtains clear and comprehensive information about the proposed project, its potential negative impacts, significance of the impacts, and the firm intention of the Proponent to reduce the adverse impacts to a level compatible with the imperatives for the protection of the environment, to ensure justifiable evaluation and decision.

The Proponent obtains detailed information about the sustainability of his/her proposed project, adjust initial plans, and incorporate appropriate mitigation measures as an integral part of his/her project.

The EIS must include, but not limited to, the following main sections:

- Executive summary
- Introduction
- Project description
- Issues scoping
- EIA methodology
- Assessing potential impacts
- Conclusion
- Mitigation plan
- Environmental management plan
- Appendices

Annex (1.4) provides detailed description and list of contents of EIS.

Once the EIS is completed, the Proponent submits (4) signed copies to GCEP.

The Proponent is held responsible to satisfy the requirements of GCEP in order to assist proper evaluation.

II. TECHNICAL EVALUATION

Upon receipt of the EIA and EIS and due registration, GCEP undertakes technical appraisal of the EIS to assess the following:

- The quality and pertinence of the submitted material.
- The scientific value and plausibility of the applied methods and approaches, information and research results.
- The compatibility of the impacts with the bearing capacity of the environment.

assisted by specialists from the various relevant Ministries, undertakes the evaluation of the entire EIA and EIS. GCEP can seek specialized technical help, if needed, from research institutes and universities.

GCEP sets up the above mentioned inter- Ministerial, inter-Departmental Technical Evaluation Committee and coordinates its activities to ensure proper participation and comprehensive inter-disciplinary evaluation.

is composed of three distinct steps, as follows:

**STEP 1**

Evaluation of the general conformity and consistency of the submitted EIS with the requirements of the Directives, TOR and other legal references.

Where the EIA and EIS do not conform to the legal requirements, and/or the sector-specific Directives and/or the TOR, GCEP informs the Proponent, in writing, within two weeks of having received the EIA and EIS. GCEP requests from the Proponent to incorporate the
necessary adjustments, additional information and data, scientific clarification and re-submittal.

**STEP 2**

Evaluation of the credibility of the EIA, particularly, the appropriateness of the methodology and approach of the entire EIA, the scientific validity of the study, the scientific/professional quality of supporting resources such as licensed laboratories, simulation techniques etc., and the legal value of the various evidences.

**STEP 3**

Evaluation of the compatibility of the residual impacts with the protection of the environment and sustainable development in Jordan, referring to existing standards and norms, limits and threshold values, and confirmed scientific references.

The Technical Directorate at GCEP is responsible to complete the evaluation process within thirty days of having received and registered the EIA and EIS for a proposed project. This time-line applies for complete submittals only. Time required by the Proponent to complete and provide additional requested data, is at the Proposed projects of major importance and significant inter-sectoral impacts are exempted from this time-line.

Upon completion of the evaluation, the Technical Directorate informs the Director General (DG)/GCEP about the findings and conclusion, and justifies this conclusion.

The technical report prepared by the Technical Directorate and submitted to the DG/GCEP provides confirmed facts and data to the decision-maker, and gives executive information concerning the conditions and particular observations related to the proposed project.

**III. DECISION AND APPROVAL**

The DG/GCEP reviews the technical report and makes his/her decision on whether or not the proposed development project can proceed. The decision is announced on the public notice board at GCEP for two weeks.

The decision of GCEP is notified to the Proponent in writing within forty-five days of having received the EIA and EIS from the Proponent.

Upon expiry of this period, and in cases where no decision of GCEP has been filed, the EIA and the connected EIS are considered as approved without further conditions.

In any case of evident persistence of significant residual impact on the environment and sustainability of the socio-economic development, the DG/GCEP may reject the application and proscribe the implementation of such project.

Where the DG/GCEP rejects the application for a proposed project, the Proponent has the legal right to appeal to the Environment Protection Council. The appeal must be filed within 15 days from the date of issuing the decision. The council studies and evaluates the case and its decision is considered final.

The approval of the EIA and EIS is a legal prerequisite for further licensing from other relevant governmental agencies. Any
application for permits or licenses is approval or exemption is attached to the application.

the EIS submitted by the Proponent becomes legally binding. GCEP has legal power to ensure and enforce compliance with the EIS, during the various stages of the project.

In case of persisting non-compliance, GCEP applies the legal consequences determined by Law No. 12/95 for the Protection of the Environment.

LEVEL 3

I. ENVIRONMENTAL MANAGEMENT PLAN

The approval of an EIA and EIS is linked to conditions for follow-up of the activity during its different phases. The purpose of the follow-up is to ensure that the project does not exceed the environmental impacts predicted in the EIA.

The Proponent is responsible for implementing the Environmental Management Plan (EMP), included in the EIS and approved by GCEP. Thus, the Proponent shall undertake the necessary monitoring (compliance, effectiveness, and impact monitoring) and submit the results periodically to GCEP, as mentioned in the EMP.

GCEP receives files and evaluates such submittals. In any case of non-compliance with the requirements as set forth in the EIS and EMP, GCEP informs the Proponent in writing giving clear instructions on the required measures to be taken by the Proponent to rectify the situation.

GCEP, as empowered by Law No. 12/95, implements any monitoring, inspection, and follow-up activities on its own initiative and in coordination with other concerned authorities.
EIA PROCEDURE
simplified flow diagram

Proponent submits PIF to GCEP

GCEP files PIF, evaluates contents & consults Inclusion list

GCEP makes decision & informs Proponent in writing

GCEP announces on public notice board for two weeks

Proponent proceeds with normal licensing

EIA is not required

EIA is required for project

Proponent submits draft

GCEP reviews draft TOR, modifies, approves & informs Proponent

GCEP Technical Directorate (TD) evaluates Directives & technical aspects when needed

Independent, approved specialist

Proponent submits 4 copies of EIA & EIS to GCEP

Proponent conducts EIA & prepares EIS

Proponent adjusts, modifies, completes and re-submits EIS

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

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* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

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* reviews Directives
* recurs to public participation
* prepares work plan for EIA
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* reviews Directives
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* prepares work plan for EIA
* prepares draft TOR

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR

Proponent

* reviews Directives
* recurs to public participation
* prepares work plan for EIA
* prepares draft TOR
ANNEX 1.1

PROJECT INFORMATION FORM (PIF)      FILE NO.------

Instructions:
* This form should be completed by the Proponent for all development projects prior to licensing.
* The purpose is to determine whether or not the proposed development project is exempted from Registration for Environmental Impact Assessment (EIA) under the JEIAA No. (----) for the year -----

I. General Information
   Project Title: ---------------------------------------------------------------
   Location: (attach site map)----------------------------------------------------

   Name of Proponent: -------------------------------------------------------------
   Address: ------------------------------------------------------------------------
   Tel. No: ------------------------------------------------------------------------
   Fax No: ------------------------------------------------------------------------
   E-mail: ------------------------------------------------------------------------
II. Project Description

Purpose: -----------------------------------------------

Nature: -----------------------------------------------

Capacity/unit: -----------------------------------------------

Components: -----------------------------------------------

Facilities: -----------------------------------------------

Implementation Schedule: -----------------------------------------------

Expected Expansion: -----------------------------------------------

III. a. Sector:

* Industrial  * Agriculture  * Tourism & Recreation
* Energy  * Commercial  * Housing
* Mining  * Transportation  * Water & Sanitation
* Waste Disposal
* Other (specify)-----------------------------------------------

b. Sub-sector: -----------------------------------------------

IV. Water Requirement

Source: * Municipal * On-site Private Well * Tanker * Other

Expected Consumption (m³/d) -----------------------------------------------

V. Energy Requirement

Source: * National Grid * Electricity Generator

Expected Consumption: * Fuel Oil * Diesel -----------------------------------------------

VI. Land Requirement:

Area: -----------------------------------------------

VII. Labor Requirement:

No. of Workers: * Skilled  * Unskilled-----------------------------------------------

VIII. Expected Emissions and Wastes

a. Waste Water

Quantity (m³/d) : -----------------------------------------------

Treatment/Reuse/Disposal: -----------------------------------------------

b. Solid Waste:

Quantity (kg/d) : -----------------------------------------------

Treatment/Recycling/Disposal: -----------------------------------------------

c. Air Emissions:

Pollutants: -----------------------------------------------

Control Methods:-----------------------------------------------
DECISION:

(A) Project is exempted from EIA under JEIAA No. ( ) of the year ----
Proponent proceeds to normal licensing and permitting.

(B) Project is not exempted from EIA under JEIAA No. ( ) of the year ---
Proponent should register for EIA at GCEP/EIAD.

Recommended by:                                Approved by :
Name: ---------------------------------------- Name: ----------------------------------------
Title: ----------------------------------------  Title: ----------------------------------------
Date:----------------------------------------- Date :-----------------------------------------
Signature: ----------------------------------  Signature: ----------------------------------
ANNEX 1.2

List of activities subject to EIA Procedure and approval prior to any other licensing by public authorities Concerned, and implementation.

Any industrial activity generating solid, liquid or gaseous emanation of dangerous, unsanitary or annoying nature and likely to generate significant negative impact on natural and human environment.

ENERGY PRODUCTION

- Thermal power plants and any other combustion operated power generation (> 300 MW);
- Installation for industrial production of electric energy, steam or hot water;
- Installation for the transport of gas, steam, hot water and electric energy in overhead lines;
- Hydrocarbon and fossil gas industry: prospecting, production, transport
- Hydrocarbon refineries and gasification and liquefaction plants of > 500 t/day of carbon fuel or bituminous schist.
- Fossil gas storage units
- Open air natural gas storage units
- Underground storage tanks for gas
- Gas and oil pipelines
- Industrial carbonising plants
- Hydro-electric power plants

CHEMICAL & PHARMACEUTICAL INDUSTRY

- Chemical industries
- Pharmaceutical industries
- Storage installation for petro-chemical and chemical products
- Production of artificial mineral fibres,
- Production, processing and filling of explosives and powder.
- Glass industry
- Phosphate industry

METALLURY & METAL WORKS

- Metallurgy, ferrous and other metal.
- Foundries and metal melting and casting works
- Metal works
- Boiler and container production industry, plumbing industry
- Surfacing and galvanising industry
- Cutting and sawing units
- Shipyards
- Aeroplane construction and/or maintenance
- Railway construction
- Car and motor assembling industry
- Scrap iron and junk yards.

MINING & QUARRYING

- Mining, quarries and open air mining.
- Underground prospecting by explosives
- Drilling and deep well construction, with the exception of soil and sub-soil quality test drilling and particularly:
  - Geothermal wells
  - wells for waste storage and deposit
  - water production wells
  - mineral production wells and pits
  - coal production wells ( dry distillation of coal ):
- Cement and calcareous material production plants
- Asbestos cement production.

TEXTILE, PAPER, LEATHER, TIMBER PRODUCTION &
PROCESSING INDUSTRY

- Textile and dyeing industry,
- Industrial washing, cleaning and bleaching of woollen and other textile material
- Fibre dyeing industries;
- Paper, cardboard and cellulose processing and production.
- Tanneries, hides and skins industry.
- Timber processing industries;
- Fabrication of laminated and chip-board panels of fibre, sawdust, wooden chips and/or assimilated material
- Cutting and saw mills.
- Production and processing of elastomers

FOOD PRODUCTION & PROCESSING INDUSTRY

- Food production and food processing
- Fat and oil production and processing industry
- Sugar production, molasses and syrup industry;
- Diary plants
- Flour-milling and semolina production;
- Breweries and bottling plants
- Slaughter houses
- Food canning industry
- Fishery products processing and canning industry

RURAL DEVELOPMENT & AGRICULTURE

- Rural land consolidation and reallocation.
- Reforestation of > 100 ha.
- Clearance operations, and barren land or semi-natural land re conversion, for intensive agriculture, of > 50 ha;
- Rural irrigation schemes and works;
- Polder works and polder agriculture;
- Poultry farming;
- Pig farming;
- Aqua-culture and fish farming

INDUSTRY PARKS DEVELOPMENT AND IMPLEMENTATION

MAJOR URBAN DEVELOPMENT WORKS

TOURISM DEVELOPMENT, INFRASTRUCTURE AND IMPROVEMENTS

- Tourism facilities and centres, in particular activities situated in: mountains, coastal environments, forests, rural environments, national parks and other protected areas, situations in vicinity of cultural values and socially singular conditions;
- Tourism hotels > 250 beds.

INFRASTRUCTURE WORKS

- Roads, railways, airports
- Ports and harbours.
- Urban railway, in surface, overhead or underground position
- Dams and barrages, and other type of major water retention and water storage works.
- Water transfer schemes and works.
- River and waterways improvements, and connected works.
- Coastal civil works
- Sewage collection and disposal systems.
• Waste water treatment plants, and water conditioning plants.
• Installations for disposal, treatment and elimination of solid waste of any type and nature, and of any type of technical or biological processing

ANNEX 1.3

SCOPING & TERMS OF REFERENCE

SCOPING

Scoping is an important early step in EIA. It identifies the important issues that should be considered in the assessment and eliminate those that are not important. Thus ensure that time and money are not wasted on unnecessary investigations.

Scoping should aim at focusing the EIA on key components of the environment (or valued environmental components VECs), and on alternatives and issues of greatest concern.

Scoping is a process that result in identifying:
➢ The appropriate extent of EIA.
➢ The important issues and concerns.
➢ The information necessary for decision making.
➢ The significant effects and factors to be considered.

Scoping requires consultation with all stakeholders (public including NGOs, governmental / regulatory authorities, and the developer).

Different techniques are used for such consultation such as:
➢ Telephone calls.
➢ Meetings.
➢ Workshops.
➢ Writing letters.

TERM OF REFERENCE

Commonly soping is completed when a document (often called terms of reference) is produced setting out what the EIA is to cover (scope of EIA) and how is to be managed (schedule of activities). The terms of reference TOR should also be flexible to adapt to changes that may appear during the assessment.

The main components of the Terms of Reference document are:
➢ Background to the project.
➢ Setting the context for the problem.
➢ Alternatives (site and processes).
➢ Institutional and public involvement.
➢ Required information and data.
➢ Analysis of impacts.
➢ Mitigation and monitoring.
➢ Conclusions and recommendations.

The terms of reference can also contain:
➢ Schedule.
➢ Budget.
➢ Outputs reports.
➢ Negotiations in case of variations.

ANNEX 1.4

CONTENTS OF ENVIRONMENT IMPACT STATEMENT (EIS)

1. EXECUTIVE SUMMARY

The executive summary is a non-technical summary of the EIA study. It is the part of the report that is ready by most people. Thus it should be written in a clear way avoiding technical details. The executive summary is normally of 1-3 pages long. However, it may extend to 10 pages for large projects.

In some cases where projects are of wide public concern, it is a common practice to have a summary volume that can be widely distributed to interest people.

Executive summaries contain:

• Title and location of projects;
• Name of proponent;
• Name of EIA preparer;
• Brief outline of proposal;
• Significant impacts; mitigation/compensation measures;
• Proposed monitoring.

2. INTRODUCTION
This section introduces briefly:

- The purpose of the EIS;
- The scope of EIA;
- An overview of the undertaking;
- The regulatory process framework;
- The study strategy.

3. PROJECT DESCRIPTION

This chapter typically covers all information related to the undertaking in terms of need, component, activities, phases, facilities, and the schedule. It is also very important to include information about environment design features being adopted, and plans for employment and skills procurement.

A typical table of content for a project description chapter is as follow:

- Proponent Name
- Project overview
- Rationale and need
- Alternatives
- Site and route selection
- Facilities
- Environmental Design Features
- Project phases
- Employment and skills
- Environmental Management Plan
- Benefits Implementation Plan
- Schedule
- Emission, discharge and solid waste
- Zones of influence

It should be noted that the purpose of project description is to enable identification of major issues and concerns as well as to provide a basis for impact analysis. In preparing project description, the author should know the intended audience, as the technical format of the project description may vary accordingly. For example, if an EIS is to be read by technical terms and information. Project descriptions of less technical nature are prepared for public use.

4. ISSUES SCOPING

In this section, the results of the public and regulatory consultation processes are given. These include:

- Range of issues raised by the public and regulatory authorities
- Key issues identified
- Terms of reference.

A list of persons consulted and meetings held can be added including one-to-one meetings and public meetings.

5. EIA METHODOLOGY

In this section, a description of methodology adopted in analyzing and assessing the impact is given. For example, the EIS prepare can describe:

- How were valued environmental components determined
- What boundaries are
- Which methods were used to evaluate impacts
- Which significance criteria has adopted

6. ASSESSING POTENTIAL IMPACTS

This is the focus of EIS. The EIS prepare should present the results of the work conducted for each of the valued environmental components (VEC) as follows:
• Establish ecological context
• Establish boundaries
• Establish criteria for evaluating significance
• Describe existing environment
• Review mitigation specific to VEC
• Impact analysis:
  - Identification of project VEC interactions
  - Identification of issues and concerns with project VEC interactions
  - Consideration of existing knowledge about project VEC interactions
  - Impact assessment
    • Determining residual impact significance or acceptability
    • Monitoring and follow up
    • Summarizing impact analysis

7. CONCLUSION

Major findings of the assessment, particularly the predicted impacts are highlighted. Recommendations are also made regarding the acceptability of the proposed project taking into account the opportunities for mitigation, compensation, and monitoring. In case of assessing alternatives, a comprehensive review of residual impacts can be presented.

8. APPENDICES

• Data
• Component studies
• Detailed analysis
• Minutes of Consultation Meetings
• ETC
This present document concerns the sector of industrial processing activities in general, and the sub-sector of FOOD PROCESSING in particular.

As industrial processing in the various sub-sectors follows similar processing principles, logical lines, and basic techno-organisational logistics, structure and infrastructure, the present Directive provides orientation and guidance in two distinct parts:

PART I pertaining to processing industries (1) in general, and

PART II containing particular additional information and instruction specific to the sub-sector of Food Processing.

-sectors such as: Textile, Paper, Leather, Hides and Skins, and Timber processing. Chemical and Pharmaceutical industries and others will be available upon request.

PART I
DIRECTIVE
ENVIRONMENTAL IMPACT ASSESSMENT And EI-STATEMENT

ORIENTATION and GUIDELINES

Processing Industries 1

SECTION I

CHAPTER 1 The presentation of the proponents
Shall be presented under this first chapter, the propo
and function, his situation of responsibility for the activity subject matter of the EI-Statement, his full
address, telephone and other communication links.

Equally shall be made known, the specialist entrusted with the elaboration of the EIA and EI-Statement,
by indication of his name, function full address, telephone and other communication links.

Evidence shall be provided of his sound professional qualification for the specific study undertaking, and
for his status of independence.

CHAPTER 2 Summary information

of the EIA and EI-Statement to the decision-maker:

- the planned activity subject matter of the present EIA and connected
  statement, and its justification;
- its aims and purpose;
- the major impacts it may have on the environment, and the alterations it
  may generate to the various environmental compartments and biotypes, as
  wel
- the comparison of the impact with established norms and standards.

The latt -Statement may, if
applicable, indicate the positive impacts originating from the activity and beneficial to the social and
economic development of the country, a region or a selected area or community.

Thus, the Summary Information shall be concise, clear in its structure and expression, well referenced
and without ambiguity and polemics.

CHAPTER 3 Legal and institutional setting of the EI-

All legal references shall be indicated, that apply to the planned activity, to its implementation, and to the
present EI-Statement.

Such references shall include all particular laws, by-laws, codes and regulations that govern the
implementation and operations of the planned activity as well as eventual particular conditions and/or
characteristics of the activity or the implementation site / environment, and, in given cases, international
law, conventions and declarations pertaining to environment protection, to restricted or prescribed
activities, areas, material and the like.

The chapter shall as well include information about eventual special conditions issued by financing
organisations ( regional / international ) or international co-operation and pertaining to norms and
standards in general or in particular: to EIA.

SECTION II CHAPTER 4

1-General presentation of the activity
This general presentation shall be based upon appropriate mapping of the implementation site, its surroundings and access ways. Shall be indicated distinctly: the production unit(s), auxiliary unit(s), structure, buildings and general services.

Furthermore, the sub-chapter 4.1 shall inform about:

- the structural and functional links between several units,
- the identification of the planned processing methods and techniques, their respective license owners, confirmed references in Jordan and in the greater region, of such processing technologies and their application.
- Summary plan (at scale) of the implementation site.
- Presentation of the implementation programme indicating the implementation method (turn key, modu

This presentation shall equally identify:

- the planning engineer and eventually
- the construction company, if already retained,
- the provisional time schedule for implementation and start-up of operations.
- The planned or eventual extension phases (physical or production volumes);
- required for the implementation of the activity (transport, energy, water, workers hous
- estimated cost of the implementation: production units, environmental utilities
- pre(treatment of industrial waste water, other emissions, solid waste mana

2-Detailed description of the activity, and preliminary identification of sources of eventual pollution.

This sub-chapter starts from the general aim and purpose of the activity, and it shall describe all and any element of the industrial implementation and future operation that may have interrelation with the environment and eventually cause significant negative impacts on the environment and on the process of sustainable development of the country.

It is important to note, that any non pertinent information shall be avoided, and will not be received by the authority.

Thus, the description shall include comprehensive information including:

(i) site preparation and construction,
(ii) operations of the processing plant,
(iii) handling of raw material: transport, loading and unloading, stor
(iv) energy production operations,
(v) infrastructure (access utilities),
(vi) particular risks and accidents,
(vii) waste discharge, treatment and management,
(viii) maintenance management, monitoring and control.
2.a Site preparation, and construction

The required description shall concern:
the planned implementation works as well as the prior site preparation works; site clearance and
earthworks, provisional access ways construction and material storage improvements;
construction works, techniques and particulars.

The description shall be concise and clear, and indicate any foreseeable risk of pollution and other impact
on the environment.

The description shall be completed by a scaled map and plans, as well as by a provisional implementation
schedule.

2.b Operations

- Brief but clear description of the main processing techniques available for
  the various units and production stages, and indication of the criteria and
  justification for the selection of the retained processing techniques.

- Description of the retained processing techniques, supported by graphs,
  charts and explanatory schemes regarding: the routing and the sequences of
  the processing, the circulation of liquids and gas, physical operations,
  chemical reactions etc.

- Indication of raw materials, products, sub- and by-products, emissions,
  waste and other emanation.

- Identification of all and any operation pertaining to the processing and to
  the functioning of the plant,

- according to their nature: normal operation (continued, discontinued,
  intermittent or emergency operation), cleaning of the unit, maintenance
  operation etc.

The various sources of noise and gaseous emanations, liquids and solids shall be indicated.

2.c Handling of raw material, sub- and by- products, and finished products.

The description shall include all of the handling operations of raw materials (including of chemical
products), sub- and by-products and finished products:
unloading, loading, transportation, pre-treatment, storage and other operations undertaken on the site of
the future activities or nearby.

The description shall work out particularly regarding potential pollution cases (risks), and briefly
evaluate the importance of such risk (probability, qual

2.d Energy production, and other utilities.

Shall be described: all and any installation planned for energy production and supply to the industrial
unit.
The description shall include graphs and schematic drawings showing the process of arrival, storage and handling.

The emissions, effluent and waste generated by such energy production operations and likely to cause negative impact on the environment, shall be indicated and evaluated.

2.e Transport requirements.

The required infrastructure for road and/or rail access shall be described. The expected traffic shall be indicated in terms of quantity, frequency, origin and/or destination; shall also be indicated in the type and nature of the planned transport: personnel, mat

In cases, where specific transport infrastructure improvements are planned such as: harbour, railway station, multi-

-Statements to be established and submitted separately.

2.f Special risks and accidents.

The risk of accidents and emergency situations shall be indicated and evaluated as follows:

- Identify and evaluate the risk of accidents from potentially dangerous products. Indicate their place of storage or application as well as the security provision planned as part of the present activity / project.
- Identify the risk of accidents and emergency situations that may be caused by deficient installation or malfunctioning of the latter and thus lead to significant environmental damage.
- Identify and evaluate eventual and/or accidental malfunctioning or any other danger caused by human error of the operating personnel, by material ageing or usury, corrosion, the loss of control over the processing plant,
- Quantify the probability of any of these major risks, and their consequences taking into account the possible interaction with surrounding products, processing plants, by-products etc.
- In cases where occasional overload, overcharges or overflow may be unavoidable, indicate how the probable pollution and induced incidents can be contained, and how security provisions in utilities and/or special installations can interfere in order to prevent from major pollution and damage to the environment.

2.g Management of solid and liquid waste, pre-treatment of effluents.

All planned installation and techniques for waste collection, disposal and treatment as well as liquid waste pre-treatment shall be described, including methods of treatment / pre-treatment and control provision.

Graphical support and charts are considered helpful to clear description.

The control methods shall be indicated, as well as intervention programmes for any case of major malfunctioning or accident.

2.h Maintenance management, - monitoring and control.
The monitoring and control system shall be summarily described (a detailed description of the maintenance management remaining reserved for chapter 13 of the present EI-Statement).

The monitoring system shall primarily function in order to detect and to inform unexpected and significant pollution of the environment, and it shall be designed such as to initiate instantly appropriate intervention and curative measure.

3. Balance of material flow:

Entries, output, effluents and waste, norms and standards.

The entire flow.

In general for the production entity, and in particular for each processing unit or sub-unit -, for raw material, auxiliary material and effluents and waste (before and after treatment) shall be demonstrated in the form of flow diagrams, - dimensioned and well explained. Different flow diagrams shall apply to the several cases of operations as indicated in chapter 4.2 b above.

These balances indicate in volumes and in quality terms, all of the entries and outputs of the raw material, additional material, utilities, products, sub- and by-products, waste and effluents, evaporations, emanations etc. The description of the qualities shall include the chemical composition, the physical composition (temperature, pH etc.)

- The list of analytical methods shall be enclosed with the annex to the present EI-Statement.

- Noise and vibration levels shall be indicated,

- for occasional and/or intermittent waste and effluent production, frequency, duration and estimated quantities shall be notified.

Norms and standards,

all and any national norms and standards applicable to the activity shall be listed.

In any case of non-availability of Jordanian norms, standards or similar guidelines, international norms shall be used.

However, in such cases, at least three different international norms shall be indicated, and at least one shall originate from a European industrialised country and one other from a country with similar environmental conditions as those prevailing in Jordan.

The choice of the referenced norm or standard shall be justified.

CHAPTER 5
Alternative solutions, and justification of the final option

The justification of an industrial project refers usually to its aims and objectives, market opportunities and demand, techno-commercial principles, study approaches to identify and to integrate into the concept and implementation programme, a maximum efficiency, and sustainability.

Such approach implies references to the various alternative solutions that have been investigated, and to the criteria applied for selecting the final solution subject matter of the present EI-Statement.

Thus, the present chapter shall contain as a minimum:
• a brief presentation of the sector / sub-sector, its condition in terms of demand and existing offer, its techno-commercial functioning, deficiencies, major challenges and flexibility;
• the functional and techno-commercial criteria for the selection of the implementation site for the activity, - with pre-defined input and output quantity margins, the principal design criteria for the identification of the most efficient solution in terms of processing techniques and efficiency, operations, utilities and access, economics, social benefits and environmental compatibility.
• the various solutions (site and implementation) investigated and developed prior to final option of the present solution,
• the selection criteria applied for the evaluation of the various alternative solutions, and the justification of the final selection.

It is important to note that such justification includes all of the aspects of the very activity in its global setting, - technically, economically, socially and environmentally -, and it incorporates the entire activity undertaking from site selection through implementation, operational phase, extension, closing down, land reclamation and final restoration of the site and the environment.

CHAPTER 6
The Potential Impact Area

The Potential Impact Area incorporates all and any of the space related dimensions exposed to pollution risks or significant impact emanating from the activity, - directly or indirectly. Consequently, it shall include the implementation site and its surroundings, the latter to be dimensioned in function of its various exposures to the different types and nature of risks; the delimitation of the air space risk areas shall always be the projection of the latter on the ground level.

As the validity of the entire EI-Statement depends on the pertinence of the impact study area, the importance of its delimitation as well as its implication on study rationale and economics are evident.

It is however, that direct impacts induce rather often indirect reaction within the synergetic compound of an ecosystem that can hardly be foreseen without in-depth study and analyses of the condition of the environment and the importance and characteristics of a given impact. Consequently, it is suggested to opt for a two-step approach for defining the potential impact area:

Step 1: define at the initial study stage, a preliminary area limit incorporating the propagation lines and areas of the various emanations and significant impacts likely to be generated by the activity. Thus, this initial delimitation designs an envelope of a series of specific impact sub-areas.

Step 2: With the ongoing study work on the analyses of the present condition of the environment, its particular sensitivities and ex...
The time horizon aimed at by an activity, or by a project, is important and decisive for successful EIA and pertaining Statements, evaluation and approval; successful EIA being conditioned by its application to the entire and integral time span and horizon of an activity:

- pre-implementation phase,
- site acquisition, and preparation of the site and its surroundings ( provisional access ways, material storage, workers housing ),
- construction phase,
- production units construction, annex facilities, infrastruc
- start-up and operations phase,
- planned or probable extension phase of the structural improvements and/or of the production capacities and activities, the annex facilities and/or the related infrastructure improvements;
- closing down and dismantling phase,
- and reclamation and final restoration phase of the site and its environment.

The impacts may vary from phase to phase, - as it regards their type, nature and importance, and an accumulation of negative impacts is not to be excluded!

Consequently, it is an important requirement ( and task of the EIA ) that the EI-Statement includes a clear description of the state of the environment before the implementation of the activity, as well as evolution forecast through the entire lifetime of the activity for the case of evolution without the event of the activity.

The appreciation of the final environmental statement and balance shall strongly depend on the comparison of the two evolution scenarios: without activity with activity.

CHAPTER 8
Description of the environment

The accurate identification and correct assessment, evaluation and appreciation (by the decision-maker) of the impact originating from the activity, will strongly depend on a qualified and thorough description and analyses of the state of the environment concerned.

It is therefore of outstanding importance, to carry out this part of the study with utmost care, in-depth and application, and to present the relevant findings in a most transparent and comprehensive language and format.

Such presentation shall be supported by pertinent illus
demonstrational material, and all and any references and sources shall be clearly indicated.

Voluminous source and reference material may be submitted to the authority in an annex document to the present EI-Statement.

The following information concerning the structure and contents of the present chapter, is indicated as guidance only, and it is not exhaustive.

The chapter to contain presentation of :

The physical environment
It shall be described and documented in particular (but not exclusively): the natural site conditions such as the topography, hydrography, hydro-geology, climatology and air quality (particularly shall be indicated existing pollution charges and levels such as: particles, oxides of sulphur, nitrous oxides, carbon vibration level, etc.

**the biological environment**

the fauna and flora, including of the important wildlife habitats, protected / endangered species, unique or rare ecosystems, forest and fishery re

**the human environment**

the resident population, their demographic, socio-economic and social condition and trends, existing facilities (education, health, civic), prevailing occupations, socio-professional strata and income level, land use in the area (agriculture, tourism), areas of unique or exceptional ecological or aesthetic quality and values, important recreational, cultural or historical areas.

**SECTION III**

**CHAPTER 9**

**Identification and analysis**

The subject matter of the present chapter addresses three distinct study activities:

- identify the significant impacts,
- analyse and quantify the impact,
- assess the environmental compatibility (by comparison to established norms and standards e.g.)

The identification shall be undertaken in a systematic way and approach in order to ascertain entirety.

The analysis and quantification shall be based upon recognised methods, qualified specialist support (licensed laboratories e.g.), and be documented in a most transparent format (annex to the EI-Statement: laboratory reports, tests and evaluation methods and formula, resource literature, documents, persons).

The environmental compatibility shall refer to established national norms and standards, and only in the absence of those, comparison to international norms shall be applied. In the latter case, at least

- three different norms shall be indicated, including
- one of a European industrialised country and
- one other from a country with most similar environmental conditions to those prevailing in Jordan.

The choice of the finally selected norm of reference for the present EIA, shall be clearly indicated and justified.
It is important to note, that the significant impacts on the environment to be identified include those that occur and those that may occur accidentally.

The source of the impacts may be direct or induced (indirect), - in first or subsequent generation, immediate or timely retarded.

The most reliable, transparent and justified method for impact identification being the crossing of the various single elements of the activity (chapter 4) with the various single elements of the environment (chapter 8), a matrix method (see example in the annex hereto) may be applied.

The same matrix could be used for synoptic indication of the environmental compatibility, reveal clearly the eventually required measures for the reduction of:

Impacts, and finally justify an ultimate matrix and notify the decision-maker of the environmental balance values.

Besides the comparison of normalised dimensions and an appreciation based upon the importance of the margin between value forecast and legal limitation, there are various other criteria to be considered by a comprehensive evaluation such as:

- General importance, duration and intensity,
- Type and nature of the pollution incidents,
- Reversibility,
- Direct impacts, indirect impacts,
- Accumulation effects and synergy.

**GENERALITIES**

Each and any articulation of the activity likely to generate an impact whatsoever on the environment, shall be identified and described as regards its foreseeable importance, expansion and duration.

Main elements for such description shall be the geographical limits / zone (the point / zone of impact may correspond to a distinct area, inside or exceeding the boundaries of the implementation site or the pre-defined - thus preliminary - impact area), and the type and importance of the environmental elements affected (resident population, other living elements, other valuables).

The elements for the assessment and measuring of the intensity of the impact shall include the noise level, the quantity of solid or liquid or gaseous pollution (in internationally recognised dimension units / metric system, such as mg/m³, or mg/l)

The duration of their impact may be limited, to episodical occurrence, to a project phase (construction period e.g.) long lasting (lifetime of the activity), or even permanent, if the pollutants are extremely resistant.

Thus, it is important to note in the present chapter, whether a pollution is continuous fact, intermittent, accidental.
TYPE AND NATURE OF THE POLLUTION INCIDENTS

The impacts and subsequent alteration and deterioration may be numerous and various, and they are function of the hazardous relation- pollution environmental reaction. Thus, they may impact unlimited varieties of environmental compartments including of the human health e.g. (cancer, productivity, microclimate etc.

REVERSIBILITY

Certain impacts can cause non reversible damage such as deafness consequent to extreme noise exposure, impact of heavy metal pollution, or desertification. An impact or an environmental alteration shall be considered important if there are limited chances or none, to revert the damages. Reversibility in general, that may reduce the importance of an impact, is a function of natural forces and

Direct impacts are the reactions of the environment in function of and subsequent to their contact with a pollution emanating from the activity (toxic fumes is emanating from the industrial plant affecting directly human health).

in cases where the pollution itself does no visible harm the environment, but initiates alterations that cause damage or deterioration elsewhere, within the impact area, outside, at the time of the pollution event or at any later time:
(heavy metals penetrating into the nutritional chain: >ground water
or, as another example: sediments retained in a barrage may impact soil fertility downstream, and even fishery resources in coastal areas that no longer receive nutrients enclosed with the retained sediments,
>losses for the fishery industries and socio-economic negative thus: indirect impacts.

It is important to note that the outstanding weight that EI-Statements evaluation and decision-making may attribute to indirect impacts, as they are often hidden though very obstructive to sustainable development, - often even more than direct impacts generally easy to reduce or to control by appropriate mitigation measures.

ACCUMULATION EFFECTS AND SYNERGIES

The process of assessment of the environmental compatibility shall include and accumulate all and any of the impacts, besides their evaluation on a particular and single impact level.
Such double approach is very important, as quite often, a single impact may have insignificant incidences on the environment, but if several impacts of interrelated nature are added, the total of their impacts may become significant.

Equally, one single pollution case may have insignificant impact if the time span of one pollution case to the n
If however, similar pollution cases occur repeatedly and if the pollution concerns chemical products for example, with high persistency level (like pesticides deriving from hydrocarbon chlorides), they may not be toxic for animals at low quantities and short-term exposure, but at longer term, its effects may become fatal.
Equally as well, synergetic effects increase the importance of an impact, and the reaction of two or more pollution simultaneously, may be much more significant than a single impact phenomenon, - one by one.

**RECAPITULATION MATRIX OF THE IMPACTS**

A matrix similar to the specimen exhibited earlier in this chapter may be used to recapitulate the various impacts identified and evaluated. In order to indicate the note of environmental compatibility, it is recommended to restrict to either simply three different notes ( - . O . + ) or to a maximum of five different appreciation ( = . - . O . + . ++ ). The indication in the matrix has only synoptical character as addition or compensation of the various impacts is excluded by the difference of their nature. Thus, explanatory summary notes are necessary.

**CHAPTER 10**

**Mitigation measures**

Mitigation measures shall be applied wherever harmful impact constitutes a risk for healthy environment. Those measures shall lead to avoid, to reduce or to compensate negative impacts. There exist three different types of mitigation measures and the proponent or his independent consultant for the EI-Statement shall not confound them:

- **Measures to attenuate (or to avoid)** an impact consist of a technical or organisational complementary arrangement, implemented by their owner on his own account, and as part of his activity and obligation, and for the only reason: to protect the environment against the risk of damages eventually caused by his activity, - throughout its entire lifetime;

- **Compensation measures** for environmental damages that will be caused by the activity, and to be entirely born by the owner. Such measure may be applicable to cases, where the residual impacts remain important (even after application of attenuating measures), but where the particular nature of the environmental alterations allow for an equivalent compensation: - within the impact area of the activity, - outside the latter or even - outside the contextual frame of the project (e.g. resettlement, replanting of trees).

It shall however be noted that such type of mitigation measure shall only be considered by the decision maker in cases, where the positive impacts of the activity on the sustainable development of the region are felt **important** by the authority.

- **Attenuating measures** as described here above, but that shall be born and undertaken by third. This type of measure shall apply to cases, where one or several impacts, direct or indirect, are generated by the activity, but cannot be charged to it (example: heavy traffic increase due to massive job creation through the activity, and traffic overload on a distant road interchange).

In such case, the required adjustment of the public infrastructure to the dynamics of the socio-economic development shall not be charged to the account of the activity, but be born by third budgets.

In order to assist in identifying possible mitigation measures / practices, some practical advice or examples are listed hereafter:
Appropriate siting:

- or
- select site convenient for easy road access, transport of personnel, discharge of waste, appropriately distant to residential areas and sensitive health or educational facilities
- avoid siting close to riverbeds / water courses,
- avoid siting in areas with inversion risk,
- avoid siting close to protected areas (residential recreational, forest, nature parks, natural or national reserves)

Operations:

- pre-treat liquid effluents,
- recycle treated effluents, if possible (cooling systems),
- filter gaseous emanations (fabric filters, electro-static filters),
- manage solid waste: collection, treatment, recycling, disposal,
- maintain proper and safe material storage,
- minimise energy requirements and employ at maximum renewable energies and proper technologies,
- maintain environmental monitoring and safety control,
- organise transport flow to minimise impact on external traffic condition and safety,
- apply noise abatement measures,
- train workers in environmental protection and safety measures,
- the initial condition of the site and the environment, with an emphasis on the particular sensitivities;
- the main action of the project (throughout all the phases of its lifetime),
- the negative impacts, indicated in decreasing order of their importance, extent and reversibility, the residual impacts, and
- the firm engagement of the owner regarding the implementation on his account, of all of the proposed mitigation measures and of the measures for final land reclamation and restoration of the site and the environment;
- the positive impacts (social benefits, economic advantages).

Regarding the environmental balance:

nce positive and negative impacts. Such approach is not possible, as till date, no common scale exists allowing, - for the benefit of sustainable development -, for accounting in a unified approach, impacts on the physical environment e.g. and impacts on the socio-economic or cultural human environment!

It is important however, that the proponent shall try to expose in a very clear and transparent manner, the positive attainments and results to be expected from the planned activity (during and after a lifetime) on sustainable develop damages to the environment.

Such demonstration may be accompanied by a matrix similar to the format as exhibited in Chapter 9 here above.

In this same present chapter, and in the form of a general conclusion, the proponent may propose and bring to the attention of the technical evaluation staff of the authority, and of the decision maker, his own final appreciation of the impact and environmental compatibility, accompanied by due and plausible justification.

SECTION V
CHAPTER 13
The maintenance management plan

As environmental monitoring and control of the entire activity and of its emissions and other implications on the environment are a necessary and binding obligation, the authority requires from the proponent of the present EI-Statement, a comprehensive maintenance and environmental monitoring plan.

The authority shall evaluate this planning document and approve in conjunction with the EI-Statement.

This plan shall contain (not exhaustive example):

- the plan for the monitoring of the environment during the implementation phase of the activity,
Annex 1

- the periodical control of the condition of the environment and its different and various compartments, within and around the project area, and during the operations phase, eventually dismantling and restoration of the site and the environment;
- the monitoring and control of all liquid waste, surface water and underground waters, sampling, analyses and counter analyses to be undertaken by qualified and licensed laboratories;
- the permanent monitoring and control of the air quality within and around the project area, sampling, analyses and counter analyses by application of certified measuring methods and instruments;
- permanent training of the owners professional staff in the fields of environmental protection and prevention of eventual negative impacts;
- the permanent adjustment of base data for the environmental compatibility of the activity, and in particular of those not available during the study and planning phase (e.g. pluri-annual climate data).

CHAPTER 14
ANNEX

In the annex to the present EI-Statement, shall be submitted all and any additional and detail information that may be instrumental and useful for the authority, to verify the multiple information and data, analyses and conclusions, and in particular but not exclusively:

- all reference documents and data, additional information and sources, analyses reports, maps, photographs, photo-interpretation etc. such as referenced in the present EI-Statement;
- simulation out-prints and modelling results,
- bibliographical references (publications, documents, studies, research reports etc).

PART II

ENVIRONMENTAL IMPACT ASSESSMENT
EI-STATEMENT

(1) ORIENTATION and GUIDELINES

Processing Industries

SUPPLEMENT TO THE DIRECTIVE

Containing particular additional information and instruction specific to the sector of Food Processing
Food processing industries including of the sub-sectors of meat and fish processing, fruit and vegetable processing, flour and oil milling diary plants, breweries and bottling units etc; are usually large scale water consumers and consequently, large wastewater producers. Equally, the production of solid waste, mainly of organic nature, is largely above the average production of most of the other sectors of industries and crafts. Common use in food processing for local or export markets implies conservation measures. The latter traditionally require the use of chemicals or short wave, sometimes even radio-active treatment affecting, if not properly operated and well maintained, the product and the environment, - working environment, or through waste and airborne action, waterborne or amination, the environment outside of the plant.

In consequence of these particulars, special attention is required when elaborating the key chapters (n-Statement).

1- WATER CONSUMPTION

Water is a limited resource in Jordan, and water wastage is obstructive to sustainable development. Thus, the industry is obliged to opt for or to develop, processing techniques with reduced water requirements. As in the sub-sector of food processing, cleaning and washing are essential to hygiene and to the consumers health, mainly two means of economising water are likely to be emphasised:

- recycling water within the plant (washing and cooling, sanitary water), a method that implies proper treatment facilities, - however feasible, 'rentable' and largely available on the technology markets;
- cleaner production of raw materiel, particularly in the field of fruit and vegetable production and processing (reduction of chemical treatment with pesticides, fungicides).

2- WASTE WATER

The issue is connected to the above water consumption>. Recycling of treated effluents will reduce the quantity of waste water. Excess quantities as well as qualities unfit for recycling shall be pre-treated on site and conditioned (decontamination!) for agricultural or similar use in nearby areas or for recycling to groundwater basins (negative wells).

In no case, uncontrolled waste water disposal will be admitted, an in any case of contravention, the authority may refer to and act by reference to the Environ...

3- SOLID WASTE

Likewise the liquid waste, food processing produces exceptional amounts of solid waste, mainly of organic consistency and type. As proper waste disposal requires increasing means and services, the owner of a food processing plant should arrange for his own appropriate facilities to minimise the quantities to be discharged for costly...
treatment and disposal. Various technologies may be applied to reduce the solid waste, to valorise parts through appropriate treatment (industrial sub-products, animal food, composting) or to arrange for final disposal on the project site.

4- SPECIAL WASTE

In any case, care is required in liquid and solid waste treatment regarding toxic or dangerous pollutants from deficient animal health.

A particular care is required, where radioactive treatment is applied (some diary products, eggs, spices, and other dry food).

Appropriate treatment is necessary, and waste contaminated or contaminated waste shall be processed separately.

The EI-Statement to bring appropriate evidence to the attention of the decision-maker.

5- GASEUOS WASTE

Contaminated gaseous waste emanations (toxic fumes etc) shall be treated through suitable filtering. Several efficient technologies are available on the cleaning technologies markets.

THUS:

The EI-Statement shall concentrate beyond the general lines of the above Directive, on:

Subject 1 and 2: Water supply / waste water
- Reduction of consumption of fresh water
- Introduction of the use of recycled treated effluents (TSE),
- Reduction of waste water,
- Control of wastewater quality
  - physico-chemical characteristics
  - (SM, BOD, COD, toxicity, colours)
- Pre-treatment of final effluents,
- Re-use of mud, and recycling of TSE to groundwater reserves.

Subject 3: Solid waste

The different branches of the industry produce different type of organic waste.
- fruit and vegetable industry produces mainly peelings, crust, grains, stones,
- fish processing industry leaves shells, heads and fishbone,
- bottling plants produce mainly packing waste,
- oil mills leaving margins
- etc

Thus, the EIA shall identify and specify the nature of waste, define the most efficient treatment, recycling disposal or elimination.
Subject 5: Air pollution

Certain industries such as flourmills produce large amounts of dust and gas (often fermentation gas). The EIA shall thus determine:

- the nature of the dust,
- the quantity of dust contaminated and contained in the emanations - total quantity/day emitted,
- the nature and physico-chemical consistency of the gas produced during storage and processing.

Subject / Noise pollution

Determination of the sound levels inside the production units, and outside, protection measures for the workers and nearby residents,

Subject / Transportation

Food processing industry usually creates excessive transport needs and activities.

In order to control eventual implications on outside traffic safety (motor traffic and pedestrian circulation), precautions shall be applied and efficient measures be developed and implemented:

- Well designed access ways, parking and loading areas, manoeuvring space,
- transport schedule control such as to avoid transport activities during rush hours,
- transport management such as to avoid unnecessary movements.
B. DRAFT PROPOSAL

Sector:

QUARRYING AND MINING INDUSTRIES

This present document contains two parts:

PART I  a general presentation of the sector, a summary overview, and essential particular considerations, and

PART II  Orientations and Guidelines for EIA and EI-Statements

PART I

A general presentation and overview of the sector, and essential particular considerations.

INTRODUCTION

QUARRYING and MINING

The present section will provide an overview regarding the major interrelations between the activity and the environment.

The most likely impacts of quarrying and mining are function of the location of a mine, of whether surface or underground operation, of its characteristics and use of the mining area, the physical and chemical properties of the resource and the method used to mine it, processes used in mineral processing operations (e.g. ore concentration) etc.

As it is not possible to describe within the present context, details and particularities pertaining to all types of mining and processing, the section will attempt to provide general information applicable to most and major types of mining and quarrying. Thus, differences between surface and underground mining are considered, whereas specifics and singularities remain subject to particular annexes.

Such singularities include high-risk minerals (toxic, highly radio-active or high health hazardous minerals) as well as specific mining such as dredging and leaching.
The principal aim of the section is to provide aids for identification of activities, sub-activities and connected articulation thereof, likely to generate significant impact on the natural and human environment, and therefore to be studied during pre-project stage and be monitored after the implementation of the project.

General suggestion on environmental mitigation are provided in Part II.

**The objective of the Directives pertaining to EIA and related statements for activities in the industry of QUARRYING and MINING.**

The subject matter of the present document being EI-Statements in compliance with the legal provisions and in conformity with the details of the procedure established and enforced by GCEP, the aims of the Directive are:

- to provide to developers detail information concerning the application of the legal references and the procedure related to EI-Statements, evaluation and decision, and to provide guidance for the elaboration of Terms of Reference pertaining to EIA and Statements for particular projects in the various fields of quarrying and mining.

There are multiple methods and approaches for EIA study undertakings, and the choice remains an option of the owner or of the specialist consultant entrusted with the elaboration of the EIA and the pertaining Statement.

The minimum consistency of an EIA and EI-Statement is stipulated by the By-../99, and further defined in an annexe thereto.

The structure of an EI-Statement and the sequence of the various study chapters of the EIA, are prescribed by the present Directive, and they are binding.

**General information regarding the sector.**

The extraction of rock, minerals and energy resources in the quest for economic development involves a sequence of activities which have environmental implications.

Many rock material, mineral ores and coal supplies are readily accessible through strip or surface mining operations. When a mineral, rock or fuel deposit lies at a depth that the cost of removing the overburden is prohibitive, the resource is extracted by underground mining operations. Examples of such resources are coal, copper, lead, zinc, molybdenum and uranium. The environmental impacts of these two mining practices are distinctively different. Surface mining has a particularly disruptive effect on the landscape and land use and occupation patterns, mainly because it requires the removal of the overlying vegetation, soil and rock (overburden), and because it affects usually large surfaces or strips of land. Surface mining is usually less expensive than underground mining. However, even in situations where underground mining would be feasible, surface mining is often favoured because it permits more complete extraction, and it is usually less hazardous to the safety and health of the miners. The considerable danger of collapse or explosions in underground mines is virtually non-existent in surface mines.

Although underground mines generally produce less waste than surface mines, the spoils are heaped on the ground in the vicinity of mine sites where they cause the same problems that attest surface mining spoils: acid (or toxic) runoff, air, surface and water pollution (dust, heavy metals, radio-active gas, liquids and air-born particulate), erosion, sedimentation, landslides etc. The destruction of landscape, drainage systems, human environment and land use patterns, wildlife habitat and subsequent ecological and social impacts caused by underground mines are usually different to those of surface mines.
The activities usually involved in quarrying and mining projects include e.g.:
- exploration and prospecting for minerals,
- selection of the mine and spoil disposal sites,
- site preparation and construction of facilities (offices, laboratories, pipelines, transmission lines, access roads, railways),
- mining operations (blasting, breaking, crushing, milling, washing, drying, conveying, sorting, pore-screening,
- energy producing operations,
- water supply,
- transportation,
- mineral processing,
- spoil disposal,
- waste water discharge,
- workers housing and services,
- land reclamation and restoration.

Prospecting and exploration

The environmental impacts of preparatory activities, such as prospecting and exploration for minerals are usually non significant but in some cases the latter may involve, for instance, blasting and drilling operations with significant noise and vibration. The psychological and subsequent socio-economic impacts may also be considerable, as such preparatory activities indicate the future connected opportunities of mining an area. This may give rise to fears or expectations among local communities and induce, for example, migration and land speculation.

Site selection

The determination of the most suitable location of the mine site is critical, on the one hand, to the economic viability of the project, and on the other, to the environmental impacts. An open-cast (surface) mine will destroy large areas of land for a relatively long period of time; Therefore it is very important to consider the importance of other land and water uses in the area as well as its ecological values. The related surveys and studies should consider e.g.:

- availability of raw-materials,
- availability of energy supply,
- availability of water supply,
- availability of appropriate transportation facilities and infrastructure,
- location of human settlements (at risk),
- ecological conditions (existing flora and fauna, sensitivity, importance to different land
- hydrological, hydro-geological and meteorological conditions,
- capacity of receiving waters to assimilate treated effluents,
- present and projected beneficial uses of downstream water resources (water supply, fisheries, recreation, etc)
- availability of land for solid waste disposal,
- socio-economic and cultural conditions.

Site selection plays an important role in determining the needs and cost of necessary environmental mitigation measures (e.g. resettlement and compensations for people to be displaced, air and water pollution control; erosion control, restoration etc. Alternative sites and locations of the mine site as well as spoil disposal sites, housing areas, routes for pipelines, roads and railways and wastewater discharge must be considered in order to minimize adverse impacts.

Site preparation and construction
The main activities having potentially significant environmental impacts in site preparation and construction stages of a mining project include for example:

- land clearing,
- surface,
- construction excavation of access roads and railways,
- construction of transmission lines and pipelines,
- construction of offices, laboratories and other buildings,
- barriers, including fencing,
- blasting and drilling transportation, material storage,
- housing and other services for the labour force,
- migration / resettlement of resident population.

Mining projects often encroach upon natural resources areas, such as forests and wetlands, and hence the ecological impacts should be carefully evaluated. The impacts may be caused directly by the project as well as trough induction by subsequent uncontrolled encroachment by the directly affected population searching in compensation for socio-economic losses, for substitute farmlands, firewood, game, or even illegal op may destroy rich fishery reproduction areas as well as habitat for waterfowl and other wildlife.

Changes in the hydrology of the site and waterways intercepted by the project can result in creating or increasing local flooding problems and affecting aquatic ecology including fishery. The flow and quality of groundwater may be disrupted.

The major sources of sediment (erosion) in mining operations are the areas being cleared (especially steep slopes), improperly placed or protected salvaged or stockpiled material, surface that impede infiltration or concentrate runoff (bulldozer cleat marks up and down slopes). Roadways are also often the major source of sediment, and many functions as conduits for sediment washing into the natural drainage system. The roads within the mining area itself may cause this as well as access roads to the site. Long access roads can also adversely affect the natural drainage system by intercepting, concentrating and diverting runoff.

Other potential impacts related to the construction stage include:

- impacts on surface water and ground water quality caused by spills of oil and other chemicals, or dumping of construction spoils,
- air pollution (dust, fumes, gas, exhaust),
- noise and vibration,
- solid waste,
- visual impacts,
- changes in land use and income distribution,
- changes in human settlement patterns, population structure and population dynamics,
- social and cultural conflicts due to the differences in customs of immigrated workers and local population,
- social problems caused by displacement and resettlement of populations,
- occupational and public health problems, and safety problems (accidents, exposure to hazardous material, transmission of insect vector diseases and other communicable diseases to workers and/or resident populations),
- disturbance to local traffic,
- encroachment on archaeological and historical resources and cultural and recreational sites.

**Operational phase:**

The importance of the impact of surface g depends on many factors, including the topographic features of the mined lands, the amount of rainfall in the area, the specific mining technique employed and the chemical characteristics of the deposit and waste products.
Several techniques of SURFACE MINING are practices, depending on the deposit. Sand and gravel are removed from small pits,

- while limestone, granite and marble, for example, are taken from quarries.
- Metallic ores (e.g. copper and iron) are removed from open pit mines, which are huge, deep, gaping excavations.
- In hydraulic mining powerful jets of water remove the overburden, soil and vegetation, and wash out the deposit. Then a considerable amount of sediment is washed into nearby drainage ways.
- Dredging can be used for instance in streambed and seabed sand and gravel deposits.
- There are two basic types of strip mining used to extract e.g. coal, phosphate rock and gypsum deposits:
  - area strip mining, which is carried out in flat terrain, and
  - contour strip mining in which a series of shelves or benches are cut into the steep flanks of a mountain.

UNDERGROUND MINING

Operations generally create a system of subsurface shafts, tunnels and rooms by drilling and blasting the rock. Certain soluble minerals (e.g. potash and salts) can be removed from the subsurface by solution mining, where water is pumped down an injection well to the deposit to dissolve the minerals. One major problem then is the risk of contaminating groundwater reservoirs.

The main activities of the operational phases of a mining project may involve:

- energy producing operations,
- water supply,
- mining operations, such as crushing, pre-screening, drying, milling, washing, conveying, grading, sorting, storing, loading etc.
- mineral processing operations,
- transportation,
- spoil disposal,
- waste water treatment and discharge,
- workers housing and services

The brief repeal of the major risks and eventual impacts provided below, concerns the particulars of the sector only. Project planning and EIA should additionally and duly consider all and any other implication and incidence of connected sub-activities and services (such as e.g. human settlements and facilities, transportation).

EROSION AND SEDIMENTATION

Accelerated on-site and off-site erosion will continue during the operation stage and also after the mine ceases operation, if measures are not taken to permanently stabilise exposed surfaces with vegetation and/or other erosion control methods.

The accumulating spoil has also a large potential for causing off-site sediment damage. The lack of nutrients and excessive stoniness in waste piles often inhibit the establishment of potentially stabilising vegetation. In addition to rapid erosion, dangerous sliding may occur on these piles. Water pumped from the mine can also contribute to extra sedimentation.
Contour strip mining on steep or mountainous terrain has the largest potential for erosion and sediment damage. Unstable slopes create a potential risk of accidents caused by landslides.

AIR POLLUTION

The main air pollution problem in mining projects is dust. Particulate matter can be emitted from several handling and shipment activities of the ore minerals, mineral processing operations, transportation and spoil heaps. The effects of pollution emission depend upon topography, weather conditions, elevation of discharge points, location, control technology, the raw material processed and other variables.

The dust pollution may have significant impacts on vegetation, soil, equipment, visibility, and most importantly, on human health. In addition to the respiratory problems commonly caused by dust pollution, the particulate from mining process may include radioactive substance (e.g. Radon) and thus potentially increase the risk of cancer.

There are various methods available to prevent or minimise dust emission. These include the use of cyclones, filters and other pollution control technologies, greenbelts, water sprays, enclosure of equipment, paving of roads, etc.

In underground mining, dusts and gas (e.g. methane) may cause problems. Effective ventilation should be used to reduce gas concentrations to levels below the flammable or toxic limits, and thus the possibility of underground explosions can be avoided.

WATER POLLUTION

In addition to increased sedimentation due to increased erosion and soil material in waste water, the ground and surface water quality can be significantly affected by acid or toxic mine drainage waters and hazardous substances (e.g. heavy metals) leaching from spoil disposal sites. Also the tailings from material processing (ore concentration) may contain toxic elements. At the low pH values level, heavy metals (such as iron, manganese, aluminium, cadmium, mercury, copper, zinc and lead) are more soluble and can create serious water pollution problems. Determination of pH, acid-base balance and heavy metals on the different geologic formations will help identify potential problem strata, and an overburden analysis will allow for a more accurate prediction of the spoil characteristics.

OTHER

Other potential impacts of mining operations include:

- noxious fumes derived from use of explosives,
- noise from blasting operations, machinery and traffic,
- nuisance to local traffic,
- water and soil pollution caused by repair area wastes (oils) and sanitary wastes,
- reduced water supply,
- ecological impacts through air and water pollution and other disturbance (and subsequent socio-economic impacts, e.g. on human settlements and services, agricultural activities, fisheries, game management etc.),
- human hazards presented within the mine and associated with slides, overburden piles or tailings etc.,
- aesthetic destruction,
- ground subsidence,
- social and economic impacts on affected economies and social systems, e.g. displacing a long-standing activity by substitution.
Land reclamation and site restoration:

The lifetime of any mining and mine project is limited. However, some of the impacts of mining (e.g. erosion, aesthetic and land use impacts) will continue after the mine ceases operations; that is if the site is not restored and lands are not returned to natural conditions or conditions capable of supporting prior land uses that are c value than prior land use.

After mining has been completed, all acid and toxic material must be backfilled and graded. Highwalls and spoil piles must be eliminated, and the approximate original contour be restored. All surface areas must be stabilised and protected in order to control slides, erosion, subsidence and accompanying water pollution and human hazards. Mining wastes or rubbish must be properly decontaminated (radio-active gas!) and disposed.

The land reclamation should be started as soon as possible after the opening of the mine. Therefore, the overall project planning must include land reclamation operations, including sufficient budget allocations. The basic geological and ecological information, including of the principal vegetation associations and the chemical and biological characteristics of water courses, wadi beds, and wetlands, which must be collected prior to the project implementation, will be an asset in the re-establishment of natural or agricultural ecosystems (for example) on the site once mining has been completed.

PART II

Environmental Impact Assessment
EI-STATEMENT
Orientation and Guidelines

SECTION I

CHAPTER 1
The presentation Of the proponent

of the Shall be presented under this first chapter, the proponent full name and function, his situation of responsibility for the activity subject matter of the EI-Statement, his full address, telephone and other communication links.

Equally shall be made known, the specialist entrusted with the elaboration of the EIA and EI-Statement, by indication of his name, function full address, telephone and other communication links.

Evidence shall be provided of his sound professional qualification for the specific study undertaking, and for his status of independence.

CHAPTER 2
Summary Information

Summary -Statement to the decision-maker:

• the planned activity subject matter of the present EIA and connected statement, and its justification;
• its aims and purpose;
• the major impacts it may have on the environment, and the alterations it may generate to the various environmental compartments and biotopes, as well as the condition of the environment
• the comparison of the impact with established norms and standards.

Equally, the Summary informs and presents the planned mitigation measures and the residual impact. The activity, the EI-Statement may, if applicable, indicate the positive impacts originating from the activity and beneficial to the social and economic development of the country, a region or a selected area or community.

Thus, the Summary Information shall be concise, clear in its structure and expression, well referenced and without ambiguity and polemics.

CHAPTER 3
Legal and institutional setting of the EI-Statement, and of the activity

All legal references shall be indicated, that apply to the planned activity, to its implementation, and to the present EI-Statement.

Such references shall include all particular laws, By-laws, codes and regulations that govern the implementation and operations of the planned activity as well as eventual particular conditions and/or characteristics of the activity or the implementation site / environment, and, in given cases, international law, conventions and declarations pertaining to environment protection, to restricted or proscribed activities, areas, material and the like.

The chapter shall as well include information about eventual special conditions issued by financing organisations (regional / international) or international co-operation and pertaining to norms and standards in general or in particular: to EIA.

SECTION II
CHAPTER 4
Presentation and detailed description of the planned activity

The activity shall be described in detail, - in a concise language and simple and comprehensive expression, and in an oriented manner:
inform all and any EIA related data, conditions and details, avoid non pertinent technical description.

It shall be included in the present chapter, description of all elements, structures, infrastructure, spatial provision and improvements, processing, action and function of the activity, that may imply an articulation or impact whatsoever and/or how so ever, on the various and different elements and/or compartments of the environment of the implementation site or zones contiguous to it.

The present subject project activity to be described, consists of all and any element pertaining to:
• Site preparation
• Implementation
• Operations, and
• Dismantling / land reclamation and site restoration,
and consequently shall be included in the EI-Statement under the present chapter, the following sub-activities (at a minimum): land clearing, surface excavation, construction of access roads and/or railways, construction of transmission lines and pipes, construction of offices, laboratories and other buildings,
barriers and fences, blasting and drilling activities, transportation, material storage, housing and other services and connected utilities for labour force (e.g. waste management / resettlement of resident populations, energy producing operations, mine water supply, mining operations, \textit{(mineral processing operations)}, spoil disposal, mine waste water treatment, recycling, reclamation, etc.

The description shall be supported by maps and photographic illustration, plans, schematic drawings etc., all at appropriate scales, and such as to clearly identify the site and situation of the activity, its dimensions and its general aspects.

\textbf{CHAPTER 5}

\textbf{Alternative solutions, and justification of the final option}

The justification of the project refers to its aims and objectives, bases upon its technical principles, the study approach to identify maximum efficiency, and sustainability. Such approach implies references to the various alternative solutions that have been investigated, and to the criteria applied for selecting the final solution subject matter of the present EI-Statement.

Thus, the present chapter shall concentrate as a minimum at:

- a brief presentation of the present condition of the very sector field of activities, its functioning and/or deficiencies, major challenges, needs and/or demands,
- the approach of the planned activity aiming at responding to an opportunity or need emanating from the present condition of the sector and its role for development,
- the principal design criteria for the identification of the most efficient solution in terms of technology, economy, social benefits and environmental compatibility,
- the various solutions investigated and developed prior to final option of the present solution,
- the selection of the criteria applied for the evaluation of the various alternative solutions, and
- the justification of the final selection.

It is important that such justification includes all of the various aspects of the activity in its global setting, technically, economically, socially and environmentally, and that it incorporates the entire activity undertaking from site selection and acquisition through implementation, operational phase, land reclamation and final restoration of the abandoned site and its environment.

\textbf{CHAPTER 6}

\textbf{The Potential Impact Area}

The Potential Impact Area incorporates all and any of the space related dimensions exposed to pollution risks or significant impact emanating from the activity, directly or indirectly. Consequently, it shall include the implementation site and its surroundings, the latter to be dimensioned in function of its various exposures to the different types and nature of risks; the delimitation of the air space risk areas shall always be the projection of the latter on the ground level.
As the validity of the entire EI-Statement depends on the pertinence of the impact study area, the importance of its delimitation as well as its implication on the study rationale and economics are evident.

It is however, that direct impacts induce rather often indirect reaction within the synergetic compound of an ecosystem that can hardly be foreseen without in-depth study and analyses of the condition of the environment and the importance and characteristics of a given impact.

Consequently, it is suggested to opt for a two-step approach for defining the potential impact area:

**Step 1:** define at the initial study stage, a preliminary area limit incorporating the propagation lines and areas of the various emanations and significant impacts likely to be generated by the activity. Thus, this initial delimitation designs an envelope of a series of specific impact sub-areas.

**Step 2:** With the ongoing study work on the analyses of the present condition of the environment, its par between the various environmental compartments and site specific particulars as well as with the increasing knowledge and experience resulting from the impact analyses and assessment, an adjustment of the potential impact area may become necessary that implies consequent adjustment, and eventually complementary study work regarding the environmental implications over-covered or not covered by the initial delimitation. (see also Annex 2)

**CHAPTER 7**

**The Time Horizon of the activity**

The time horizon aimed at by an activity, or by a project, is important and decisive for successful EIA and pertaining Statements, evaluation and approval; successful EIA being conditioned by its application to the entire and integral time span and horizon of an activity:

> pre-implementation phase, site acquisition, and preparation of the site and its surroundings (provisional access ways, material storage, workers housing),
> construction phase, pre-extraction works, annex facilities, infrastruc
> start-up and operations phase, planned or probable extension phase of the mining and quarrying activities, the annex facilities and/or the related infrastructure improvements;
> closing down and dismantling phase, and reclamation and final restoration phase of the site and its environment.

The impacts may vary from phase to phase, - as it regards their type, nature and importance, and an accumulation of negative impacts is not to be excluded!

Consequently, it is an important requirement (and task of the EIA) that the EI-Statement includes a clear description of the state of the environment before the implementation of the activity, as well as evolution forecast through the entire lifetime of the activity for the case of evolution without the event of the activity.

The appreciation of the final environmental statement and balance shall strongly depend on the comparison of the two evolution scenarios: without activity with activity.
CHAPTER 8
Description of the environment

The accurate identification and correct assessment, evaluation and appreciation (by the decision-maker) of the impact originating from the activity, will strongly depend on a qualified and thorough description and analyses of the state of the environment concerned.

It is therefore of outstanding importance, to carry out this part of the study with utmost care, in-depth and application, and to present the relevant findings in a most transparent and comprehensive language and format. Such presentation shall be supported by pertinent illustrative material, and all and any references and sources shall be clearly indicated.

Voluminous source and reference material may be submitted to the authority in an annex document to the present EI-Statement.

The following information concerning the structure and contents of the present chapter, is indicated as guidance only, and it is not exhaustive.

The chapter to contain presentation of:

the physical environment

the natural site conditions such as the topography, hydrography, hydro-geology, climatology and air quality, erosion level and soil qualities, raw material and energy resources, the noise and vibration level

the biological environment

the fauna and flora, including of the important wildlife habitats, protected / endangered species, unique or rare ecosystems, forest and fishery

the human environment

the resident population, their demographic, socio-economic and social condition and trends, existing facilities (education, health, civic), prevailing occupations, socio-professional strata and income level,

areas of unique or exceptional ecological or aesthetic quality and values,

important recreational, cultural or historical ar

SECTION III

CHAPTER 9
Identification and analysis of the various impacts

The subject matter of the present chapter addresses three distinct study activities:

- identify the significant impacts,
- analyse and quantify the impact,
• assess the environmental compatibility (by comparison to established norms and standards e.g.)

The identification shall be undertaken in a systematic way and approach in order to ascertain entirety.

The analysis and quantification shall be based upon recognised methods, qualified specialist support (licensed laboratories e.g.), and be documented in a most transparent format (annex to the EI-Statement: laboratory reports, tests and evaluation methods and formula, resource literature, documents, persons).

The environmental compatibility shall refer to established national norms and standards, and only in the absence of those, comparison to international norms shall be applied. In the latter case, at least three different norms shall be indicated, including
- one of a European industrialised country and
- one other from a country with most similar environmental conditions to those prevailing in Jordan.

The choice of the finally selected norm of reference for the present EIA, shall be clearly indicated and justified.

It is important to note, that the significant impacts on the environment to be identified include those that accidentally.

The source of the impacts may be direct or induced (indirect), - in first or subsequent generation, immediate or timely retarded.

The most reliable, transparent and justified method for impact identification being the crossing of the various single elements of the activity (chapter 4) with the various single elements of the environment (chapter 8), a matrix method (see example in the annex hereto) may be applied.

The same matrix could be used for synoptic indication of the environmental compatibility, reveal clearly the eventually required measures for the reduction of impacts, and finally justify an ultimate matrix informing summarily the environmental balance values to the decision-maker.

CHAPTER 10
Mitigation measures

Mitigation measures shall be applied wherever harmful impact constitutes a risk for healthy environment. Those measures shall lead to avoid, to reduce or to compensate negative impacts. There exist three different types of mitigation measures and the proponent or his independent consultant for the EI-Statement shall not confound them:
Measures to attenuate (or to avoid) an impact consist of a technical or organisational complementary arrangement, implemented by their owner on his own account, and as part of his activity and obligation, and for the only reason: to protect the environment against the risk of damages eventually caused by his activity, throughout its entire lifetime;

Compensation measures for environmental damages that will be caused by the activity, and to be entirely born by the owner. Such measure may be applicable to cases, where the residual impacts remain important (even after application of attenuating measures), but where the particular nature of the environmental alterations allow for an equivalent compensation: within the impact area of the activity, outside the latter or even - outside the contextual frame of the project (e.g. resettlement, replanting of trees). It shall however be noted that such type of mitigation measure shall only be considered by the decision maker in cases, where the positive impacts of the activity on the sustainable development of the region are felt important by the authority.

Attenuating measures as described here above, but that shall be born and undertaken by third. This type of measure shall apply to cases, where one or several impacts, direct or indirect, are generated by the activity, but cannot be charged to it (example: heavy traffic increase due to massive job creation through the activity, and traffic overload on a distant road interchange). In such case, the required adjustment of the public infrastructure to the dynamics of the socio-economic development shall not be charged to the account of the activity, but be born by third budgets.

In order to assist in identifying possible mitigation measures/practices, some examples are listed hereafter:

- use of low-waste and low-pollution technology,
- air pollution abatement measures (e.g. dust control and protection),
- waste water treatment,
- water recycling and conservation,
- energy conservation,
- noise abatement measures,
- solid waste management (especially recycling),
- training and education of workers and general public,
- workers safety measures,
- contingency plans, training and equipment,
- medical and other social services development,
- safe storage facilities for hazardous materials,
- resettlement plans (and proper execution of such plans),
- compensatory measures,
- land reclamation and restoration,
- erosion control and soil conservation,
- regulation of heavy traffic,
- protection unique/valuable habitats, endangered species, cultural, religious, historical, archaeological and recreational sites.
CHAPTER 11
Summary estimation of the Financial implications

For all cases of the three types of mitigation measures as indicated in the previous chapter, the financial implication of the proposed arrangement shall be summarily estimated, and indicated at the cost rates and values as current at the time of the submission of the present EI-Statement for evaluation and approval.

SECTION IV

CHAPTER 12
Final balance and environmental statement

The present chapter shall be introduced by a brief reiteration to the key elements of the EIA, and to the various results, findings and conclusions.

Thus, it shall be summarily recalled:

- the initial condition of the site and the environment, with an emphasis on the particular sensitivities;
- the main action of the project (throughout all the phases of its lifetime),
- the negative impacts, indicated in decreasing order of their importance, residual impacts, and the firm engagement of the owner regarding the implementation on his account, of all of the proposed mitigation measures and of the measures for final land reclamation and restoration of the site and the environment;
- the positive impacts (social benefits, economic ad

Regarding the environmental balance:

counterbalance positive and negative impacts. Such approach is not possible, as till date, no common scale exists allowing, - for the benefit of sustainable development -, for accounting in a unified approach, impacts on the physical environment e.g. and impacts on the socio-economic or cultural human environment!

It is however important, that the proponent shall try to expose in a very clear and transparent manner, the positive attainments and results to be expected from the planned activity (during and after lifetime) on sustainable develop rm of the various negative impacts, - damages to the environment.

Such demonstration may be accompanied by a matrix similar to the format as exhibited in chapter 9 here above.
In this same present chapter, and in form of a general conclusion, the proponent may propose and bring to the attention of the technical evaluation staff of the authority, and of the decision maker, his own final appreciation of the impact and environmental compatibility, accompanied by due and plausible justification.

SECTION V
CHAPTER 13
The maintenance management

As environmental monitoring and control of the entire activity and of its emissions and other implications on the environment are necessary and binding obligation, the authority requires from the proponent of the present EI-Statement, a comprehensive maintenance and environmental monitoring plan.

The authority shall evaluate this planning document and approve in conjunction with the EI-Statement.

This plan shall contain (not exhaustive example):

- the plan for the monitoring of the environment during the implementation phase of the activity,
- the periodical control of the condition of the environment and its different and various compartments, within and around the project area, and during the operations phase, the dismantling and restoration of the site and the environment;
- the monitoring and control of all liquid waste, surface water and underground waters, sampling, analyses and counter analyses to be undertaken by qualified and licensed laboratories;
- the permanent monitoring and control of the air quality within and around the project area, sampling, analyses and counter analyses by application of certified measuring methods and instruments;
- permanent training of the owners professional staff in the fields of environmental protection and prevention of eventual negative impacts;
- the permanent adjustment of base data for the environmental compatibility of the activity, and in particular of those not available during the study and planning phase (e.g. pluri-annual).

CHAPTER 14
ANNEX

In the annex to the present EI-Statement, shall be submitted all and any additional and detail information that may be instrumental and useful for the authority, to verify the multiple information and data, analyses and conclusions, and in particular but not exclusively:

- all reference documents and data, additional information and sources, analyses reports, reports of drilling campaigns and surveys, maps, photographs, photo-interpretation etc. such as referenced in the present EI-Statement;
- simulation out-prints and modelling results, bibliographical references (publications, documents, studies, research reports etc)
ARTICLE 1: This By-law shall apply to each and any of the industrial, agricultural commercial, construction, housing and other projects and those services connected with, according to the lists issued by the corporation for this purpose, and its amendments.

b. The Corporation has the right to require the proponent to prepare and submit the Environmental Impact Assessment to any project not included in the lists mentioned in (a) above.

ARTICLE 4: The Directorate shall establish the necessary environmental guidelines and forms required for the study and evaluation and discussion of the submitted alternatives to the project, taking into consideration the environmental interests of all governmental and non-governmental sectors concerned in the light of the study and assessment, noting that all parties shall abide by the guidelines under the stake of responsibility.

ARTICLE 5: The proponent shall submit the terms of reference for conducting the Environmental Impact Assessment for approval by the directorate before carrying out the study and assessment.
V.
VI. The Directorate shall have the right to refuse, modify or add what it may consider suitable.

**Article 6:** The Directorate is the concerned party for reviewing the EIS, and it shall decide the non-requirement for submitting this document. The Director General shall form specialized technical committees for each project individually.

**ARTICLE 7:** No permit of any kind shall be issued to any project, until all licensing requirements are met, including acquiring the EIS according to the requirements and conditions issued by the corporation.

**ARTICLE 8:** All parties to whom this By-law apply, shall conduct the research study and analysis required for the EIS.

**ARTICLE 9:** The Director General shall issue his decision, in writing, either approval of the EIS, or its modification, or refusal within a period not to exceed 45 days from the date of submission.

**ARTICLE 10:** The proponent shall have the right to appeal the decision regarding the EIS to the council within (15) days from the date of decision.

The decision of the council in this regard shall be final.

**ARTICLE 11:** The Corporation shall conduct control and periodic inspection of the projects included under the provisions of this By-law, to insure adherence to the conditions contained in the EIS document.

**ARTICLE 12:** Any violator of the provisions of this By-law shall be fined according to the penalties contained in the law for Environmental Protection No (12) of 1995.

**ARTICLE 13:** The Council, the Director General and the Directorate are entrusted in the implementation of the provisions of this By-law, including the preparation of data, forms and annexes for fulfilling its objectives.

**ARTICLE 14:** This By-law shall repeal any legal provisions not consistent with the present provision.