

**Southern Africa Enterprise
Development Fund
Implementation Assistance Report:
Environmental Manual**

Final Report

U.S Agency for International Development

Prepared for USAID/RCSA

Prepared by Cargill Technical Services

**Sponsored by Private Enterprise Development
Support Project III
Contract No PCE-0026-Q-00-3031-00
Delivery Order No 815
Prime Contractor Coopers & Lybrand, L L P**

February 1998

**Coopers
&Lybrand**

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SAEDF ENVIRONMENTAL MANUAL

**To be read in conjunction with
HQT-96-006**

**Resolution concerning Environmental Guidelines
for the Southern Africa Enterprise Development Fund
to observe when making Investments**

Administrative Note

It is recommended that this document be published as a control document in a loose leaf format to enable regular update and improvement

Introduction

The evaluation of environmental impacts and environmental risk can be a complex and involved process. However, in many cases, these necessary evaluations can be undertaken simply by using a series of filtering tools which progressively indicate how serious the environmental aspects of a project may be. By working through the simple, sequenced process, common sense will often guide the user to the main issues that need to be considered.

The key to the exercise is the filtering base project information through simple checklists and tests to enable those projects that have little or no direct environmental impact to be “fast-tracked” through the decision-making process.

IMPORTANT NOTE TO USER

On first sight, the contents of this manual may seem both onerous and excessively detailed. As the user becomes more familiar with the content material through regular use and referral, the manual will become more of a background reference document. Many environmental factors become second nature with regular use and testing. Over time, Investment Officers will find that the body of information and experience they gather will be of such a practical value, that it will need to be incorporated in a revised version of this manual. This should be done as it will ensure that the environmental experiences of the investment officers are documented into the “corporate memory” of the Fund and are available to future new officers and staff.

The tools referred to in this manual (i.e. checklists, activities lists, information procedures, guidelines, etc.) are assembled in a structured order. However, they are flexible enough to be used in any order, dependant upon officer’s preferences and deal circumstances. For example, some officers may have a preference to use the Investment officer’s Environmental checklist mentioned in Stage 1 in the first stage. This can be accommodated if individuals prefer this kind of alternative option.

Stage 1 - Desk Study

Probably the most important stage in the environmental evaluation of projects is the desk study. It is at this point that the first impressions are formed from the application documentation. Those impressions will be tested when field visits or site inspections are undertaken.

The first action would be to check the deal application against the environmental screening checklist below.

ENVIRONMENTAL SCREENING CHECKLIST

The checklist consists of four parts, the first part is a reminder of the limitations set on the Fund which have an environmental/leisure/conservation component to them. The second part consists of a revised and expanded list of the activities requiring environmental review (to be checked by applicant) from SEADF board resolution HQT-96-006 (Should these revisions not be acceptable, the original list can be inserted as a replacement.) The third part consists of a list of potential impacts or issues which cut across a number of possible activities which should be considered. The fourth part consists of a list of industries which, experience has shown, tend to have negative environmental or pollution problems unless managed carefully and in a professional manner.

FUND LIMITATIONS

The following activities are deemed inappropriate, illegal, environmental unacceptable. Check proposal against the following for evaluation and decision.

- Production or trade in any product or activity deemed illegal by host country regulations or international law
- Production or trade in weapons and munitions
- Production or trade in tobacco
- Gambling, casinos and equivalent enterprises ("adult leisure" centres)
- Trade in wildlife or wildlife-related products (CITES)
- Trade in radio-active materials or use in unlicensed or illegal activities
- Trade in products containing PCBs (Polychlorinated biphenyls)
- Trade or use of unbonded asbestos fibres
- Trade in pharmaceuticals subject to international phase-outs or bans
- Trade in pesticides/herbicides subject to international phase-outs or bans
- Trade in ozone depleting compounds subject to international phase out¹

¹Subject to conditions of the Montreal Protocol governing host country

REVISED CATEGORIES REQUIRING ENVIRONMENTAL REVIEW/ASSESSMENT ²
(List to be given to applicant, checked “Yes” or “No” and returned with application)

- Significant environmental impacts which are likely to affect third parties (e.g. local community, adjacent landowners, etc.)
- Industrial plant production or processing
- River basin or new lands development
- Large scale housing development on “greenfield” locations
- Road building or rehabilitation of roads (primary, secondary or tertiary over 10 kms length and building or rehabilitation of any roads which may pass through or near relatively un-degraded forest lands or other sensitive ecological areas)
- Substantial piped water supply, water treatment operations or sewage construction
- Major borehole or water point construction, other than small scale water points or water storage devices which will not affect environmentally sensitive areas or jeopardise threatened species (Note-the concentration of a large number of small scale operations constitutes an impact due to the cumulative effects and should be considered)
- Large scale irrigation
- Dams, impoundments, flood control, or other water diversionary schemes
- Large scale agricultural mechanisation
- Any projects that involve clearance or removal of virgin forest
- Agricultural land levelling
- Agrochemicals (pesticides, herbicides, fertilisers) - production, use, procurement, importing
- Activities that may impact protected natural habitats, areas or high biological diversity, threatened and endangered species or the modification of habitats that support the above
- Impacts upon indigenous peoples

Should the answer “yes” be given to any of the above in relation to the potential deal, an environmental review will need to be carried out

POTENTIAL ISSUES OR IMPACTS THAT MAY AFFECT ENVIRONMENTAL RISK OR DECISIONS RELATING TO THE PROPOSAL

- ◆ Environmental issues subject to local or national permitting/licensing/legal approval
- ◆ Workplace health and safety issues
- ◆ Emissions to air
- ◆ Generation of wastewater
- ◆ Generation of solid waste (inert and toxic)
- ◆ Significant or nuisance noise levels
- ◆ Chemicals (including oil, diesel, paraffin, and petrol) stored on site
- ◆ Use of significant volumes of water (cooling, dilution, washing, etc.)
- ◆ Use of ozone depleting substances
- ◆ Fire risk or prevention

² Note that certain countries, e.g. South Africa, have now introduced compulsory EIA requirements which would be required once the project is ready for permitting/licensing application

LIST OF POTENTIALLY CONTAMINATIVE USES

When carrying out due diligence checks on potential deals, inspections of connected properties often reveal a great deal of information. One clue to possible problems is the nature of previous land uses or businesses of previous land occupiers. The following list of uses could indicate the presence of contaminated land to some degree or other. Should any of these uses emerge from discussions, it is strongly suggested that further investigation is undertaken to ensure that past use or past waste disposal on site did not contaminate the land to a degree that remediation or clean up may be required at some point.

- ▶ Animal processing works
- ▶ Asbestos works
- ▶ Brickworks
- ▶ Cemeteries
- ▶ Chemical works
- ▶ Coal mines and coal preparation plants
- ▶ Dry cleaners
- ▶ Docks
- ▶ Electrical equipment manufacturers
- ▶ Engineering works
- ▶ Food processing or manufacture
- ▶ Garages and petrol stations
- ▶ Gasworks
- ▶ Hospitals
- ▶ Heavy engineering installations including shipbuilding and shipbreaking
- ▶ Land used by the military
- ▶ Landfills and waste disposal facilities
- ▶ Metal processing industries (smelters, foundries, iron and steel works)
- ▶ Military firing or exercises ranges or grounds
- ▶ Mineral workings
- ▶ Mineral processing works (brickworks, cement works, tarmac/asphalt plants)
- ▶ Munitions production and testing sites
- ▶ Oil Refineries, petroleum storage and distribution sites
- ▶ Paint manufacturers
- ▶ Paper and printing works
- ▶ Power stations
- ▶ Quarries or mines
- ▶ Railways lines
- ▶ Radio active materials
- ▶ Research laboratories
- ▶ Scrap Yards
- ▶ Sewage works and water treatment plants
- ▶ Tanneries
- ▶ Timber treatment works
- ▶ Tyre manufacture

World Bank-IFC have developed a number of sector/industry specific environmental guidelines. A full electronic set of these environmental guidelines is held by the SAEDF Legal Advisor. A few samples of these environmental guidelines can be found in Appendix 6 (Forestry Operations, Logging, Fish Processing, and Food and Beverage Processing). As experience within the organisation in this area grows, every effort should be made to add customised lists and guidelines to this manual for reference purposes.

Stage 2 - Field Visit or Site Inspection

The site visit and meeting with potential clients can reveal a great deal of environmental information, if the correct and appropriate questions are asked and informed field observations made. The investment officer's checklist is a means of testing deal documentation against investment officer impressions and "facts in the field".

ENVIRONMENTAL CHECKLIST INVESTMENT OFFICERS

Site

What was the site previously used for?

Is there a documented history for the site?

Were any areas of the site used to dump/dispose or bury solid or liquid waste?

Are you aware of any contamination of the soil or water on site?

Have any boreholes or trenches been dug site to check groundwater and potential contamination?

Will adjoining land uses or neighbours affect, or be affected by the project?

Are storage areas on site bunded³, concreted/asphalted or in any way sealed to prevent leakage to soil of deleterious liquids?

Is there any evidence that there were storage tanks on site (surface or below ground)? If so detail, type, status, age and contents.

Is the site close to any sensitive environmental or human assets and facilities?

Will the addition of site employees to the area cause social or environmental problems?

Raw Materials

Are there any environmental impacts related to raw materials in the project?

Does the transport of raw materials pose an environmental problem?

Water

What arrangements have been made to handle stormwater on site?

Is the site liable to flash floods or heavy rains at any time?

Is water for the project piped in or drawn from borehole or collected and stored from rainfall?

If other, detail

Could the project or programme contaminate water on site in any way?

³ A bund is a low wall, usually around a tank, to contain any spills or leaks from the tank.

Does the project include water conservation policies and programmes?
Will, nitrates, phosphates or high BOD/COD⁴ materials be a potential problem to water supplies?

Air

What sources of air emissions are there? (Relating to stacks or vents)
Are there any smells or nuisance odours that are related to the project?
Is there a dust problem on site? (Windblown, stacks, etc)
Will the project or programme create a dust problem?

Wastes

Where is the nearest waste disposal/landfill site?
How will the project/programme's wastes be disposed of?
Are there any hazardous or toxic wastes to be disposed of? If so, how will this be done?
Are there any genetic/pathological/medical wastes that must be disposed of?
Are there any plans to recycle/reuse/reduce/minimise wastes generated?
Are wastes separated for ease of handling or potential recycling?
How are organic wastes handled? Do they pose a potential pollution threat?
Are there hazardous wastes that are present in small quantities? (E g laboratory wastes)
What arrangements have been made to handle process water or waste water?

Materials

Will materials used in the project be harmful/hazardous or a threat to the environment? How?
What plans are in place to ensure that stored materials do not affect the environment?
What chemicals are to be used? Are there Material Safety Data Sheets⁵ available?
Can chemicals be replaced by less hazardous materials?
Is asbestos used anywhere on site? If so detail
Are PCBs part of transformer oils or transformer banks on site? Evidence?

Processes

Are the processes to be used hazardous in any way to the environment? Explain
Has a full and explanatory flow chart of project processes been drawn

Administration

Do insurance policies carrying sufficient cover for pollution clean-up/remediation?
Do insurance policies have exclusionary clauses for environmental or pollution episodes?
Does the organisation's administration have any environmental files, documentation, or references?

The Investment Officer's Environmental Checklist should be used to ensure that the information accompanying the application satisfies the questions asked above. Some of the information will

⁴BOD/COD - Biological Oxygen Demand/Chemical Oxygen Demand

⁵Material Safety Data Sheets or MSDSs contain valuable data on chemical or product composition, characteristics, clean up guides, control guidelines, accident treatment, and are held for all chemicals used by reputable organisations

emerge in the Environmental review (if it is undertaken)

The Investment Officer may be invited to examine various client documents, files, papers, and other information in support of the application. In order to be able to draw the environmental information needed for this material, there needs to be a basic awareness of what is available. Appendix 2 contains a list of the kind of company documents that can supply environmental information.

Stage 3- Decision-making

Stage three involves looking at decisions that need to be taken as a result of the evaluation of the environmental information. The necessary environmental decisions arise at various stages of the overall process, depending upon the particular case or set of circumstances. The kind of decisions and results will be as follows -

No Further Environmental Requirements

This is likely to result from early evaluations where little or no environmental impact can be identified, or where the environmental impact is deemed not to be significant, from a negative or positive perspective.

If such a decision is reached, it is vitally important that the reasons and rationale behind that decision is documented. It may seem futile or a waste of time but if ever the decision should be reviewed, an audit trail exists to spell out the reason behind the decision. It must be remembered that conditions change and this can change the basis for decision making. Thus, the documentation of the decision is not to protect the decision makers but to "prove" that a decision-making process took place, and to document the facts, AT THAT PARTICULAR POINT IN TIME, which prompted the decision.

Environmental Review

The environmental review will be required when the environmental screening checklist indicates that a potential deal may have environmental impact. Resolution HQT-96-006 indicates that the Environmental Review should be a document about 3-5 pages long (more if required) and consist of the following sections - Background (Rationale and results expected), Activity Description, Environmental Situation, Evaluation of activities and Issues with respect to Environmental Impact Potential, Environmental Mitigation Actions (including Monitoring and Evaluation), and any other relevant information.

This information could also serve as the basis for a scoping⁶ exercise that might need to be conducted if a full environmental impact assessment is required. It is important that the Environmental review, if it is to be undertaken, is carried out as early as possible in the deal life cycle. This is to ensure that any "environmental fatal flaws" are identified as soon as possible, and to ensure that environmental concerns are incorporated into the deal structure at the earliest possible stage, to minimise excessive cost and time wastage.

⁶Scoping is the term used to describe the method of gathering information to prioritise key issues to be included in an environmental evaluation or EIA. The information is collected from experts, government officials, and other interested and affected parties.

This is the first point that the question of monitoring, data collection and information arises in the process. The procedure indicated below attempts to categorise and prioritise environmental information in a form that will enable it to be used quantitatively in a decision-making exercise. Once again, this tool is basic and not the only method of its type available. It is included as an optional aid. Although included at the environmental review stage, the tool can be used at any point in the process.

PROCEDURE FOR COLLECTION OF APPROPRIATE ENVIRONMENTAL INFORMATION

Normally, the collection, management and updating of environmental data is a costly and time-consuming exercise. It can often only be carried out by large companies and organisations who have the money and skills to undertake the work or where there is a specific legal requirement for such data and the company or client are obliged to gather the data in order to continue their business. Any form of environmental data, formal or informal, creates a basis for decision-making or understanding of the dynamics of environmental concerns relating to an operation or business.

The procedure detailed below categorises environmental data into three levels which relate, broadly, to the circumstances that might be found, surrounding a loan. It should be noted that the environmental data will form only a part of wider data collected. For example, trip reports will probably be made for all projects but the level of environmental data content will vary.

LEVEL 1

Original environmental monitoring data such as stack emission data, water quality data, test results and sampling data normally collected by the client.

LEVEL 2

Environmental data from other sources, "second-hand" data that does not relate directly to the project/client but is from adjoining areas or is of an area or regional nature, or other forms of related data that is available.

LEVEL 3

Subjective information, trip reports, observations, anecdotal information, information from other anecdotal or subjective sources, client reports.

Every effort should be made to collect high order environmental data at Level 1 to enable environmental risk or risk assessments to be undertaken as appropriate. If that information is not available or "not collectable", the next level down, Level 2 data should be collected. The value of that data will be sound but not to the same degree as level 1. Level 2 data will not contribute as significantly to risk assessment exercises and should be treated accordingly. Should level 2 data not be available, the final resort is to collect Level 3 data. Level 3 data has limited scientific value but is vital in the absence of any other means of making judgements or decisions.

Environmental Impact Assessment

Should an environmental impact assessment be required either as a result of concerns raised

through the environmental review or through legislative requirements, it is recommended that consultants be commissioned to undertake the work. Appendix 5 includes a list of contacts for information and assistance and a basic list of environmental consultants and their areas of operation. Those consultants should be commissioned on the basis of legal requirements and these should form the basis for the briefing of the consultants. IFC have developed guidelines for the commissioning of environmental impact assessments, which provide a useful guide.

Loan Approval Conditions

An important environmental control if environmental concerns arise at any stage of the deal, is to insert environmental conditions in the loan agreement. These would include, for example, requirements to monitor water quantity, the frequency and type of data to be submitted and controls and limitation upon activities. If mitigating measures are given to minimise the negative environmental impacts of a deal, these should be written into the agreement and monitored through the regular reports on project or deal progress.

Monitoring of environmental performance is difficult to quantify but information can be gathered to meet these needs. Incorporating these requirements in the loan agreement will secure compliance. Appendix 1 is a proposed set of guidelines for monitoring of environmental performance which may assist.

Client Support

The issue of environmental support for clients is a delicate one. Whilst the Fund does not want to appear to interfere in its client's day-to-day operating affairs, it does wish to protect its investment and promote a sound environmental management ethic, in keeping with the environmental ethos of the US government. Capacity building is an important component of aid philosophies and assistance can be given "diplomatically".

Some clients will request assistance and it is wise to have material at hand to accommodate this. The tools discussed in this manual can be used for that purpose where the material is not of a sophisticated level that would cause confusion or misunderstanding. In the case of IFIs, a suggested environmental checklist has been included in Appendix 3 which is relatively simple and is designed merely to focus of awareness, not detail. At the level of clients of IFIs, this whole task becomes even more difficult. An even more simplified environmental checklist has been included in Appendix 4 which may be of assistance. It is anticipated that the demand for environmental information and support may only arise at a later stage. In which case, existing material can be modified in the light of experience.

Appendix 1

A PROPOSED SET OF GUIDELINES FOR THE MONITORING OF ENVIRONMENTAL PERFORMANCE

Introduction

The degree to which a lending agency gets involved in a client's business can be a delicate and sensitive matter. Whilst the lending agency, needs to ensure that its interests and investment are protected, any element of excessive "interference" in the business of the client could cause disruption and disequilibrium. Environmental performance, if not carefully defined, could easily fall within this category.

In order to ensure that environmental performance monitoring does not become a political issue, it is important to clearly spell out precisely what environmental performance is, in the context of the client's operations, and to clarify precisely what measurement and monitoring of the performance involves and what parameters are used. This will, of course, vary from project to project and vary from the upper extreme of a formal environmental audit⁷ to simple checks such as a review of the original environmental checklist prepared and a site inspection.

As a point of clarification, monitoring of environmental performance involves -

- ▶ checking actual environmental performance against projected or planned performance
- ▶ evaluating environmental performance for unforeseen environmental eventualities or results
- ▶ checking environmental measurements taken (e.g. chimney stack emissions and effluent quality data) against environmental performance predicted
- ▶ checking actual environmental performance against environmental policies and loan conditions and commitments

Environmental Performance Monitoring Checklist

- If environmental conditions formed a part of the loan agreement, have these conditions been adhered to?
- Has it been necessary, at Board level, to agree to any changes of procedure, policy, systems or operation as a result of environmental concerns, impacts or issues?
- Has the client been able to manage environmental circumstances adequately and according to his original plans and predictions?
- Has it been necessary to utilise environmental consultants or experts to deal with environmental matters that have arisen?
- Are there any significant environmental changes since the original site visit? (Only

⁷ " A management tool comprising a systematic, documented periodic and objective evaluation of how well environmental organisation, management, and equipment are performing with the aim of helping to safeguard the environment by (i) facilitating management control of environmental practices, and (ii) assessing compliance with company policies, which would include meeting regulatory requirements " - International Chamber of Commerce

applicable if same investment officer carried out both evaluation and monitoring)

- Do the environmental data from air and water quality measurements indicate any trends that could be cause for concern or are unexplained or unsatisfactorily explained?
- Are the environmental authorities (local, provincial and national) satisfied with the client's compliance to environmental requirements, conditions, laws, ordinances and regulations?

Appendix 2

ENVIRONMENTAL RECORDS AND DOCUMENTATION GUIDELINE

The data list below is an indication of the kind of documents that can provide environmental information which is relevant and useful in assessing environmental risk and environmental performance -

- Plant/site Layout
- Organisation and management structure chart/document
- Job responsibilities/ job descriptions
- Schedule of Chemicals (Trade name & chemical description) on site (raw materials, catalysts, etc and finished product)
- Hazard Data Sheets for ALL chemicals on site
- Summary & Flow chart(s) of processes on site
- List of regulations, standards & legislation affecting site
- Copies of Permits, licences, waivers, relaxations, approvals
- Legislative compliance statistics
- Company Environmental policies documents
- Company Environmental Policies for Site
- Company/Site Environmental Objectives
- Company Environmental Standards
- External or Customer Environmental Standards
- Copies of Environmental or SHE Committee meetings
- Conditions of operation for contractors & subcontractors
- Contractor documents and agreements
- Budget for environmental management
- Activities, Operations & Procedures Manuals
- Plant Modifications Sheet File
- Emergency Plan & Procedures Manuals
- Emergency Plan & Procedures Practice Schedule
- Emergency Contacts Lists
- Media Contacts Lists
- Training Manuals
- Training Schedules
- Training Records
- Internal & External Environmental information & publicity material
- Emission & Effluent monitoring schedules
- Schedules of internal & external complaints
- Schedule of wastes removed from site (internally and by contractor)
- Accidental Release/Escape Statistics & reports
- Incident Book/File
- Control Room activity log
- Mass Balance Equations for processes
- Plant Audit Schedules
- Plant Audit Protocols
- Environmental Improvement Plans

Appendix 3

A SUGGESTED IFI ENVIRONMENTAL CHECKLIST

- ▶ Will your client's operation cause or contribute to any form of pollution? (Air, water or soil)
- ▶ Will your client's operation cause or contribute to any form of nuisance? (E g noise, odours, unsocial or anti-social activities, etc)
- ▶ Do your client's activities generate waste which might contribute to increased littering or waste that must be disposed of on landfills or burnt? If so, detail
- ▶ Do your client's activities generate any toxic, poisonous or hazardous waste which might hazardous to health or the environment? If so, detail
- ▶ Are there any risks associated with your client's activities? If so, detail
- ▶ Would your client be interested in helping to minimise his impact on the environment? If so indicate what type of help or if he requires assistance or advice
- ▶ Are any of your client's activities dangerous or hazardous to health? Explain
- ▶ Do any of your client's activities involve streams, water courses, rivers, lakes, vleis or other freshwater? Please explain

Appendix 4

A SUGGESTED CLIENT ENVIRONMENTAL CHECKLIST (BASIC OR FOR IFI CLIENTS)

- Have you thought about the environmental aspects (positive and negative) of your project?
- Will your project cause air, soil or water pollution?
- Will your project cause any nuisance to neighbours or adjoining operations? (Noise, dust, smoke, smells, traffic at unsocial hours, any other unsocial activities)
- Have you made adequate provision to dispose of your waste in a safe and environmentally responsible manner?
- Will you be using any chemicals or substances which could be hazardous to health or the environment?

Appendix 5

Contacts List

(Please note that although the numbers below are the latest available, telephone numbers are constantly changing and it may be necessary to consult directory inquiries or “New Numbers” for the very latest details)

Industry Associations/Agencies/advisory bodies

Agricultural and Veterinary Chemicals Association (Agrochemicals)

P O Box 1995

1685 MIDRAND

Tel - (011) 805-2000, Fax - (011) 805-2222 Executive Director Mr Jan Kleynhans

Aerosol Manufacturers’ Association (Ozone-friendly label)

P O Box 483

1665 OLIFANTSFONTEIN

Tel - (011) 318-2716, Fax - (011) 318-1698 Executive Director Mr Mike Naude

Chemical and Allied Industries’ Association

P O Box 91415

2006 AUCKLAND PARK

Tel - (011) 482-1671/4, Fax - (011) 726-8310 Executive Director Dr Laurraine Lotter

Dept Environment Affairs & Tourism (Directorate Environmental Management/EIAs)

Private Bag X447

0001 PRETORIA

Mr Wynand Fourie, Director Environmental Management - Tel - (012) 310-3703

Mr Jerry Lengoasa, Deputy Director Environmental Management - Tel - (012) 310-3709

Fax - (012) 3222682

Dept Environment Affairs & Tourism (Directorate Montreal Protocol)

Private Bag X447

0001 PRETORIA

Mr Morkel Steyn, Deputy Director Montreal Protocol, Tel -(012) 312-0215

Dept Environment Affairs & Tourism (Directorate Air Pollution Control)

Private Bag X447

0001 PRETORIA

Tel - (012) 312-230, Fax - (012) 221-5392, Chief Air Pollution Control Officer - Mr Martin Lloyd

Dept Environment Affairs & Tourism (Waste Management Policy & Legislation)

Private Bag X447

0001 PRETORIA

Tel - (012) 310-3671, Fax - (012) 3222682, Deputy Director (Waste Management) Mr Tinus

Joubert

Dept Water Affairs & Forestry (Registration of Landfill sites and toxic waste disposal)
Private Bag X313
0001 PRETORIA
Tel - (012) 338-7552 Deputy Director (Waste Management) - Mr Leon Bredenhann

Industrial Environmental Forum
P O Box 1091
2000 JOHANNESBURG
Tel - (011) 800-2687, Fax - (011) 800-4360 Manager - Ms Karin Ireton

Institute of Quarrying
P O Box 940
1876 WALKERVILLE
Tel - (011) 949-1534, Fax - (01) 949-1608 Secretary - Mrs Lynn Montgomery

Fertiliser Society of Southern Africa
P O Box 75510
0040 LYNNWOOD
Tel - (012) 349-1450, Fax - (012) 349-1363 Manager - Mr H Venter

Pharmaceutical Manufacturers Association
P O Box
2000 JOHANNESBURG
Tel - (011) 805-5100, Fax - (011) Chief Executive - Ms Mirryena Deeb, Cell
No - 083-377-1546

Plastics Federation of Southern Africa
Private Bag X68
1685 HALFWAY HOUSE
Tel - (011) 314-4021, Fax - (011) 314-3764 Environmental Officer - Mr Douw Steyn

Provincial Environmental Affairs Departments
(Provincial telephone numbers and departmental responsibilities are constantly changing and the details below may already be out of date)

Eastern Cape
Department of Economic Affairs, Environment & Tourism
Private Bag X0054
5605 BISHO
Tel - (0401) 956-4266, Fax - (0401) 91883 Contact - Director Environmental Affairs

Free State
Director Environmental Affairs
Department of Environmental Affairs & Tourism

P O Box 517
9300 BLOEMFONTEIN
Tel - (051) 405-4443, Fax - (051) 448-1758 Director Env Affairs -Mr I Moroe

Gauteng
Directorate Environmental Management
Department of Conservation, Agriculture & Environment
P O Box 8769
2000 JOHANNESBURG
Tel - (011) 333-2106, Contact - Ms Z Budnik

KwaZulu-Natal
Department of Traditional & Environmental Affairs
Private Bag X01
3838 ULUNDI
Tel - (0358) 70-0552, Fax - (0358) 70-0580, Contact - Acting Director Environment

Mpumalanga
Head Environmental Affairs
Mpumalanga Provincial Government
Private Bag X11289
1200 NELSPRUIT
Tel - (013) 759-4000, Fax - (013) 759-4032 Contact - Mr J C Mhlongo

Northern Cape
Health & Welfare and Environmental Affairs
Private Bag X5049
8300 KIMBERLEY
Tel - (0531) 81-4218, Fax - (0531) 3-1925 Contact - Dr M F Matlaopane

Northern Province
Department of Agriculture, Land & Environmental Affairs
Private Bag X9487
0700 PIETERSBURG
Tel - (0152) 295-7090, Fax - (0152) 295-7046 Contact - Administrative Secretary

North West
Department of Agriculture
Private Bag X2039
2735 MMABATHO
Tel - (0140) 875111, Fax - (0140) 84-2679 Contact - Mr O J Tselapedi

Western Cape
Department of Environmental & Cultural Affairs
Private Bag X9086
8000 CAPE TOWN

Tel - (021) 483-4093, Fax - (021) 23-0939 Head - Dr J H Neethling

South African Chamber of Commerce & Industry

P O Box 91267

2006 AUCKLAND PARK

Tel - (011) 358-9700, Fax - (011) 358-9773/4 Infrastructure & Environment Manager

South African Petroleum Industry Association (Environmental Officer)

P O Box 6094

8012 ROGGEBAAI

Tel - (021) 419-8054, Fax - (021) 419-8058 Environmental Officer - Mr Anton Moldan

South African Property Owners Association (Head Office)

P O Box 78544

2146 SANDTON

Tel - (011) 883-0679, Fax - (011) 883-0684 Chief Executive Officer - Mr B Kirchmann

Aggregate & Sand Producers Association of South Africa

Private Bag 34

2006 AUCKLAND PARK

Tel - (011) 726-5300, Fax - (011) 482-2000 Director - Sir Rupert Bromley

Professional Associations or Bodies

Environmental Planning Professions Interdisciplinary Committee (EPPIC)

P O Box 90142

2013 BERTSHAM

Tel/Fax - (011) 942-3450 Secretary - Mrs Yvonne Poole

International Association of Impact Assessment (South African Chapter)

P O Box 44335

7700 CLAREMONT

Tel - (021) 45-1609, Fax - (021) 461-8926 Secretary - Ms Glaudin Kruger

South African Institute of Ecologists & Environmental Scientists

P O Box 36356

7702 GLOSDERRY

Tel/Fax - (021) 788-1153 Secretary - Ms D L Stafford

Environmental NGOs

Endangered Wildlife Trust (TRAFFIC Officer, Southern Africa, CITES)

Private Bag X11

2122 PARKVIEW

Tel - (011) 486-1102, Fax - (011) 486-1506 TRAFFIC Officer - Mr David Newton

Wildlife & Environment Society (Ozone-friendly label)
P O Box 394
3290 HOWICK
Tel - (0332) 30-3931, Fax - (0332) 30-4576 Director - Mr Malcolm Powell

Environmental Consultants⁸
(Alphabetical order)

All consultants listed are small groups of professionals working together or single consultants
This is done in the interest of supporting small entrepreneurial business

African Environmental Solutions (Env Auditing, EIAs, EMSs)
P O Box 53577
7745 KENILWORTH
Tel - (021) 797-8479, Fax - (021) 797-8482 MD - Dr John Raimondo

Agency for Cultural Resource Management (cultural resources, archaeology)
P O Box 159
7306 RIEBEEK WEST
Tel/Fax - (0224) 61-2755 Director - Mr Jonathan Kaplan

CEN Integrated Environmental Management (ecologists, EIA, EMS, biological surveys)
36 River Road
6070 WALMER
Tel/Fax - (041) 51-2983 Director Dr Mike Cohen

Digby Wells & Associates (Mines, Mine rehabilitation, auditing, EMPRs, EMPs)
Private Bag X10046
2125 RANDBURG
Tel - (011) 789-9495, Fax - (011) 789-9498 Contact - Mr Ken van Rooyen

Eagle Environmental (Environmental auditing & training, EIAs, Env Networking)
Private Bag X1
3611 PAVILION
Tel - (031) 701-5315, Fax - (031) 701-5377 Contact - Mr Arend Hoogervorst

Ecoserv (Pty) Ltd (EIAs, Air quality monitoring & modelling, Env Audits, Chem Eng)
P O Box 37945
4067 OVERPORT
Tel - (031) 309-2391, Fax - (031) 319-2952 Director Mr Quentin Hurt

⁸The author takes no responsibility for standards or quality of the consultants listed. At the time of writing, the consultants were undertaking work listed of a standard that could be construed as satisfactory. Users are advised to check the credentials of the consultants and satisfy themselves that the service that they provide will meet the needs of the SAEDF.

Environmental Management Services (Air quality measurement and modelling)
P O Box 52668
0149 VIERDA PARK
Tel - (012) 668-1047, Fax - (012) 668-1828 Director Dr Lucien Burger

IDEAS Environmental Consultants (EIAs, Biological & Ecological Surveys)
P O Box 50826
4062 MUSGRAVE ROAD
Tel - (031) 23-5948, Fax - (031) 23-4841 Director Mr Kevin Weerts

Lombard & Associates (Waste Management, Landfill design, Waste Minimisation)
P O Box 115
3652 LINK HILLS
Tel - (031) 763-3222, Fax - (0310) 763-3041 Director - Mr Ray Lombard

Mark Wood Consultants (EIAs, Mine & Quarry Planning & rehabilitation, auditing)
P O Box 2963
2040 HONEYDEW
Tel - (011) 958-1920, Fax - (011) 958-1858 Contact - Mr Mark Wood

Walmsley Environmental Consultants (EIAs, Mines, Quarries, Housing)
P O Box 5384
2125 RIVONIA
Tel - (011) 807-1360, Fax - (011) 803-4248 Director - Ms Bryony Walmsley

Appendix 6

WORLD BANK ENVIRONMENT, HEALTH AND SAFETY GUIDELINES¹

1 FORESTRY OPERATIONS LOGGING

FORESTRY POLICY

International Finance Corporation (IFC) forest-based projects are subject to an internal environmental review process to ensure that any proposed IFC participation is consistent with the spirit and intent of the appropriate World Bank guidelines and policies (e.g., The World Bank "Forest Policy Paper"). Bank policy as it relates to private sector investment and logging operations may be summarized as follows:

- a) support for investment in commercial logging in primary tropical moist forest is excluded
- b) all forestry operations must entail a commitment to an active program for sustainable and conservation-oriented forestry. This includes setting aside adequate preservation forests to protect and conserve biological diversity (flora and fauna) and environmental services such as watershed protection. Sustainable forest management may include cyclic use of tree plantations or sustainable, selective harvesting in secondary (previously harvested) forest stands
- c) the interests and livelihoods of indigenous peoples and forest dwellers must be adequately addressed through the project

Recognizing that forest operations are likely to occur in tropical moist forest in some countries, IFC will consider investments in upgrading the design and control of harvest operations as part of a program to transform to sustainable forestry, provided the following conditions are met:

- a) new plantations can be supported only on heavily degraded forest land or non-forested areas, or on good quality secondary forest if it can be clearly shown that the area cannot reasonably be expected to recover to a healthy climax forest condition due to either ecological conditions or extraneous human encroachment (e.g., invasion by colonists or swidden agriculture) if the land is not protected through plantation concessions

¹ Source: The World Bank policies and guidelines, supplemented with information from OECD sources and the proposed revisions to the World Bank guidelines

- b) active programs are included where and as appropriate to encourage social and agro-forestry operations by local residents

FOREST MANAGEMENT PLAN

Project sponsors are required to develop a forest management plan. The plan should include the components noted below.

Basic Principles

- a) conversion of secondary forest to plantations in the concession area will be kept to the minimum required to sustain the raw material production rate
- b) selective tree removal and directional felling are encouraged in secondary forest areas. Multi-species and multi-age stands are encouraged in plantations.
- c) maintenance of a sustainable, healthy, diverse environment within the concession must be a high priority for the company.
- d) rights and welfare of local inhabitants will be respected and enhanced where possible.
- e) the design and management of conservation areas will be undertaken so as to ensure sound watershed management, reduction of soil erosion, and maintenance of biological diversity.
- f) to the extent practical, conservation areas should occur in the largest possible blocks of contiguous area, maintain connecting corridors of natural habitat where they must be separate, and maintain connections with natural habitat outside of the concession area.
- g) a unit shall be established in the company operations whose sole function is to monitor the environmental impact of the operation, the design and implementation of conservation management areas, and the relation of the company with local inhabitants and community programs.

Water Resources

Both surface water and groundwater can be adversely affected by logging operations. Particular attention should be given in the forest management plan to

- a) avoid harvesting areas of karst terrain, unstable slopes, slopes greater than 30%, highly erodible floodplain soils, or highly braided channel areas.
- b) keep stream crossings to a minimum so as to reduce siltation (project sponsors are encouraged to consider log suspension for yarding across small streams).
- c) reclaim areas disturbed by drag lines and vehicles, preferably with native species.
- d) protection of surface water and groundwater from contamination by any herbicide and fungicide applications (biodegradable chemicals are to be used and buffer zones should be maintained adjacent to water courses).

- e) buffer strips (no harvest or significant disturbance of vegetation) established on each side of stream banks, the width to be determined on a case-by-case basis by a qualified forester's evaluation of soil and ecological conditions in the logging concession

Road Construction

Road construction and road networks often represent sources of significant adverse effects on streams and rivers, which may extend to resources and resource users outside of the concession area. Particular attention should be given in the forest management plan to

- a) maximize use of existing roads
- b) minimize the amount of cut and fill for roads
- c) culverts should be designed to carry reasonable flood flows and installed at natural channel grade to maintain drainage systems
- d) avoid poorly drained areas or placing roads on slopes more than 60%
- e) slash from road right-of-way clearing should be placed in windrows downslope of the road to act as a sediment filter, especially in fill areas
- f) construct water bars or employ other methods of rapidly diverting surface runoff from the road surface

Settlement Incursion

The forest management plan must address the risk of human incursion from settlers, squatters, or other human activities and the appropriate measures to minimize or reduce this impact. Appropriate measures can include

- a) proper delineation of concession boundaries
- b) establishing plantations around designated conservation areas to the extent practical and consistent with the basic principles noted above
- c) preferential recruitment and training of local inhabitants for employment
- d) promotion of agro-forestry and community forestry programs where possible
- e) cooperation with extension programs operated by government institutions or non-governmental organizations to increase environmental awareness and technical skills among local people

All resettlement or relocation of local residents or communities must be in compliance with World Bank Operational Directive 4.30 (Involuntary Resettlement) and any local or national laws.

WORKPLACE AIR QUALITY

- a) dust collection, adequate ventilation, and lighting in all inside work areas
- b) provision of special footwear, respirators, and dust-proof clothing to personnel working in areas with high dust levels
- c) use of protective respiratory devices when the workplace dust levels exceed 10 mg/m³

WORKPLACE NOISE

- a) regular maintenance of equipment and facilities to minimize noise levels
- b) use of feasible administrative and engineering controls, including sound-insulated equipment and control rooms, to maintain the average noise level in normal work areas below 90 dBA
- c) use of hearing protection for personnel exposed to noise levels above 85 dBA

SAFETY

- a) established warning system for keeping employees safely away from falling trees
- b) safety gloves, safety helmets and non-slip closed shoes available for employees felling trees or handling sawn timbers
- c) saws stored in special racks away from possible casual or accidental contact
- d) guards and emergency devices on all mill saws
- e) ability to emergency stop conveyor systems from multiple locations other than the main control center -- a siren alert must be sounded before the conveyor is started

HEALTH - GENERAL

- a) pre-employment and periodic medical examinations for all personnel
- b) on-site health center stocked with appropriate medications and first aid equipment and full time rapid response access to personnel trained in first aid
- c) ambulance service or comparable emergency response

SAFETY - GENERAL

- a) All steam pipes should be insulated
- b) Shield guards or guard railings should be installed at all belts, pulleys, gears and other moving parts
- c) Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toeboards and non-slip surfaces
- d) Electrical equipment should be grounded, well insulated and conform with applicable codes
- e) Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated
- f) A fire prevention and fire safety program should be implemented and include regular drills

TRAINING

- a) Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee's task and work area
- b) Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials
- c) Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities
- d) Training also should include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, and proper response actions for each foreseeable emergency situation

RECORD KEEPING AND REPORTING

- a) The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies
- b) This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety program
- c) An annual summary of the above information should be provided to IFC

WORLD BANK ENVIRONMENT, HEALTH AND SAFETY GUIDELINES¹

2 FISH PROCESSING

LIQUID EFFLUENTS

Process wastewater, domestic sewage and contaminated stormwater should be treated to meet the following specified limits before being discharged to surface waters

pH	6 to 9	
BOD ₅	50	mg/l
Oil and Grease		20 mg/l
Total Suspended Solids		50 mg/l
Coliforms		Less than 400 MPN/100 ml
	(MPN - Most Probable Number)	
Temperature - at the edge of a designated mixing zone receiving waters	>28 C	Max 5 C above ambient temperature of receiving waters - max 3 C if

Alternatively, mass loading limits may be applied for BOD₅, TSS and oil and grease for the following product categories

	Maximum daily kg/mt live weight processed		
	BOD ₅	TSS	Oil and grease
Tuna	2 2 2 2	0 27	
Salmon	11 2 8	2 8	
Other finfish		4 7	4 0 0 85
Crab	3 6 3 3	1 1	
Shrimp	52 22	4 6	
Other shellfish		41	41 0 62

Liquid effluent discharges to a public or private central wastewater treatment system may be subject to pre-treatment requirements. Sponsors should provide information from the local authority or private central wastewater treatment company, to confirm that the treatment system has the capacity to adequately treat the project's liquid effluents

¹ Source: The World Bank policies and guidelines, supplemented with information from OECD sources and the proposed revisions to the World Bank guidelines

AMBIENT AIR

Concentrations of contaminants, measured outside the project property boundary, should not exceed the following limits

Particulate Matter (<10 µm)	
Annual Arithmetic Mean	100 µg/m ³
Maximum 24-hour Average	500 µg/m ³
Nitrogen Oxides, as NO ₂	
Annual Arithmetic Mean	100 µg/m ³
Maximum 24-hour Average	200 µg/m ³
Sulfur Dioxide	
Annual Arithmetic Mean	100 µg/m ³
Maximum 24-hour Average	500 µg/m ³

STACK EMISSIONS

Concentrations of contaminants emitted from the stacks of significant sources with an equivalent heat input of greater than 10 million BTU/hr , including boilers, furnaces, incinerators and electrical generating equipment should not exceed the following limits

Particulate Matter	mg/Nm ³
Nitrogen Oxides, as NO ₂	600 mg/Nm ³
Sulfur Dioxide	1000 mg/Nm ³

Alternatively, mass emission limits may be applied for the specified fuels and source sizes as follows

Fuel Type and Contaminant	Emission Limits, g/million BTU Based on Source Size		
	10-30 million BTU/hr	30-100 million BTU/hr	100-250 million BTU/hr
Gaseous Fossil Fuels			
Nitrogen Oxides, as NO ₂	N/A	N/A	90
Liquid Fossil Fuels			
Particulate Matter	75	75	45
Nitrogen Oxides, as NO ₂	N/A	N/A	180
Sulfur Dioxide	230	230	230

Solid Fossil Fuels			
Particulate Matter	75	25	25
Nitrogen Oxides, as NO ₂	N/A	N/A	275
Sulfur Dioxide	550	550	550
Wood Based Fuels			
Particulate Matter	45	45	45

The sponsor is required to demonstrate compliance with the above specified emission limits
The following methods may be used to demonstrate compliance

- a) For sources less than 100 million Btu/hr, compliance with the guidelines for Particulate Matter may be demonstrated by maintaining the stack emissions opacity below 20%. Opacity can be determined visually by a qualified observer, by a continuous opacity meter, or with a mobile Light Detection and Ranging (LIDAR) system
- b) The sulfur content of fuels may be used to demonstrate compliance with the Sulfur Dioxide emission guidelines. The use of liquid fuels with a sulfur content of $\leq 0.5\%$ meets the Sulfur Dioxide emission guideline. The use of solid fuels with sulfur contents of $\leq 0.8\%$ meets the Sulfur Dioxide guideline. The use of solid fuels combusted in underfired-feed stoker units meets the Sulfur Dioxide emission guideline if the sulfur content of the solid fuel is $\leq 1.0\%$. The sponsor must maintain records of fuel analyses to demonstrate that the sulfur content of the fuel is at or below the specified levels
- c) Manufacturers performance guarantees can be used to demonstrate that the Nitrogen Oxides emission guidelines are met. The performance guarantees must be verified by conducting an initial performance test after the equipment has been commissioned. The sponsor must maintain records to demonstrate equipment is operated within manufacturers specifications
- d) Alternately, stack emissions monitoring can be conducted for the specified contaminants. The monitoring must be sufficiently frequent to demonstrate ongoing compliance with the guidelines

The following table may be used to determine equivalent source sizes

10 Million Btu/hr	=	4.2 Tons Steam/hr	=	2.9 MWe
30 Million Btu/hr	=	12.6 Tons Steam/hr	=	8.7 MWe
100 Million Btu/hr	=	42 Tons Steam/hr	=	29 MWe
250 Million Btu/hr	=	105 Tons Steam/hr	=	73 MWe

The World Bank guidelines for Thermal Power Plants apply for sources larger than 73 MWe or with an equivalent heat input greater than 250 million BTU/hr

AMBIENT NOISE

Noise levels from the project's operation, measured at noise receptors located outside the project property boundary, should not exceed the following limits

Category of Noise Receptor	Limits in Decibels, dBA	
	Day Time	Night Time
Residential	55	45
Commercial	65	55
Industrial	75	70

SOLID AND LIQUID WASTES

- a) Project sponsors should recycle or reclaim materials where possible
- b) If recycling or reclaim is not practical, wastes must be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations
- c) All hazardous materials, process residues, solvents, oils, and sludges from raw water, process wastewater and domestic sewage treatment systems must be disposed of in a manner to prevent the contamination of soil, groundwater and surface waters
- d) If seafood waste is discharged to the marine environment, solids must be ground to pass through a 5 mm mesh screen and must be discharged to the sea in an area with sufficient water movement to prevent long-term build up of solid waste deposits or significant decreases in dissolved oxygen levels in the overlying water column

OTHER GENERAL ENVIRONMENTAL REQUIREMENTS

- a) Formulations containing chromates should be avoided in water treatment processes
- b) Transformers or equipment containing polychlorinated biphenyls (PCBs) or PCB-contaminated oil should not be installed, and existing equipment involving PCBs or PCB-contaminated oil should be phased out and disposed of in a manner consistent with the requirements of the host country
- c) Processes, equipment and central cooling systems involving the use or potential release to the environment of chlorofluorocarbons (CFCs), including Halon, should not be installed, and their use in existing processes and systems should be phased-out and disposed of in a manner consistent with the requirements of the host country

- d) Storage and liquid impoundment areas for fuels, raw and in-process materials, solvents, wastes and finished products should be designed with secondary containment (e g dikes, berms) to prevent spills and the contamination of soil, groundwater and surface waters

WORKPLACE AIR QUALITY

- a) Periodic monitoring of workplace air quality should be conducted for air contaminants relevant to employee tasks and the plant's operations
- b) Ventilation, air contaminant control equipment, protective respiratory equipment and air quality monitoring equipment should be well maintained
- c) Protective respiratory equipment must be used by employees when the exposure levels for welding fumes, solvents and other materials present in the workplace exceed local or internationally accepted standards, generally expressed as threshold limit values (TLVs)

WORKPLACE NOISE

- a) Feasible administrative and engineering controls, including sound-insulated equipment and control rooms should be employed to reduce the average noise level in normal work areas
- b) Plant equipment should be well maintained to minimize noise levels
- c) Personnel must use hearing protection when exposed to noise levels above 85 dBA

WORK IN CONFINED SPACES

- a) Prior to entry and occupancy, all confined spaces (e g , tanks, sumps, vessels, sewers, excavations) must be tested for the presence of toxic, flammable and explosive gases or vapors, and for the lack of oxygen
- b) Adequate ventilation must be provided before entry and during occupancy of these spaces
- c) Personnel must use air-supplied respirators when working in confined spaces which may become contaminated or deficient in oxygen during the period of occupancy
- d) Observers/assistants must be stationed outside of confined spaces to provide emergency assistance, if necessary, to personnel working inside these areas

HAZARDOUS MATERIAL HANDLING AND STORAGE

- a) All hazardous (reactive, flammable, radioactive, corrosive and toxic) materials must be stored in clearly labeled containers or vessels
- b) Storage and handling of hazardous materials must be in accordance with local regulations, and appropriate to their hazard characteristics
- c) Fire prevention systems and secondary containment should be provided for storage facilities, where necessary or required by regulation, to prevent fires or the release of hazardous materials to the environment

HEALTH - GENERAL

- a) Sanitary facilities should be well equipped with supplies (e g , protective creams) and employees should be encouraged to wash frequently, particularly those exposed to dust, chemicals or pathogens
- b) Ventilation systems should be provided to control work area temperatures and humidity
- c) Personnel required to work in areas of high temperature and/or high humidity should be allowed to take frequent breaks away from these areas
- d) Pre-employment and periodic medical examinations should be conducted for all personnel, and specific surveillance programs instituted for personnel potentially exposed to toxic or radioactive substances

SAFETY - GENERAL

- a) Shield guards or guard railings should be installed at all belts, pulleys, gears and other moving parts
- b) Elevated platforms and walkways, and stairways and ramps should be equipped with handrails, toeboards and non-slip surfaces
- c) Electrical equipment should be grounded, well insulated and conform with applicable codes
- d) Personnel should use special footwear, masks and clothing for work in areas with high dust levels or contaminated with hazardous materials
- e) For work near molten or high temperature materials, employees should be provided with non-slip footwear, gloves, safety glasses, helmets, face protection, leggings and other

necessary protective equipment

- f) Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated
- g) Personnel should wear protective clothing and goggles when in areas where corrosive materials are stored or processed
- h) Emergency eyewash and showers should be installed in areas containing corrosive materials
- i) A safety program should be established for construction and maintenance work
- j) A fire prevention and fire safety program should be implemented and include regular drills

TRAINING

- a) Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee's task and work area
- b) Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials
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WORLD BANK ENVIRONMENT, HEALTH AND SAFETY GUIDELINES¹

3 FOOD AND BEVERAGE PROCESSING

LIQUID EFFLUENTS

Process wastewater, domestic sewage and contaminated stormwater should be treated to meet the following specified limits before being discharged to surface waters

pH	6 to 9	
BOD ₅		50 mg/l
Oil and Grease		20 mg/l
Total Suspended Solids		50 mg/l
Coliforms		Less than 400 MPN/100 ml
	(MPN - Most Probable Number)	
Temperature - at the edge of a designated mixing zone receiving waters >28 C		Max 5 C above ambient temperature of receiving waters - max 3 C if

Liquid effluent discharges to a public or private central wastewater treatment system may be subject to pre-treatment requirements. Sponsors should provide information from the local authority or private central wastewater treatment company, to confirm that the treatment system has the capacity to adequately treat the project's liquid effluents

STACK EMISSIONS

Concentrations of contaminants emitted from the stacks of significant sources with an equivalent heat input of greater than 10 million BTU/hr, including boilers, furnaces, incinerators and electrical generating equipment should not exceed the following limits

Particulate Matter	100 mg/Nm ³
Nitrogen Oxides, as NO ₂	600 mg/Nm ³
Sulfur Dioxide	1000 mg/Nm ³

Alternatively, mass emission limits may be applied for the specified fuels and source sizes as follows

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Fuel Type and Contaminant	Emission Limits, g/million BTU Based on Source Size		
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Liquid Fossil Fuels			
Particulate Matter	75	75	45
Nitrogen Oxides, as NO ₂	N/A	N/A	180
Sulfur Dioxide	230	230	230
Solid Fossil Fuels			
Particulate Matter	75	25	25
Nitrogen Oxides, as NO ₂	N/A	N/A	275
Sulfur Dioxide	550	550	550
Wood Based Fuels			
Particulate Matter	45	45	45

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The following methods may be used to demonstrate compliance

- a) For sources less than 100 million Btu/hr, compliance with the guidelines for Particulate Matter may be demonstrated by maintaining the stack emissions opacity below 20% Opacity can be determined visually by a qualified observer, by a continuous opacity meter, or with a mobile Light Detection and Ranging (LIDAR) system
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- a) Project sponsors should recycle or reclaim materials where possible
- b) If recycling or reclaim is not practical, wastes must be disposed of in an environmentally acceptable manner and in compliance with local laws and regulations
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- a) Formulations containing chromates should be avoided in water treatment processes
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- c) Electrical equipment should be grounded, well insulated and conform with applicable codes
- d) Personnel should use special footwear, masks and clothing for work in areas with high dust levels or contaminated with hazardous materials
- e) For work near molten or high temperature materials, employees should be provided with non-slip footwear, gloves, safety glasses, helmets, face protection, leggings and other necessary protective equipment
- f) Eye protection should be worn by personnel when in areas where there is a risk of flying chips or sparks, or where intense light is generated
- g) Personnel should wear protective clothing and goggles when in areas where corrosive materials are stored or processed
- h) Emergency eyewash and showers should be installed in areas containing corrosive materials
- i) A safety program should be established for construction and maintenance work
- j) A fire prevention and fire safety program should be implemented and include regular drills

TRAINING

- a) Employees should be trained on the hazards, precautions and procedures for the safe storage, handling and use of all potentially harmful materials relevant to each employee's task and work area
- b) Training should incorporate information from the Material Safety Data Sheets (MSDSs) for potentially harmful materials
- c) Personnel should be trained in environmental, health and safety matters including accident prevention, safe lifting practices, the use of MSDSs, safe chemical handling practices, and proper control and maintenance of equipment and facilities

- d) Training also should include emergency response, including the location and proper use of emergency equipment, use of personal protective equipment, procedures for raising the alarm and notifying emergency response teams, and proper response actions for each foreseeable emergency situation

RECORD KEEPING AND REPORTING

- a) The sponsor should maintain records of significant environmental matters, including monitoring data, accidents and occupational illnesses, and spills, fires and other emergencies
- b) This information should be reviewed and evaluated to improve the effectiveness of the environmental, health and safety program
- c) An annual summary of the above information should be provided to IFC